

The impact of the new ESA rules on Goods for Processing on the Belgian SUT and IO tables for 2010

June 2014

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Federal Planning Bureau

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Abstract - In the ESA 2010, good flows related to international processing are to be excluded from imports and exports, leaving only a net flow for the value of the processing service. The paper discusses the consequences of this modification with respect to the ESA 95 rules both from the point of view of the users and the compilers of Supply and Use and Input Output tables. The paper gives a simplified estimate of the adjustments to be made in the Belgian SUT to apply these changes. Since the transition process to the new ESA is not completed and some decisions still have to be made, these adjustment only have the status of a proposal, not a result.

Table of contents

1. Introduction	1
2. Goods for processing in the SUT and IO tables	3
2.1. The SUT-treatment of international processing in the ESA 95 system	3
2.2. Interpretation of the grossing of output and intermediate use in ESA 95	5
2.3. The implications of the change towards the ESA 2010	7
3. The estimation of the processing fee and adjustments to trade data	9
4. Adjusting the SUT to the new rules on international processing	12
5. Conclusion	15
Appendix: estimated SUT adjustments caused by the new ESA rules on goods for processing...	17

List of tables

Table 1	Treatment of inwards processing in the basic metal industry according to the ESA 95.....	4
Table 2	Treatment of outwards processing in the clothing industry according to the ESA 95.....	4
Table 3	Treatment of outwards processing in diamonds according to the ESA 95.....	6
Table 4	International trade data by Industry before and after reconciliation with other sources, the case of inward processing.....	1
Table 5	International trade data by Industry before and after reconciliation with other sources, the case of outward processing.....	3
Table 6	Proposed adjustments by Industry for complying with ESA 2010 rules in the case of Inwards Processing ⁽¹⁾	5
Table 7	Proposed adjustments by product for complying with ESA 2010 rules generated by Inwards Processing ⁽¹⁾	7
Table 8	Proposed adjustments by Industry for complying with ESA 2010 rules in the case of outwards Processing ⁽¹⁾	9
Table 9	Proposed adjustments by product for complying with ESA 2010 rules in the case of outwards Processing ⁽¹⁾	11

1. Introduction

Between ESA 95 and ESA 2010, the treatment of goods for processing, that is goods sent abroad or entering the country for significant processing or repair but without change of ownership, has changed fundamentally.

In ESA 95 goods sent abroad for processing without being sold to a non resident were included both in exports and imports, corresponding to their physical leaving and re-entering the country. Likewise, goods sent towards the country for being processed while remaining the property of a non resident were shown as imports, followed by exports once the inward processing was completed. This gross recording of trade flows in the case of significant processing or repair was an exception to the general rule that imports and exports of goods only occur when a change of ownership takes place between residents and non residents.

In the ESA 2010 this gross recording method is abandoned in favour of a strict application of the change of ownership principle. If the goods that pass the borders remain the property of the original owner, the only shift of ownership (leading to a payment) that takes place is the value of the processing service. Therefore, in the case of outwards processing, only the import of a processing service is to be shown, while in the case of inwards processing, only the export of a processing service is recorded. Further, we will refer to the value of the processing service as the processing fee.

By imposing this change, the ESA 2010 merely follows the new System of National Accounts 2008 treatment of goods for processing. The SNA 2008¹ explicitly defends this change by stating that in doing so one moves away from the “traditional” view of an Input Output or a Supply and Use Table (SUT) as portraying the physical or technological process of production in favour of an approach that more closely follows financial transactions and would therefore better reflect risks associated to the ownership of the goods².

One may wonder whether this new approach of goods for processing is what most current users of SUT and IO tables were waiting for? Any application of the IO model that relates the use of (raw) materials to changes in (final) demand will be affected as soon as a part of manufacturing involves inwards or outwards processing. Why should the view of input output coefficients as reflecting the physical or technological process of production be called “traditional” (does this imply outdated?) if most of the new uses of IO are in the field of environmental economics, where a link with the physical use of goods is crucial? The paper will demonstrate that the shift from gross to net recording of international processing flows has more specific implications at the level of goods than at that of industries.

This is not to say that the gross method of recording imports and exports for international processing did not have its complications or downsides. For compilers of Supply and Use tables, it meant that a part of the imports and export flows involved in inwards and outwards processing had to be imputed directly to the intermediate use and output of the industries concerned. This is because only the

¹ System of National Accounts 2008, joint publication by the EU, IMF, OECD, UN & World Bank (2009), par 14.37 and 14.38 (p 274)

² including the risk involved in marketing the good.

amount of the processing fee can be expected to be present in the costs (outward processing) or revenues (inward processing) of firms, not the value of the goods sent abroad / received for processing.

The next section, dedicated to the compilation of SUT and IO tables, starts by explaining how this imputation process was applied in the Belgian SUT tables of 2005 and 2010. It shows that the gross recording of processed goods and the imputation that goes along with it is more intuitively appealing and defensible in the case of inwards processing than in that of outwards processing. This section further outlines how the new ESA rules for processing can be implemented and what are the consequences of the new rules for the compilation of the IO tables.

The third section focuses on the international trade data on goods for processing. Even in the new ESA 2010, the existence of these data is vital for the determination of the import/ export services flows, particularly at the product level. But the comparison with or even a (partial) shift to other data sources may now become indispensable for arriving at a acceptable estimate of the processing fee's value.

The fourth section projects the adjustments to be made in the Belgian SUT table for 2010. What is presented here is a proposal to adjust the SUT to the new ESA, by changing the values of P1 (output), P2 (intermediate use P2), P71 and P61 (imports and exports of goods) and P72 and P62 (imports and exports of services) while maintaining the equilibrium of the SUT. The final adjustments are likely to differ from this proposal because what is described is still a simplification of the full adjustment process in the national accounting³ and some decisions still need to be made⁴.

In section four, a distinction is made between inwards and outwards processing. While the net export services associated with inwards processing are more important for Belgium than the net import of services associated with outwards processing, the latter catches the eye for its importance in some specific industries, including diamonds, pharmaceuticals and clothing. The section also compares the impact of the ESA change at the industry level with that at the level of goods.

³ In deriving the new SUT there may be restrictions on the totals for P61, P71, P62 and P72, which have not been imposed here.

⁴ These decisions are made jointly by the three institutions that form the Institute of National Accounts in Belgium: Statistics Belgium, the Federal Planning Bureau and the Belgian National Bank. The compilation of the SUT table is a responsibility of the BNB, while the FPB is responsible for the shift to basic prices, the use table of imports and the IO tables.

2. Goods for processing in the SUT and IO tables

To help understand the likely impact of the new system on the SUT tables, the section starts by explaining how the imports and exports of goods for processing necessitated a “grossing” of output and intermediary use in the ESA 95 system. The next point discusses the benefits and drawbacks of the old system. In point three, a brief and yet incomplete evaluation of the shift towards the new ESA is given, based on the examples given in points 1 and 2.

2.1. The SUT-treatment of international processing in the ESA 95 system

In the ESA 95, goods for processing are included in import and export flows in the case of “significant” processing or repairs. What significant means is not really explained, but any processing service or repair that either changes the nature of the product (e.g. by changing its product code) or leads to a significant increase in the value of the goods, is likely to be significant.

In table 1 an example is given of the treatment of inwards (or “active”) processing by the basic metal industry. Table 2 gives an example of the treatment of outwards processing by the clothing industry. Both examples are realistic for Belgium in terms of the chosen goods and amounts, but are still an idealised representation of the reality where practical problems, like negative processing fees or an inconsistency between different sources, may arise.

In the case of inwards processing, the processing is done in Belgium. In the example in table 1, metal ores are being transformed in basic metals by a Belgian basic metal industry firm. During the whole process, both the ores and the resulting metals remain the property of a non resident. As a reward for its production of basic metals, the firm only receives a processing fee, which is valued in the example at 60 million euro. Because it is the only revenue that results from this production, the processing fee is the amount that is most likely to show up as the turnover in the firm’s annual account.

Since the turnover from annual accounts⁵ is the basis for estimating the production in the national accounts, this leads to a production of 60 million euro. Thus, if no imputation of the goods flows for processing was done, the SUT would be unbalanced since in the ESA 95 the export must comprise the full export value of the processed basic metals. A similar problem arises for the imports of metal ores and their intermediate use. While the intermediate costs of the processing firm will reflect things bought such as energy or working clothes, it will not reflect the value of the metal ores, since these have never been bought.

The solution for this equilibration problem is straightforward. It suffices to augment both intermediate use and production with the value of the goods as they enter the country *before* processing. In the example this means an increase in P2 and P1 by 80 million euro. For the intermediate use this increase is entirely allocated to metal ores (cpa 07), while the production increase is entirely attributed to basic

⁵ The industrial statistics are mentioned as well because these are used to assign these productions to the right product.

metals (cpa 24). The imputed values are shown in red in the table. This augmentation of P1 and P2 is also known as the “grossing” of P1 and P2 ⁶.

Table 1 Treatment of inwards processing in the basic metal industry according to the ESA 95
(millions of euro)

	Imports (P71)	Exports (P61)	Intermediate use (P2)	Production (P1)
Metal ores (cpa 07)	80		80	
Basic metals (cpa 24)		140		80 + 60
<i>Sources</i>	<i>Trade data (imports before proc- essing)</i>	<i>Trade data statistics (exports after proc- essing)</i>	<i>imputation</i>	<i>imputation + annual accounts & industrial statistics</i>

Source: FPB, hypothetical example

Table 2 gives an example of the imputation in the case of outwards or “passive” processing by the clothing industry. Here the processing (the confection of the clothes) takes place outside Belgium, but a Belgian clothing firm organises the whole production process, and retains the ownership of the goods all the time. To make the picture complete, the example is extended by assuming that the firm will sell all the produced clothes afterwards to a non resident in a third country.

The imputation in the case of outward processing is quite similar to that in the case of inward processing. Again, it is the value of the goods *before* processing that determines the increase in both P1 and P2. This corresponds to the value of the exports of textiles of 50 million euro. Like in the case of inward processing, production figures must match export data; while intermediate use figures should match imports. The question is what economic meaning can be given to the imputations in the case of outwards processing. This is dealt with in the next point.

Table 2 Treatment of outwards processing in the clothing industry according to the ESA 95
(millions of euro)

	Imports (P71)	Exports (P61)	Intermediate use (P2)	Production (P1)
Textiles (cpa 13)		50		50
Clothing (cpa 14)	70	100	50 + 20	100
<i>Sources for textiles</i>		<i>Trade data: exports before processing</i>		<i>imputation</i>
<i>Sources for clothing</i>	<i>Trade data: imports after processing</i>	<i>Trade data: exports of goods sold</i>	<i>imputation + Structural Business Statistics on purchases</i>	<i>Annual report (turnover) & industrial statistics</i>

Source: FPB, hypothetical example

⁶ Note that because the industry totals for P1 and P2 have to be supplied to Eurostat in year t+1, this grossing was already performed before the compilation of the SUT tables, which have a t+3 timing. To avoid later problems in the allocation of the imputation over products in the frame of the SUT, it is crucial that the international trade data on processing is used both for performing the initial imputation at the industry level and allocating them to products when the SUT is compiled.

2.2. Interpretation of the grossing of output and intermediate use in ESA 95

In the case of inward or active international processing, the imputation of the import flow and part of the export flow in intermediate use and production can be justified from a physical and technological viewpoint. By inserting the metal ores in the intermediate use of the metal industry and increasing the production of metals to the value of its output as in table 1, one ensures that:

1. steel/copper/... is made with iron/copper/... just as in the physical reality
2. the input structures of basic metal producers (their technical coefficients) are unaffected by the ownership of the goods

When deriving an Input Output table from a Supply and Use table, the second point is quite reassuring. For example, if one applies product technology to homogenise the industries in the SUT table, one assumes that the same input coefficients are used wherever a good is produced⁷. Without the grossing of import and export flows and the consequent imputation in table 1, the input structure of a steel producing plant that does so under a processing agreement would differ significantly from that of a steel producing plant that would buy its iron ore and sell its own steel.

Sadly, the imputation does not always have such nice consequences in the case of outward or passive international processing. In the example from table 2, the imputation leads to the creation of a production of textiles valued at 50 million euro by the Belgian firm that organises the production. Now it is possible that these textiles are effectively produced by the Belgian Firm, in which case the SUT reflects reality. But it is also possible that the firm buys its textiles from other resident or non resident firms, in which case the created production does not correspond to an existing one.

The imputation also leads to an upwards shift in the output and intermediate use of firms that rely on outward processing with respect to firms that fully produce the same quantity themselves. In the SUT, a firm that relies on outwards processing will generate a production of textiles for a value of 50 million euro and an additional intermediary use of clothing for the same amount. *Ceteris paribus*, a firm that keeps the clothing production in Belgian and is owner of both textiles and clothing, will not generate an production of textiles (since they are not sold, even if produced) and will not generate the additional intermediate use of 50 million of clothing. The final output of clothing should be the same in both cases, thus the input coefficients differ.

If there is really a production of textiles proceeding the offshore processing of clothing, this difference is not necessarily troubling⁸. Nothing can prevent firms from organising the production of similar goods differently. The industry input coefficients in the SUT should simply reflect the average production method. The extent to which firms outsource production is visible in the diagonal cells of the Make (=production) matrix.

⁷ Resorting to the industry technology hypothesis as an alternative would not resolve the problem, because here it is assumed that whatever is produced within an industry, uses the same input structure. This assumption is not only less defensible in general, it is also clearly violated if no imputation is done and an industry consists of both processors and classical producers that own the inputs.

⁸ When deriving the IO table from the SUT table using the product technology assumption it can still be the case that every industry producing a certain good resorts in the same extent to outwards sourcing.

The imputation of imports before (outwards) processing to production does pose a problem if this production does not or cannot take place in reality. In that case, it will give rise to a secondary production that is likely to cause (large) negatives when one converts the SUT table into an IO table ⁹.

To illustrate such a situation, table 3 represents the imputation resulting from the outward processing of diamonds. To remain as close as possible to reality, this case is made more complicated than the previous two. Antwerp, a portal city in Belgium, is a world centre in the international trade in both crude and processed diamonds. While historically most of the processing activities of diamonds, including its planning, cutting, cleaving, bruting and polishing did take place in Antwerp or other places in Belgium, most of these activities have now been relocated to other countries, including India.

But there is still a large market for both crude and processed diamonds in Antwerp and the Belgian traders usually retain the ownership of the diamonds sent abroad for processing. This results in huge amounts of imports and exports in both crude and processed diamonds, both in transaction types that imply a shift of ownership as in transactions for outwards processing without a change in ownership.

The numbers on imports and export flows in table 1 reflect this reality ¹⁰: a purchase of crude diamonds (value 420 million euro) precedes an export for the processing abroad of crude diamonds (valued 450 million euro), which then return as processed diamonds (valued at 490 million euro). These are finally sold mainly to non residents ¹¹ for a value of 600 million euro.

The right hand side of table 3 shows how the SUT would have been affected if the normal imputation rules for processing under ESA 95 was applied. The figures not only show a large intermediate use of crude and processed diamonds, but also a large production of crude diamonds. Now in Belgium there is no extraction of diamonds. All crude diamonds are imported.

Table 3 Treatment of outwards processing in diamonds according to the ESA 95
(millions of euro)

	Imports	Exports	Intermediate use	Production
Crude diamonds (cpa 08)	420	450	420	450
Processed diamonds (cpa 32)	490	600	450 + 40	600
Sources for crude diamonds	Trade data: imports of goods bought	Trade data: exports before processing	Structural Business Sta- tistics on purchases & annual report (costs)	imputation
Sources for processed diamonds	Trade data: imports after processing	Trade data: exports of goods sold	imputation + Structural Business Statistics on purchases	Annual report (turnover)

Source: FPB, hypothetical example

⁹ Indeed, if the imputed production does not take place in reality, the firm will not have bought the inputs that are normally required to realise this production. As a result, these inputs will not be present in the intermediary use of the industry and the homogenisation process according to the product technology hypothesis will generate negative input coefficients.

¹⁰ In fact, they still idealise the actual figures, where a negative processing fee is observed for diamonds (see section 3)

¹¹ Actually a part is of course sold to residents, but these numbers have been left out here to simplify the table.

Thus, the imputation would lead to production that is clearly at odds with reality. Because the cpa 08 product also contains other stones, sand, and some raw materials for the chemical industry, of which some extraction activity does exist, the inclusion of a production of diamonds would have invalidated all SUT and IO results in the industry and/or product 08.

For this reason, no grossing of P1 and P2 was done in the case of diamonds in the 2010 SUT table. Thus the numbers in red in table 3 were put to zero, while the blue numbers, reflecting the export and import values before and after offshore processing remained in place. To maintain the equilibrium in the SUT, this implies that both the intermediate use of crude diamonds as well as the production of processed diamonds also had to be reduced to much lower levels.

2.3. The implications of the change towards the ESA 2010

In tables 1 to 3, the shift towards the ESA 2010 implies that all imports or exports before processing are put to zero. From the value of the imports and exports after processing only the part that corresponds to the processing fee is kept. The imputations in P1 and P2 are put to zero. While in terms of industry totals, the impact on intermediate use and production is rather limited (both decline by the same amount), there is a more significant impact on the product composition of production and intermediate use. The reader can check this by looking at tables 1 and 2, but he can also look at tables 6 to 9 in the appendix, which give the anticipated adjustments at the industry and product level in the Belgian case.

There is also a conceptual change, since the processing fee is no longer considered as a production of goods, but is now treated as an industrial service. In the example of the steel production in table 1, the processing fee will no longer be a part of P61 (export of goods), but will now appear under P62 (exports of services). This service will continue to be placed in the cpa-product of steel production, though, so that the production of the steel company remains under cpa 24.

For the compilation of a SUT table, the shift towards the new ESA should not lead to big problems. If the imputation under ESA 95 as described in part 2.1 has been applied, the adjustments to be made in P61, P71, P1 and P2 are straightforward and already equilibrated at the product and industry level. This optimistic view has to be nuanced though, because it relies heavily on the presence of high quality data on imports and exports related with international processing. The next section is concentrated exclusively on the problems that these data yield in the Belgian case.

For compiling an IO table (that is either a homogenised industry by industry or a product by product Use table), the new ESA may result in a worsening (an increased number of negatives) for inwards processing and an improvement (a reduced number of negatives) for outward processing. The new treatment of inward processing may lead to more problems when homogenising the SUT because of the increased differences in technical coefficients between firms with or without processing. The new treatment for outward processing is likely to lead to less secondary production in the SUT, which will automatically reduce the generation of negatives during the homogenisation process. Since no new input output table has been derived yet, we cannot be fully conclusive on this point.

The main objection that can be formulated against the new system is probably that it may limit the use of input output tables for impact studies that relate (final) demand to the use of certain inputs. If e.g. local pollution is related to the use of certain raw materials in the production process itself, part of the inputs causing the pollution will now have been removed from the SUT and IO tables because of the new treatment of inwards processing.

It is at least paradoxical that the new ESA rules can lead to better (more understandable) technical coefficients for outwards processing, while they worsen those for inwards processing.

3. The estimation of the processing fee and adjustments to trade data

In the ESA 95 the international trade data on goods were about the only possible source for realising the required grossing of import and export flows in the case of international processing. In this context the processing fee can be implicitly obtained as the (hopefully) positive difference between the value of the exports (imports) after processing and that of the imports (exports) before processing.

In the new ESA, where the grossing is no longer required, the focus is on the correct estimation of the value of the processing service. For the processing fee, in contrast to the goods flows, other data sources are available besides international trade data. The ESA 2010 warns that while the processing fee can in general be approximated by the difference in the value of the goods before and after processing, this may sometimes not be the case¹². So it is advisable to compare the international trade data on processing with alternative sources before changing the import and export flows in the national accounts.

For inwards or active processing these alternative sources include the firm's turnover in its annual accounts¹³ (particularly for firms that only perform processing activities), the Industrial Survey (or prodcom) that provide data on the fee for active international processing at the product level and the Survey on the exports and imports of Services, that provides reliable information on the total value of inward processing and repair, but no product detail.

For outwards processing, the industrial survey only gives the total value of the goods sold after foreign processing. There is no product detail and this value even exceeds the grossed imports after processing. The Structural Business Survey asks for the amount spent on processing. The best source is the survey on international imports of services which directly asks for the value of the processing fee. This survey does not provide any detail on the nature of the processed goods though.

In short, while the survey on the international imports and exports of services provides the best information on the value of the processing fee, this source gives no information on the products concerned. The international trade data on goods and the industrial statistics both provide information on products (the latter only for inwards processing). Thus, to obtain the information required in the SUT (a processing fee by product), it is necessary to combine the information of these three sources.

To verify if the information of these sources could be combined, they were compared at the firm level for the year 2010. This comparison revealed serious differences in the (reported) presence of foreign sourcing as well as the value of the processing fee! Differences include:

¹² The ESA 2010 refers to the possibility of holding gains or losses as well as measurement errors associated with the goods movements as possible causes for a non correspondence between the processing fee and the value difference before and after processing.

¹³ In the explanation of their the annual accounts, which Belgian firms have to publish, the presence of processing contracts is often mentioned along with the nature of the products concerned by it.

1. a large number of firms that report inwards or outwards processing activities in the imports/exports of services survey and/or in industrial statistics, but that do not report imports or exports of goods under transaction codes corresponding to processing ¹⁴.
2. a large number of firms that only report import and export flows related to processing in the goods trade statistics, but not in the other data sources ¹⁵
3. inconsistencies between the implicit processing fee from the goods trade statistics and that reported in the industrial statistics and/or the survey on imports/exports; particularly, but not only in the case of negative implicit processing fees in the goods trade statistics.

One of the complications in performing the comparison is that for their reporting on imports and exports Belgian firms often rely on fiscal representatives. Thus, an exporting firm would first sell or hand over the goods to its fiscal representative, which would then declare the exports. The same happens with imports. The import and export flows of these fiscal representatives can be linked to the Belgian firms behind them by using the annual VAT clients listing ¹⁶.

When different sources give different results, a choice has to be made. The ideal solution is to compare all sources at the firm level and make a decision on the value of the processing fee and the products concerned as well as on the imports and exports of goods that should be omitted from imports and export flows under the ESA 2010 ¹⁷.

The tables 4 and 5 in the appendix show the adjustments made so far in the export & import flows by industry in the case of inward and outward processing. The original international data on imports and exports of goods are presented at the industry level in the first two columns. The third column gives the implicit processing fee in these data. For inwards processing (table 4) it is obtained by subtracting the value of the imported goods from that of the exported goods. For outward processing (table 5) it is obtained by subtracting the value of the exports from that of the imports.

The 4th and 5th column in table 4 and 5 give the revised amounts of the import and export flows of goods related with inward and outward processing. The new processing fee results from the difference between the revised import and export flows for processing.

In 11 out of the 39 industries in table 4, the processing fee obtained for inward processing has been increased due to the revision. In only 2 it has dropped, while in the others there has been no change.

The most significant increases in the processing fee are found in the manufacture of chemicals (Nace 20) of Pharmaceuticals (Nace 21) of electrical equipment (Nace 27) and of Machinery and equipment

¹⁴ In some cases these firms seem to have reported the imports and exports of goods involved in processing under other transaction codes (even wrongly under a change of ownership transaction code), in other cases the part of import or export of goods related to processing were reported by fiscal representatives.

¹⁵ This is also the result of comparing survey data (on import and exports of services) with more inclusive data like those on international trade of goods. If only one source is available, this solely determines the adjustments to be made.

¹⁶ Belgian firms with activities subject to value added tax (VAT) must provide a yearly list with the amounts sold per VAT liable client. The resulting database reflects the value of all transactions between all VAT liable Belgian firms, including fiscal representatives.

¹⁷ Which may, as a consequence of the differences under point 1 or 3 also include import and export flows that have not (initially) been reported under transaction codes related to international processing.

(Nace 28). In these industries, large firms (or their fiscal representatives) have reported imports and exports under a transaction code that implies a change of ownership where these flows are in reality related to inwards processing. This could be found because in industrial statistics as well as in their annual accounts, these firms indicated to be engaged in inward processing. In some cases, this was a recent change in the organisation of the production method, which might explain the errors in the foreign trade statistics.

The only significant decrease in the processing fee is seen in the manufacture of motor vehicles (Nace 29), where it drops from 1,6 billion to 256 million euro. The large car assembly firms in Belgium all report a varying part of the import and export of goods under transaction codes of inwards processing. Yet in their annual accounts, their turnover is not limited to their processing fee, but reflects the full value of the assembled motor vehicles, while their costs also include the price of the pieces that come from other countries.

Because this observation was already made in the past, no “grossing” of P1 and P2 was performed for these car assemblers under the ESA 95 system. The ESA 2010 now forces the national accounts to decide whether or not such flows are excluded in imports and exports. It was decided to consider the flows as representing a shift of ownership, so that they can continue to make part of the Belgian import and export flows. The trade of goods statistics will be revised in the same way here.

In 13 out of the 42 industries in table 5, the processing fee for outward processing has been increased due to the revision. In 3 it has dropped, while in the others there has been no change. The upwards revision in the processing fee is most important in manufacturing of pharmaceuticals (nace 21), non metallic mineral products (nace 23) and other manufacturing (nace 32). In the latter two industries, the implicit processing in column 3 is negative. Industry 32 includes the processing of diamonds, which is also the cause of the large negative¹⁸. Because a negative fee is not acceptable, a revision was obviously necessary.

One should take care to interpret the differences between columns 4 & 5 versus 1 & 2 in tables 4 and 5 correctly. A drop in the imports and exports of goods in tables 4 and 5 is a reinterpretation of imports or exports under processing to flows with a change of ownership. An increase in the imports and exports of goods means the reverse: a shift towards a transaction code related with processing. At the end, the imports and exports of goods should be reduced with the amounts in columns 4 and 5, not with those in columns 1 and 2.

Also note that for each industry the processing fee equilibrates the changes in the import and exports of goods. As a result these changes have no effect on the trade balance. There is only a shift from exports of goods towards exports of services in the case of inwards processing and one from imports of goods towards imports of services in the case of outwards processing.

¹⁸ A possible explanation for the value of the exports before processing to exceed that of imports after processing is that a part of the diamonds processed abroad are sold to non residents immediately after processing and therefore do not return to Belgium first. In the case of diamonds an effort was made to revise numbers to obtain a positive fee. In other cases with smaller negative fees in the international trade data, the fee is simply put to zero and imports and exports are only reduced with the smallest amount of both.

While it may be deplored that with the new ESA the SUT and IO table loose track on certain imported inputs, it is likely to lead to a better estimation of the values of the processing fees. However, this improvement is entirely conditional on the use of extra data and may go along with a less reliable product specification. To make sure the improvement in terms of the value of the processing fee is realised, a lot of extra work has to be put in the comparison and reconciliation of the different data sources.

The revisions have increased the total value of the fee obtained for inward processing from 2,5 billion to 3,4 billion euro. The adjustment in terms of import and export flows has been decreased, but this is only due to a large revision towards a change in ownership in the manufacture of motor vehicles (nace 29). For outward processing, the fee to be paid has increased from 217,5 million in the "crude" trade statistics to 494,7 million after the reconciliation. The change, which goes along with a larger drop in the exports of goods before processing, is mainly due to "other manufacturing" and "manufacture of other non metallic products where large negative fees have been replaced by positive ones, using alternative sources.

Before as well as after the revision, inwards processing is far more important for Belgium than the outwards processing, both in terms of the import and export flows concerned as in terms of the value of the processing service.

4. Adjusting the SUT to the new rules on international processing

This section presents a proposal to adjust the Belgian SUT to the new ESA rules on the treatment of goods for processing. Note that as some of the proposed changes in P1, P2, P61, P71, P62 and P72 are still subject to a decision by the national accounts, all values are of a provisional nature.

The main advantage of this proposal is that it maintains the equilibrium of the Supply and Use Table. This does not only hold for the proposal as a whole, but for each individual firm, so that is easy to introduce modifications for specific firms. For each product, the proposal respects the equilibrium between supply and demand. Here, supply is composed of output (P1), import of goods (P71) and import of services (P72), while intermediate use (P2), export of goods (P61) and export of services (P62) are demand variables.

For each firm involved in international processing the adjustments are realised in two steps. First a series of adjustments is introduced at the product level in the variables P1, P2, P61, P71 that closely follow the rules discussed in the examples of tables 1 and 2:

- a) imports and exports of goods are reduced with the flows that are accepted to be related to processing (and thus imply no change of ownership) ¹⁹.
- b) al imputations or "grossing" in production (P1) and intermediate use (P2) introduced in the 2010 SUT table under the ESA 95 are put to zero.

¹⁹ It is of course the revised flows before and after processing in columns 4 and 5 of tables 4 and 5 that are used in this step.

- c) some additional equilibrating adjustments in P1, P2, P61 and P71 are introduced in cases with incomplete grossing in the ESA 95 version of the SUT (like that of diamonds for outwards processing).

In the second step, the change in P62 and P72, which equal the processing fee in the case of inwards and outwards processing, are derived as an equilibrating tool:

- a) in the case of inwards processing, the increase in the export of services is obtained for each product (and industry) by : $\Delta P62 = -\Delta P61 + \Delta P71 + \Delta P1 - \Delta P2$
- b) in the case of outwards processing, the increase in the import of services is obtained for each product (and industry) by : $\Delta P72 = -\Delta P71 + \Delta P61 + \Delta P2 - \Delta P1$

The Δ represents the amount of the adjustment, which is usually negative for the variables to the right hand side and positive for the import and export of services. The processing fee is only an equilibrating device in technical terms here, since the adjustments in the variables P1, P2, P61, P71 can be made in such a way that for each firm the desired processing fee (consistent with either the trade of goods statistics or the trade of services survey) is obtained.

Tables 6 and 7 summarise the proposed adjustments for inwards processing by industry and by product. Tables 8 and 9 summarise those for outwards processing. The trade in goods adjustments by industry in tables 6 and 8 correspond exactly to those in the right parts of the tables 4 and 5. The import and export adjustments by product in tables 7 and 9 are of course distributed differently than over the industries, but sum to the same total values.

The normal rule for the adjustment by industry corresponds to that of an individual firm. Both for inwards and outwards processing the import and exports of goods before and after processing are put to zero. Production and intermediate use are reduced with the value of the imports of goods before processing in the case of inwards processing and with the value of the exports of goods before processing in the case of outwards processing. The difference between the values of the (revised) trade flows before and after processing are recuperated as the export of a service in the case of inwards processing and the import of a service in the case of outwards processing.

In table 6 in industries where the normal rule is applied, the proposed adjustment for P71, P1 and P2 have the same value. In table 8 the adjustments in P61, P1 and P2 have the same value under the normal rule. In all industries, the adjustment for P1 (over all products) equals that for P2, both in the case of inwards and outwards processing. But in some industries the total adjustment in P1 and P2 differs from that in the trade flow before processing. This may be because no grossing was performed under the ESA 95 (like in the case of diamonds in table 8)²⁰ or because an *increase* in the imports of goods was preferred over a decrease in the export of goods to obtain the required processing fee (like in the case 21 and 26 in table 6).

²⁰ In some industries, the grossing was also “incomplete” as a result of the equilibration process of the SUT. This process took place after the amounts for the grossing were introduced in the SUT. As a result, the available values for P1 and P2 in the equilibrated SUT are not large enough to reverse the grossing for some products. This only has a small impact in value terms..

In the case of inwards processing, the total reduction in the imports of goods amounts to 2 655 million euro, that in the exports of goods to 6 048 million euro. This results in an total downwards adjustment of P1 and P2 of 2 867 million euro, which is about 0,7% of total intermediate use and only 0,4% of the total output (P1) of the economy. The fee obtained from these processing activities amounts to 3 393 million euro. This represents about 1 % of the total value added in the Belgian Economy and 7,1% of the value added realised in manufacturing ²¹.

The industries most affected in relative terms by the changes for inward processing are machinery and equipment n.e.c (nace 28), which see intermediate use fall by 6.5%, manufacture of fabricated metal products (nace 25) with a reduction of 6.4% of P2, pharmaceuticals (nace 21), with a 5,9% drop in P2 and the printing and reproduction of recorded media (nace 18) with a drop of 5% in P2. Five other industries, including textiles, chemistry, basic metals, computer & electronic & optical products and motor vehicles will see a significant drop in P2 and P1 in terms of euro's that represents around 2% or 3% of their intermediate use.

The industries with the highest fee obtained from inwards processing, which will now be represented as an exported industrial service, are the manufacture of pharmaceuticals with a fee of 740 million, the manufacture of chemicals (574 million euro) of machinery and equipment n.e.c. (415 million euro) and of basic metals (361 million euro). In these industries, the processing fee is also large when compared to their value added, but as a % of value added, the processing fee is more important in the manufacture of other transport equipment (30%) and other manufacturing (19%).

Table 7 summarizes the adjustments to the ESA 2010 for inwards processing at the product level. The 4 products with the largest adjustment of P2 in terms of euro's are basic metals (-490 million, -3.1% of P2), chemicals (-412 million, -1.2% of P2), machinery and equipment n.e.c. (-392 million, -7% of P2) and motor vehicles (-381 million, -4.3% of P2). Besides these industries the adjustments are also large with respect tot P2 for metal ores (-8.3%), other transport equipment (-5.6%) and pharmaceuticals (-5.5%).

In the last column of table 7, the processing fee is compared with total production (P1), because it is meaningless to subtract P2 from P1 of the same product (this would result in both positive and negative numbers depending on the product). The percentages are highest for metal ores (18,4%) and for other transport equipment (10,9%) and pharmaceutical products (9,2%).

Tables 8 and 9 give the adjustments for outward processing. The adjustments for outward processing are smaller than those for inwards processing. Indeed, the processing fee of about 495 million euro for outward processing is less than 15% of that of 3393 million for inwards processing. In relative terms, the adjustments in P1 (or P2) due to outwards processing amount to 0.1% of total P1, compared to 0.4% for inwards processing. When compared to P2 (not in the tables), the adjustments in P1 and P2 amount to 0.2%, compared to 0.7% for inwards processing.

The increase in imported services, which equals the processing fee in the case of outwards processing, is largest in the manufacture of pharmaceutical products (128 million euro), followed by the other

²¹ An industries value added is equal to its output (P1) minus intermediate use (P2). When excise taxes and some other taxes on products are added, total value added equals a country's GDP.

manufacturing (101 million euro) the wholesale industry (53 million euro), the textiles industry (39 million euro) and at some distance the clothing industry (24 million euro).

The normal adjustment procedure could not be followed in the case of the diamond industry, which makes part of other manufacturing (nace 32). In table 8 it can be seen that the adjustments in P1 and P2 are well below those in the imports and exports of goods. This is caused by the fact that, as reported in point 2.3, no grossing of P1 and P2 was performed in the case of outward processing. As a result of this, it is impossible to match the accepted reductions in imports and exports with reductions in P2 and P1 in the industry 32. This is problematic because, while the adjustments of imports and exports are equilibrated at the level of industry 32, the removed exports concern product 08 (crude diamonds), while the removed imports are in product 32 (processed diamonds).

Tables 8 and 9 already include a series of extra adjustments to address this problem. These include:

- a large shift in trade margins by product ²² (from product 08 to 32) to re-equilibrate the SUT after the drop in imports and exports related to the outwards processing of diamonds.
- some equilibrating adjustments in other industries like wholesale (nace 46), the glass industry (nace 23) and the extraction of other products of mining and quarrying (nace 08).

Table 9 shows the results of the adjustments to outwards processing, including the additional adjustments at this stage. The results for products 08 (crude diamonds) and 32 (processed diamonds, but also jewelry) are very sensitive to the equilibrating adjustments.

Table 9 also presents some interesting results on other products. These include pharmaceutical products, responsible for a paid processing fee of 126 million euro, as well as textiles and clothing with a fee of resp. 38 and 63 million euro. Note that the processing fee paid for clothing largely exceeds that paid by the clothing industry. This is because the offshore processing of clothing is also organised by firms in other industries like wholesale and textiles. In general, all the trade and service industries included in table 8 drop out in table 9 because processing is only possible for goods.

5. Conclusion

The ESA 2010 excludes import and export flows related to processing because (and in so far as) these flows imply no change of ownership. This is a fundamental change with respect to the ESA 95, where the flows related to international processing were fully included in a countries imports and exports.

In the ESA 2010 only a net import or export flow of industrial services will remain. That is, in the case of inwards processing (where the processing activity is performed in the country, while the goods are owned by a non resident) there will be an exported service reflecting the value of the processing fee. In the case of outwards processing (where the processing activity is performed abroad and a resident owns the goods) there will be an imported service that reflects the value of the paid processing fee.

²² Trade margins by product are part of the supply table. In the tables in appendix they are considered as part of P1.

This change has implications for the Supply and Use and Input Output Tables that go much further than import and export values. In the ESA 95, the inclusion of all flows before and after processing lead to the “grossing” of intermediate use and production of the concerned industries and products. In the case of inwards processing this grossing (or imputation of the value of the traded goods before processing to intermediate use and production) resulted in technical coefficients that were more meaningful in physical terms as well as full comparability between firms involved in processing and those not. This favourable feature of the old ESA is lost in the new ESA. On the other hand, the new ESA is likely to lead to less counterfactual secondary productions which could be caused by the grossing of intermediate use and production in the case of outwards processing.

The focus of the ESA 2010 on these processing fees, as well as the need to attribute those fees to the correct products, makes it -at least in the context of the Belgian national accounts- necessary to compare and reconcile international trade data with alternative sources on the processing fees. These sources include annual accounts, industrial survey data and survey data on the import and export of services.

In the Belgian case the reconciliation process has led to significant changes in the import and export flows of goods that are accepted to be related to international processing. These changes affect several manufacturing industries. In most of these the processing fees have increased significantly. In (at least) one industry (motor vehicles) the comparison has led to a revision of the international trade statistics on goods away from international processing and a reduction of the fee.

In Belgium, inwards processing is far more important than outwards processing. The exports of services that correspond to inwards processing for the year 2010 are estimated at 3 393 million euro, while the import of services corresponding to outward processing represents 495 million euro. The fee received for inwards processing corresponds to 1 % of total value added and as much as 7,1% of value added in manufacturing ²³.

By presenting a proposal of SUT adjustments to apply the new ESA rules on goods for processing, the paper goes further than just exploring the data. The proposal formulated here is one that respects the SUT equilibrium at the detailed product level and for each firm. The proposal further leaves each industry's value added (P1-P2) unchanged and as a result, the current account surplus (total exports minus total imports) is also unchanged.

The proposal consists of the removal of the accepted import and export flows of goods under processing and the associated grossing of P1 and P2 that was performed under the ESA 95. After that, the processing fee can be derived as an equilibrating tool. In cases where the trade on goods statistics are inconsistent with the survey on the import and exports of services, the adjustment for P61, P71, P1 and P2 can be fixed in such a way that the desired processing fee is obtained.

In this proposal, the total adjustment in P2 (which equals that for P1) represents 0.4% of the total output in the economy and 0.7% of the intermediate use in the case of inwards processing. In the case of outward processing these parts are respectively 0.1% and 0.2%. For specific manufacturing industries and products, as well as raw materials these shares are much more significant.

²³ When a processing fee is compared with value added, one should realise that the fee may still comprise intermediate costs like energy use, clothing and some services that are not included in value added.

Appendix: estimated SUT adjustments caused by the new ESA rules on goods for processing

Table 4 International trade data by Industry before and after reconciliation with other sources, the case of inward processing
2010, million euro, provisional results

Nace rev. 2	Industry	Trade of goods data on processing			Data on processing after source reconciliation		
		Import of goods before processing	Export of goods after processing	Implicit Processing fee	Import of goods before processing	Export of goods after processing	Processing fee from imp/exp sur- vices+goods
01	Crop and animal production, hunting and related service activities	2.3	3.6	1.3	2.3	3.6	1.3
10	Manufacture of food products	21.0	30.2	9.1	20.9	64.0	43.1
11	Manufacture of beverages	0.1	0.0	-0.1	0.0	0.0	0.0
12	Manufacture of tobacco products	0.7	4.1	3.4	0.6	4.1	3.5
13	Manufacture of textiles	83.1	109.4	26.3	81.7	109.4	27.7
14	Manufacture of wearing apparel	1.3	2.5	1.2	1.0	2.5	1.5
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	13.7	16.2	2.5	13.7	16.2	2.5
17	Manufacture of paper and paper products	4.7	7.1	2.4	4.7	17.8	13.2
18	Printing and reproduction of recorded media	149.8	219.1	69.3	149.8	219.1	69.3
19	Manufacture of coke and refined petroleum products	0.0	2.0	2.0	0.0	21.5	21.5
20	Manufacture of chemicals and chemical products	123.4	213.5	90.2	414.1	987.6	573.5
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	122.4	154.5	32.0	-71.4	668.5	739.9
22	Manufacture of rubber and plastic products	25.9	65.2	39.3	25.3	65.2	39.9
23	Manufacture of other nonmetallic mineral products	0.0	0.5	0.4	0.0	0.5	0.4
24	Manufacture of basic metals	244.4	469.2	224.7	311.8	673.2	361.4
25	Manufacture of fabricated metal products, except machinery and equipment	545.1	665.7	120.7	536.7	675.6	138.9
26	Manufacture of computer, electronic and optical products	20.2	101.4	81.1	-6.4	152.9	159.3
27	Manufacture of electrical equipment	0.1	22.0	21.9	126.0	336.1	210.2
28	Manufacture of machinery and equipment n.e.c.	0.5	0.7	0.2	439.2	853.9	414.7
29	Manufacture of motor vehicles, trailers and semi-trailers	2,953.5	4,556.1	1,602.6	468.4	724.3	255.9

30	Manufacture of other transport equipment	16.1	98.3	82.2	16.1	159.1	143.0
31	Manufacture of furniture	3.1	3.5	0.5	3.1	3.5	0.5
32	Other manufacturing	12.9	110.2	97.3	11.1	109.0	97.9
33	Repair and installation of machinery & equipment	4.4	12.7	8.3	3.2	12.7	9.5
38	Waste collection, treatment and disposal activities; materials recovery	16.1	17.8	1.7	16.1	17.8	1.7
43	Specialised construction activities	0.0	0.5	0.5	0.0	0.5	0.5
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	22.6	22.6	0.1	22.0	22.6	0.6
46	Wholesale trade, except of motor vehicles and motorcycles	16.9	19.6	2.7	12.3	43.6	31.3
47	Retail trade, except of motor vehicles and motorcycles	0.9	0.0	-0.9	0.0	0.0	0.0
52	Warehousing and support activities for transport	6.3	5.4	-0.8	4.3	5.4	1.1
55	Accommodation	0.2	0.0	-0.2	0.0	0.0	0.0
56	Food and drink serving activities	0.0	0.2	0.2	0.0	0.2	0.2
59	Motion picture, video and television programme production, sound recording and music publishing activities	0.0	0.0	0.0	0.0	0.0	0.0
70	Activities of head offices; management consultancy activities	3.9	5.0	1.2	3.9	5.0	1.2
71	Architectural and engineering activities; technical testing and anal	0.1	0.1	-0.1	0.1	0.1	0.0
73	Advertising and market research	0.0	0.5	0.5	0.0	0.5	0.5
82	Office administrative, office support and other business support activities	3.7	20.3	16.6	3.7	20.3	16.6
86	Human health activities	25.3	32.5	7.3	25.3	32.5	7.3
88	Social work activities without accommodation	15.6	19.4	3.8	15.6	19.4	3.8
	Total Economy	4,460.2	7,011.6	2,551.3	2,654.9	6,048.3	3,393.4

(1) The trade data after reconciliation may still be revised as the 2010 SUT table according to ESA 2010 is only due to December 2014.

Source: crude trade data come from the Foreign Trade Statistics (Belgian National Bank), reconciled trade data on processing have been generated jointly by the Belgian National Bank and the Federal Planning Bureau.

Table 5 International trade data by Industry before and after reconciliation with other sources, the case of outward processing
2010, million euro, provisional results

Nace rev. 2	Industry	Trade of goods data on processing			Data on processing after source reconciliation		
		Import of goods after processing	Export of goods before processing	Implicit Processing fee	Import of goods after processing	Export of goods before processing	Processing fee
01	Crop and animal production, hunting and related service activities	5.8	4.1	1.7	5.8	4.1	1.7
10	Manufacture of food products	11.9	6.8	5.1	11.9	6.8	5.1
11	Manufacture of beverages	1.6	0.4	1.2	1.6	0.4	1.2
12	Manufacture of tobacco products	15.2	0.6	14.6	11.3	0.5	10.8
13	Manufacture of textiles	111.2	66.6	44.7	105.7	66.2	39.4
14	Manufacture of clothing	61.4	39.0	22.3	61.4	37.6	23.7
15	Manufacture of leather and related products	0.9	0.3	0.6	0.9	0.3	0.6
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1.1	0.7	0.4	1.1	0.7	0.4
17	Manufacture of paper and paper products	1.1	0.8	0.3	1.1	0.7	0.4
18	Printing and reproduction of recorded media	2.8	1.7	1.0	6.6	1.5	5.1
20	Manufacture of chemicals and chemical products	49.5	36.1	13.4	49.5	28.2	21.3
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	179.5	117.9	61.6	243.3	115.6	127.7
22	Manufacture of rubber and plastic products	37.4	16.9	20.5	29.9	15.3	14.6
23	Manufacture of other non-metallic mineral products	179.3	192.1	-12.9	179.3	158.0	21.2
24	Manufacture of basic metals	51.6	44.5	7.1	57.6	43.6	14.0
25	Manufacture of fabricated metal products, except machinery and equipment	17.9	12.1	5.9	17.9	12.0	5.9
26	Manufacture of computer, electronic and optical products	30.5	29.6	1.0	30.4	22.2	8.1
27	Manufacture of electrical equipment	16.7	9.0	7.7	16.7	9.0	7.7
28	Manufacture of machinery and equipment n.e.c.	8.3	6.6	1.7	8.3	6.6	1.7
29	Manufacture of motor vehicles, trailers and semi-trailers	17.2	13.3	3.9	17.2	13.3	3.9
30	Manufacture of other transport equipment	81.4	56.9	24.4	75.6	56.9	18.7

31	Manufacture of furniture	0.6	0.5	0.1	0.6	0.5	0.1
32	Other manufacturing	824.1	862.8	-38.7	587.5	486.8	100.7
33	Repair and installation of machinery and equipment	0.6	0.6	-0.1	0.6	0.6	0.0
38	Waste collection, treatment and disposal activities; materials recovery	0.1	0.0	0.1	0.1	0.0	0.1
43	Specialised construction activities	0.4	0.0	0.4	0.4	0.0	0.4
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	2.3	1.2	1.1	2.3	1.2	1.1
46	Wholesale trade, except of motor vehicles and motorcycles	91.8	66.0	25.8	117.9	64.9	53.0
47	Retail trade, except of motor vehicles and motorcycles	0.8	0.0	0.8	0.8	0.0	0.8
49	Land transport and transport via pipelines	0.4	0.0	0.4	0.4	0.0	0.4
52	Warehousing and support activities for transportation	0.3	0.0	0.2	0.3	0.0	0.2
56	Food and beverage service activities	0.4	0.2	0.1	0.4	0.2	0.1
58	Publishing activities	0.2	0.0	0.2	0.2	0.0	0.2
64	Financial service activities, except insurance and pension funding	0.2	0.0	0.2	0.2	0.0	0.2
68	Real estate activities	0.0	0.0	0.0	0.0	0.0	0.0
70	Activities of head offices; management consultancy activities	1.0	0.0	1.0	1.0	0.0	1.0
71	Architectural and engineering activities; technical testing and anal	0.7	0.3	0.4	0.7	0.3	0.4
74	Office administrative, office support and other business support activities	2.9	0.9	2.1	2.9	0.9	2.1
77	Rental and leasing activities	0.0	0.0	0.0	0.0	0.0	0.0
82	Office administrative, office support and other business support activities	1.6	1.5	0.0	1.6	0.9	0.7
86	Human health activities	10.2	12.9	-2.8	10.2	10.2	0.0
88	Social work activities without accommodation	0.0	0.1	-0.0	0.0	0.0	0.0
	Totaal	1,820.7	1,603.2	217.5	1,660.8	1,166.1	494.7

(1) The trade data after reconciliation may still be revised as the 2010 SUT table according to ESA 2010 is only due to December 2014.

Source: crude trade data come from the Foreign Trade Statistics (Belgian National Bank), reconciled trade data on processing have been generated jointly by the Belgian National Bank and the Federal Planning Bureau.

Table 6 Proposed adjustments by Industry for complying with ESA 2010 rules in the case of Inwards Processing ⁽¹⁾
2010, million euro, provisional results

Nace rev. 2	Industry	International trade adjustments			Other SUT adjustments		Adjustment in P2 or P1 as a fraction of P2 (%)	Processing fee as a % of value added (P1-P2) (%)
		import of goods (P71)	export of goods (P61)	Exports of services (processing fee) (P62) ⁽²⁾	Production (P1)	Intermediary use (P2)		
01	Crop and animal production, hunting and related service activities	-2.3	-3.6	1.3	-2.3	-2.3	-0.0%	0.1%
10	Manufacture of food products	-20.9	-64.0	43.1	-20.4	-20.4	-0.1%	0.8%
11	Manufacture of beverages	-0.0	-0.0	0.0	-0.0	-0.0	-0.0%	0.0%
12	Manufacture of tobacco products	-0.6	-4.1	3.5	-0.6	-0.6	-0.2%	0.5%
13	Manufacture of textiles	-81.7	-109.4	27.7	-81.7	-81.7	-2.4%	2.5%
14	Manufacture of clothing	-1.0	-2.5	1.5	-1.0	-1.0	-0.1%	0.5%
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-13.7	-16.2	2.5	-13.7	-13.7	-0.6%	0.3%
17	Manufacture of paper and paper products	-4.7	-17.8	13.2	-4.1	-4.1	-0.1%	1.3%
18	Printing and reproduction of recorded media	-149.8	-219.1	69.3	-117.3	-117.3	-5.0%	6.0%
19	Manufacture of coke and refined petroleum prod- ucts	0.0	-21.5	21.5	0.0	0.0	0.0%	0.5%
20	Manufacture of chemicals and chemical products	-414.1	-987.6	573.5	-414.1	-414.1	-1.9%	9.2%
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	71.4	-668.5	739.9	-337.7	-337.7	-5.9%	17.0%
22	Manufacture of rubber and plastic products	-25.3	-65.2	39.9	-25.3	-25.3	-0.7%	2.3%
23	Manufacture of other non-metallic mineral products	-0.0	-0.5	0.4	-0.0	-0.0	-0.0%	0.0%
24	Manufacture of basic metals	-311.8	-673.2	361.4	-363.9	-363.9	-2.0%	13.0%
25	Manufacture of fabricated metal products, except machinery and equipment	-536.7	-675.6	138.9	-536.7	-536.7	-6.4%	3.7%
26	Manufacture of computer, electronic and optical products	6.4	-152.9	159.3	-52.6	-52.6	-2.2%	12.7%
27	Manufacture of electrical equipment	-126.0	-336.1	210.2	-0.1	-0.1	0.0%	15.1%
28	Manufacture of machinery and equipment n.e.c.	-439.2	-853.9	414.7	-395.8	-395.8	-6.5%	14.1%
29	Manufacture of motor vehicles, trailers and semi-trailers	-468.4	-724.3	255.9	-379.1	-379.1	-3.0%	11.1%

30	Manufacture of other transport equipment	-16.1	-159.1	143.0	-16.1	-16.1	-1.7%	29.6%
31	Manufacture of furniture	-3.1	-3.5	0.5	-3.1	-3.1	-0.2%	0.1%
32	Other manufacturing	-11.1	-109.0	97.9	-11.1	-11.1	-1.4%	18.6%
33	Repair and installation of machinery & equipment	-3.2	-12.7	9.5	-3.2	-3.2	-0.3%	1.3%
38	Waste collection, treatment and disposal activities; materials recovery	-16.1	-17.8	1.7	-16.1	-16.1	-0.4%	0.1%
43	Specialised construction activities	0.0	-0.5	0.5	0.0	0.0	0.0%	0.0%
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	-22.0	-22.6	0.6	-22.0	-22.0	-0.4%	0.0%
46	Wholesale trade, except of motor vehicles and motorcycles	-12.3	-43.6	31.3	-9.8	-9.8	-0.0%	0.1%
47	Retail trade, except of motor vehicles and motor- cycles	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
52	Warehousing and support activities for transport	-4.3	-5.4	1.1	-5.1	-5.1	-0.0%	0.0%
55	Accommodation	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
56	Food and Beverage serving activities	0.0	-0.2	0.2	0.0	0.0	0.0%	0.0%
59	Motion picture, video and television programme production, sound recording and music publishing activities	0.0	-0.0	0.0	-0.0	-0.0	-0.0%	0.0%
70	Activities of head offices; management consultancy activities	-3.9	-5.0	1.2	-3.9	-3.9	-0.0%	0.0%
71	Architectural and engineering activities; technical testing and anal	-0.1	-0.1	0.0	-0.1	-0.1	-0.0%	0.0%
73	Advertising and market research	0.0	-0.5	0.5	0.0	0.0	0.0%	0.0%
82	Office administrative, office support and other business support activities	-3.7	-20.3	16.6	-3.7	-3.7	-0.1%	0.8%
86	Human health activities	-25.3	-32.5	7.3	-25.3	-25.3	-0.2%	0.0%
88	Social work activities without accommodation	-15.6	-19.4	3.8	-1.4	-1.4	-0.1%	0.1%
	Total Economy	-2,654.9	-6,048.3	3,393.4	-2,867.2	-2,867.2	-0.7%	1.0%

(1) All numbers shown are projected adjustments. They may still change as a result of revisions since the SUT equilibration process according to ESA 2010 is not completed yet.

(2) The processing fee by industry is obtained by subtracting the imports before inwards processing from the exports after processing in each industry.

Source: Belgian Federal Planning Bureau

Table 7 Proposed adjustments by product for complying with ESA 2010 rules generated by Inwards Processing ⁽¹⁾
2010, million euro, provisional results

CPA 2008	Product	International trade adjustments			Other SUT adjustments		Adjustment in P2 as a % of P2	processing fee as a % of production (P1) (%)
		import of goods (P71)	export of goods (P61)	export of services (processing fee) (P62) ⁽²⁾	Production (P1) ⁽³⁾	Intermediary use (P2)		
01	Products of agriculture and hunting	-4.5	-5.0	1.8	-3.2	-4.5	0.0%	0.0%
02	Products of forestry and logging	-1.2	-0.7	0.1	-0.6	-1.2	-0.2%	0.0%
03	Products of fishing and aquaculture	-1.3	-2.3	1.0	1.3	1.3	0.4%	0.6%
06	Crude petroleum and natural gas	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
07	Metal ores	-116.4	-21.4	8.0	-13.5	-116.4	-8.3%	18.4%
08	Other products of mining and quarrying	-1.3	-31.7	30.0	-1.6	-1.3	-0.1%	4.0%
10	Food products	-39.2	-51.0	14.4	-25.6	-28.2	-0.2%	0.1%
11	Beverages	-0.3	-0.3	0.0	-0.3	-0.3	0.0%	0.0%
12	Tobacco products	-0.4	-4.8	3.9	-0.9	-0.4	-0.6%	0.4%
13	Textiles	-79.1	-103.0	25.5	-77.5	-79.1	-2.9%	0.6%
14	Clothing	-0.5	-4.8	3.6	-1.3	-0.6	-0.1%	0.3%
15	Leather and related products	-2.5	-0.2	0.1	-0.2	-2.5	-2.3%	0.0%
16	Wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-12.5	-15.5	2.4	-13.1	-12.5	-0.4%	0.1%
17	Paper and paper products	-91.5	-13.8	11.7	-2.1	-91.5	-1.9%	0.3%
18	Printing and reproduction of recorded media	-0.0	-0.0	0.0	-0.0	-0.0	0.0%	0.0%
19	Coke and refined petroleum products	-122.1	-27.0	21.5	-5.5	-122.1	-0.6%	0.1%
20	Chemicals and chemical products	-411.2	-1,136.1	711.4	-425.8	-412.3	-1.8%	2.1%
21	Pharmaceutical products and preparations	169.4	-602.3	688.7	-326.5	-243.6	-5.5%	9.2%
22	Rubber and plastic products	-59.7	-125.3	79.1	-38.6	-52.1	-0.9%	1.5%
23	Other non-metallic mineral products	-24.4	-20.6	5.1	-15.2	-24.2	-0.3%	0.1%
24	Basic metals	-437.6	-864.7	320.8	-596.0	-489.7	-3.1%	1.5%
25	Fabricated metal products, except machinery and equipment	-167.2	-175.6	42.2	-133.4	-167.2	-2.0%	0.4%

26	Computers, electronic and optical products	-12.7	-190.2	178.6	-70.6	-71.6	-1.5%	6.3%
27	Electrical equipment	-157.7	-353.8	212.9	-11.6	-28.4	-0.6%	5.4%
28	Machinery and equipment n.e.c.	-389.9	-855.8	433.1	-424.3	-391.5	-7.0%	4.8%
29	Motor vehicles, trailers and semi-trailers	-507.2	-819.7	260.0	-433.9	-381.3	-4.3%	1.9%
30	Other transport equipment	-46.5	-186.2	144.3	-39.2	-43.8	-5.6%	10.9%
31	Furniture	-1.4	-3.4	0.5	-2.9	-1.4	-0.3%	0.0%
32	Other products of manufacturing	-30.7	-84.7	77.1	-4.5	-27.6	-1.5%	5.6%
33	Repair and installation of machinery and equipment	0.0	-10.9	10.9	0.0	0.0	0.0%	0.6%
38	Waste collection, treatment and disposal activities; materials recovery	-51.1	-9.7	1.6	-8.3	-51.2	-0.6%	0.0%
58	Books, newspapers, computer games, software, online or in physical form	-53.9	-206.8	66.8	-107.7	-21.6	-0.7%	1.7%
59	Films and other video content on disk, tape or other physical media	-0.2	-0.0	0.0	-0.0	-0.2	0.0%	0.0%
70	Activities of head offices; management consultancy	0.0	-84.6	0.0	-84.6	0.0	0.0%	0.0%
82	Office administrative, office support and other business support activities	0.0	-36.4	36.4	0.0	0.0	0.0%	0.3%
	Total Economy	-2,654.8	-6,048.3	3,393.4	-2,867.2	-2,867.2	-0.7%	0.5%

(1) All numbers shown are projected adjustments. They may still change as a result of revisions since the SUT equilibration process according to ESA 2010 is not completed yet.

(2) The received processing fee by product is obtained as the increase in the export of services necessary to equilibrate supply (imports+ P1) and Use (exports + P2) at the product level.

(3) Adjustments in production (P1) may include changes in trade margins here. This is the case of outwards processing of diamonds. To be able to equilibrate the SUT, it is proposed to reduce trade margins on product 08A03 (crude diamonds) with 392 million euro, while increasing the trade margins on processed diamonds with at least 306 million euro.

Source: Belgian Federal Planning Bureau

Table 8 Proposed adjustments by Industry for complying with ESA 2010 rules in the case of outwards Processing ⁽¹⁾
2010, million euro, provisional results

Nace rev. 2	Industry	International trade adjustments			Other SUT adjustments		Adjustment in P1 or P2 as a fraction of P1 (%)	payed processing fee as a fraction of P1 (%)
		import of goods (P71)	export of goods (P61)	Import of services (processing fee) (P62) ⁽²⁾	Production (P1)	Intermediary use (P2)		
01	Crop and animal production, hunting and related service activities	-5.8	-4.1	1.7	-4.1	-4.1	-0.1%	0.0%
08	Other mining and quarrying	0.0	0.0	0.0	-15.0	-15.0	-2.0%	0.0%
10	Manufacture of food products	-11.9	-6.8	5.1	-6.8	-6.8	-0.0%	0.0%
11	Manufacture of beverages	-1.6	-0.4	1.2	-0.4	-0.4	-0.0%	0.0%
12	Manufacture of tobacco products	-11.3	-0.5	10.8	-0.5	-0.5	-0.0%	0.9%
13	Manufacture of textiles	-105.7	-66.2	39.4	-66.2	-66.2	-1.5%	0.9%
14	Manufacture of wearing apparel	-61.4	-37.6	23.7	-31.1	-31.1	-2.5%	1.9%
15	Manufacture of leather and related products	-0.9	-0.3	0.6	-0.3	-0.3	-0.2%	0.3%
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-1.1	-0.7	0.4	-0.7	-0.7	-0.0%	0.0%
17	Manufacture of paper and paper products	-1.1	-0.7	0.4	-0.7	-0.7	-0.0%	0.0%
18	Printing and reproduction of recorded media	-6.6	-1.5	5.1	-1.5	-1.5	-0.0%	0.1%
20	Manufacture of chemicals and chemical products	-49.5	-28.2	21.3	-28.2	-28.2	-0.1%	0.1%
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	-243.3	-115.6	127.7	-114.8	-114.8	-1.1%	1.3%
22	Manufacture of rubber and plastic products	-29.9	-15.3	14.6	-15.3	-15.3	-0.3%	0.3%
23	Manufacture of other non-metallic mineral products	-179.3	-158.0	21.2	-176.8	-176.8	-2.4%	0.3%
24	Manufacture of basic metals	-57.6	-43.6	14.0	-43.6	-43.6	-0.2%	0.1%
25	Manufacture of fabricated metal products, except machinery and equipment	-17.9	-12.0	5.9	-12.0	-12.0	-0.1%	0.0%
26	Manufacture of computer, electronic and optical products	-30.4	-22.2	8.1	-22.2	-22.2	-0.6%	0.2%
27	Manufacture of electrical equipment	-16.7	-9.0	7.7	-9.0	-9.0	-0.2%	0.2%
28	Manufacture of machinery and equipment n.e.c.	-8.3	-6.6	1.7	-6.6	-6.6	-0.1%	0.0%
29	Manufacture of motor vehicles, trailers and semi-trailers	-17.2	-13.3	3.9	-13.3	-13.3	-0.1%	0.0%

30	Manufacture of other transport equipment	-75.6	-56.9	18.7	-56.9	-56.9	-3.9%	1.3%
31	Manufacture of furniture	-0.6	-0.5	0.1	-0.5	-0.5	-0.0%	0.0%
32	Other manufacturing	-587.5	-486.8	100.7	-69.0	-69.0	-5.3%	7.8%
33	Repair and installation of machinery and equipment	-0.6	-0.6	0.0	-0.6	-0.6	-0.0%	0.0%
38	Waste collection, treatment and disposal activities; materials recovery	-0.1	-0.0	0.1	-0.0	-0.0	-0.0%	0.0%
43	Specialised construction activities	-0.4	0.0	0.4	0.0	0.0	0.0%	0.0%
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	-2.3	-1.2	1.1	-1.2	-1.2	-0.0%	0.0%
46	Wholesale trade, except of motor vehicles and motorcycles	-117.9	-64.9	53.0	-60.7	-60.7	-0.1%	0.1%
47	Retail trade, except of motor vehicles and motorcycles	-0.8	-0.0	0.8	-0.0	-0.0	-0.0%	0.0%
49	Land transport and transport via pipelines	-0.4	-0.0	0.4	-0.0	-0.0	-0.0%	0.0%
52	Warehousing and support activities for transportation	-0.3	-0.0	0.2	0.0	0.0	0.0%	0.0%
56	Food and beverage service activities	-0.4	-0.2	0.1	-0.2	-0.2	-0.0%	0.0%
58	Publishing activities	-0.2	0.0	0.2	0.0	0.0	0.0%	0.0%
64	Financial service activities, except insurance and pension funding	-0.2	0.0	0.2	0.0	0.0	0.0%	0.0%
68	Real estate activities	-0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
70	Activities of head offices; management consultancy activities	-1.0	-0.0	1.0	-0.0	-0.0	-0.0%	0.0%
71	Architectural and engineering activities; technical testing and analysis	-0.7	-0.3	0.4	-0.3	-0.3	-0.0%	0.0%
74	Other professional, scientific and technical activities	-2.9	-0.9	2.1	-0.9	-0.9	-0.1%	0.2%
77	Rental and leasing activities	-0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
82	Office administrative, office support and other business support activities	-1.6	-0.9	0.7	0.0	0.0	0.0%	0.0%
86	Human health activities	-10.2	-10.2	0.0	-10.2	-10.2	-0.0%	0.0%
88	Social work activities without accommodation	-0.0	-0.0	0.0	-0.0	-0.0	-0.0%	0.0%
	Total	-1,660.8	-1,166.1	494.7	-769.7	-769.7	-0.1%	0.1%

(1) All numbers shown are projected adjustments. They may still change as a result of revisions since the SUT equilibration process according to ESA 2010 is not completed yet.

(2) At the industry level, the processing fee is obtained by subtracting the exports before foreign processing from the imports after processing.

Source: Belgian Federal Planning Bureau

Table 9 Proposed adjustments by product for complying with ESA 2010 rules in the case of outwards Processing ⁽¹⁾
2010, million euro, provisional results

cpa 2008	Product	International trade adjustments			Other SUT adjustments		Adjustment in P1 as a fraction of P1 (%)	Processing fee as a fraction of P1 (%)
		import of goods (P71)	export of goods (P61)	Import of services (processing fee ⁽²⁾) (P62)	Production (P1)	Intermediary use (P2)		
01	Products of agriculture and hunting	-6.1	-5.5	1.9	-5.5	-4.2	-0.1%	0.0%
02	Products of forestry and logging	-0.7	-0.7	0.0	-0.7	-0.6	-0.2%	0.0%
03	Products of fishing and aquaculture	0.0	-2.6	0.0	0.0	2.6	0.0%	0.0%
07	Metal ores	-0.5	0.0	0.1	0.0	-0.3	0.0%	22.2%
08	Other products of mining and quarrying	-64.7	-380.4	0.2	-407.9	-92.0	-54.3%	0.0%
10	Food products	-19.3	-7.5	7.5	-4.8	-9.1	0.0%	0.0%
11	Beverages	-1.6	-0.4	1.2	-0.4	-0.4	0.0%	0.0%
12	Tobacco products	-11.2	-0.1	10.8	-0.1	-0.5	0.0%	1.0%
13	Textiles	-99.2	-84.3	37.6	-84.2	-61.6	-2.1%	0.9%
14	Clothing	-106.5	-15.6	62.6	-9.1	-37.3	-0.9%	6.0%
15	Leather and related products	-2.4	-1.8	1.1	-1.8	-1.3	-1.2%	0.8%
16	Wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-0.9	-0.7	0.5	-0.7	-0.5	0.0%	0.0%
17	Paper and paper products	-1.5	-2.7	0.6	-2.8	-1.0	-0.1%	0.0%
18	Printing and reproduction of recorded media	-2.2	-1.4	0.7	-1.4	-1.4	0.0%	0.0%
19	Coke and refined petroleum products	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
20	Chemicals and chemical products	-93.5	-98.9	25.1	-97.8	-67.3	-0.3%	0.1%
21	Pharmaceutical products and preparations	-213.7	-52.6	126.0	-52.4	-87.5	-0.7%	1.7%
22	Rubber and plastic products	-16.2	-7.8	12.1	-7.1	-3.4	-0.1%	0.2%
23	Other non-metallic mineral products	-16.3	-10.0	4.4	-10.0	-11.9	-0.2%	0.1%
24	Basic metals	-54.1	-45.9	11.2	-45.9	-42.9	-0.2%	0.1%
25	Fabricated metal products, except machinery and equipment	-28.0	-25.6	8.8	-25.6	-19.2	-0.3%	0.1%
26	Computers, electronic and optical products	-24.8	-12.5	9.1	-12.5	-15.6	-0.4%	0.3%

27	Electrical equipment	-25.6	-20.4	8.7	-20.4	-16.9	-0.5%	0.2%
28	Machinery and equipment n.e.c.	-32.5	-30.8	7.1	-31.2	-25.7	-0.3%	0.1%
29	Motor vehicles, trailers and semi-trailers	-8.5	-6.4	1.6	-6.4	-6.9	0.0%	0.0%
30	Other transport equipment	-76.5	-52.3	19.6	-52.3	-56.9	-4.0%	1.5%
31	Furniture	-0.2	0.0	0.1	0.0	-0.1	0.0%	0.0%
32	Other products of manufacturing	-742.4	-291.4	124.5	119.0	-207.4	8.7%	9.1%
38	Repair and installation of machinery and equipment	-6.3	-7.3	6.2	-7.3	0.0	-0.1%	0.1%
58	Books, newspapers, computer games, software, online or in physical form	-5.6	-0.4	5.1	-0.4	-0.5	0.0%	0.1%
59	Films and other video content &	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
71	photographs on disk, tape or other physical media	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%
	Total	-1660.8	-1166.1	494.7	-769.7	-769.7	-0.1%	0.1%

(1) AI numbers shown are projected adjustments. They may still change as a result of revisions since the SUT equilibration process according to ESA 2010 is not completed yet.

(2) Here the processing fee is obtained as the increase in import services that makes sure that the supply (imports + P1) and use (exports+ P2) is equilibrated at the product level.

Source: Belgian Federal Planning Bureau