Statistics Netherlands

Economic ownership as leading principle in ESA 2010: consequences for national accounts

Stephen Chong

Project and report commissioned by the European Union

Project of Directorate C1, Eurostat, European Commission, Grant Agreement Number 20101.2011.001-2011.197

Final report

Remarks:

The views expressed in this paper are those of the author and do not necessarily reflect the policies of Statistics Netherlands.

Date: 13 February 2015

Economic ownership as leading principle in ESA 2010: consequences for national accounts

Table of contents

1. Introduction 3

2. Goods sent abroad for processing 4

    2.1 Shortcomings of the ITGS in measuring goods sent abroad for processing and related processing fees 4

    2.2 Alternative sources used to estimate import and export of processing services 5

    2.3 Sources and method used to estimate the values of the goods sent abroad for processing 7

    2.4 Overview of total corrections made for goods sent abroad for processing 10

3. Production abroad 10

    3.1 Identifying enterprises engaged in production abroad 11

    3.2 Estimating foreign trade values for the enterprises engaged in production abroad 12

4. Merchanting 14

    4.1 Measurement of merchanting 15

    4.2 Main results for merchanting 16

5. Impact of conceptual changes on trade in goods in national accounts 18

6. Measures taken to improve the measurement of trade in goods according to the principles of economic ownership 19

    6.1 Measures taken by the international trade in goods department 19

    6.2 Measures taken by the international trade in services department 20

    6.3 Large cases unit 20

7. Recommendations to improve the foreign trade measurement of global manufacturing within Dutch national accounts 22

Appendix 1: Numerical examples of the method of goods sent abroad for processing for large enterprises 24

Appendix 2: References 25

1. Introduction

In ESA2010 the principle of change in ownership is applied to the international trade in goods without any exceptions. This has significant implications for the recording of international trade in goods and services in the national accounts for the following global manufacturing arrangements:

- Goods sent abroad for processing
- Production abroad
- Merchanting
- Trade between affiliated enterprises

No cross border flows of goods are imputed for goods sent abroad for processing and trade between affiliated enterprises. An import or export of services is imputed for services performed by the contractor (in goods sent abroad for processing) or the affiliated enterprise (in trade between affiliated enterprises). Conversely, cross border flows of goods are imputed for merchanting and production abroad and the merchanting margin is no longer recorded as a service.

In theory, these changes should not have an effect on the value added attributed to the trading partners, as there is no change in the trade balance of goods and services. After all, a shift occurs between trade in goods to trade in services, or vice versa. In practice, there may be a shift in value added between trading partners due to holding gains and losses or the embodiment of value added of the principal in the imputed value of the goods after processing (Globalization Handbook, 2011).

This paper, third in the series of Eurostat grant C1 (Improvement of quality of NA)[1], presents the sources and methods used by Statistics Netherlands to measure changes in economic ownership in the international trade in goods and services. Some of the sources that are presented in this paper were not yet developed or available at the time the first paper by Van der Ende and Verbiest (2011) was written. This paper goes more in depth in the methods and sources used to measure global manufacturing as presented by Hiemstra (2014) and provides an overview of recent work by the business statistics departments at Statistics Netherlands to measure foreign trade according to the change in ownership principle.

In the following three chapters the sources and methods are presented that are used to measure international trade in goods and services for goods sent abroad for processing (chapter 2), production abroad (chapter 3) and merchanting (chapter 4). In chapter 5 an overview is given of the annual estimates for the Dutch economy for 2010, 2011 and 2012. This is followed in chapter 6 by the presentation of recent work by the business statistics departments to measure foreign trade according to the change in ownership principle, including the activities of the consistency unit for large and complex enterprises. Finally, in chapter 7 recommendations are made to improve the coverage and consistency of the sources and methods used to measure international trade by change of ownership.

[1] See the earlier papers by Van der Ende and Verbiest (2011) and Hiemstra (2014).

2. Goods sent abroad for processing

Following ESA 2010 goods sent abroad for processing have to be removed from the international trade in goods in the national accounts, since there is no change of economic ownership from a resident unit to a non-resident unit, or vice versa. The fee that the processor receives from the principal has to be registered as a service. This new registration method has been a challenge for Statistics Netherlands.

In this chapter we will discuss the shortcomings of the International Trade in Goods Statistic (ITGS) in measuring goods sent abroad for processing and processing fees. We discuss alternative sources used by Statistics Netherlands to make the final annual estimates for goods sent abroad for processing and processing fees. We end the chapter by discussing the measurement challenges that remain and make some recommendations to improve the estimation process in the future.

2.1 Shortcomings of the ITGS in measuring goods sent abroad for processing and related processing fees

In the classic case of goods sent abroad for processing, material inputs are sent by the principal in country X to the processor in country Y. After processing, the processor returns the finished goods to the country of the principal. The principal pays the processor a fee for the services provided. In this scenario, assuming the transactions are correctly reported in the ITGS, the goods sent abroad for processing can be identified and removed from the ITGS using the corresponding Nature of Transaction (NoT) codes. The processing fee can be estimated as the difference between the value of the goods in the ITGS before and after processing.

In reality, however, the goods may not return to the country of the principal after processing. In that case, the NoT codes in the ITGS cannot be used to estimate the value of the processing fee, since the value of the goods after processing is not included in the ITGS.

In the Netherlands, the NoT codes are collected on a one-digit level in both Intra- and Extrastat. NoT codes 4 and 5 indicate the goods sent abroad for processing where code 4 indicates the receipt or dispatch of goods before processing and code 5 indicates the receipt or dispatch of goods after processing. Table 1 contains the value of the goods at macro level reported in the ITGS as goods sent abroad for processing (both in- and outward processing) for 2010, 2011 and 2012. The processing fee is derived as the difference between the goods before and after processing.

Table 1: Inward and outward processing reported in ITGS (in million euros)

Year	Inward processing			Outward processing		
	Import	Export	fee	Import	Export	fee
2010	1308	2162	854	2054	1639	415
2011	1502	2138	636	1300	1633	-333
2012	1588	2332	744	1604	1660	-56

At macro level the results for inward processing seem plausible with positive values for the processing fees in all three years. This is not the case for outward processing, where the processing fees are negative in 2011 and 2012. For both in- and outward processing the absolute values of the goods send for processing are small compared to the total value of trade reported in ITGS.

It is not clear what the cause is of the relatively small values of goods sent for processing and the negative values of the import of processing fees (fee related to outward processing) in the ITGS. It can be due to statistical deficiencies (i.e. units not reporting the goods sent for processing under NoT codes 4 and 5) or due to goods not returning to the country of the principal after processing. In both cases, the conclusion is that we cannot solely rely on the ITGS data to estimate goods sent abroad for processing and the related processing fees.

In the following sections we discuss the alternative sources used to estimate the import and export of processing fees and the goods sent abroad for processing.

2.2 Alternative sources used to estimate import and export of processing fees

Structural Business Survey (SBS) and Prodcom

The annual SBS contains values for the import and export of industrial services by enterprises in the manufacturing industry. Industrial services consist of processing fees and of repair, maintenance and installation services. To estimate the values of the import and export of processing fees, we combined the data about the import and export of industrial services from the SBS with data from the Prodcom statistic.

The Prodcom statistic contains – for the same population of enterprises in the manufacturing industry as the SBS - a separate estimate of the sales of processing services and of repair, maintenance and installation services. Using the Prodcom, we calculated the share of processing services in total sales of industrial services for each manufacturing industry. Note that the Prodcom only contains the value of total sales with no breakdown to domestic sales and exports. Therefore the shares could not be calculated for the export of industrial services separately. Furthermore, the Prodcom only contains the value of the sales of industrial services. There is no information on the purchases of industrial services.

Nevertheless, we used the shares of the sales of processing services in total industrial services from the Prodcom, to calculate the value of import and export of processing services in the SBS. This was done for each manufacturing industry, by multiplying the shares from the Prodcom with the value of imports and exports of industrial services in the SBS. Van der Ende and Verbiest (2011) describes in detail how this was done for the years 2006 to 2008 and also provides the figures reported in the SBS and Prodcom for those years.

The SBS also contains the import of industrial services for the wholesale trade industry (exports are not explicitly surveyed). The Prodcom, however, only covers the manufacturing industry. We therefore do not have a proxy for the share of processing services in the total sales of industrial services for the wholesale trade industry. For this reason, we applied the shares of the manufacturing industry to the wholesale trade industry taking into account the type of goods traded in the wholesale industry at the NACE 5-digit level. The share from the manufacturing industry whose main activity corresponds to the type of goods traded by the wholesale trade industry was then used as a proxy. For

instance, the share from the manufacturing of metal products was used as a proxy in the wholesale trade industry of metal products.

Identification of imports and exports of processing fees from other sources

During the compilation of the Supply and Use Table (SUT), national accounts compilers gather data from different source statistics in order to make a confrontation between supply and use for each commodity group. It is during this process that inconsistencies between the different source statistics become apparent. During the ESA2010-revision of the national accounts, a lot of effort was put into identifying the origin of the inconsistencies in the commodity account. This led to the identification of several, rather large units, that did not report the import and export of processing services correctly in the SBS. In most cases the enterprises reported production or use of processing services in the SBS, but did not give a further specification to domestic or foreign sales or purchases. In other cases, enterprises mistakenly reported the production of processing services under the production of goods. In coordination with colleagues from the departments responsible for the SBS, an estimate of the import and/or export of processing services was imputed for these missing enterprises.

In some cases, the national accounts compilers imputed the import of processing services. This was done for enterprises that have outsourced (part) of their production abroad. These enterprises have control over the production process and are the owners of the final goods. These cases are not treated as *goods sent abroad for processing*, because the owners do not physically send the goods to the processing country. These cases are also not treated as *Factoryless Goods Producers*, because the owner purchases the material inputs in the country of the processor and/or from third countries. These cases of *production abroad* are discussed more at length in the next chapter. Here, it suffices to mention that in these cases an import of processing services has to be imputed for the fee that the owner pays to the processor, in case the enterprise that is producing abroad does not report the import of the processing fee in the SBS.

Table 2 contains the import and export of processing services by industry in the national accounts for 2010, 2011 and 2012.

Table 2: Import and export of processing services

Industry	Export of processing fees			Import of processing fees		
	2010	2011	2012	2010	2011	2012
Agriculture, forestry and fishing	**0**	**0**	**0**	**0**	**0**	**0**
Mining and quarrying	**16**	**16**	**15**	**0**	**0**	**0**
Manufacturing	**3679**	**3747**	**4025**	**4118**	**5688**	**6036**
Food, beverages and tobacco	1152	1079	1158	310	351	368
Textile-, leather products	4	4	4	45	48	45
Paper-, wood products, printing	35	36	34	49	40	35
Coke and petroleum	385	426	448	0	0	0
Chemicals	1649	1695	1863	1120	1353	1321
Pharmaceuticals	35	34	11	118	105	117
Plastic and building material	21	23	36	143	151	145
Basic metals and -products	122	128	128	59	61	55
Electronic products	31	35	38	1873	3164	3574
Electrical equipment	15	17	25	6	14	14
Machinery n.e.c.	23	28	32	14	16	15
Transport equipment	156	190	193	352	356	317
Other manufacturing and repair	51	52	55	29	29	30
Electricity and gas supply	**76**	**62**	**78**	**0**	**0**	**0**
Trade	**9**	**9**	**9**	**278**	**317**	**318**
Information and communication	**0**	**0**	**0**	**2**	**2**	**1**
Total	**3780**	**3834**	**4127**	**4398**	**6007**	**6355**

Notice that there is a net trade deficit in processing services in all three years. This is caused by the large import of processing services in the manufacturing of electronic products. This effect is partly mitigated by the surplus in the chemical industry, the food, beverages and tobacco industry and in the coke and petroleum industry.

2.3 Sources and method used to estimate the values of the goods sent abroad for processing

In this section we discuss how the values of the goods sent abroad for processing were estimated for the years 2010, 2011 and 2012 along with the breakdown to commodity groups as used in the SUT. We used different estimation methods for large enterprises (in terms of the values of processing fees) and small and medium enterprises (SME). First, for the large enterprises the goods sent abroad for processing were estimated by looking at the data from the ITGS as reported by those enterprises. Next, for the SME's the goods related to processing were estimated on an industry-level by assuming a certain relationship between the value of processing services and the value of goods sent for processing on an industry-level.

Goods sent abroad for processing for large enterprises

Most of the enterprises that were identified as inward or outward processors in the SBS, did not report the trade in the ITGS under NoT codes 4 and/or 5. Therefore, we could not simply use the NoT codes to estimate the values for the goods sent abroad for processing for these enterprises. Instead we estimated the values of the goods for processing as follows:

- Inward processors: The value of goods sent to the country of the owner after processing is assumed to be equal to the value of the outflow of goods reported in ITGS. The value of the goods received from the owner before processing is then estimated by reducing the value of the outflow of goods in ITGS with the value of the processing fee from the SBS
- Outward processors: The value of the goods received from the country of the processor after processing is assumed to be equal to the value of the inflow of goods reported in ITGS. The value of the goods sent abroad for processing is then estimated as the difference between the value of the inflow of goods in ITGS and the value of the processing fee from the SBS

The following table shows how this was done for inward processing using a numerical example. In the example the principal sends material inputs with a value of 100 to the processing country. The processor transforms the inputs into final products with a value of 120. The processor receives a processing fee of 20 from the principal. In this example the processed goods return to the country of the owner.

The correction of the export of the goods (-120) is equal to the value reported in ITGS in this inward processing example. The correction of the value of import of goods (-100) is estimated by reducing the value of export of goods with the value of the processing fee (20). In this way we correctly estimated the trade balance (20) in the national accounts.

Table 3: Inward processing example, large enterprise, no leakage.

	Goods		Services	Trade balance
	Import	Export	Export	
ITGS	100	120		
Corrections	-100	-120	20	0
National accounts	0	0	20	20
ESA2010 rules	0	0	20	20

Appendix 1 contains numerical examples of the method described above for inward processing and shows the consequences for the national accounts. The examples show what happens when 1) not all goods return to the country of the owner and 2) the enterprise also reports trade on own account under the same statistical unit in ITGS. The examples show the following:

1. The value of the import and export of goods and services and the value of the trade balance of goods and services are correctly estimated when there are leakages (example 1), but
2. The values of the import of goods (goods that remain in the country after processing) are registered under the wrong commodity groups

3. In case the reporting unit in ITGS also reports trade on own account (example 2), the value of the import and export of goods and thereby also the trade balance of goods, is not estimated correctly (the trade balance of goods and services (-5) is correct however)
4. The import and export of goods are also assigned to the wrong commodity groups.

Goods sent abroad for processing for SME

For SME we did not look at individual enterprises, but corrections were determined per industry (at the NACE-level of the SUT, 4 digit NACE level) from SBS import and export of processing fees. From ITGS we derived all NoT 4 and 5 transactions reported as import or export of goods, excluding transactions reported by the individual large enterprises identified in step one. Per industry, relevant commodity groups (SUT commodities, CPA-based) were identified related to processing in ITGS by determining the principal activity of the NACE industry. The corrections were made in such way that the trade balance in goods for that block of commodities was decreased (inward processing) or increased (outward processing) by the same amount as the processing fee. The corrections to imports and exports were made on the same commodity group.

The numerical example in the following table shows how the corrections for inward processing were made on an industry-level for SME. In this example not all goods return to the owner (leakage of 10).

Table 4: Example inward processing, SME, leakage of 10

	Goods		Services	Trade balance
	Import	Export	Export	
ITGS, NoT 4 or 5	100	110		
ITGS	180	190		
Corrections	-180	-200	20	0
National accounts	0	-10	20	10
ESA2010 rules	10	0	20	10

The total corrections on import and export of goods are determined by assuming that the fee reported in SBS is more or less 10% of the gross flow of goods. In this example the corrections on the export of goods is equal to 200 (=10*20). The value of the corrections on the import of goods is estimated by deducting the processing fee from the value of the export of goods. A value of 20 is imputed for the export of the processing fees provided to the principal. As a result of these changes, the values of the import and export of goods are both underestimated by 10. The trade balance of goods and services is correctly estimated.

To determine on which commodity groups the corrections had to be made, we looked at the main economic activity of the industry that reported the import and export of processing fees in the SBS. For those commodity groups that correspond to the main economic activity of the industry, the values reported under the NoT codes 4 and 5 were derived from ITGS. The corrections were then made on those commodity groups that reported transactions under NoT codes 4 and 5. The value of the

corrections on each commodity group was then derived in proportion to the values reported under NoT codes 4 and 5.

2.4 Overview of total corrections made for goods sent abroad for processing

Table 5 shows the total corrections made for goods sent abroad for processing for all inward and outward processors (both large and SME).

Table 5: Goods sent abroad for processing in 2010, 2011 and 2012 (in mln euro)

Year	Inward processing		Outward processing	
	Import	Export	Import	Export
2010	12326	15468	5871	5052
2011	16482	19485	5554	4635
2012	21157	25118	5728	4744

3. Production abroad

The previous chapter discussed global manufacturing arrangements in which goods are sent abroad for processing by affiliated or unaffiliated enterprises. The material inputs or semi-manufactured goods are thereby sent from the country of the principal to the country of the processor.

This chapter discusses global manufacturing arrangements in which the material inputs are purchased by the principal from suppliers in the processing country or third countries and shipped directly to the processor. The goods do not cross the border of the country of the principal. After processing, the goods are sent directly to the customers who are usually located abroad.

According to ESA2010/BPM6, the purchase of material inputs by the principal has to be recorded as import of goods in the country where the principal resides, since the economic ownership of the goods changes from a non-resident to a resident. The sale of finished products by the principal has to be recorded as export of goods in the country where the principal resides, since a change of ownership occurs from a resident to a non-resident.

From the perspective of the country of the processor, this global manufacturing arrangement is treated the same way as the goods sent for processing discussed in the previous chapter. The inflow of the raw materials from abroad and the outflow of the finished products to other countries have to be removed from the foreign trade in the national accounts.

The material inputs and finished products, however, do not cross the border of the country of the principal and are therefore not included in the ITGS. The import and export of these goods have to be imputed in the country of the principal using other sources.

In this chapter we discuss the method used by Statistics Netherlands to identify enterprises that are engaged in this form of global production and the method used to impute related foreign trade flows in the national accounts.

Note that this chapter discusses ‘outward’ production abroad in which an enterprise that is resident in the Netherlands produces (part) of its production abroad and the goods (material inputs and finished

goods) do not cross the Dutch border. There are also manufacturers that reside in the Netherlands that produce manufacturing services on goods owned by non-residents and the goods are not sent from or returned to the country of the owner. The statistical treatment of these cases of 'inward' production abroad are no different from inward processing (as discussed in the previous chapter) from the perspective of the Dutch economy. These cases of inward production abroad are therefore not discussed in this chapter.

3.1 Identifying enterprises engaged in production abroad

Structural Business Survey

From 2010 onwards, the production boundary of the Dutch SBS was harmonized with ESA2010. In 2010, respondents in the manufacturing industry were asked to include in total manufacturing turnover, the turnover from production abroad of goods. Production abroad was defined as 'goods produced abroad under economic ownership or control of the respondent'. Respondents were also asked to include in the purchase of raw materials associated with, production abroad. Although respondents were asked to include these values in manufacturing turnover and intermediate consumption of goods, respondents did not have to report these values separately in the questionnaire.

From the SBS of 2011 onwards, the following two questions about production abroad were added to the questionnaire of the manufacturing industry:

- What is your turnover from production abroad of goods?
- What is the total use of goods in the production process abroad?

Therefore, from 2011 onwards, we can derive the manufacturing turnover from production abroad and the intermediate consumption of goods in the production process abroad, directly from the SBS.

The Dutch national accounts were revised starting with statistical year 2010. At the start of the revision only the SBS results for 2010 were available. Although, as stated above, the SBS of 2010 did include the turnover from production abroad, it was included in the total manufacturing turnover and could not be separately identified. Therefore, another method was implemented to identify enterprises that were engaged in production abroad in statistical year 2010. This method compared the 2009/2010 growth rate of production from the SBS with the growth rate of the Prodcom statistic.

The SBS figures for 2009 did not include production abroad and the figures for 2010 did. The Prodcom statistic on the other hand contains the manufacturing turnover physically produced in the Netherlands for all units in the manufacturing industry. Manufacturing turnover from production abroad is excluded from the Prodcom. The Prodcom is based on the same population of enterprises as the SBS. The difference in the growth rate of manufacturing turnover between the Prodcom and the SBS for individual enterprises was used as an indication of the presence of production abroad.

Using this approach, a first list was made of enterprises that were possibly engaged in production abroad.

In the final stages of the revision of statistical year 2010, preliminary results became available of the SBS 2011. A second list was made of all enterprises reporting manufacturing turnover from production abroad in the SBS 2011. Numerous enterprises, many of which were not included in the

first list, reported manufacturing turnover from production abroad. However, a comparison with the value of manufacturing turnover reported in the Prodcom of 2011, revealed that most of the enterprises that reported turnover from production abroad in the SBS of 2011, were mistakenly reporting all exports under this item.

Fortunately, additional data was available from the short-term statistics (STS) on the turnover from production abroad. Since statistical year 2010 – simultaneous with the SBS – the STS harmonized the production boundary with the ESA2010, incorporating production abroad in the turnover. This led to a break in the quarterly time series of the STS for enterprises that derive (part) of their turnover from production abroad. These enterprises were contacted for confirmation of the fact that the break was due to production abroad. A list was made of all enterprises in the STS that confirmed that they derive turnover from production abroad.

Finally, a comparison was made of the enterprises in all three lists. Enterprises present on all three lists, were identified as engaged in production abroad. This resulted in a total of sixteen enterprises.

3.2 Estimating foreign trade values for the enterprises engaged in production abroad

Value of production abroad

For each of the sixteen enterprises we estimated annual values for production abroad and the intermediate consumption connected with this production. To estimate the value of production abroad, the data on the *turnover* derived from production abroad in the SBS was used. The value of the changes in inventory was not reported separately for production abroad. We therefore assumed that all production abroad is sold in the same accounting period.

As mentioned above, the SBS 2010 for the manufacturing industry did not separate the value of production abroad from the value of domestic production. This was corrected from the SBS of 2011 onwards, with the turnover from production abroad reported separately from domestic production.

To calculate the value of production abroad for 2010, we had the following two options (see numerical example):

1. Use the growth rate of the value of sales in the Prodcom for 2009/2010 to estimate the turnover from domestic production in 2010 in the SBS, by multiplying the turnover in the SBS of 2009 with the growth rate in the Prodcom 2009/2010. The difference between the resulting value of domestic turnover and the total turnover value in SBS 2010 is the turnover from production abroad.
2. Use the turnover from production abroad reported in SBS 2011 to calculate the turnover from production abroad in 2010, by assuming that the proportion of turnover from production abroad in total turnover (domestic and production abroad) in 2010 is equal to ratio reported in 2011.

Numerical example: Two methods for estimating the value of production abroad for 2010

	Growth rate Prodcom 2009/2010 (*)	Turnover SBS2009 (*)	Estimated turnover 2010 (*)	Turnover SBS 2010 (**)	Turnover SBS 2010		Value Prod. Abroad 2010	
					Total Turnover (**)	Of which Prod. Abroad	Method 1	Method 2
	a	b	c = a x b	d	e	f	g = d - c	h = f/e x d
Method 1	1,05	200	210	240			30	
Method 2				240	255	15		14

(*) Domestic production
(**) Total production (Domestic plus prod. abroad)

= survey data

= estimated value

The decision was made to use the second option, because it uses data from the same statistic (SBS) on the values of turnover from production abroad reported by the enterprises in 2011. The first option uses data on the domestic production from a different statistic (Prodcom).

It is assumed that total production abroad is sold within the same accounting period and that it is fully sold abroad. The entire value of turnover was recorded as export of goods. Because this data is used in the SUT, a breakdown by commodity was necessary. The latter was done using the commodity breakdown of sales reported by the respective enterprise in the Prodcom by linking the Prodcom classification of commodities to the commodity classification of the SUT. The assumption made here is that the same types of products are produced in the production facilities abroad as are made domestically.

Value of intermediate consumption for the production abroad

The principal (resident in the Netherlands) purchases raw materials in the country of the processor or in third countries and supplies them to the processor. The value of the raw materials is recorded as import of goods. The principal pays the processor a fee for the manufacturing services provided. The fee may include the purchase of raw materials[2] and services by the processor used in the production of the goods.

From the SBS 2011 onwards, the value of purchases of raw materials by the principal for production abroad is reported separately from other purchases of raw materials. In the SBS 2010, only the total purchases of raw materials (for domestic and foreign production) are reported. Therefore, the SBS data of 2011 is used to estimate the purchase of raw materials for production abroad for each enterprise in 2010. This is done in a similar way as described for the production abroad above by first calculating the ratio of the value of purchases of raw materials for production abroad in the value of turnover reported from production abroad in the SBS of 2011. The ratio of 2011 is then applied to the estimated value of turnover from production abroad in 2010 to derive the value of raw materials used in production abroad. A breakdown to commodities is made using the commodity breakdown of the raw materials purchased as reported in the SBS 2010. The commodity breakdown is only made for all

[2] The value of the raw materials purchased by the processor is small compared to the supply of raw materials by the principal.

purchases of raw materials. The assumption is that the same commodities are used in the production process abroad as in the domestic production

The value of the processing fee is calculated as the difference between the value of production abroad and the purchase of raw materials by the principal. We therefore make the bold assumption that there is no value added derived from production abroad. This was done because the data available for the measurement of production abroad is weak. In reality there is probably value addition from the outsourcing of production abroad. However, further improvements have to be made to the data sources, in order to make good estimations of the value added derived from production abroad.

Table 6 shows the estimated values of export of goods and the import of processing fees related to production abroad in 2010, 2011 and 2012.

Table 6: Export of goods and import of processing services derived from production abroad

Manufacturing industry	**Export of goods**			**Import of processing services**		
Amounts in million Euros	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Food, beverages and tobacco	552	606	575	58	39	35
Chemicals	4407	4546	4105	754	875	816
Pharmaceuticals	79	72	87	78	72	87
Electronic products	7416	9625	9915	1837	3147	3557
Transport equipment	1092	625	1676	190	190	164
Total	**13546**	**15474**	**16358**	**2917**	**4323**	**4659**

4. Merchanting

Merchanting is usually referred to in the context of global wholesaling services or commodity trading where a trader resident in country A purchases goods in country B and sells the goods – without substantial transformation - to a third party in country C without the goods ever crossing the border of country A.

Merchanting can also be a global manufacturing arrangement in which an (parent) enterprise in country A arranges for goods to be delivered from a manufacturing affiliate in country B to an affiliate in country C without the goods passing through country A. The ownership of the goods is transferred from B to A and from A to C and the goods are not subject to any transformation while owned by the enterprise in country A

The difference with the processing arrangements of the previous chapters is that the principal does not own the material inputs and does not control the production process. The goods are not transformed during the period in which the merchant or principal - arranging the distribution of goods within an MNE - owns the goods.

The statistical treatment of merchanting within Statistics Netherlands is in line with ESA2010/BPM6. The purchase of the merchanted goods by a resident enterprise from a non-resident is recorded as a

negative export of goods in the national accounts. The subsequent sale of the merchanted goods to another non-resident is recorded as a positive export of goods. The merchanting margin is attributed to the industry of the merchant.

4.1 Measurement of merchanting

Van der Ende and Verbiest (2011) describes the potential sources for measuring merchanting in the Netherlands. They concluded that the SBS is the most viable source. The SBS contains data on merchanting for the wholesale trade industry. Merchanting activities of other industries are not covered by the SBS. However, by using data from the wholesale trade industry in the SBS we made an estimate of merchanting in the other industries

Merchanting in the wholesale trade industry

The SBS of wholesale trade industry contains the following two questions on merchanting:

- The turnover from the sale of merchanted goods with a breakdown to EU and Eurozone countries
- The purchase value of the merchanted goods with a breakdown to EU and Eurozone countries

Merchanting is defined in SBS as the purchase of a good by a resident from a non-resident and the subsequent resale of the good to another non-resident. This definition is not completely in line with ESA2010/BPM6 definition which states that the goods do not enter or leave the compiling country.

Given the definition in SBS, enterprises may report goods under merchanting when the goods cross the border and thus are reported in ITGS. It is also possible that the purchase from and sale to non-residents occurs within the compiling economy. This latter transaction is not defined as merchanting in ESA2010/BPM6, but an import and export of goods has to be recorded, because there is a change of ownership between residents and non-residents.

However, due to a lack of alternative data sources, we used the SBS to measure merchanting, even though the definition is not completely in line with ESA2010/BPM6.

In the Dutch national accounts the merchanting margin is not allocated to the underlying goods in the SUT. Therefore, no commodity breakdown is made of the sales and purchases of merchanted goods.

Merchanting outside the wholesale trade industry

From VAT data (see Van der Ende and Verbiest, page 16-18) it is known that merchanting is undertaken in other industries. The VAT data was, however, not used to estimate merchanting outside the wholesale trade industry, due to the following drawbacks as mentioned by Van der Ende and Verbiest (page 17 and18):

i. The definition of the ABC deliveries is not precisely the same as that of merchanting
ii. ABC deliveries only encompass transactions of Dutch enterprises inside the EU and thereby only the sales. The accompanying purchases cannot be distinguished.
iii. Not all enterprises choose to register via the Dutch tax office. Large enterprises often choose for VAT payment/registration in the different countries.

Furthermore, no direct link was readily available between the statistical units in the VAT data and the statistical units used in the national accounts.

As explained by Van der Ende and Verbiest (2011), the SBS was used to make a rough estimate of the sales and purchases of merchanted goods outside the wholesale trade industry. The applied method estimates merchanting at industry-level (5-digit NACE code). The method makes use of the data on merchanting from the wholesale trade industry. Merchanting is estimated not only for the manufacturing industry, but for all industries where we expect merchanting to be present. To clarify the method used, an example for the shoe manufacturing industry is given.

In the *shoe manufacturing industry* shoes were purchased for resale (wholesale trade) for a value of 70 and sold to customers for 100. In the *wholesale trade industry in shoes*, 50 per cent of the sales of wholesale trade pertain to merchanting. We assume that this ratio also applies to the shoe manufacturing industry. Thus, half of the wholesale trade of 100 is assumed to be the sale of merchanted shoes. To estimate the merchanting margin and thereby the purchase value of the merchanted shoes, we assume that the merchanting margin is equal to the total wholesale trade margin of the shoe manufacturing industry, which results in a merchanting trade margin and purchase value of 15 and 35 respectively.

This same reasoning is applied to other industries. In industries where we cannot reasonably assume that one particular type of good is being traded, the ratio of the *sales of merchanted goods in total sales of wholesale traded goods* of the entire wholesale trade industry is used.

4.2 Main results for merchanting

Table 7 on the next page shows the sales and purchases of merchanted goods estimated in the national accounts of 2010, 2011 and 2012 with a breakdown to industry.

Table 7: Sale and purchase of merchanted goods and merchanting margins for 2010, 2011 and 2012

Industry	2010			2011			2012		
	sale	purchase	margin	sale	purchase	margin	sale	purchase	margin
Agriculture, forestry and fishing	0	0	0	0	0	0	0	0	0
Mining and quarrying	0	0	0	0	0	0	0	0	0
Manufacturing	5.405	4.491	914	5.839	5.171	669	6.725	5.987	738
Food, beverages and tobacco	532	371	161	582	486	96	581	508	73
Textile-, leather products	22	15	7	23	16	7	32	21	11
Paper-, wood products, printing	11	8	3	11	8	3	10	7	3
Coke and petroleum	2.084	1.978	106	2.762	2.752	10	3.381	3.374	7
Chemicals	74	54	20	77	58	19	108	81	27
Pharmaceuticals	23	14	9	14	8	6	14	8	6
Plastic and building material	29	21	8	31	22	8	35	27	8
Basic metals and -products	90	76	14	73	61	12	78	66	12
Electronic products	1.588	1.185	403	1.271	949	322	1.412	1.036	376
Electrical equipment	373	333	40	394	355	39	399	361	38
Machinery n.e.c.	190	133	57	216	151	65	248	176	72
Transport equipment	149	108	41	167	120	47	186	144	42
Other manufacturing and repair	240	195	45	219	184	35	241	178	63
Electricity and gas supply	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0
Trade and repair of motor vehicles	89	68	21	91	69	22	83	62	21
Wholesale trade (excl motor vehicles)	44.057	39.887	4.170	52.357	46.947	5.410	53.147	47.540	5.607
Retail trade and repair	114	82	32	108	82	26	93	54	39
Hotels and restaurants	0	0	0	0	0	0	0	0	0
Transport, storage and comm.	294	191	103	266	170	97	195	133	62
Financial and business activities	113	91	22	140	110	30	140	115	25
General government	0	0	0	0	0	0	0	0	0
Care and other service activities	0	0	0	0	0	0	0	0	0
Total	**50.072**	**44.810**	**5.262**	**58.801**	**52.549**	**6.254**	**60.383**	**53.891**	**6.492**

5. Impact of conceptual changes on trade in goods in national accounts

This chapter gives an overview of the corrections made to cross-border trade in ITGS to obtain the trade in goods according to the national accounts definition.

Table 8 shows the corrections that are made for 2010, 2011 and 2012. The ITGS figures are according to the national concept, meaning that quasi-transit trade has been removed from the total cross-border trade flows in ITGS.

The corrections due to the conceptual changes in ESA2010/BPM6 have been discussed in the previous chapters, except for the corrections for trade between affiliated establishments. In the Dutch ITGS, trade between affiliated enterprises - when there is no change of ownership between a resident and a non-resident - is recorded as re-exports in case the respondent is a Dutch resident. In ESA2010, all cross-border flows of goods where there is no change in ownership have to be removed from international trade. Fortunately, the international trade in goods department had a list of all respondents that were included in re-exports even though there was no transfer of ownership of the goods. All imports and re-exports reported by these respondents have been removed from the ITGS data.

Table 8: Link between ITGS and national accounts 2010, 2011 and 2012 (mln euro)

	2010			2011			2012		
	Import (cif)	Export (fob)	Balance	Import (cif)	Export (fob)	Balance	Import (cif)	Export (fob)	Balance
ITGS (National concept)	331913	371549	39636	364922	409358	44436	389444	429557	40113
1. Conceptual changes	-23689	-12391	11298	-20810	-13691	7119	-21230	-10218	11012
a. Merchanting		5262	5262		6254	6254		6492	6492
Goods sold under merch.		50072	50072		58801	58801		60383	60383
Goods acquired under merch.		-44810	-44810		-52549	-52549		-53891	-53891
b. Production abroad	4527	12770	8243	5662	13239	7577	7460	16470	9010
c. Goods sent for processing	-23162	-25534	-2372	-22363	-29254	-6891	-24403	-29065	-4662
d. Affiliated establishments	-5054	-4889	165	-4109	-3930	179	-4287	-4115	172
2. Other corrections	2494	1138	-1356	1259	3077	1818	-1408	6069	7477
NA after balancing	310718	360296	49578	345371	398744	53373	366806	425408	58602

Besides the corrections for conceptual changes, other corrections are made to the cross-border trade flows. These are corrections for, among others, balancing the supply and use table.

6. Measures taken to improve the measurement of trade in goods according to the principles of economic ownership

The previous chapters discussed the corrections made by the national accounts department of Statistics Netherlands to the international trade statistics to account for changes in economic ownership. At the time of the revision of the national accounts (base year 2010 finalised in August 2013) the departments of the international trade statistics (ITGS and ITSS) did not account for changes in economic ownership. These source departments have, since then, taken measures to account for changes in economic ownership in the deliveries of foreign trade data to the national accounts department. In July 2010 a new unit was created at the Business Statistics department to identify and remove inconsistencies between the different statistical sources available for the largest enterprise groups. This chapter discusses the measures taken by the source departments to improve the measurement of global production arrangements.

6.1 Measures taken by the international trade in goods department

The international trade in goods department (IHG, Dutch abbreviation) is obliged to supply Eurostat with data on trade in goods according to the FTS regulation. Therefore IHG measures the cross border movement of goods instead of trade in goods where a change in economic ownership occurs. The cross border movement of goods is measured according to both the community (including quasi-transit trade) and national concept (excluding quasi-transit trade).

Delivery of data by IHG to the national accounts department and the Dutch central bank (in charge of BoP statistics) is required according to the change of ownership principle. To fulfil this requirement, IHG makes ex-post corrections to the ITGS data (national concept) for goods sent abroad for processing. The corrections are made in a separate database, the so-called BPM6 database. The national accounts department derives the international trade in goods data from this database.

For the statistical year 2012 IHG researched trade in goods reported by respondents[3] under the nature of transaction (NoT) codes 4 and 5. The main goal of the research was to check if the response on the NoT codes 4 and 5 by the selected respondents was correct. Where necessary, corrections were made to the reported NoT codes.

IHG removes all trade reported under NoT codes 4 and 5 from the BPM6 database. The corrections of the NoT codes 4 and 5 have now been incorporated in the production process of IHG. As was mentioned in chapter two, many of the larger inward processors that were identified by the national accounts department, are not reporting the cross-border flow of goods under NoT codes 4 and 5. IHG makes additional corrections for processing by these enterprises. It does so by identifying corresponding statistical units in the ITGS[4] and by confirming that these units do not have economic ownership of the goods. If there is no change in economic ownership of the goods, the cross-border flows are removed in the BPM6 database. In cases where the finished goods are sold domestically, a corresponding import value is imputed.

[3] Respondents reporting monthly values of more than 1 million euro under NoT code 4 or 5 were researched.
[4] The statistical units in the SBS differ from the statistical units in the ITGS.

IHG only makes corrections in the BPM6 database for leakages for large inward processors. No leakages are estimated for other enterprises by IHG or the national accounts department.

6.2 Measures taken by the international trade in services department

The international trade is services department (IHD) revised the questionnaire of ITSS in 2014 to comply with the new ESA2010/BPM6 regulations. The new questionnaire includes, among others, the international trade in processing services and the sales and purchases of merchanted goods. Merchanting is surveyed in ITSS even though it is registered as a goods transaction, because the ITGS only measures cross-border movement of goods. The definition of merchanting is completely in line with ESA2010/BPM6.

Hiemstra (2014) discusses how the ITSS is used as a main source for the quarterly and annual estimates of the trade in processing services and merchanting in the national accounts.

The ITSS results will improve our final annual estimates for processing services (as discussed in chapter 2) as the SBS only provides a rough measure of the import and export of processing services, since processing services are reported together with repair, maintenance and installation services under the variable 'industrial services'.

The ITSS results will improve our final yearly estimates of the sales and purchases of merchanted goods in the wholesale trade industry (as discussed in chapter 4), as the definition of merchanting in the SBS is not completely in line with ESA2010/BPM6. Furthermore, ITSS also measures merchanting outside the wholesale trade industry.

IHG will use the data on the trade in processing services to identify enterprises that are mistakenly not reporting the trade in goods under NoT codes 4 and 5. A complication in this exercise is that, due to global manufacturing arrangements like production abroad and factoryless goods producers, enterprises may report import of manufacturing services even though no goods are crossing the border. Therefore, it would be useful if IHD can make a breakdown of the processing services by kind of global manufacturing arrangement.

6.3 Large Cases Unit

The large cases unit is responsible for removing inconsistencies between statistical sources within the largest enterprise groups (about 320). The unit has been operational since July 2010. Annex 2.2 in the Globalization Handbook (2011) provides an overview of the activities of the large cases unit.

The national accounts department has been working closely with the large cases unit to identify and remove inconsistencies within the large enterprise groups, especially regarding inconsistencies that arise due to global arrangement of production processes of MNE's operating in the Netherlands. The large cases unit is able to identify and, if necessary[5], remove inconsistencies that arise due to goods for processing, production abroad and merchanting at an early stage[6] of the compilation process of the national accounts.

---

[5] Inconsistencies that arise due to differences in the definitions of the statistics are explained, but not removed.
[6] Data from the large cases unit is used during the compilation of the quarterly national accounts.

To identify inconsistencies arising from changes in economic ownership within MNE's, the large cases unit uses short term statistics (STS), SBS, ITGS, ITSS, VAT data and statistics on the finances of large enterprises (SFGO). These statistics differ both in frequency (monthly, quarterly and annual) and in the time lag between the end of the reporting period and the publication date.

Inconsistencies due to inward processing by a manufacturing service provider can be identified by comparing the export value of goods reported in ITGS by that enterprise with the export value reported in the STS on a quarterly basis. The STS measures the money flow from the transaction and not the value of the cross-border movement of the goods. In the case of inward processing, the export value in STS will probably[7] be lower than the export value in ITGS, as the STS will only measure the processing fee.

Inconsistencies due to production abroad and merchanting can also be identified by comparing the export value in STS with the export value of goods in ITGS. In both cases, the export value in STS is higher than the export value in ITGS, since the goods do not cross the border.

To find out if the inconsistencies are due to global manufacturing and to identify the type of arrangement, the large cases unit uses information available from annual reports (for small inconsistencies) and/or contacts the enterprise group (large inconsistencies or in case no annual report is available). The annual report states who runs the risk and gets the rewards for the inventories of the goods and thereby who owns the goods.

After confirmation of a global production arrangement, the large cases unit checks if the enterprise group consistently records the relevant transactions in the different statistics.

[7] In most cases the bulk of the processed goods are returned to the non-resident owner.

7. Recommendations to improve the foreign trade measurement of global manufacturing within Dutch national accounts

The measures taken by IHG, IHD and the large cases unit will be used to improve the measurement of the consequences of global manufacturing arrangements on the national accounts. In this chapter recommendations are made for each global manufacturing arrangement to improve the measurement of the foreign trade flows.

Goods sent abroad for processing

For the revision of the base year 2010, the national accounts department made corrections for goods sent abroad for processing on both an industrial level (for small and medium-sized processors and large outward processors) and for individual enterprises (large inward processors). This method was also used for the final annual estimates of 2011 and 2012.

For the quarterly estimates[8] the national accounts department uses the estimates for goods for processing made by IHG on a monthly basis, as discussed in the previous chapter.

The aim is to use the estimates of IHG also for the final annual estimates. Therefore, it is essential to improve the coverage of both inward and outward processors under the nature of transaction (NoT) codes 4 and 5 in the ITGS. The reasons for the non-response on these codes by enterprises identified as processors (in ITSS, SBS and the large cases unit) have to be determined. Where necessary, goods sent abroad for processing should be classified under NoT codes 4 and 5.

At the moment, IHG only imputes trade flows - for goods that are not returned to the owner after processing – for large inward processors. No leakages are imputed for other inward and outward processors. The recommendation to IHG is to identify leakages for all inward and outward processors by analysing the trade flows under NoT codes 4 and 5 for the respondents belonging to the same enterprise group. Since the Dutch ITGS only contains one-digit NoT codes, the leakages can only be identified by contacting the enterprises. This is a very labour intensive operation for IHG. Another potential method of measuring the leakages for all inward processors is to look at the domestic sales by the non-resident owner of the goods in VAT data (assuming the non-resident owner of the goods is registered for VAT in the Netherlands). For outward processing leakages can only be determined by contacting the resident owner of the goods.

Production abroad

The national accounts department identified manufacturers that are producing (part) of their production abroad based on the response of enterprises in the manufacturing industry in the SBS (as explained in chapter 3). A rough estimate was made of the import and export value of goods based on the values reported in the SBS. The import of processing services was estimated in such a way that the total value added from production abroad is zero. This may lead to an underestimation of value added for these enterprises.

[8] The first quarter of 2014 was the first quarter that Statistics Netherlands published according to the new regulations

It is important to check if the annual estimates of production abroad by the national accounts department are correct by comparing the estimates with data from the large cases unit. The group coordinators of the large cases unit can contact the enterprises reporting production abroad in the SBS and STS to confirm the values for export of goods and import of goods and processing fees. The latter is important in order to determine the value added for production abroad.

A method has yet to be developed to measure the value of production abroad on a quarterly basis. At the moment the quarterly export and import values of goods related to production abroad are given the same growth rate as the cross-border trade flow of the corresponding commodity in the ITGS. To improve the quarterly estimates, the approach used by the large cases unit to identify units involved in production abroad on a quarterly basis, may be used[9]. If successful, this approach can also be used to measure quarterly values for production abroad for enterprises that are not part of the large cases unit.

Merchanting

The national accounts department currently estimates annual values for the sales and purchases of merchanted goods by using the merchanting data from the wholesale trade industry in the SBS. However, as stated in chapter 4, the definition of merchanting in the SBS differs from ESA2010/BPM6. Also, the SBS does not contain values for merchanting for industries other than wholesale trade. Therefore, the recommendation is to use data on merchanting from the ITSS to measure the export of goods.

Since the ITSS started to collect data according to BPM6 from the first quarter of 2014, the results can only be used to estimate the quarterly and annual values for merchanting from statistical year 2015 onwards. The reason for this is that values for merchanting in the ITSS may not be comparable to those in the SBS and the national account estimates (in general) have to be comparable in time.

Before using the merchanting data from ITSS, it is recommended to check if the units reporting merchanting in ITSS (especially units reporting high values of merchanting) correspond to the units reporting merchanting in the SBS.

General recommendations

For all three global manufacturing arrangements it is important to have a list of all enterprises that are involved in these arrangements and that the list is used by all business statistics departments and national accounts.

For the identification of new enterprises with global manufacturing arrangements, there has to be close cooperation between the business statistics departments. For the large enterprise groups, this process is safeguarded by the large cases unit. For the enterprises that are not part of the large cases unit, guidelines and procedures are currently being developed to improve the coordination.

---

[9] The large cases unit compares the quarterly export value in STS with the quarterly export value of goods in ITGS. The difference between these two values may correspond to the export value of goods related to production abroad, for units identified as having production facilities - under own control – abroad. The usefulness of this approach is currently being examined by Statistics Netherlands. The import of goods and processing services can be approximated by assuming certain fixed proportions related to the export of goods.

Appendix 1: Numerical examples of the method of goods sent abroad for processing for large enterprises

In this appendix we give two numerical examples of the way the corrections for goods sent abroad for processing are made in the Dutch national accounts, which clarify the consequences on the trade balance in the national accounts. The examples consider the following inward processing case from the perspective of the country of the processor:

The principal sends material inputs with a value of 100 to the processing country. The processor transforms the inputs into final products with a value of 120. The processor receives a processing fee of 20 from the principal.

In the first example a portion of the final products (value of 10) is sold by the principal in the country of the processor. In this example, ITGS will record a value of 100 for imports and 110 for exports. From the SBS we derive an export of processing fee of 20. As stated in the main text, in case of inward processing, we make a correction of 110 to the export of goods. The value of the import of goods to be removed was estimated by deducting the value of the processing fee from the export of goods. So, we reduce the import of goods with 90. As a result, a value of import of goods of 10 remains in the national accounts along with the value of the export of the processing fee of 20. The trade balance is 10 and is in line with the recommendations of ESA2010. However, the import of goods is registered under the wrong commodity group, namely that of the material inputs instead of the final goods.

Example 1: Leakage (value of 10), no statistical deficiency

	Goods		Services	Trade balance
	Import	Export	Export	
ITGS	100	110	20	
Corrections	-90	-110	0	
National accounts	10	0	20	10
ESA2010 rules	10	0	20	10

When we make the corrections for goods sent abroad for processing, the ITGS data is considered for the VAT numbers that correspond to the enterprise in the SBS. However, some units in the ITGS may be reporting for different enterprises (the statistical unit in the SBS) or may be reporting their own trading activities, i.e. the trade in the goods that they own, under the same ITGS-units as the processing activities.

Again we consider the case where there is a leakage of the goods of 10. The ITGS-unit also reports the trading activities in ITGS: Imports of 10 and exports of 15. Total imports and exports are equal to 110 and 125 respectively. Because we are unaware that the ITGS-unit also reports the trading activities under the same unit, we make similar corrections to ITGS as in the previous example. We remove all export of goods (-125) and we reduce the import of goods by 105 (=125-20). This results, in import of goods of 5, export of services of 20 and a trade balance of 15 in the national accounts. The trade

balance is correctly estimated, but the value of the import and export of goods is underestimated by 15.

Example 2: Leakage (value of 10), no statistical deficiency, unit reports trade in goods over which it has economic ownership under same VAT number in ITGS

	Goods		Services	Trade balance
	Import	Export	Export	
ITGS processing	*100*	*110*	*20*	
ITGS trade of own goods	*10*	*15*		
ITGS total	110	125		
Corrections	-105	-125	0	
National accounts	5	0	20	15
ESA2010 rules	20	15	20	15

Appendix 2: References

- Kees van der Ende en Piet Verbiest (August 2011), The Dutch approach to cross border transactions in the national accounts, Statistics Netherlands
- Leo Hiemstra (February 2014), Processing, production abroad and merchanting in the national accounts, Statistics Netherlands
- The impact of globalization on national accounts (2011), UNECE/Eurostat/OECD