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WORLD TRADE AND WORLD PRODUCTION: REAL FIGURES?

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Summary

Official statistics show an enormous growth in world trade and world production over the last decades. However, we have to conclude that the underlying statistics, although they use internationally agreed concepts and methodology, do not in all respects reflect economic reality. The real growth in terms of physical production and economic results from international trade has been smaller than the statistics suggest.

For the Netherlands a substantial share of total exports consists of re-exports, which means that imported goods leave the country again without having undergone much processing and without much value having been added. For these exports not only the value added is counted in the export statistics, but the total value of the product also shows up in Dutch export figures.

Furthermore, part of Dutch domestic production, as counted in the official statistics, has not been produced on Dutch territory. This may cause double registration and may also cause inconsistencies with imports and exports statistics.

The Dutch economy is not representative for all (European) countries. Nevertheless: the phenomena described do occur in other countries as well, and for some countries with open economies the figures are as high as in the Netherlands or even higher. On the level of the European Union we estimate – and this is a conservative estimate on the basis of assumptions – total re-exports worth at least 500 billion US \$ and a domestic production of 22 billion US \$ produced elsewhere. On a global level, these figures are at least 800 billion US \$ re-exports and 27 billion US \$ of production produced in other countries.

We recommend to collect more detailed information on production and trade, to admit the possibility for policymakers and scientists to use different points of view, while using the data. With respect to production we propose to distinguish between real domestic production, intra-firm contract processing abroad and extra-firm contract processing abroad. With respect to exports we propose to distinguish between exports from domestic production and re-exports, and to collect information on total value and value added for the re-exports. Quasi-transit should be measured as well.

1. Introduction

World trade and world production have been steadily growing over the last decades. Trade between the Netherlands and other countries has also increased enormously. This is illustrated below in tables 1 and 2.

In this paper we will examine the theoretical and operational concepts used in trade and production statistics, to find if they really are apt to describe economic phenomena as they occur in a globalizing world. From our experience with these statistics in recent years, not only on a macro and meso level, but also on micro level (sometimes with our feet deep in the mud) we have reasons to believe that concepts need to be adapted.

We will focus on the *growth* of production and international trade, but not only growth figures give problems. As regards the *level* of imports and exports, there is also some kind of problem. Within the European Union, the level of imports must be underestimated or the level of exports must be overestimated, because on a yearly basis about 78 billion euro more exports than imports are reported by the member states.

In this paper we will first explain the problems in a qualitative sense and focus on the *methodological concepts* used and the effects of the *empirical definitions and working procedures*. There are operational problems regarding data collection and data cleaning, but also conceptual problems in the statistical handling of more and more internationalizing enterprises.

We will make categories of problems, give live examples and try to give at least some quantitative information and estimates, first for the Netherlands, but we will also try to extend our analysis to Europe and the rest of the world. Then we will propose alternative concepts to be used alongside the traditional concepts to give a more complete description of the developments in the economy.

**Table 1. World trade and output developments, 1990 – 2004
(At constant prices, annual percentage change)**

	Average 1990-2000	Average 2000-2004		2001	2002	2003	2004
Merchandise exports	6.4	4.2		-0.5	3.5	5.0	9.0
Merchandise production	2.5	...		-0.7	0.8	2.8	...
GDP at market exchange rates	2.5	2.5		1.4	1.8	2.6	4.0
GDP at PPP	3.4	3.6		2.4	3.0	3.9	5.0

Source: World trade report 2005

**Table 2. Imports and exports of The Netherlands, 1950 - 2005
(Index figures, 2000 = 100)**

	Import value	Export value	Import quantity	Export quantity
1950	2	1	6	4
1960	4	3	12	10
1970	10	8	24	19
1980	32	29	36	34
1990	48	47	52	51
2000	100	100	100	100
2005	116	121	121	122

Source: Statistics Netherlands

2. Production, imports and exports: theory and practice

2.1. Production and international trade: physical concepts in theory

In the production process of goods, raw materials are transformed into products, ready to be used for consumption or as tools or equipment in households or in other production processes. Capital and labour are used as production factors in this process. The theoretical concept of production refers in the first place to the quantity of products that are physically made in a country during a certain period. The resulting products are expressed in quantities (q); for the sake of comparability and accountability, they are often expressed in turnover or monetary terms, which means they are multiplied by prices ($p * q$).

Because the value chain from raw materials to user products consists of many steps like assembling parts and converting half-products, the production process is rather complicated and in international trade not only raw materials and consumer products, but also parts and half-products show up.

International trade of goods in a theoretical and conceptual way means that goods physically cross borders. Again: for the sake of comparability and accountability, these flows are expressed in values ($p * q$) rather than in quantities (q). Dutch statistics on imports and exports are based on direct reporting by enterprises for the trade within the European Union, which amounts to 77% of exports and 55% of imports for the Netherlands, and on customs information for the trade with countries outside the European Union.

Until 1993, there was a direct relationship between goods crossing the border and reporting the data on trade within the European Union, because every transporter had to stop and had to hand over the customs paperwork (part of it for Statistics Netherlands). Since 1993, there is only an indirect relationship between crossing borders and reporting, since office people fill out the questionnaires for statistical means.

2.2. International trade: different operational concepts

The theoretical concept of imports and exports may be simple, the operational ins and outs are quite complicated. We will give a brief introduction into the different concepts used in and related to international trade. More detailed information on the subject can be found in Roos (2006, 2005) and Rutten and van Brummelen (2001).

2.2.1. Normal imports and exports

In publications of Statistic Netherlands normal imports and exports are broken down by kinds of goods (SITC, HS and CN) and by country (or group of countries)¹. These imports and exports are expressed as values and quantities and consist of exports from domestic production and re-exports. In most of the published tables, no distinction is made between these two categories. Only in one special table, made on a highly aggregated level, the re-exports and exports from domestic production are estimated as separate categories.

a) Exports from domestic production

Exports from domestic production consist of goods produced in the Netherlands or goods that have been subject to processing in the Netherlands.

In 2005, the flow of exports from domestic production amounts to 161 billion euro.

b) Re-exports

Re-exports are imported goods leaving The Netherlands in a largely unprocessed state.

The flow of re-exports in 2005 is worth 121 billion euro.

2.2.2. Quasi-transit

Quasi-transit means that goods have been imported into the Netherlands, but will never have a Dutch owner, and leave the country in an (almost) unprocessed state.

On a yearly basis, the size of this flow is estimated to be about 30 billion euro.

There is no regular statistical information on quasi-transit in the Netherlands, and this flow is not included in normal imports and exports. That is to say: theoretically, there is no information and this flow is not included. However, in practice in some cases, it is hard to spot the difference between quasi-transit and re-exports.

2.2.3. Transit via customs warehouses

Customs goods can be stored in a customs warehouse. From there, they can be exported directly, or imported in the Netherlands (and from there various routes are possible, like re-export and quasi-transit).

This flow is not included in the statistics on international trade in goods, but it is included in the statistics on international trade in services.

2.2.4. Transito trade

Transito trade means that a Dutch resident buys and sells goods and delivers them, but the goods never show up in the Netherlands. Only the financial transaction takes place in the Netherlands.

This flow is not included in the statistics on international trade in goods, but it is included in the statistics on international trade in services.

2.2.5. Transit through the Netherlands (customs goods)

Real transit means that goods enter the Netherlands on their way out to another country; they only pass Dutch territory.

This flow is not included in Dutch statistics.

Summarizing, the Dutch statistics on *international trade in goods* measure total imports and total exports, that is exports from domestic production plus re-exports. The amount of re-

¹ HS = Harmonised System: worldwide used customs nomenclature concerning all kinds of goods
CN = Combined Nomenclature: nomenclature of goods used in international trade statistics within the European Union
SITC = Standard International Trade Classification: nomenclature developed by the United Nations for international comparisons

exports is calculated ex post, and published in a separate table; but in most tables as published on the website of Statistics Netherlands² exports include re-exports. The Dutch statistics on *international trade in services* measure the transit via customs warehouses and the transit trade. As yet, there is not much detail in these rather young and complicated statistics. In the past, this work was done by the Dutch Central Bank (De Nederlandsche Bank). Since 2003, these statistics have been transferred to Statistics Netherlands, while the direct reporting system for banks was implemented. Quasi transit and real transit are not measured on a regular basis in the Netherlands. Real transit has been measured in the past, but because of the big workload and the difficult character of the work, it has been stopped.

2.3. Statistical discrepancies between production and international trade

Annual structural business statistics measure turnover and a specification of costs. Product statistics measures turnover broken down by kinds of product that have been produced by enterprises whose main activity lies in manufacturing (NACE D). The kinds of products are classified according to the PRODCOM nomenclature.³

Statistics on international trade measure goods crossing borders, without restrictions to the main activity of the enterprise involved. The unit used for these statistics is not the same enterprise as the one used in the structural business statistics or in the Prodcom statistics, but the fiscal unit used for the VAT (Value Added Tax).

Moreover, international trade statistics, Prodcom statistics and structural business statistics use different cut-offs in the collection of data.

This means that discrepancies in the statistical data can be expected and will occur.

2.4. Asymmetries in international trade

Within Europe, a lot of research has been carried out to find the causes of asymmetries. More exports than imports are reported by the member states of the European Union. In other countries and also on a global level the same phenomenon has been found.

Results of research usually show a mix of different causes for the asymmetries, which means that there is no simple solution to this problem. Causes are for instance:

- Enterprises have to organise their exports carefully: build a distribution system or use a distribution channel from another company, adapt their product (at least the text on the wrapping) to local circumstances, organise transport and storage, etcetera.
- Imports, on the other hand, can have more of an ad hoc character and may thus be forgotten in the reporting.
- Statistics on international trade are collected with a cut-off, which means that exports tend to be more above the reporting level, whereas the more diffuse imports can easily dive under this line.

3. Agreed concepts do not always reflect economic reality

From our experience with Dutch statistics, we conclude that official statistics, though truthfully sticking to the internationally agreed concepts, suffer from several kinds of bias. In

² The website www.cbs.nl gives access to Statline, the central database of Statistics Netherlands.

³ NACE = Nomenclature statistique des activités économiques dans la Communauté Européenne
Prodcom = Nomenclature of products used in the European Union; ProdCom means Production Communautaire

this paper we use the word “bias” to indicate that we think that the concepts reflect the real economic phenomena only to a limited extent. We discern the following categories:

a) Export and re-import (and re-export) for packaging or other minor processing

Production takes place in country A, the product is exported in bulk to country B. In country B the product is converted to consumer packages. After that the product comes back to country A.

Because this product crosses the border twice, it is seen in statistics of international trade in goods also twice, and for the full value. The agreed concept of international trade is applied correctly, but we think this concept leads to double reporting. It would make more sense if only the value added would be counted in the second step.

Example

A pharmaceutical company in Germany delivers medicine to the Netherlands in bulk. For repackaging the goods are transported to Italy; from there the pills are transported back to the Netherlands in consumer packages. Ownership travels with the medicine from Germany to the Netherlands, to Italy and back to the Netherlands. Not much value is added during these movements, which are all seen as normal import and export flows. The same goods show up in trade statistics more than once or twice, and not only for the amount of value added, but on every occasion for the total value.

b) Contract processing: extra-firm

Production takes place in country A, but is directed from country B, and the ownership of the raw materials used and the ownership of the products is located in country B. The enterprise in country A produces services for the enterprise in country B.

Because the physical production takes place in country A, it will probably be counted in the statistics of that country, and right so according to the physical concepts we started with in paragraph 2. But because the production is directed from country B and the ownership is located there, the production is included in the statistics of country B as well. In the case of the Netherlands: our country is frequently playing the role of country B and includes this kind of production in its statistics. We also include the exports of these products in Dutch exports. During the ITS/TIS meeting organised by Eurostat and OECD in 2005 these problems have been discussed. In a paper by Harrison, Dippelsman and Havinga, the hybrid system is explained that statistical institutes use. The same paper was also discussed in the IMF committee on balance of payments statistics and during the meeting of the advisory expert group on the update of the 1993 SNA. Maurer of the World Trade Organisation commented on behalf of the task force on international merchandise trade statistics. Although everyone involved felt that these are important issues to be solved, so far nothing has changed.

Example

A big Dutch clothing retailer with establishments in practically every Dutch town sells his own brand of clothing, especially made for him in Southern Europe. He buys the cotton, pays the designer, owns the jeans, blouses, skirts and jackets. Women in Portuguese ateliers are sewing the clothes.

Statistics Netherlands considers this to be Dutch production. We are not sure if the Portuguese statisticians record this as Portuguese production also. Probably not, because they have no (real) price for the product; they only know how much they receive for their sewing service. But with the theory of physical production in mind, they may also argue this is true production of clothes on Portuguese territory that has to be counted as domestic production.

c) Contract processing: intra-firm

Production takes place in country A by an affiliate (daughter) of an enterprise group (mother) in country B. It is not always clear whether the affiliate operates as a service-producing unit, or as a product-producing unit. Criteria to be used are not so easy to formulate, unity

between theoretical and operational concepts is not easy to establish, and in the real world of enterprises many different cases exist and new ones are coming up on a daily basis. The result is that production will be counted as national production in country B, but may also be counted as national production in country A. We have found cases in which products seemed to be exported from the Netherlands in the position of country A, according to the statistics on international trade, whereas the products had not been produced in the Netherlands, according to the statistics that measure the production.

Example

A chemical plant in the Netherlands uses naphtha to make chemical products. Every citizen in a circle of miles around the plant cannot help but notice the gigantic naphtha cracker that has been there for more than a decade. Until a few years ago, this was Dutch production without any doubt. Then the foreign mother company decided that the ownership of the raw materials and the products had to shift from the Dutch enterprise to the mother company in another European country. That meant that the production plant was redefined to a contract processing unit. Statistics Netherlands decided in this case to stick to the former situation.

d) Distribution centres

Production takes place in country A. The products are exported to a distribution centre in country B, which is located in another part of the world. Maybe country A is in Asia, country B in Western Europe. From country B the products are exported to different countries C in the region.

Because the distribution centre in country B gains ownership of the goods, the flow of products shows up two times in the statistics on international trade: first from A to B, then from B to C, according to the internationally agreed concepts. Both times the full value of the products is counted. To measure the economic importance of this flow, it would make more sense to count only the value added in country B, which is relatively small.

Example

An Asian producer of cars ships all his products destined for the Western European market to a distribution centre in the Netherlands. From there the cars are transported to all countries of the European Union.

The distribution centre in the Netherlands gains temporary ownership of all the cars and therefore there is no prohibition whatsoever that the trade flows are seen as normal imports and exports.

After a couple of years the Asian owner changes his mind. He decides that in the future the ownership of the cars belongs in Asia, and that the cars are exported directly from his home country to the country of destination. However, the transport system is unchanged: from Asia to the Netherlands, from the Netherlands to the country of destination.

This causes real headaches in a statistical office: according to the agreed rules and concepts, we should shift from normal imports and exports flows to quasi-transit, which means a huge change in the statistics on international trade. And how to explain this issue to the users of our statistics, while in the real world, there has been no change at all?

Most of these biases are sensitive for administrative changes. These changes may occur as a result of reorganisations, or for fiscal reasons. It is difficult however to recognize the real nature of administrative changes. A change of ownership means for instance not only a change on paper, but also a real shift of risk.

4. Reasons why these problems tend to increase

There is a growing tendency for enterprises to concentrate on their core business, to outsource parts of their company, and to buy (or “insource”) services from other enterprises. There are not many obstacles for choosing a global viewpoint .

Differences in fiscal regimes between countries are huge; companies deal with them in increasingly creative ways and do not hesitate to adapt the organisation of their enterprise or their working procedures if they can reduce tax payments. Shifts of ownership and transfer of activities to another country are common results.

Globalization is a rapidly growing phenomenon. We all know the successes of call centres in India, working for all English-speaking countries, but not hesitating to accept the challenge of speaking other languages as well. Call centres in South-Africa deal with the Dutch and German language, whereas the former French, Spanish and Portuguese colonies specialize in the languages they happen to know best.

Software problem solving is done around the clock nowadays, work being handed over – or rather: emailed - from one country to another from sunrise to sunset, to make sure that the client finds his software repaired once he starts working again in the morning.

Selling of goods during sea transport, even several times during one trip, is not unusual. It is quite understandable that correct registration of these transactions and trade flows for statistical means becomes therefore increasingly difficult.

5. Quantifying the biases for the Netherlands

In the Netherlands much work has been done to quantify the amount of re-exports. In 2001, a rather sensational article was published by the Netherlands Bureau for Economic Policy Analysis, in which the development of the volume of exports from domestic production and from re-exports in the period 1970 – 2000 was presented in relation to the relevant world trade. It appeared that there has been an explosive growth of re-exports, whereas the exports from domestic production decreased in the 1990s.

To monitor these developments, Statistics Netherlands started methodological work to identify re-exports, and since a few years, publishes highly aggregated results on a regular basis. However, in most publications re-exports remain part of total exports.

For the Netherlands, the re-exports in 2005 encompassed over 40% of total exports (Table 3). Re-exports cover most of the biases as referred to before in categories a) and d), as far as statistics of international trade are concerned. In table 4, some information is given on the composition of the categories of re-exports.

Table 3. Imports, exports, re-exports for the Netherlands, 2002 – 2005

	Imports	Total exports (re-exports included)	Re-exports	Re- exports / Total exports
	Billion €	Billion €	Billion €	%
2002	206	233	98	42
2003	207	234	98	42
2004	228	256	111	43
2005	249	282	121	43

Source: Statistics Netherlands

Table 4. Re-exports for The Netherlands 2005 specified

	Re-exports by kind of good (billion €)
Food and animals	7.3
Beverages and tobacco	0.5
Raw materials	4.7
Mineral fuels	7.0
Fats and oils	0.7
Chemical products	15.0
Machinery and means of transport	60.1
Other	25.7
Total	121.0

Source: Statistics Netherlands

The problem categories export and re-import for packaging or other minor processing and distribution centres (categories a) and d) as characterised in paragraph 3) sum up to the total of re-exports which amount to 43% of total exports in 2005. This percentage shows a light tendency to increase over the years and will probably do so in the future. The figure is confirmed by the information available on foreign affiliates trade, from which we know that Dutch enterprises with a foreign mother company are responsible for 25% of total turnover and that over 50% of total purchases are destined for resale in the same condition as received.

Common characteristic of all re-exports is that the goods are imported and leave the country in the same or almost the same state without undergoing much processing. A difference is that sometimes the goods are only once, sometimes more than once crossing the Dutch border on their way out. Large distribution centres are relatively easy to locate and identify, showing a systematic, repetitive pattern of trade flows. The problem category as referred to under a) is more diffuse and thus it is more difficult to detect these trade flows.

Quantifying the problems with categories b) and c) is burdensome. There is not much statistical information available on the extent to which contract processing, either intra-firm (within the enterprise group) or extra-firm (between enterprises), is carried out. Moreover, what we want to know is even more specific: contract processing in which the products are made in another country. We did find that some information is available, based on the statistics of international trade. Within these statistics, a breakdown can be made by kind of transaction, and thus the deliveries before and after contract processing can be filtered. However, we know that the transaction codes that form the basis for this breakdown are not always registered accurately, since these are non-mandatory codes and codes that are only used by exception, which has to be taken into account when considering the figures. The outcome is that in the last ten years about 2% of total imports has been registered as coming in before contract processing and also about 2% of total exports as leaving the country after contract processing.

From the annual structural business statistics we know that 9% of total purchases refer to services purchased, and that a certain share of turnover refers to services rather than products sold in manufacturing industry. But no distinction can be made as to whether these services are rendered abroad or in the Netherlands.

We have several case studies on individual enterprises and enterprise groups, carried out within Statistics Netherlands. Most of these studies have been carried out because inconsistencies occurred or there were suspicions of misreporting or underreporting. In a paper presented in April 2006 at the joint UNECE/Eurostat/OECD meeting in Geneva some of these case studies have been presented. This work has made us very alert to these kind of problems and convinced us that the 2% of total exports that we found as hard statistical evidence must be the tip of the iceberg. Experts from Statistics Netherlands estimate that at least 10% of the Dutch domestic production is in reality produced abroad in contract processing, either intra-firm or extra-firm.

Because re-exports contribute much less to GDP than exports from domestic production, this phenomenon has been recognized within National Accounts in an early stage. In the three different approaches of domestic product (from output, from generation of income and from final expenditure) that need to result in the same total for the country as a whole, the high values of imports and exports could not be explained without knowledge about re-exports.

Summarizing, for the Netherlands we are confronted with different problem categories, that have effects on level and growth of production and exports.

Applying alternative concepts, as we will elaborate on in paragraph 7, would have reasonable effects for the Netherlands.

If we would use a production value and hence a value added concept consisting only of products produced on Dutch territory, the estimate of the value of domestic production of goods would be 10% lower than the official statistics show. Because this phenomenon has been coming up during the last ten years, the impact on the *growth* of production as measured in the indices of turnover and production would be substantial. This is shown in table 5. When detailed by categories of goods – which is not done in this paper - these effects will, of course, show more extreme values.

If we would use a concept of exports in which re-exports have been eliminated or reduced to the value added in the Netherlands, the value of exports would shrink to less than 60% of the officially published amount in 2005. The growth of re-exports has exploded since the end of the 1980s. This means that the growth of exports using the alternative concept will be far less than the official statistics show. In figure 1 the results are shown.

Table 5. Growth of turnover and production, using classical and alternative definitions, 1995 = 100

	Index of turnover (value)	Index of turnover (value)	Index of production (quantity)	Index of production (quantity)
	<i>classical definition</i>	<i>alternative definition</i>	<i>classical definition</i>	<i>alternative definition</i>
1995	100	100	100	100
2000	136	129	114	108
2005	146	136	114	104

Source: Statistics Netherlands

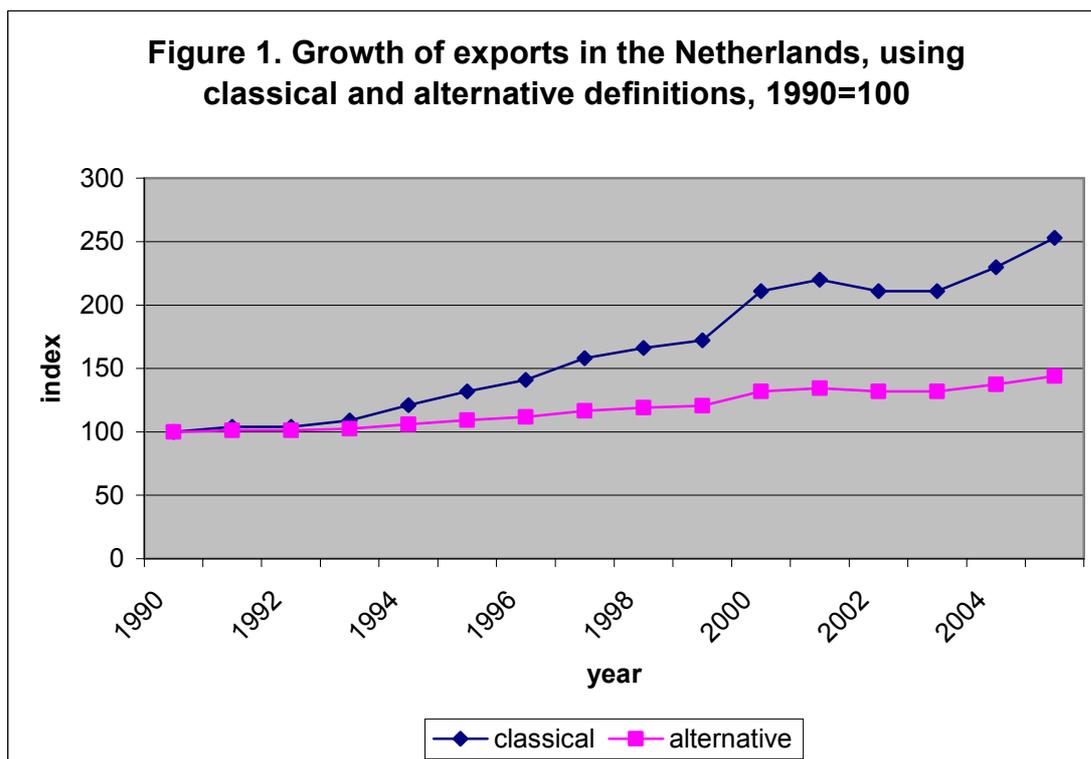


Figure 2 Kinds of problems and effects for the Netherlands

Situation	Kind of problem	Effects
Export and re-import for packaging or other minor processing (category a)	Exports are a mix of domestic production (with relatively much value added) and re-exports (low value added)	High (growth) levels of exports do not reflect economic reality: they have been magnified to too big proportions
Contract processing: extra-firm and intra-firm (category b and c)	Production abroad is counted as domestic production; inconsistencies between production and exports, and double recording of production in two countries	Domestic production as registered has partly not been produced on Dutch territory; growth statistics show a too optimistic picture
Distribution centres (category d)	There is a very thin line between quasi-transit (which is not a part of the exports concept) and re-exports (which is counted in the exports concepts)	The activities of distribution centres show up in economic statistics for much more than according to their economic meaning

6. Consequences for statistics on international trade and production for Europe and worldwide

Elaborating on the basis of the results for the Dutch economy, we can give some very rough estimates for similar effects in the European Union and worldwide, based on strong assumptions for which we were not able to find hard evidence.

Because of the small size of the country, the big harbour of Rotterdam and its geographic gate position to big parts of Western Europe, the Netherlands is not a representative example of a European nation, let alone that it can serve as a model for a worldwide average.

However, the effects shown for the Dutch economy will be seen for other economies as well. But because most economies have a less open character than the Dutch economy, the effects will on average be more modest than in the case of the Netherlands. As a measure of openness of an economy, the ratio exports/GDP can be used (table 6).

Table 6. Ratio exports of goods / GDP (%) and GDP for some EU and non-EU-countries
Reference period 2003

Country	Exports of goods/GDP (%)	GDP using current prices and current PPPs (billions of US \$)
Austria	34.9	249.0
Belgium	83.9	307.3
Czech Republic	53.9	176.4
Denmark	30.8	165.5
Finland	32.4	149.1
France	21.9	1749.1
Germany	30.7	2283.0
Greece	7.9	224.8
Hungary	52.4	152.9
Ireland	61.0	133.0
Italy	20.1	1549.0
Luxembourg	37.9	24.3
Netherlands	51.6	493.7
Poland	25.6	441.9
Portugal	21.3	196.2
Slovakia	66.9	70.8
Spain	17.7	1052.3
Sweden	33.9	259.7
United Kingdom	17.2	1782.5
Canada	31.8	963.9
United States	6.6	10951.3
Japan	11.0	3575.4
Mexico	25.8	982.6
Australia	13.3	602.0
New Zealand	20.6	93.8
Korea	31.9	922.5

Source: OECD Main Economic Indicators

We decided to present total estimates and only totals for this paper, on the one hand, to give at least an impression of the order of magnitude of these phenomena, and on the other hand, to make it very clear that we do not have data sufficiently reliable to give accurate statistics.

First we estimated the total re-exports for the European Union and worldwide, assuming that re-exports amount to a share of total exports equal to the Dutch share times the openness-indicator for each country in the above mentioned list, and assuming that in all other countries no re-exports occur. We have considered this to be a cautious *maximum* estimate. To make sure that we will give a thorough conservative *minimum* estimate, we have assumed that within the European Union (excluding the Netherlands), the average amount of re-exports is not more than 25% of the amount in the Netherlands, i.e. 10% of total exports. Here also, the countries not mentioned in the list are supposed to have had no re-exports at all, which happens to be rather a strong assumption, since we miss rapidly emerging economies like China, Brazil, India and Russia and trade economies like Hong Kong and Singapore.

For the estimation of the part of production produced abroad, we have made an estimate by making the assumption that for EU countries this share is much lower than in the Netherlands: 2.5% of total production. For the rest of the world we assume the average amount of re-exports to be 10% of the Dutch share, that is 4% of total exports, and the part of production produced abroad also 10% of the Dutch share, that is 1% of total production. Again, for the sake of cautiousness, we have assumed that the non-listed countries do not contribute at all.

The overall results of these calculations are shown in table 7. The minimum estimate of re-exports amounts to almost 500 billion US \$ for the European Union, and to some 800 billion US \$ worldwide. The maximum estimates are much higher, the broad range showing the uncertainties in these estimates. Domestic production that in reality has been produced abroad is estimated to sum up to 22 billion US \$ for the European Union and to 27 billion US \$ worldwide.

Table 7. Estimates of re-exports and production abroad for the European Union and the world, in US \$, reference year 2003

	Minimum estimate of re-exports <i>billions of US \$</i>	Maximum estimate of re-exports <i>billions of US \$</i>	Estimate of production abroad <i>billions of US \$</i>
European Union	493	1359	22
World	804	2249	27

It should be emphasized that these estimates are meant to give an impression of the size order of the phenomena described. They are meant to illustrate the impact of the problems that we have raised. And we hope that they work to convince decision makers that the proposals we make in the following chapter ought to be seriously considered.

7. Proposals for alternative concepts

To be able to deliver the statistical information that is needed for politicians and scientists, statistical institutes need more detailed data on production and international trade, not only to avoid the problems outlined before, but also to enlighten the phenomena described. Because production and international trade are basic concepts in economic statistics, which refer to

enormous amounts, we do not have the feeling that we are asking too much when we are pleading for more detailed information.

Production value

Turnover has to be specified in future statistics like the annual structural business statistics into several components. At least turnover from products sold that have physically been made in another country have to be recorded as a separate category. Moreover, a split between intra-firm and extra-firm contract processing would be very useful.

Turnover specified by kind of product

The so-called Prodcom statistics within the European Union give a specification of turnover (values and quantities) of the manufacturing industry by kind of products. The Prodcom nomenclature consists of some 5,000 product categories and is linked to NACE (the first digits are identical) and can be linked to the nomenclature as used in international trade statistics.

In these statistics, a difference has also to be made between products made within and outside the country, intra-firm and extra-firm.

Exports

Regarding exports, it is also necessary to specify them in more detail in the future.

Information is needed on:

- total value of exports from domestic production
- total value and value added of goods imported and (almost) not processed (re-exports)
- quasi-transit has to be recorded as well, to be sure to get a complete picture of transactions and trade flows

If more specifications are required, as is described here, enterprises get more items to report for statistical means. Compensation can be found in diminishing the required details in types of goods. The international trade nomenclature is a list of some 10,000 different items. This list has become so long because it is used for custom and tax purposes, hence the details. However, for statistical means not so much detail is required. Insofar as the international trade statistics are based upon direct reporting, less detail would be sufficient.⁴

Prevention of double recording

To prevent double registration of certain products within the European Union, the NSIs have to exchange information of individual enterprises as well. It will not be necessary to store data from enterprises in other countries in much detail, but the exchange is needed to be able to check on an ad hoc basis if double recording takes place. If a legal basis is needed for this exchange, this has to be established as soon as possible. Of course, it has to be made sure that the exchange of data is strictly used for statistical purposes only.

It will be preferable to start with the multinational enterprise groups. Work on a European Business Register has been started recently, which means that a backbone will soon be available.

More cooperation is needed

The different source statistics and National Accounts will profit much from the better specification of variables as described before and from the exchange of data, better

⁴ To diminish the administrative burden a big step can be made if it should be agreed within the European Union that step by step the double recording of each trade flow will be stopped. In a one flow recording system, enterprises only have to register their exports for statistical means. The imports of a country from within the European Union can be derived from the export statistics of the other member states. Conditions for success are however that NSIs exchange methodology and data, learn to trust each others figures and learn to exchange aggregate data in a smooth, fast and simple way.

communication and cooperation between NSIs, inside as well as outside the European Union. The making of the supply and use tables will become much easier, since less inexplicable inconsistencies will occur.

Trade flows outside the European Union are usually based on customs information, and not on direct reporting. This means that statisticians have few possibilities to adapt concepts used. Nevertheless, it is worth trying, and it is also advisable to seek cooperation with NSIs in countries with whom many international transactions take place. This is not just pure theory; last year in the Netherlands we have been able for the first time to use figures from the Chinese statistical office on international trade as a check on our own figures, and we have worked together with Chinese PhD students in our office in the Netherlands to clear up inconsistencies. It was only a pilot study as yet, but for us it was a major breakthrough.

8. Discussion of the results; concluding remarks and recommendations

In recent years, there has been a lot of discussion about the conceptual framework of statistics on production and international trade. These discussions, however interesting, have until now not resulted in decisions to adapt traditional concepts.

We feel that maybe we could contribute in showing the quantitative importance, but also in proposing alternative concepts that can be used not instead of, but alongside the traditional ones.

For us it is clear that for the Netherlands the levels and growth of both production and exports that have been presented in official statistics in the last decade do not reflect economic reality, although they have been made conform internationally agreed concepts. We are convinced that they suggest a too optimistic picture of our country, because part of the production activities counted took place in other countries and a considerable part of exports did not bring us much value added.

Another conclusion is that enterprises tend to make changes not only in real, but also in paper procedures which affect statistics; statistical institutes need to be very alert to make sure that statistics reflect the real outside world.

Therefore, we recommend that statistical institutes collect more detailed information from enterprises on production and international trade. We propose to split production into a real domestic part and a part produced abroad, divided into intra-firm and extra-firm.

Furthermore, we propose to split exports in exports from domestic production and re-exports, and for the re-exports to collect information on total value as well as value added. Statistical information on quasi-transit is needed to get a complete picture of trade flows.

The administrative burden for enterprises can be lowered by a step-by-step elimination of double flow registrations and by simplifying the international trade nomenclature used in direct reporting. However, several conditions have to be fulfilled before single-flow data collection will be a serious option: a) asymmetries must have been solved, and b) smooth exchange of data between NSIs must have been arranged, technically as well as legally. Exchange of data on an aggregated and on a micro-level and more cooperation between NSIs can lead to more consistency and better quality. Of course, the privacy of individual enterprises should not be violated; therefore, strict procedures have to be agreed and established, and, if necessary, a legal basis has to be created as well.

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