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The International Trade of a Small and Open Economy. Revised Estimates of the Imports and Exports of Belgium, 1835-1990

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1. Introduction

In countries as small and open as Belgium long-term macroeconomic trends are generally reflected in international trade. The growth and composition of imports and exports can give an implicit view of the development of the economy as a whole. Hence, foreign trade statistics are among the favourite tools of economic historians. Unfortunately, trade returns can be a methodological nightmare, especially in the early years of statistical history. In the nineteenth century trade was usually valued at official prices that did not necessarily correspond to actual market rates.¹ The recorded origins and destinations rarely if ever reflected the actual geographical distribution of trade. The registration of volumes was sometimes

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¹ The statistics of the Netherlands provide an extremely ludicrous example. Imports and exports were valued at a set of fictitious prices that were held constant for decades. The first set dated from 1846; it was revised in 1872; and only from 1917 on did prices follow the market. Cf. J.Th. Lindblad and J.L. van Zanden, 'De Buitenlandse Handel van Nederland, 1872-1913', *Economisch- en Sociaal-Historisch Jaarboek* 52 (1988) 231-269; J.P. Smits, *Economic Growth and Structural Change in the Dutch Service Sector 1850-1913* (Amsterdam 1995).

subject to the inaccurate declaration of the nature of commodities or to changing classifications of trade, not to mention outright fraud and smuggling.²

The statistics of small transit countries can contain a particularly nasty distortion. The general reduction in trade tariffs after 1850 encouraged merchants to evade the time-consuming process of declaring goods as transit: by declaring them as imports for domestic consumption and exports of domestic origin their transactions gained speed at the slight expense of customs duties. Transit is not considered trade and has no bearing on a country's economic development. The problem of 'disguised transit' consequently undermines the reliability and usefulness of international trade statistics.³ At least until 1913 it is almost impossible to reconstruct the development of imports and exports by simply copying the source material. Some form of adjustment is always required.

The Belgian trade statistics are no exception. Until the First World War the *Tableau Général* used official prices, while imports and exports contained an as yet unknown degree of disguised transit. Daniel Degrève has collected and processed all data on the volume and value of imports and exports for the entire period 1835-1939 and has noted some of the problems associated with the *Tableau Général*.⁴ Yet, he has failed to construct consistent and reliable figures on foreign trade. This article is a continuation of his work, even though it spans a longer period, viz. 1835-1990. The primary aim is to construct time series of volumes, values, and prices, by adjusting for disguised transit and inadequate price series, by creating a consistent classification of trade, and by constructing weighted deflators for imports and exports. The results will be used to make a first quantitative analysis of Belgian international trade in relation to its economic development.

2. The Quality of the Trade Statistics of Belgium

Ever since the nineteenth century statisticians and historians have expressed concern over the reliability of trade statistics. The nature and origin of the associated

2 Fraud and smuggling were at their peak during the early nineteenth century when the international climate was dominated by protectionism and warfare.

3 In many countries the trade statistics do not distinguish between general trade (all international flows of goods including transit) and special trade (imports for domestic consumption and exports of domestic origin). The distinction is, however, only necessary when transit accounts for a significant proportion of general trade. Small countries with a large hinterland -such as Belgium or the Netherlands- were outstanding candidates for disguised transit. To this day the international trade statistics of the United States only provide data on general trade, since transit is almost non-existent. Cf. OECD, *Foreign trade by commodities* (Paris 1993).

4 D. Degrève, *Le Commerce Extérieur de la Belgique, 1830-1913-1939: Présentation Critique des Données Statistique* (2 vols.; Brussels 1982).

problems is consequently well-defined. However, little is known of the extent of the inaccuracies and even fewer attempts have been made to remedy them. Following in the footsteps of Morgenstern, Federico and Tena have developed a test for the accuracy of trade statistics.⁵ It involves a confrontation between a direct estimate of the value of imports or exports derived from a country's own official trade statistics and an indirect estimate made by adding up the total exports to or imports from a specific country according to the trade returns of all other countries in the sample. The ratio between the direct and indirect figures represents the degree of accuracy or 'accuracy index'. Their sample comprises the statistics of 35 countries, including the main trading nations of the world. Table 1 shows the accuracy indices of Belgium, the Netherlands, the industrialized nations, and 'the world'.

Table 1. *Accuracy Indices of Trade Statistics, 1909/13, 1928 and 1935*

	1909/13	1928	1935
<i>Imports</i> Belgium	105	78	97
Netherlands	218	83	92
industrial countries	117 ^a	108	113
world	114 ^a	110	112
<i>Exports</i> Belgium	97	78	94
Netherlands	284	78	82
industrial countries	98 ^a	93	96
world	87 ^a	94	92

Note: The index measures the relation between the recorded value of a nation's imports and exports and the sum of the trade of 'all' other countries with that nation on the basis of their respective trade statistics. ^a Excluding the Netherlands. The official values of Dutch trade were highly unreliable as a result of the use of a completely outdated set of prices. Source: Federico and Tena, 'On the accuracy' 10 and 18.

The estimates of Federico and Tena show that on aggregate trade statistics were fairly reliable even before the Second World War, although official imports were generally higher and exports were lower than the indirect estimates suggest. It is nonetheless remarkable that Belgium and the Netherlands consistently scored below the average for the industrialized nations, particularly in 1928.⁶ This does not

5 G. Federico and A. Tena, 'On the Accuracy of Historical International Foreign Trade Statistics. Morgenstern Revisited' *EIU Working Papers* no. 89/373 (San Domenico 1989); O. Morgenstern, *On the Accuracy of Economic Observations* (Princeton 1950).

6 In 1913 the Dutch trade returns were the most unreliable statistics in the world according to the calculations of Federico and Tena, which can be attributed to the use of an

necessarily mean that the Belgian and Dutch trade figures are less useful or reliable. It is quite likely that the methods used by Federico and Tena are inconclusive insofar as the overall quality of statistics is concerned. Their results pertain mainly to the total value of general trade and to its division among countries of origin or destination. They have not tried to ascertain the source of the recorded inaccuracies. Instead, Federico and Tena measure the total effect of errors in prices, volumes, and geographic distribution. The only way to make a definitive statement will be to repeat their method on the level of the individual good for a representative sample of products.

There is, however, a fairly straightforward reason why Belgium and the Netherlands scored lower than many other countries. Both were outspoken transit countries that shared the problem of 'disguised transit'. Even after this phenomenon had been officially eliminated there remained a difference between the direct and indirect estimates of Dutch and Belgian imports and exports.⁷ The remaining gap can probably be ascribed to differences in the registration of origins and destinations: goods that were recorded as transit in Belgium or the Netherlands were to some degree classified as imports from or exports to Belgium or the Netherlands by the other trading nations.

The trade statistics of Belgium -*Tableau général du commerce extérieur*- were set up shortly after national independence in 1830. Almost from the beginning they provide a vast amount of detailed information on imports and exports. Daniel Degrève -a member of the Liège group responsible for *l'Histoire Quantitative de la Belgique* [The Quantitative History of Belgium]- has constructed a database containing the quantities and values of Belgian imports, exports and transit in the period 1835-1939, classified into more than 140 commodity groups.⁸ At first glance his enormous effort seems to have made the task of analysing the long-term development of the international trade of Belgium comparatively simple. Yet, on closer examination it appears that his attempt to provide coherent time series has left in place two of the most damaging inadequacies: the use of incorrect price data to calculate trade values, and the phenomenon of disguised transit whereby transit commodities were 'mistakenly' declared as special imports and exports.

The *Tableau Général* used a set of official prices that was adjusted annually. Yet, the official prices were not equally good for every commodity, while in some periods (notably between 1860 and 1890) many goods were declared in value only. Degrève uses rather crude methods to estimate quantities when their registra-

obsolete set of fixed prices and to the phenomenon of disguised transit (Federico and Tena, 'On the Accuracy', 15).

7 The present-day Dutch trade statistics still mention the problem of disguised transit (CBS, *Statistiek van de buitenlandse handel* (Voorburg 1993).

8 Degrève, *Le Commerce Extérieur*.

tion was briefly interrupted.⁹ He has not tried to incorporate alternative price information -such as wholesale prices reported by merchant companies, industrial price series, or foreign prices- into his estimates to replace faulty price data. Degrève has apparently failed to test the quality of his implicit prices (values divided by quantities), which would inevitably have shown the weakness of certain series.¹⁰

Disguised transit poses an even greater threat, especially since there is no information on its absolute extent. In his discussion of the quality of the Belgian trade statistics Degrève regularly points out that disguised transit may pose a serious problem.¹¹ He is, however, sceptical when it comes to the possibility of an adjustment. Degrève does discuss the estimates of De Lannoy who has tried to calculate the amount of disguised transit in 1909.¹² De Lannoy distinguishes a number of products that were not produced in Belgium (such as rice and coffee), not produced in sufficient amounts for domestic consumption but nonetheless exported (such as grains), or imported and re-exported after minor processing (such as wood, crude tin, and manure). He estimates that c. 24 percent of special imports and c. 33 percent of special exports actually consisted of transit. Degrève suggests that the actual extent of disguised transit can be measured by comparing the official value of Belgian imports (and exports) with the exports to (or imports from) Belgium according to the statistics of a sample of other countries.¹³ He arrives at a gap of 1 to 6 percent, which is much lower than De Lannoy's estimates.¹⁴

Yet, the international comparison of aggregate trade values essentially measures the entire range of potential statistical problems and it can really only be made for general trade, which includes transit.¹⁵ Moreover, Degrève demonstrates that there were considerable differences in the share of foreign goods -i.e. goods not produ-

9 For example, to calculate the volume of the trade in woollen textiles in 1892-1900 he applies the average price of this product in 1901/05 (Degrève, *Le Commerce Extérieur*, vol I: product 7). For paper he uses the average price in 1866/75 to calculate quantities for the period 1835-1865, whereas he explicitly refuses to apply the same method to the trade in crude animal materials for a period of similar length: 'On ne peut pas valablement les [prices] intrapoler pour 37 années!' (Degrève, *Le Commerce Extérieur*, vol II: products 95 and 107).

10 The nature of the official prices of the nineteenth-century trade statistics is unclear. They were presumably wholesale prices rather than c.i.f.- and f.o.b.-prices.

11 Degrève, *Le Commerce Extérieur*, I: 70, 92.

12 Degrève, *Le Commerce Extérieur*, I: 139-141.

13 Essentially the same method as that of Federico and Tena, albeit based on a smaller number of countries.

14 Degrève, *Le Commerce Extérieur*, I: 147-149.

15 Special exports from Belgium to Germany do not have to be equal to special imports into Germany from Belgium, especially when one of the two trade statistics contains disguised transit. Data on the origin and destination of trade are notoriously unreliable.

ced in the exporting country- in Belgian trade according to a direct measure of Belgian exports and an indirect measure for the four surrounding economies (the United Kingdom, the Netherlands, Germany and France).¹⁶ He concludes that all foreign trade returns will have contained disguised transit. It is, however, more likely that the Belgian statistics were the main source of inaccuracy and that disguised transit was more important than Degrève assumes.

In short, the values and quantities presented by Degrève do not present an accurate picture of Belgian international trade. This affects the absolute level of trade, the quality of deflators, and the composition of imports and exports. Casually adjusted official prices, awkward manipulations by Degrève, and disguised transit require a solution before consistent time series of Belgian foreign trade in the long nineteenth century can be presented. After the First World War, or at least after 1922, the quality of the trade statistics was raised significantly: disguised transit was virtually eliminated and trade was valued at real and appropriate prices (f.o.b. and c.i.f.). All that needs to be done is to reclassify imports and exports and to construct reliable deflators for the entire period.¹⁷

3. Adjusting Prices

In general the official price series for the nineteenth century display a reliable pattern of development. For most products prices were adjusted annually and additional price series often correspond closely with the official data. Yet, for 56 products prices are completely or partially inadequate. Constant levels -usually for relatively short periods but in some instances for the entire century- and sudden radical breaks in price series undermine the reliability of trade values and deflators.¹⁸

The attempt to repair faulty price data immediately reveals that there is an urgent need to improve the state of Belgian price history. Comparatively few Bel-

16 Degrève, *Le Commerce Extérieur*, I: 148.

17 The Standard International Trade Classification of the United Nations has been applied to construct a consistent image of compositional changes in Belgian international trade: UN, *Standard International Trade Classification* (New York 1986). Twelve categories are distinguished, namely (1) livestock products, (2) arable products, (3) luxury foodstuffs, (4) crude materials, (5) mineral fuels, (6) oils, fats and waxes, (7) chemicals, (8) manufactured goods, other than textiles and metals, (9) textiles, (10) metals, (11) machinery and transport equipment, and (12) other merchandise. Groups (1) through (3) are agricultural, groups (4) through (6) comprise crude materials and fuels, and groups (7) through (11) are the industrial commodities (semi-manufactures and finished products).

18 A deflator that includes these prices is basically unreliable, whereas their exclusion reduces the representativeness of the deflator.

gian series are available.¹⁹ For some products there is no alternative but to use foreign prices.²⁰ It is fairly unproblematic to introduce the prices of one nation's trade statistics into those of another nation, since they essentially reflect the development of world market prices. However, when strictly national prices are concerned -retail prices or prices of commodities that were mainly consumed on the domestic market- they cannot simply be applied. Whenever alternative data are used to improve the quality of Degrève's data, their introduction is preceded by a comparison with the official prices. An adjustment is only made when there is at least a fair degree of similarity, even if it only concerns the general pattern of development.

The first type of problem is the occurrence of radical -and clearly artificial- breaks in price series, usually in the mid-fourties and mid-nineties.²¹ The aim is to replace the observed change in prices with an assumed price change and thus calculate a revised price level before or after the break. The official prices of the remaining years are then adjusted to the revised price level. Where possible the assumed price change is based on a comparison with representative additional price series (Belgian or foreign). It is not always necessary to adapt the prices of the entire period preceding or following a break; for some products the adjustment can be restricted to a short period in which the problem was concentrated.

Alternative data were required to repair longer periods of inadequate prices. Two different methods have been applied. First, when prices are inadequate from the beginning of the period until a certain year, they are replaced with an index of alternative prices and linked on the first year for which prices can be considered

19 Antoon Soete has kindly provided me with a large number of price series. Other Belgian price data were found J. Gadisseur, *Le Produit Physique de la Belgique 1830-1913: Présentation Critique des Données Statistiques*, vol. A (Brussels 1990) and J. Blomme, *The Economic Development of Belgian Agriculture 1880-1980: A Quantitative and Qualitative Analysis* (Leuven 1993).

20 The database of the Dutch project 'Reconstruction of the National Accounts of the Netherlands 1800-1940' yields a sufficient number of price indices with which to complete the task at hand (Smits, *Economic Growth*; J.P. Smits, E. Horlings, and J.L. van Zanden, *Dutch GDP and its Components, 1800-1913* (Groningen Growth and Development Centre Monograph Series No. 5; Groningen 2000). E. Horlings, *The Economic Development of the Dutch Service Sector 1800-1850. Trade and Transport in a Premodern Economy* (Amsterdam 1995). A. van Riel, *Prices and Economic Development in the Netherlands 1800-1913. A Growth-Analytical Approach to Price History* (University of Utrecht, forthcoming Ph.D. thesis). It must be noted that some of these prices were in fact taken from British and German sources.

21 Two of the most extreme examples are ash and unprocessed steel. In 1908/1909 the official price of ash fell from 20 BF per ton to 1.3 BF per ton; the price of unprocessed steel dropped from 50 BF per kilogram in 1864 to 1.2 BF per kilogram in 1865 (Degrève, *Le Commerce Extérieur*, vol II: products 87 and 141).

reliable. If, however, prices have to be replaced for an intermediate period, a somewhat more subtle approach is required. The general method for introducing additional price information into an existing series is as follows. The existing official price data are used to set the actual level of prices at the extreme ends of the period for which prices have to be replaced. For example, if new prices are needed for the period 1851-1864, the first step is to determine the level of prices in 1850 and 1865. The same is done for the alternative price series. The intervening years between the official and alternative benchmark prices are then filled in by means of linear interpolation. The ratios between actual values and interpolated values of the alternative price series are then used to adjust the linear interpolated values of the official price series for annual fluctuations, that are derived from the additional price series. The end result is a revised price series in which the fluctuations of an alternative price series have been combined with the absolute values of the official prices.

Unreliable price data especially appear to have affected the early years of the period. The most substantial changes to the value of trade were made for the periods 1835-1845 and 1855-1865. In the first period the value of exports was reduced by about 6 percent. During the remainder of the century the revision of price data caused a change of between 1 and 3 percent of import and export values. The benefits of this exercise will be noticed in the quality of deflators rather than the nominal values of trade.

4. The Removal of Disguised Transit

The liberalization of international trade, which began around the middle of the nineteenth century, had a beneficial effect on the economies of Europe. It was, however, also responsible for the emergence of disguised transit. Merchants who wanted to avoid the red tape and waste of time associated with transit instead declared their goods as special imports and exports at the slight expense of import duties. The trading community will have considered it an excellent loophole, while the government -although aware of the problem- was at the very least confronted with higher customs revenues. However, from a statistical point of view disguised transit is a dreadful phenomenon. It distorts the structure and level of special imports and exports and must therefore be eliminated. Yet, much like fraud and smuggling there are no statistical data with which to measure the extent of the problem. How can disguised transit be removed?

In order to revise the trade figures for the Netherlands in the period 1872-1913 Lindblad and Van Zanden developed a test for the presence of disguised transit.²²

22 Lindblad and Van Zanden, 'De buitenlandse handel', 236-240. Smits has constructed revised series of the value of imports and exports by using better price data and by remo-

It is based on two measures: (i) the size of the balance of imports and exports of a given commodity expressed as a percentage of the largest of the two trade flows, and (ii) the degree of correlation between imports and exports. A small balance points towards a high degree of disguised transit: the greater part of the goods that entered the country was re-exported.²³ A high degree of correlation indicates that imports and exports were intimately related, which may have been caused by a high degree of disguised transit. Since their correlations include the aggregate trend -they correlate actual values instead of first differences- Lindblad and Van Zanden apply a more careful interpretation of the results: a low correlation implies the absence of disguised transit, but a high correlation does not necessarily signify the reverse. Although their test is basically simple, setting limits of tolerance is less straightforward. Lindblad and Van Zanden divided their sample of commodities into three groups. Disguised transit was absent when the balance of imports and exports exceeded 70 percent and the correlation (R) fell below .70; it was present when the balance was lower than 50 percent and the correlation was above .95; and the results were inconclusive with a balance of 50 to 70 percent and a correlation of .70 to .95.²⁴

The methodology of Lindblad and Van Zanden is the starting point for the adjustment of Belgian imports and exports. The basis of the test for disguised transit consists of the size of the balance and the degree of correlation between imports and exports. Table 2 shows the probability of the presence of disguised transit according to the results of these two tests. Disguised transit will in all likelihood only be found with products that have a probability of medium, high or very high.

Table 2. *Probability of the Presence of Disguised Transit*

Correlation	Balance of trade		
	<50%	50-70%	>70%
>.95	very high	high	high
.70-.95	high	medium	medium
<.70	low	low	low

ving disguised transit for the entire period 1850-1913 (Smits, *Economic Growth*, appendix VI).

23 There is a fundamental difference between transit and re-exports: re-exported goods pass through the national trade apparatus, whereas transit merely concerns transshipment and transport.

24 Lindblad and Van Zanden, 'De buitenlandse handel', 238.

When the selection criteria are applied, Degrevè's 172 products can be divided according to the probability of the presence of disguised transit. Table 3 clearly reveals that before 1850 and after 1919 disguised transit was either absent or insignificant, whereas in 1850-1913 approximately half of the products was eligible for adjustment. In addition, the practice of disguised transit appears to have become more intense after 1880: in 1850-1880 14 percent of commodities had a high or very high probability as against 25 percent in 1880-1913.

Table 3. *A Division of Commodities in Belgian Trade according to the Probability of the Presence of Disguised Transit (%)*

	1835-1850	1850-1880	1880-1913	1919-1939
very high	-	2	4	-
high	-	12	21	8
medium	6	31	25	15
Low	94	55	51	77
total	100	100	100	100

Note: Share in the total number of commodities.

The two basic tests lead to ambiguous conclusions: weak results indicate the absence of disguised transit but strong results need not prove the opposite. Therefore, two additional tests were used. First, the correlation between the first differences (i.e. annual changes) of imports and exports has been added to support the test results. Another indicator for the presence (or absence) of disguised transit is the ratio between the volume of transit on the one hand, and the sum of the largest of the two other trade flows (special imports or exports) and transit itself on the other hand, the latter sum as a proxy for general trade. The transit ratio serves as an indicator for the propensity to declare goods as transit. A large share of transit may indicate that it was generally recorded as such, whereas a low share of transit may imply that there was disguised transit. The correlation of first differences and the transit ratio are only used to break a potential gridlock after the two first tests. It is important to note that none of the four tests is decisive by itself. Disguised transit is assumed present only when a commodity responds positively to every test. The presence (or absence) of disguised transit is determined in a four-step procedure:

- (1) A comparison of the size of the balance of imports and exports and the degree of correlation with the limits of tolerance in table 3.
- (2) A check of the development of the balance and correlation between 1850/1880 and 1880/1913. Judging by the percentages in table 4 disguised transit

occurred more frequently in 1880/1913 than in 1850/1880, which is why I expect a decline in the balance and an increase in the degree of correlation.

- (3) A test of the share of transit in general trade. A high percentage indicates that merchants tended to declare their goods as transit rather than as special imports and exports. I expect a decline in the share of transit between 1850/1880 and 1880/1913.
- (4) In the event of lasting doubt the correlation of the first differences of imports and exports can be used to pass final judgement.

Table 4 lists the test results for the commodities that tested positive to the presence of disguised transit. Most of the selected products are bulk commodities, crude rather than processed. The exceptions are drugs and sundries, paints and colours, and other chemical goods. In such diverse groups of products a test based on aggregate trade figures does not reveal differences in the quality of imports and exports. If Belgium imported large quantities of one type of paint and exported equally large quantities of another type, and if both trades were subject to the same general trend in world trade, then the test would find disguised transit where none was present. However, the test results are comparatively strong, especially for the two chemical products. Drugs and dyestuffs were also important commodities in transport on the Rhine, the main transit route into Germany.²⁵

25 H.P.H. Nusteling, *De Rijnvaart in het Tijdperk van Stoom en Steenkool 1831-1914* (Amsterdam 1974) 132, 137 and 273.

Table 4. Results of the Tests for Disguised Transit 1850-1913, Selected Products Only

commodities by probability	first year adjust- ment	1850-1913			1850-1880			1880-1913					
		R _L	R _{FD}	transit balance	R _L	R _{FD}	transit balance	R _L	R _{FD}	transit balance			
Very high (balance<50, R>.95)													
grease and fat	1850	.975**	.582**	19.7	32.9	.989**	.812**	14.9	10.0	.915**	.441*	24.0	
Raw hides	1856	29.0	.977**	.231	17.9	33.2	.973**	.305	25.1	25.4	.926**	.171	11.1
paints and colours	1851	29.6	.992**	.618**	22.0	38.1	.921**	.176	20.7	22.4	.982**	.626**	23.3
unwrought lead	1850	30.8	.969**	.598**	25.5	42.8	.883**	.604**	33.8	20.4	.947**	.607**	18.8
rags, old clothing	1861	40.6	.957**	.437**	30.0	55.1	.960**	.520*	38.1	27.6	.950**	.435**	22.4
wool	1850	47.2	.976**	.839**	17.6	64.7	.986**	.952**	22.9	31.3	.913**	.763**	12.5
crude copper and nickel	1861	49.0	.982**	.866**	16.9	52.9	.951**	.815**	20.5	45.2	.980**	.867**	13.9
High (balance<50, R.70-.95)													
other live animals	1880	27.0	.729**	.798**	11.8			a)		27.0	.729**	.798**	11.8
mineral raw materials	1856	31.8	.943**	-.002	8.8	37.8	.867**	-.003	10.2	28.3	.936**	-.065	7.7
aluminium	1904	32.2	.897**	.911**	25.9			b)		32.3	.897**	.911**	25.9
other chemical goods	1855	33.7	.932**	.840**	21.5					33.7	.932**	.840**	21.5
Oil	1861	34.8	.931**	.573**	21.5	44.2	.683**	-.089	30.9	27.0	.935**	.644**	12.7
meat	1871	39.5	.921**	.747**	16.5	53.8	.958**	.760**	11.6	26.8	.780**	.700**	20.5
horses and foal	1852	42.8	.895**	-.167	18.0	64.9	-.620**	-.375	21.2	22.7	.903**	.346	15.9

Table 4. Results of the Tests for Disguised Transit 1850-1913, Selected Products Only

commodities by probability	first year adjust- ment	1850-1913			1850-1880			1880-1913					
		R _L	R _{FD}	transit balance	R _L	R _{FD}	transit balance	R _L	R _{FD}	transit balance			
High (balance 50-70, R>.95)													
drugs ^{o)}	1860	54.5	.974**	.699**	24.7	56.0	.634**	.348	31.0	53.5	.938**	.297	18.6
crude rubber	1893	56.5	.998**	.822**	39.6	77.7	.434*	.096	49.4	38.1	.997**	.821**	30.4
resin, asphalt, and petroleum ^{o)}	1855	67.8	.963**	.413**	3.6	67.4	.974**	.428*	4.6	68.0	.936**	.392	2.7
oats, maize, and buckwheat	1870	68.1	.965**	.751**	11.6	67.8	.867**	-.256	16.0	68.6	.916**	.824**	7.3
High (balance>70, R>.95)													
Oil seeds	1850	70.8	.989**	.828**	3.1	90.9	.803**	.287	5.3	52.5	.981**	.860**	.9
wheat	1870	77.1	.956**	.709**	6.2	81.5	.918**	.608**	11.7	72.7	.865**	.731**	1.0
sodium salt	1870	78.8	.955**	.372*	9.4	86.9	.933**	-.208	11.1	71.5	.955**	.337	7.7
hemp	1856	79.6	.952**	.473**	9.4	91.4	.917**	.384	8.6	69.0	.939**	.472	9.9
Raw cocoa	1895	86.1	.992**	.765**	29.8	96.4	.611**	-.027	34.4	77.0	.991**	.753**	26.0
Medium (balance 50-70, R .70-.95)													
other vegetable materials	1850	53.5	.919**	.297	9.3			^{o)}		53.5	.919**	.297	9.3
cotton	1865	55.8	.936**	.694**	7.3	71.0	.971**	.745**	9.1	41.7	.667**	.689**	5.5
starch	1859	57.2	.947**	.401**	16.4	74.4	.853**	-.211	13.2	41.2	.802**	.523**	18.9
manure ^{o)}	1880	61.1	.878**	.049	8.9	79.5	.783**	-.133	1.8	43.6	.937**	.052	15.3
Rice ^{o)}	1852	68.8	.888**	.525**	9.3	74.7	.831**	.659**	8.4	63.4	.824**	.486*	10.0

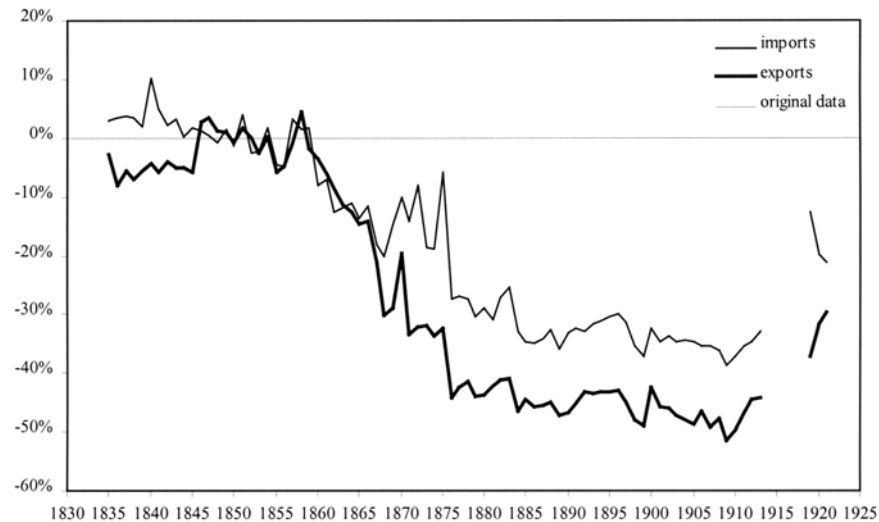
Table 4. Results of the Tests for Disguised Transit 1850-1913, Selected Products Only

commodities by probability	first year adjust- ment	1850-1913				1850-1880				1880-1913			
		balan-	R _L	R _{FD}	transit	balance	R _L	R _{FD}	transit	balance	R _L	R _{FD}	transit
		cc											
Medium (balance>70, R .70-.95)													
fodder cakes	1881	74.9	.944**	.393**	1.1	80.7	-.244	-.401	1.0	70.2	.925**	.451*	1.2
barley, malt	1871	86.4	.929**	.735**	6.0	92.0	.909**	.513*	8.7	81.1	.762**	.782**	3.5
crude zinc	1858	91.0	.940**	.412**	12.9	92.7	.494*	.086	15.7	89.7	.940**	.435*	10.5

Note: * = significance < .01, ** = significance < .001. Balance is the difference between the volume of imports and exports as a percentage of the largest of the two flows. Transit is the share of the amount of goods declared in transit as a percentage of imports or exports (whichever is larger). R_L is the correlation coefficient for actual levels. R_{FD} is the correlation coefficient for first differences.

- a) No quantities until 1901. Test of values 1835-1913 supports selection (1850/80 Balance=26.9, R_L=.223; 1880/1913 Balance=31.9, R_L=.867)
- b) No quantities until 1901. Test of values 1835-1913 supports selection (1850/80 Balance=66.3, R_L=.953; 1880/1913 Balance=18.2, R_L=.897)
- c) The main item within this group of products (all drugs without chicory; 95-100% of trade) justifies selection. In 1850/80-1880/1913 its balance of trade declined, R remained above .90, and transit fell sharply.
- d) Two subgroups justify selection; the remaining product (crude petroleum) is insignificant. Refined petroleum tests negative in 1880/1913, but its share in trade fell considerably. The remaining product (resin and asphalt) became more important and tests positive.
- e) No quantities until 1901. Test of values 1835-1913 supports selection (1850/80 Balance=21.3, R_L=.909; 1880/1913 Balance=16.6, R_L=.980)
- f) The decline in the share of guano in 1880-1913 added to the strength of the test results.
- g) Unpeeled rice tests negative, but its share declined sharply between 1880 and 1913. Peeled rice tests positive.

Graph 1. *The Effect of Revised Price Series and the Removal of Disguised Transit on the Value of Imports and Exports, 1835-1921 (%)*



Note: New minus original value divided by original value.

It is visually determined when the phenomenon first occurred in the trade of each of the selected products. Disguised transit began to appear after 1850, but the starting point was different for every product.²⁶ Its removal from the values of international trade requires more drastic measures, since the actual size of the problem cannot be ascertained. The real volume of trade is set equal to the balance of imports and exports, thus assuming that the smallest of the two trade flows consisted entirely of disguised transit. For example, if imports are 2,000 tons and exports 1,800 tons, the new volume of imports will be 200 tons while exports are reduced to zero. The method of adjustment is rather radical. It is, however, impossible to assign a specific share to disguised transit and any assumptions on such a percentage would only serve to obscure the quality of the adjusted trade series. Quantitative analysis and a comparison with macroeconomic trends will have to prove the value of the revised import and export data. The new values of trade are calculated by multiplying the revised quantities of imports and exports with their

²⁶ The *Tableau Général* first mentioned disguised transit in 1854 (Degrève, *Le Commerce Extérieur*, I: 136). It intensified in the course of the second half of the nineteenth century. For example, duties on foodstuffs were lowered in the 1850s and abolished in 1873 (Degrève, *Le Commerce Extérieur*, I: 35), while disguised transit appears to have invaded the trade in grains from the seventies on.

original unit value ratio (after the correction of price data). The correction was also made for the years 1919-1921: the Act of 28 August 1921 imposed an ad valorem duty of one percent on special imports, which virtually ended the practice of disguised transit.²⁷

The elimination of disguised transit has profound consequences for the growth and composition of trade. Graph 1 shows that the extent of the problem increased rapidly between 1850 and 1880. In 1913 the removal of disguised transit (and the adjustment of prices) lowers the value of imports and exports by 33 and 44 percent. This is even more than was suggested by De Lannoy (24 and 33 percent).²⁸ Since he did not take into account the disguised transit of goods that were also produced in Belgium, the results appear to be in line with expectations.

The adjustment has its most profound impact on the trade in crude materials and fuels. Table 5 shows that 70 percent of disguised transit was found in that category of trade. Arables, livestock products, and luxury foodstuffs added another 14 to 15 percent. Unprocessed metals (semi-manufactures included among manufacturing commodities) add another 6 percent. The results thus confirm the notion that the phenomenon was mainly concentrated in low-taxed, low-value bulk commodities.

Table 5. *The effect of the removal of disguised transit on the value and structure of imports and exports in 1913 (%)*

	effect on the value of trade		share in total adjustment for disguised transit	
	imports	exports	imports	exports
arables	-17	-60	10	10
livestock products	-20	-70	3	4
luxury foodstuffs	-6	-19	1	1
crude materials	-51	-79	63	61
mineral fuels	-10	-28	2	4
oils, fats, and waxes	-56	-83	5	5
chemicals	-71	-86	11	10
metals	-33	-18	6	6
total	-33	-44	100	100

The correction for disguised transit drastically alters the development of the composition of Belgian international trade. Imports have undergone moderate change (table 6). The downward adjustment of crude materials and fuels was distributed more or less evenly among agricultural and industrial commodities. Exports have

27 Degrève, *Le Commerce Extérieur*, I: 136-137.

28 Degrève, *Le Commerce Extérieur*, I: 141.

become much more industrial. In Degrève's estimates a growing proportion of Belgian exports in the second half of the nineteenth century was made up of primary commodities; the share of industrial commodities actually fell. The new estimates indicate an increase in the share of industrial semi-manufactures and finished goods. Manufacturing commodities account for 68 percent of exports in 1913 as against only 40 percent in Degrève's estimates.

Table 6. *Effect of the Removal of Disguised Transit on the Value and Composition of Imports and Exports (Total = 100 percent)*

	agricultural goods and fuels	crude materials	manufacturing commodities
<i>Share in the total correction for disguised transit</i>			
imports	14	70	17
exports	15	70	16
<i>Composition of trade before and after revision</i>			
imports 1850	41	35	24
Degrève 1913	30	52	18
revised 1913	36	41	23
exports 1850	23	31	46
Degrève 1913	14	45	40
revised 1913	11	21	68

Note: The category of 'all other products' was left aside. It accounted for 3 to 5 percent of the value of exports.

Sources: Revised database. Degrève, *Le Commerce Extérieur*.

5. Deflation

Deflation is commonly used to distinguish between the effect of changes in prices and volumes. The recorded volume of trade (i.e. quantities imported and exported) is insufficient if not irrelevant. Only values can adequately measure the importance of a good and quantities do not take into account changes in relative prices.²⁹ Similarly, the ratio between the total value and total volume of trade -the aggregate unit value ratio- cannot be used as a deflator. It is standard practice to adjust nominal values by means of a representative weighted deflator. The con-

29 Horlings, *The Economic Development*, 99-101.

struction of price indices for Belgian imports and exports presents a number of interesting challenges: the need to adjust for faulty price data prior to 1913; the use of unit value ratios for groups of products rather than prices of individual commodities; and the need to select a uniform group of products (with reliable price data) for each separate weighting scheme.

The most popular and simplest price index formulas are those of Paasche and Laspeyres. They are internally consistent (they disaggregate values into volumes and prices without leaving a residual) and consistent in aggregation (a direct application of the formula to the individual commodities should yield the same result as an indirect application in which the formula is used to make partial deflators that are then weighted into an aggregate deflator).³⁰ However, Paasche and Laspeyres not only distinguish between changes in prices and quantities, they also measure the effects of structural change during a period. An average weighting scheme would eliminate this problem. I have therefore applied the so-called ideal formula of Fisher, which is equal to the geometric average of a Paasche and a Laspeyres price index. It combines the simplicity of the constituent formulas with the added advantage of an average weighting scheme.

The main methodological problem is that the deflators will not be based on prices, but on unit value ratios (the ratio between the value and volume of trade in a group of commodities). Such ratios present an indication of price movements, but their reliability is highly dependent on the size and composition of the subgroups. The unit value ratio of a group of products measures both actual price movements and relative shifts between constituent goods; the more individual commodities per group (or the less individual groups of products are distinguished or the more heterogeneous they are) the more serious this problem can potentially be.

Degrève's groups of products are generally homogeneous. This mainly follows from the large number of individual products he distinguishes. The summary tables for the period 1936-1990 divide imports and exports into fewer commodity groups, but these are based on a logical classification. From 1951 on the trade statistics of the *BLEU* are divided following the guidelines of the United Nations -the Standard International Trade Classification. Although there will have been qualitative shifts, it seems safe to assume that the unit value ratios are representative of the average development of prices of the various subgroups.³¹

30 G. den Bakker, 'De keuze van indexcijferformules en gewichten. Een gevoeligheidsanalyse aan de hand van macro-reeksen voor het interbellum', in: CBS, *Statistische onderzoeken* M38 (The Hague 1990) 6-7.

31 A test of the effect of aggregation on the quality of weighted price indices for Belgium in the twentieth century suggests that as the number of commodity groups declined the price index increased at a higher rate. The effects were, however, only significant when a small number of heterogeneous groups was used.

Strictly speaking the choice of benchmark years should be based on movements in relative prices: the index has to be reweighted after a period of strong relative price changes.³² This may seem fairly straightforward when weighting a few price series (e.g. aggregate indices for agriculture, industry and services), but when a very large number of series is involved, relative price changes are anything but easy to identify. In order to avoid radical changes in weights and to make the most of the available price series the distance between these years was set at around a decade: the benchmark years were 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1924, 1937, 1950, 1960, 1970, 1980, and 1990. Each of the subseries overlaps the previous and following series by three years: e.g. 1849-1861 is weighted on 1860, 1839-1851 on 1850, and the two series are linked on the average ratio in 1849-1851.³³

Partial deflators are constructed for each category of trade using the same methods and excluding the same products as in the aggregate deflator. Since each deflator is based on a much smaller sample than the aggregate price index, some partial indices are less reliable due to a lack of adequate or representative price series. Consequently, the values at constant prices are also less reliable.³⁴

On average the nineteenth-century series (1840-1910) cover 87.3 percent of the value of imports and contain 83 commodity groups; the coverage of exports is an average of 85.5 percent of value and 74 commodity groups. Coverage is substantially higher in the twentieth century: 97.0 percent of imports and 95.3 percent of exports. However, the number of products decreases from more than one hundred in the interbellum period to just under ninety in the 1950s and 1960s, and 50 to 60 groups of products in the decades thereafter. Considering that in terms of value coverage is exceptionally high and that the classification of products results in fairly homogeneous groups of commodities the deflators can nonetheless be regarded as reliable.

6. Aggregate Trends in Size and Structure

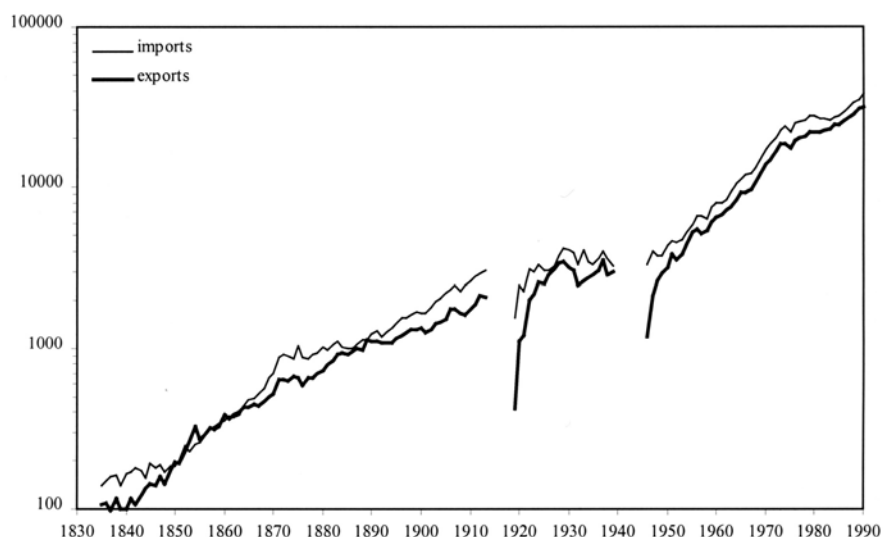
In the absence of independent data on international trade the best way to test the reliability of the results is to chart the quantitative development of imports and exports and to confront it with macroeconomic estimates on the Belgian economy

32 O. Krantz, 'Historical National Accounts - Some Methodological Notes', *Scandinavian Economic History Review* 31 (1983) 109-131.

33 Some products were excluded from the deflators. It concerns the remaining inadequate price series of the nineteenth century as well as products for which either the numerator or the denominator of the Paasche or Laspeyres price index was zero.

34 This problem is largely restricted to the nineteenth century and to three small groups of products: (1) oils, fats and waxes, (2) chemicals, and (3) unspecified products.

Graph 2. *The Value of Imports and Exports at Constant 1910 Prices, 1835-1990 (millions of Belgian Francs; semi-logarithmic scale)*



in the nineteenth and twentieth centuries. Do the revised trade figures provide an accurate and consistent image of general macroeconomic trends?

Graph 2 displays the aggregate values of imports and exports at constant prices of 1910. One final correction was needed to make the entire series consistent. Starting on May 1, 1922 all trade figures relate to the Belgian-Luxemburgian Economic Union [BLEU]. On aggregate only a minor correction is needed to isolate the foreign trade of Belgium from the data pertaining to the entire Economic Union: the value of imports must be reduced by 4.64 percent and that of exports by 2.14 percent.³⁵ This procedure has no effect on the structure of imports and exports. Luxemburg was quite simply too small to have a significant effect on the size and composition of the international trade of the Union.³⁶ The time series of total im-

35 The adjustment had to be made by means of data from the 1920s. Since then all Belgian-Luxemburgian trade has been considered domestic. *Tableau Général* (1922) 29-31, 504. *Annuaire Statistique de la Belgique* 9 (Brussels 1920-21) 217. The correction removes the imports and exports of Luxemburg and restores Belgian trade with Luxemburg.

36 At the end of 1922 Belgium had 7.6 million inhabitants as against 262 thousand in Luxemburg (*Tableau général* 1922, 20-21). The effect of the creation of the BLEU was tested to make sure that the removal of Luxemburg did not affect the structure of trade. Conversion ratios (Belgian imports or exports relative to Union imports or exports) were calculated for four general categories (live animals, foodstuffs and beverages, raw materials and semi-manufactures, and manufactured goods) and applied to value of trade of the

ports and exports provide a consistent picture of Belgian international trade. The two World Wars did not represent a break in the development of either trade flow.

The pattern of development appears to fit in with the available evidence on macroeconomic performance (table 7). In general the growth rates of trade match those of real per capita GDP. The industrial revolution of the period 1850-1870 went along with a rapid expansion of international trade, most notably imports of crude materials (8.7 percent per year) and exports of finished industrial commodities (6.9 percent per year). Growth rates remained fairly high until the Great Depression hit the Belgian economy and international trade went into decline. The Second World War dealt another blow, albeit less severe than its predecessor. After 1950 the Belgian economy resumed its growth with renewed vigour; imports and exports increased by more than 7 percent per year. A long-term perspective on the growth of GDP and international trade confirms that the achievements of the fifties and sixties of the twentieth century can rightly be called the Belgian Miracle. As a matter of fact, the same holds true for the fifties and sixties of the nineteenth century.

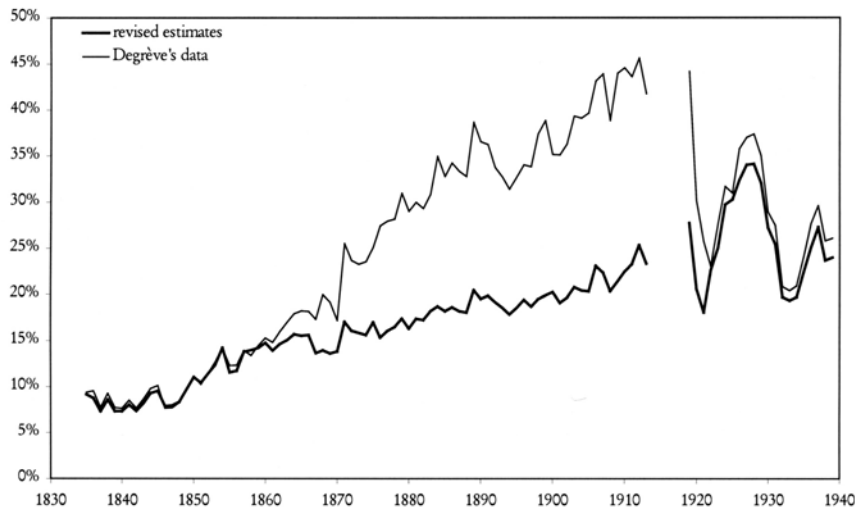
Table 7. *Compound Average Growth Rates of Imports and Exports at Constant 1910 Prices, 1835/37-1988/90 (%)*

	real	imports				exports			
	per capita GDP	primary	crude	industrial	total	primary	crude	industrial	total
1836-1850	1.2	1.7	2.1	0.4	1.8	4.5	4.4	3.5	4.3
1850-1870	2.9	5.5	8.7	5.7	7.0	2.8	4.2	6.9	5.5
1870-1890	0.9	3.6	1.9	4.0	2.5	3.3	2.9	4.5	3.6
1890-1910	0.9	2.8	4.4	5.0	3.9	0.2	2.1	3.8	2.3
1836-1910	1.5	3.5	4.4	4.0	3.9	2.5	3.3	4.8	3.9
1910-1929	0.5	0.7	3.3	2.9	2.2	4.1	3.3	3.9	3.5
1929-1937	-0.5	0.5	0.7	-3.4	-0.8	-4.3	4.1	-1.6	-0.7
1937-1950	0.9	-1.0	-1.6	3.7	1.0	-1.3	-5.2	1.8	0.4
1910-1950	0.4	0.1	1.2	1.9	1.2	0.6	0.6	2.1	1.6
1950-1970	3.4	4.9	4.7	9.0	7.2	10.3	5.1	6.6	7.4
1970-1989	2.4	3.9	1.0	4.3	3.9	6.6	3.4	3.7	4.3
1950-1989	2.9	4.4	2.9	6.7	5.6	8.5	4.2	5.2	5.8

Sources: E. Horlings, *The Contribution of the Service Sector to Gross Domestic Product in Belgium, 1835-1990* (Unpublished research memorandum; Utrecht 1997); CBS, *Statistisch Jaarboek* 1938-1991.

BLEU in 1923. It emerged that the trade of Luxemburg had only a minor effect on the structure of imports and exports of the entire Union: *Annuaire Statistique* (1920-21) 217, (1923-24) 224.

Graph 3. *The Value Exports as a Percentage of GDP according to Degrève and the Revised Estimates, 1835-1939 (%)*



Belgium is traditionally grouped among the small and open economies of Europe. According to the original trade figures for 1910 imports and exports amounted to 53 and 41 percent of GDP at current prices. Countries of comparable size -such as Sweden, Denmark or Switzerland- had export ratios of only around 20 percent.³⁷ What is more, the import share of 1910 would only have been surpassed in 1968 and the export share in 1981, which seems rather unlikely. After adjustment the ratios of imports and exports to GDP are much lower and their development is more gradual than in the original estimates (graph 3).

Long-term growth entailed economic shifts. Graphs 4 and 5 display the development of the composition of imports and exports. The most outstanding feature of the two graphs is that the revised figures result in an uninterrupted image of the structure of Belgian international trade. The two world wars and the elimination of disguised transit in 1921 no longer represent a break in the time series.

Imports

The trade figures reflect the ongoing modernisation of the Belgian economy in the nineteenth century. The growth of imports was dominated by primary commodities, although industrial imports grew vigorously after 1850. The composition of

37 In 1913 the unweighted average ratio of exports to GDP (at current prices) in a sample of fourteen countries (excluding Belgium and the Netherlands) was 17.9 percent: A. Maddison, *Dynamic Forces in Capitalist Development* (Oxford 1991) 326.

imports changed very little until 1913. The most notable developments were the decline in the share of textiles as domestic production increased, and the relative rise of arable imports during the 'agricultural invasion'. Despite their dynamic development industrial products had a modest share in the value of imports; agricultural goods, crude materials, and fuels accounted for 75 to 80 percent of the value of imports.

After the First World War imports quickly returned to pre-war levels. The imports of machinery experienced a remarkable expansion (4.9 percent in 1910-1924) which was presumably related to the destruction of plant overhead capital by the German army. The growth of imports was cut short by the depression of the 1930s. Only arables, crude materials and metals achieved a fair amount of growth. The other categories performed poorly (livestock products, chemicals, textiles and machinery in particular). In the early 1920s the structure of imports was little different from that of the nineteenth century and shifts in the period 1924-1937 were modest. The most notable changes were the rising importance of fuel imports, a decline in the share of arables and textiles, and a compensating increase in the share of metals and machinery.

The Second World War was a watershed in the development of Belgian imports. The continuous expansion of household demand for imported goods and the emergence of processing industries -the automobile industry in particular- transformed Belgian international trade. Whereas most primary imports declined (arables, crude materials) or grew slowly (fuel, luxury foodstuffs), industrial imports expanded rapidly. Metal manufactures were the only exception. As a result the post-war composition of imports was quite different from that of the interbellum. The share of foodstuffs and crude materials had decreased (arables in particular) and industrial commodities had become more important (especially machinery). During the after-war period the centre of imports shifted decisively towards industrial products, from 40 percent in 1946 to 72 percent in 1990. Between 1950 and 1970 industrial imports grew at an average annual rate of 9.0 percent. After 1970 -or more precisely after the oil crisis- the growth rate of crude materials and fuel plummeted, while industrial goods still achieved an average rate of 4.3 percent.

Exports

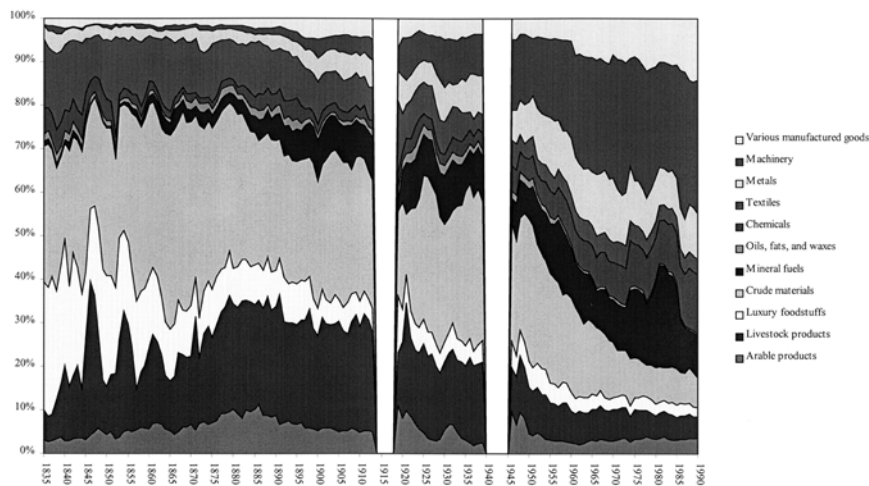
Throughout most of the nineteenth century industrial commodities were the engine behind the growth of Belgian exports. Particularly the period 1850-1870 was one of exceptional growth. During the final decades of the long nineteenth century (1890-1910) when foodstuffs, fuel, fat and waxes, and textiles performed poorly, the other industrial products as well as the crude materials saved the day. Unlike imports there was already a clear trend in the composition of Belgian exports in the nineteenth century. The share of foodstuffs declined steadily, from 20 percent in 1836 to 11 percent in 1910. To a lesser extent the same was true for crude materials; their share declined from 31 percent in 1836 to 21 percent in 1910.

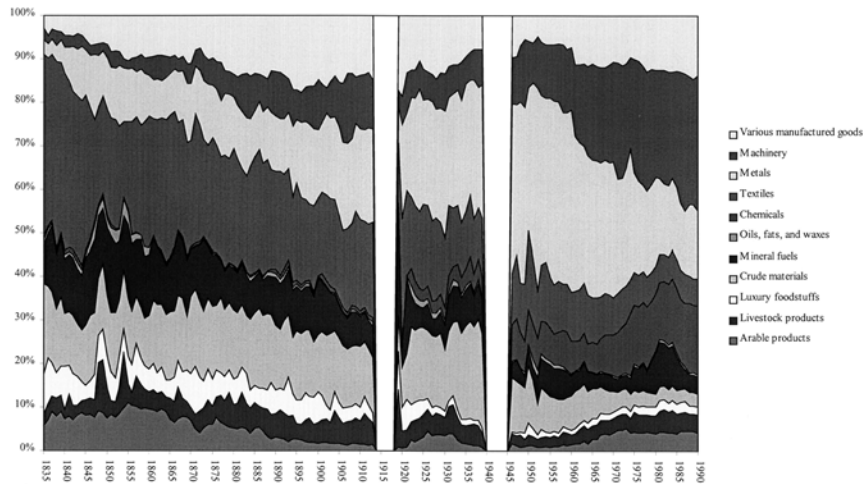
Industrial commodities were clearly the dynamic element of Belgian exports, accounting for 50 to 80 percent of its value. What is more, there was a clear shift away from textiles –the basic product of early industrialization– towards metals, machinery and other manufactured goods. In 1836 textiles accounted for as much as 38 percent of the value of exports as against only 8 percent for metals, manufactures and machinery. By 1910 textiles had dropped to 20 percent, while the other three categories made up 44 percent of exports.

The interbellum witnessed an increase in the share of primary commodities, crude materials in particular. Between 1910 and 1924 growth was concentrated in livestock products, luxury foodstuffs, crude materials, and fats and waxes. Manufactures, textiles and mineral fuels performed poorly, while machinery exports barely reached the average rate of growth. The main trend in the development of the composition of exports was the continued relative rise of crude materials and metals (33 percent in 1910 and 50 percent in 1937). During the depression of the thirties metals and crude materials as well as fuel and chemicals were the only categories to surpass the average growth rate of exports. The other commodities performed well below par. The exports of textiles and machinery increased, but in 1937 their share was much lower than before the Great War (31 percent in 1910 and 19 percent in 1937).

After the Second World War another dramatic shift occurred. Between 1937 and 1950 exports were almost stagnant (0.4 percent per year). However, primary exports (A through F) were in terrible shape. The trade in crude materials and fuel fell by about 5½ percent and ceased to be a significant part of exports. Instead,

Graph 4. *The Composition of Imports at Current Prices, 1835-1990 (%)*

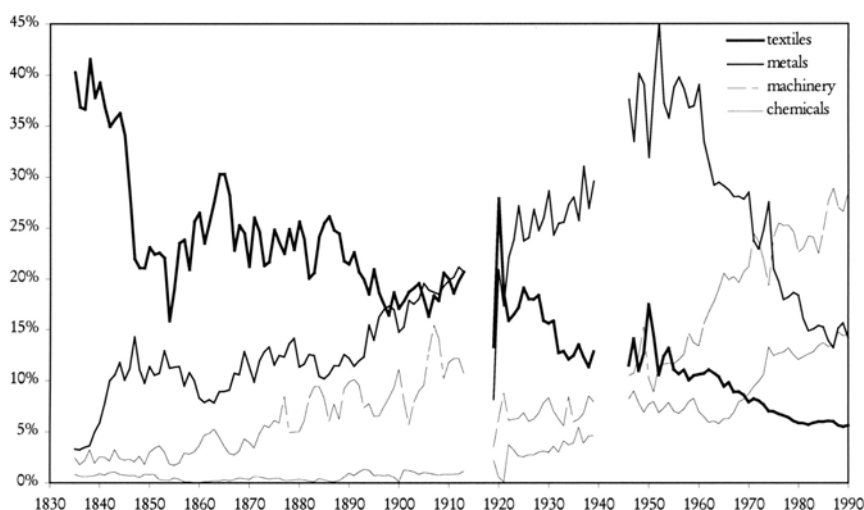


Graph 5. *The Composition of Exports at Current Prices, 1835-1990 (%)*

industrial commodities -semi-manufactures and finished products- became the mainstay of Belgian exports, accounting for about 80 percent of their value. During the 1950s and 1960s total exports increased at astonishing rates. Chemicals, manufactures and machinery increased by 8 to 9 percent per year, while arable and livestock products surpassed even that rate. After 1970 growth slackened, albeit to a more than respectable level of growth. Between 1950 and 1989 industrial exports changed shape. Textiles continued to decline, but the share of metal products also fell dramatically from 37 percent in 1950 to a mere 15 percent in 1989. These trends were offset by the rise of chemicals (from 8 to 15 percent), various manufactures (from 6 to 13 percent), and most of all by the expansion of machinery exports (from 11 to 27 percent). Graph 6 shows the development of the shares of the three main industrial exports of Belgium.

The pattern of Belgian industrial development can be described on the basis of structural shifts in exports. In the middle of the nineteenth century textiles were the main export product, accounting for 35 to 40 percent in the late thirties and 20 to 25 percent of exports until the mid-1880s. After 1880 the importance of textiles began to dwindle to only c. 5 percent in 1990. The rise of metal exports marks the second phase in industrial growth. From 1880 the share of metals and metal products increased from about 10 percent until 1880 to 20 percent in 1913, almost 30 percent in 1939, and 35 to 40 percent in the 1950s. After 1960 the metal age ended in an abrupt decline: by 1990 its share had dropped to a mere 15 percent of exports. Machinery and chemicals were the new elements of Belgian international trade. Machinery and transport equipment went from about 10 percent in the late 1940s to almost 30 percent in 1990, while the share of chemical products went

Graph 6. *The Development of the Share of Textiles, Metals, Machinery and Chemicals in Belgian Exports, 1835-1990 (%)*



from c. 8 percent in 1950 to 15 percent in 1990. In the course of the nineteenth and twentieth centuries the structure of exports had shifted from the basic commodities of early industrialization to high-grade exports and a more diverse supply of goods.

The balance of trade

Finally, an examination of the balance of trade can shed some more light on the nature of the Belgian economy. Table 8 presents figures on the value of net exports at current prices. Throughout the entire period Belgium was a net importer of foodstuffs, arables in particular. However, at the end of the period -from 1967 on- Belgium became a net exporter of livestock products, which corresponds to the astounding growth of this category after the Second World War (10.5 percent per year in 1950-1989). In spite of the domestic production of coal, imports of fuel and crude materials far surpassed their exports. On the other hand, Belgium was always a net exporter of industrial commodities, with the exception of chemicals in the nineteenth century and machinery in 1937 and 1950. Nevertheless it took until the end of the 1980s before the aggregate balance of trade became consistently positive.

By expressing the balance of trade at constant prices of 1910 it becomes possible to compare the size of the deficit in the various benchmark years. It appears that the trade gap was at its worst in 1910. At the end of the nineteenth century, and especially between 1900 and 1913, most European economies experienced a rapid

Table 8. *The balance of trade distinguished by category of product, 1850-1989 (millions of BF at current prices)*

	1850	1910	1937	1950	1989
Livestock products	5	-105	-217	-4,005	36,744
Arables	-11	-552	-3,221	-8,318	-31,074
Luxury goods	-37	-78	-635	-3,613	-11,937
Crude materials	-43	-573	-3,397	-19,726	-138,378
Mineral fuels	27	-83	-449	-4,440	-159,039
Oils, fats, and waxes	1	-25	-150	-552	2,825
Chemicals	-8	-46	321	2,570	90,234
Manufactured goods	10	120	782	1,477	13,116
Textiles	17	157	1,653	10,253	87,325
Metals	15	207	3,797	26,767	202,241
Machinery	4	101	-550	-3,411	56,663
Other goods	-1	-5	-108	-598	-88,273
Total –current prices	-21	-880	-2,174	-3,596	60,448
–constant 1910 prices ^{a)}	-19	-886	-369	-158	594
Foodstuffs	-43	-735	-4,073	-15,936	-6,267
Crude materials	-16	-656	-3,846	-24,166	-297,417
Industrial goods	39	515	5,854	37,104	452,405

^a Deflated with a Fischer index for imports. Note: No attempt was made to adjust the nineteenth-century prices to c.i.f. and f.o.b. prices. All data refer to three years around a benchmark. Sources: Revised database.

expansion of their domestic market. Imports grew at a much higher rate than exports, and Belgium was no exception. In addition the terms of trade –an index of export prices as a percentage of an index of import prices– deteriorated during the second half of the nineteenth century: from 99 in 1850 to 67 in 1910. After the First World War the Belgian balance of trade steadily improved.

7. Conclusion

The growth and compositional change of international trade can help chart a nation's long-term macroeconomic development. This essentially requires reliable time series of imports and exports, with adequately weighted deflators as well as a consistent and rational classification of commodities. The importance of trade data is considered especially considerable for small and open economies. The limited extent of their domestic market and a relative lack of natural resources would

make them more dependent on world trade, which would in turn enhance the value of trade data as an indicator for economic development.

The Belgian trade statistics were in dire need of revision. The nineteenth-century data contained a large amount of faulty price data and were corrupted by the widespread practice of disguised transit. After these shortcomings had been removed, the construction of weighted deflators and the consistent classification of commodities have made it possible to examine growth rates and compositional shifts in the entire period 1835-1990. The adjustment for disguised transit and inadequate prices, the construction of weighted deflators, and the classification of imports and exports into homogeneous commodity groups results in a consistent and reliable view on the long-term development of the Belgian economy. Contrary to the original data there are no longer breaks in such time series as aggregate imports and exports, export shares of specific commodity groups, and ratios of trade to GDP.

A first quantitative analysis of revised imports and exports revealed the trends in the development of the Belgian economy. In the nineteenth century trade grew rapidly, particularly in 1850-1870. This upward trend was interrupted by two world wars and a severe international crisis. After the Second World War -notably in 1950-1970- Belgian trade achieved rampant growth once again. The composition of imports and exports reflects the changing nature of the economy of Belgium. In the nineteenth century the structure of trade was characterized by large imports of crude materials and agricultural inputs as well as a strong increase in the share of industrial commodities in the value of exports (especially in 1870-1910). The interbellum was a bad period for the trade in industrial products, but after 1945 industrial semi-manufactures and finished goods came to dominate the international trade of Belgium, much like in other western industrialized economies. What is perhaps most insightful is the changing nature of industrial exports during the nineteenth and twentieth centuries. There appears to have been a clear sequence of 'export leaders' from textiles (until the 1880s) to metals (until 1960) and finally machinery. During the final decades of the period industrial exports have become more diverse, with growing shares of chemicals and other manufactured products.

Thus, the results correspond to and confirm the current perspective on macroeconomic trends in the nineteenth and twentieth centuries.³⁸ They tally with the available evidence on macroeconomic development, reflecting the expansion of industry as well as changes in domestic demand. The new estimates result in a clearer and more reliable picture of the international trade of Belgium, truly turning international trade data into a mirror of macroeconomic development.

38 E. Horlings and J.-P. Smits, 'A Comparison of the Pattern of Growth and Structural Change in the Netherlands and Belgium, 1800-1913', *Jahrbuch für Wirtschaftsgeschichte* 2 (1997) 83-106.

THE TOTAL VALUE OF IMPORTS AND EXPORTS AT CURRENT AND
CONSTANT 1910 PRICES

	Imports			Exports		
	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF
1835	181	130	139	131	123	107
1836	202	136	149	140	129	109
1837	196	124	158	123	126	97
1838	202	124	163	146	126	116
1839	182	130	140	130	130	100
1840	214	128	167	130	129	101
1841	212	126	168	144	125	115
1842	216	118	182	132	123	108
1843	205	118	174	144	120	120
1844	179	114	157	160	118	136
1845	229	120	190	171	120	143
1846	221	122	181	152	108	140
1847	242	128	189	174	108	161
1848	179	106	168	154	108	142
1849	204	110	185	180	103	175
1850	218	118	185	207	107	195
1851	229	115	200	201	103	194
1852	295	119	249	235	104	225
1853	293	130	226	289	109	264
1854	351	140	251	392	120	328
1855	370	144	257	329	122	270
1856	418	148	283	358	126	285
1857	441	142	310	411	128	320
1858	447	137	326	400	127	314
1859	464	135	343	408	125	325
1860	492	138	355	465	122	381
1861	535	143	374	446	124	361
1862	532	145	366	478	125	384
1863	564	146	387	500	126	397
1864	643	148	435	557	130	427
1865	694	145	479	561	131	429
1866	717	146	490	608	136	446
1867	697	136	513	531	120	441

	Imports			Exports		
	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF
1868	765	136	561	565	123	461
1869	837	128	652	579	117	494
1870	891	127	700	623	120	518
1871	1,232	142	870	793	124	639
1872	1,310	145	905	897	142	633
1873	1,259	139	903	947	151	627
1874	1,158	134	863	902	137	660
1875	1,348	131	1,027	884	136	649
1876	1,185	137	867	776	131	592
1877	1,189	138	863	815	125	654
1878	1,208	132	914	823	125	656
1879	1,198	128	932	851	122	696
1880	1,369	136	1,006	888	124	718
1881	1,289	132	973	957	121	792
1882	1,283	122	1,054	958	115	836
1883	1,295	117	1,110	1,000	111	903
1884	1,109	109	1,014	943	102	923
1885	1,027	104	985	896	97	920
1886	1,025	102	1,003	885	94	945
1887	1,102	103	1,068	917	92	1,001
1888	1,205	107	1,130	928	96	967
1889	1,197	106	1,135	1,101	98	1,120
1890	1,300	107	1,220	1,090	98	1,107
1891	1,364	106	1,282	1,098	100	1,102
1892	1,177	99	1,187	1,028	95	1,085
1893	1,212	96	1,263	992	92	1,079
1894	1,197	90	1,336	928	87	1,069
1895	1,291	90	1,431	989	86	1,145
1896	1,380	90	1,533	1,054	87	1,213
1897	1,384	90	1,544	1,070	86	1,248
1898	1,452	91	1,603	1,126	87	1,300
1899	1,574	93	1,697	1,210	92	1,319
1900	1,602	97	1,646	1,281	97	1,324
1901	1,572	95	1,653	1,168	93	1,258
1902	1,723	96	1,803	1,228	93	1,315

	Imports			Exports		
	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF
1903	1,933	98	1,968	1,339	94	1,419
1904	2,005	99	2,022	1,358	93	1,458
1905	2,150	98	2,198	1,398	92	1,514
1906	2,368	103	2,298	1,690	96	1,760
1907	2,600	106	2,460	1,710	97	1,765
1908	2,220	99	2,252	1,483	89	1,658
1909	2,413	99	2,439	1,564	97	1,617
1910	2,608	100	2,608	1,736	100	1,736
1911	2,775	99	2,797	1,855	99	1,874
1912	3,024	103	2,935	2,129	100	2,139
1913	3,111	103	3,023	2,018	98	2,059
1914						
1915						
1916						
1917						
1918						
1919	4,438	289	1,534	1,393	331	421
1920	10,273	417	2,464	5,866	530	1,106
1921	8,083	358	2,256	5,146	429	1,198
1922	9,214	298	3,096	6,580	331	1,985
1923	12,198	415	2,942	8,810	405	2,176
1924	16,450	501	3,282	12,641	490	2,582
1925	16,328	540	3,021	13,542	536	2,527
1926	20,465	672	3,045	17,895	634	2,821
1927	26,512	816	3,248	23,867	774	3,083
1928	28,365	764	3,713	27,218	808	3,368
1929	32,373	786	4,116	28,697	836	3,434
1930	28,529	703	4,060	24,659	778	3,169
1931	21,477	545	3,937	20,919	686	3,051
1932	15,394	467	3,294	13,913	563	2,469

	Imports			Exports		
	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF
1933	14,069	349	4,036	13,309	507	2,628
1934	13,101	383	3,422	13,122	480	2,734
1935	15,909	486	3,271	14,660	514	2,853
1936	19,651	552	3,562	17,933	588	3,048
1937	25,025	628	3,982	23,347	663	3,521
1938	20,908	586	3,570	19,641	685	2,869
1939	17,807	555	3,211	19,651	664	2,959
1940	7,907	740	1,068	10,577	957	1,106
1941	6,945	1,208	575	5,194	1,278	407
1942	6,264	1,504	416	5,130	1,766	290
1943	6,122	1,796	341	8,719	2,313	377
1944	3,486	1,982	176	5,303	2,356	225
1945	13,124	1,451	904	3,901	2,959	132
1946	54,531	1,643	3,319	29,198	2,466	1,184
1947	81,589	2,029	4,021	60,336	2,823	2,137
1948	83,457	2,223	3,755	72,535	2,750	2,638
1949	77,927	2,102	3,707	78,081	2,676	2,918
1950	92,979	2,135	4,355	80,804	2,561	3,155
1951	121,300	2,611	4,646	129,731	3,391	3,826
1952	117,315	2,591	4,528	119,927	3,380	3,548
1953	115,508	2,442	4,730	110,549	2,911	3,797
1954	121,578	2,316	5,250	112,710	2,567	4,391
1955	135,604	2,329	5,823	135,988	2,613	5,205
1956	156,032	2,375	6,570	154,740	2,832	5,465
1957	163,659	2,477	6,607	155,893	3,015	5,171
1958	149,423	2,338	6,390	149,440	2,799	5,338
1959	164,612	2,192	7,510	161,797	2,675	6,049
1960	188,674	2,368	7,968	184,732	2,826	6,537
1961	201,164	2,517	7,993	192,021	2,840	6,760
1962	217,202	2,580	8,417	211,553	2,938	7,200
1963	243,743	2,652	9,192	236,781	3,158	7,498
1964	282,383	2,714	10,404	273,508	3,268	8,370
1965	309,772	2,755	11,245	312,255	3,375	9,252
1966	342,057	2,850	12,002	334,143	3,575	9,345
1967	347,432	2,830	12,279	346,554	3,612	9,595

	Imports			Exports		
	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF	value at current prices mlnBEF	Fischer price index 1910=100	value at constant prices mlnBEF
1968	400,281	2,992	13,380	399,816	3,723	10,739
1969	476,259	3,112	15,306	492,482	3,974	12,393
1970	544,169	3,207	16,970	567,569	4,071	13,940
1971	599,874	3,222	18,619	606,965	4,164	14,576
1972	650,139	3,241	20,062	695,765	4,166	16,699
1973	816,404	3,605	22,648	851,499	4,608	18,478
1974	1,106,829	4,592	24,104	1,076,289	5,774	18,641
1975	1,078,469	4,886	22,072	1,034,262	5,982	17,290
1976	1,305,441	5,281	24,718	1,239,355	6,382	19,419
1977	1,380,795	5,480	25,195	1,315,927	6,483	20,297
1978	1,455,236	5,647	25,770	1,380,078	6,694	20,616
1979	1,701,559	6,205	27,422	1,625,674	7,390	21,999
1980	2,003,330	7,261	27,589	1,849,905	8,431	21,942
1981	2,202,588	8,267	26,643	2,018,182	9,114	22,144
1982	2,530,246	9,552	26,488	2,341,940	10,534	22,232
1983	2,689,977	10,324	26,054	2,594,602	11,251	23,060
1984	3,047,485	11,331	26,895	2,928,085	12,066	24,266
1985	3,163,866	11,328	27,929	3,099,902	12,646	24,513
1986	2,923,012	9,864	29,632	3,004,622	11,630	25,836
1987	2,965,782	9,523	31,144	3,033,806	11,203	27,081
1988	3,236,097	9,748	33,197	3,309,946	11,664	28,376
1989	3,699,397	10,620	34,835	3,855,759	12,588	30,630
1990	3,825,451	10,183	37,567	3,860,050	12,188	31,671