

Bilateral Trade Flows in Europe, 1857-1875

A new dataset

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Abstract

This study constructs a large, internationally comparative set of foreign trade data for the period 1857 to 1875. The dataset is constructed using information at the commodity group-level and contains import and export values for the UK, France, the Zollverein, the Netherlands, Belgium, Austria-Hungary and the United States, itemised by trade partner. The study tackles three basic problems related to the heterogeneity in national statistics of the period: different definitions of aggregates, inadequate ‘official’ pricing, and the ‘proximity bias’, i.e. the misleading practice of crediting imports to bordering countries from where they physically entered, but where they did not originate. After passing successfully a consistency test, the resulting dataset contains harmonised and country of origin-corrected bilateral trade values for 7 central importers, 10 points in time and 21 commodity groups, along with *ad valorem* tariff rates for all commodity groups and countries. They offer new detailed insights into the composition and evolution of trade and tariffs in the third quarter of the 19th century.

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1. Introduction

Much has been written about inaccuracy and inconsistency of international trade statistics predating the foundation of international statistical bodies like the UN, the IMF, and the OECD. The most telling criticism was provided by Oskar Morgenstern who qualified foreign trade statistics for the first half of the 20th century as “exceedingly poor” (Morgenstern ²1963, 138). He stated that the degree of inaccuracy was such that the chance to obtain reliable results from any kind of empirical tests of international trade theory was doubtful. Hence, any attempt of economic historians to make sense of 19th century international trade statistics and to use them for statistical analysis seems to be even less promising, as that period predated statistical unification and modern data procession even more.²

Still, especially for the decades after 1870 economists and economic historians *are* making intensive use of international trade statistics, as is proven by high citation frequencies for the accessible data compendiums of Maddison (2006) and Mitchell (⁵2003). This practise finds backing by Paul Bairoch, who published central and authoritative works on the structure of European trade in the 19th century (Bairoch 1973, 1974, 1976) and proceeded from the assumption that foreign trade statistics for the later part of the 19th century were not or not substantially less reliable than those for the 1970s (with exception of Dutch statistics). While he provided no direct evidence for this claim, Federico and Tena (1991) re-examined early 20th century trade data comprehensively and gave a positive verdict on data quality, at least for aggregate figures, but suggested further case studies with disaggregate data. Carreras Marín (2005) followed their recommendation and in a study on geographical distribution of international trade in textiles in 1913 found that even on the aspect Federico and Tena had ruled out by aggregation, origin and destination of trade flows, data was fairly reliable if individual country pair comparisons are weighted by importance in total trade. Whether results for 1913 are representative for the decades before has never been investigated.

Reliable data especially for the decades before 1870 is highly needed, as according to the cited works by Bairoch as well as Rostow (1978) and Lewis (1981), they were marked by accelerated growth in European and world trade and what looks like the highest growth rates

² Other frequently cited works in sceptical or dismissive accounts on 19th century trade data are Don (1968) and Platt (1971).

This is not the place to discuss the even wider use of today’s trade data by international economists, although authors such as Yeats (1978), Parniczky (1980), Kostecki and Tymowski (1984), Rozanski and Yeats (1994), van Bergeijk (1995) and Makhoul and Otterstrom (1998) have pointed out that there still remains a considerable amount of error.

ever.³ Studies on this issue and its causes have been limited mostly to the investigation of integration in commodity prices and decreases in transport costs. These approaches do not allow tackling the contribution of increasing international cooperation in trade and monetary politics, nor do they explain trade growth directly.⁴ For this, reliable bilateral data is needed. Two central aims of this paper therefore are to construct a large, internationally comparable set of foreign trade data for the period from 1857 to 1875, to solve reported problems with historical data and to test the consistency of results. By this, the present paper evaluates the arguments that led a large group of historians to heavy scepticism and even dismissal of trade data as a historical source, and it provides a dataset along with qualified information on its limits to prevent the shortcomings of unconsidered use of potentially biased data. The approach follows Platt's (1971, 129) advice and combines the statistical investigation of the numbers gathered from original sources, historical foreign trade tables, with contemporaries' and historians' insights on how these statistics were elaborated. The result is an attempt to harmonize idiosyncrasies resulting from the fact that international unification in data gathering and publication was far from being implemented in the third quarter of the 19th century. National publications reflected a variety of differing ways of collecting, sampling and presenting data according to domestic preferences and needs.⁵ Three central and basic problems have to be dealt with: Which volumes were gathered? How were prices and values obtained and calculated? And, in which way should and could origins and destinations be recorded?⁶

The following section presents the construction principles of the new dataset that comprises data for seven central players in the North Atlantic economy of the mid-19th century and a bundle of 21 commodity groups of central importance in intra-European trade. Section 2 then conducts a survey of the general challenges that 19th century foreign trade statistics pose to the investigator, describe the most important idiosyncrasies of the individual statistics covered and apply strategies to correct shortcomings and overcome inconsistencies that can be treated at the national level. Next, the consistency of the dataset is analysed by systematic

³ See Acominotti/Flandreau (2006) for a comparison of different estimates of world trade growth rates.

⁴ The central motivation for the construction of the presented dataset was the investigation of the causes and effects of the Cobden-Chevalier Network of bilateral trade agreements on international trade flows.

⁵ Bateman (1892-3), Sevenig (1915), and Flux (1923) give early accounts on the struggle for unification since 1853, whose first result was the establishment of an International Convention for the Publication of Customs Tariffs in 1890, and the adoption of the Brussels Tariff Classification in 1913 as a general scheme for aggregation of commodity and tariff classes. See Estevardeordal (1997), appendix 1, for a discussion of problems in the collection of comparable data on the eve of World War I.

⁶ See Federico/Tena (1992), Platt (1971), v. Borries (1970), 7-14; Don (1968); Morgenstern (²1963), 141; Flux (1923), Zimmermann (1908), 296-300; Bateman (1892-93), and Bourne (1872), 202-208, to just name the more prominent works on historical international trade statistics.

comparisons of pair-wise records from partner's statistics on their respective import and export volumes. By this, the challenge posed by Morgenstern (²1963, 180) that "writers of all phases of foreign trade will have to assume the burden of proof that the figures on commodity movements are good enough to warrant manipulation and the reasoning to which they are customarily subject" is accepted. The tests show that the dataset has a fair, although far from perfect consistency and that it can be used for the investigation of international trade on bilateral, commodity structure and aggregate level. Subsequently, the main problem of geographical misassignment of trade flows arriving after transit through third countries is tackled by a comprehensive and systematic correction. The final section presents three central aspects of the dataset, bilateral trade shares, and main providers of specific commodities to Western Europe, and commodity specific tariff rates, and gives an outlook on possible uses for future empirical research on international trade in the period under study.

2. *The sample: countries and commodities*

Because of their importance in world trade and the quality of their statistics a core group of seven countries and customs areas was selected for investigation: the United Kingdom, France, the German Zollverein – since 1871 the German Customs Area –, Austria-Hungary, Belgium, the Netherlands and the United States. All national statistics refer to national territories only, excluding colonies and other foreign dependencies. The seven countries and customs areas included in the dataset accounted for around 62% of world exports in 1860 (calculated from Hanson 1980, Table A.3). Taking into account the commodity group selection, the dataset covers about 36 per cent of world exports, but a far higher share of trade in manufactures. On a European scale, according to Bairoch (1973, table 3), the countries in the dataset undertook around 79 per cent of Europe's total exports, of which at least 58 per cent formed part of the commodity sample described below. This means that the dataset covers at least 46 per cent of total European exports.⁷

Judging the quality of data gathering and processing, four general criteria appear: a) completeness of the reports, b) reliability and consistency in recording and reporting in systematic schemes, c) recording and/or calculation of values on the basis of realistic prices, and d) systematic and reliable determination and publication of origin and destination of the merchandise. The last two criteria are treated in detail in sections 3, while this section aims to provide

⁷ Sample shares for Belgium and the Netherlands have been calculated conservatively, see below.

a general overview of virtues and shortcomings of the original statistics used in the research presented here.

As a start, Table 1 informs about the differing degrees of detail in the national statistics, as well across countries as over time. French statistics were consistently the most detailed, while the Belgian ranked last in terms of number of differentiated items. In all countries, import records were more detailed than export and transit records. They also were assumed to be far more reliable than export and transit records. The common reason for both phenomena is that the former were subject to duties and attentive customs control, while only a small fraction of exports was dutiable, and transit was free in general, and hence controls were much

Table 1: Number of individual items reported in import, export, and transit and re-export statistics (tables for commodities) in selected years

Country	Import records	Export records	Transit / Re-export records
United Kingdom	1857: 952 (515 under other articles) 1865: 798 (334 under other articles) 1875: 351 (incl. “from all countries” as origin)	1857: 303 (94 under other articles) 1865: 407 (71 under other articles) 1875: 207 (incl. “to all countries” as destination)	1857: re-export 601 (384 under other articles), transit 28 1865: re-export 608 (474 under other articles), transit 33 1875: re-export 335 (incl. “to all countries” as destination), transit 7
France	1858: 824 1865: 1100 1875: 1009	1858: 796 1865: 877 1875: 1008	1858: 443 1865: 402 1875: 485
Belgium	1857: 554 1865: 141 1875: 221	1857: 542 1865: 141 1875: 218	1857: 542 1865: 141 1875: 218
Netherlands	1857: 459 1865: 484 1875: 506 (special), 72 (general)	1857: 458 1865: 478 1875: 478 (special), 72 (general)	1857: 368 1865: 317 1875: 68
Zollverein/Germany	1857: 263 1865: 271 (I), 340 (II) 1875: 498	1857: 249 1865: 258 (I), 336 (II) 1875: 498	1857: 247 1865: 249 (I), 324 (II) 1875: (498)
Austria-Hungary	1857: 279 1865: 417 1875: 575	1857: 258 1865: 377 1875: 530	1857: 86 1865: 26 1875: 80
USA	1856/57: 356 1865/66: 729 1875/76: 203	1856/57: 126 1865/66: 261 1875/76: 232	1856/57: 273 (re-export) 1865/66: 220 (re-export) 1875/76: 168 (re-export), 162 (in transitu)

Source: Own count.

Notes: In Belgian statistics, exports and transit are reported in joint tables. Zollverein 1865: separate statistics were published for each semester, 1875: imports and exports for transit included in imports and exports tables. Although counts for Austria-Hungary are dependent on the interpretation of subheadings and special provisions for certain individual commodities from specific trade partners as individual items or not, the figures presented here are consistent over time. Dutch transit counts are for ‘Doorvoer met overlading’; after 1871, imports for home consumption and exports of domestic production are reported in separate tables (‘special’) from total (‘general’) imports and exports.

less strict.⁸ This is why volumes and values of bilateral foreign trade in the dataset were taken and reconstructed exclusively from importers' records. Export, re-export and transit records were used only to correct geographical misassignments, and therefore were not used as absolute amounts, but for the information on shares of exports of domestic production and transit from third countries only. The pair-wise comparison of importers' and exporters' records in section 4 shows that this is feasible.

When overall data quality is referred to, the foreign trade statistics of the United Kingdom generally ranked as best practice both among contemporary and modern scholars. To German statisticians who in the 1860s were looking for models for the reform of the Zollverein's statistics, the British way of gathering quantities and values was appreciated as being "of a high degree of perfection" (Hirth 1870, 426).⁹ Also eminent British economists such as Bourne (1872), Giffen (1882) and Bateman (1892-93) as well as Imlah (1958) valued British statistics critically as largely complete and not systematically distorted.¹⁰

In France, the majority of declarations were made in quantities, although for some high value articles also value declarations occurred. The literature on the quality of French trade statistics is small (Hirth 1870, Richter 1901a), but there are no hints that French statistics contained systematic errors, except for doubts on the accuracy of export prices (see below). Publications were extremely detailed and the classification did not change substantially over time.

Belgian foreign trade statistical publications were quite similar to the French ones, although far less detailed. Contrary to almost all other historical foreign trade accounts, the consistency and reliability of Belgian publications has been systematically assessed recently. Degève (1982) published data series for the 19th century with some remarks on its quality, but was criticised by Horlings (2002, 111) for uncritically collecting and processing historical data while failing "to construct consistent and reliable figures on foreign trade", as original Belgian statistics were systematically distorted due to the presence of 'disguised transit', i.e. re-exports of low-duty commodities from entrepôts after 'nationalisation' that led to dou-

⁸ Cf. Hirth (1870), 426-429, Soetbeer (1864), Buchheim (1982), 19-20, and Platt (1971), 128. On details see Bourne (1872), 202-206, Fuchs (1893), 88-94, and Platt (1971), 128, for the UK, Hirth (1870), 415, for France, Hirth (1869), 106, and Hirth (1870), 415-416, for the Netherlands; Kaiserliches Statistisches Amt (1873a), 125-130, 137-138, Kaiserliches Statistisches Amt (1873b), XI-XII; Soetbeer (1875), 747-749, for the Zollverein,

⁹ See also Soetbeer (1864), 13-22, who showed in a detailed analysis of bilateral trade records on exports of the UK imported by the Hanseatic Towns in 1862 that figures reported in British and Hamburg and Bremen trade statistics matched to a remarkable extent.

¹⁰ See also Soetbeer (1864), 20, Hirth (1870), 409, Soetbeer (1882), 484. On details about how declarations were obtained and controlled see Bourne (1872) and Hirth (1870), 410-414. In the process of data gathering, all items listed under "other articles" (see table 1) had to be excluded due to lack of information on geographical distribution. In practice, possible distortions should be negligible as no items of major importance were grouped under "other articles" and their share in imports was only 1.7 percent of total imports in 1865.

ble-counts of imports and exports. (The problem is described in section 3 and comprehensively treated in section 5)

Dutch foreign trade statistics have been called “a stubborn source” (*een weerbarstige bron*) by Lindblad and van Zanden (1989, 231) and have been heavily criticised by everybody who worked with them.¹¹ Apart from general doubts about the accuracy of bookkeeping, especially for exports and transit, the main problems with Dutch trade statistics were unreliable ‘official values’ and the presence disguised transit, which had to be corrected.

When talking about stubborn sources, the Zollverein’s *Commerzial-Nachweisungen*, i.e. ‘Commercial Records’, championed all other statistics, or as Platt (1971, 125) expressed it, “[...] nobody can attempt to make sense of German statistics before 1880.” Until 1871, the statistics of the Zollverein were mere quantity statistics (mostly in Zentners) that made impossible any statement on values of trade. Additionally, the practice of including national harbours and the independent Hanseatic Towns (Hamburg, Bremen, and Lübeck until 1868) in the list of trading partners made information on geographical distribution almost useless. Some alleviation can be obtained from the accounts by experts like Hirth (1870, 418-429; 1869, 68-69) and Soetbeer (1875, 748) who regarded the collected quantity figures as not less reliable than those of other countries.¹² In the subsequent sections it is shown that German statistics can be worked with after introducing prices and comprehensive treatment of records on origin and destination, although certain caveats remain.

The main provisions for the elaboration of Austro-Hungarian trade statistics were given in 1855 and remained generally unchanged until 1875 (Richter 1900a, 244). Of the countries in the dataset, the Habsburg Monarchy is the only territory for which contemporaries attest a considerable amount of smuggling (Hirth 1869, 69-70).¹³ Nevertheless, the main challenges are the detail of records and the valuing practices discussed in section 3.

Some European countries had to be excluded from the dataset despite their importance in European trade, because their statistical publications were too sparse for our needs and/or their trade portfolio and degree of detail in statistics proved to be too limited. Unavailability of regular and systematic trade statistics led to the exclusion of Russia, Italy, Switzerland, Turkey and Romania and Wallachia, while Denmark, Sweden and Norway were excluded be-

¹¹ To cite just a few: Smits (1995), chapter IV and appendix VI; Bairoch (1973), 30-31 and various table notes; de Jonge (1968), 13-16.

¹² See also v. Borries (1970), 30-33, for the period prior to 1858.

¹³ Richter (1900), 249-250, and Don (1968), 83. Furthermore, an unknown amount of disguised transit in duty-free items has been claimed for the late 19th century. This constituted no major problem as only very few items in the sample were duty-free and the tests for disguised transit (section 5) found no significant amounts.

cause comprehensive information on transit was not available and the statistics would have required intensive treatment on prices. Furthermore, the exports of these countries were concentrated in few sectors and their absolute market size was small.¹⁴ The main reasons for the exclusion of Spain were the large amount of (mostly unsorted) individual items in reviewed statistical publications, reported criticism on the official values and smuggling problems, as well as the extremely limited availability of the statistics in Germany. Of these countries, missing data for Russia, the country with the highest population in Europe, and for Switzerland, for its centrality between France, Germany and Austria, are most deplored.

For research designs interested in international comparisons the United States, Europe's most important trading partner, especially as a market for manufactured commodities, have been included into the dataset. Their statistics differed from those of all other countries in that they were published for fiscal years that dated from July, 1st, to June, 30th. The values contained in the dataset thus have been calculated as averages of the two fiscal years involved, i.e. data was gathered for all fiscal years from 1856/57 to 1875/76. As to the quality of US statistics, Alexander Del Mar (1868), since 1866 Director of the newly formed Bureau of Statistics, wrote in the preface to the 1867 statistical tables that in the period when the Secretary of the Treasury had elaborated the tables, they had been of very low prestige among businessmen and scholars.¹⁵ Still, the reasons he enumerated – the very incomplete recording of exports via railway to Canada¹⁶ and merchandise recorded as imports that were actually of national produce, as well as certain exports of national production that were recorded partially as re-exports¹⁷ – were found to have had no substantial impact on the quality of the present dataset, whose focus lies on intra-European trade. As is shown below, the resulting inaccuracies

¹⁴ See section 7 for detailed figures on the importance of excluded European countries.

¹⁵ Literally: “[...] it was painfully evident that, [...] instead of being relied upon as authority in such matters, our official reports, though distributed gratuitously, and in large numbers, were but rarely quoted, except to be confuted by the less pretentious, but obviously more correct, statistics of boards of trade, chambers of commerce, and other local organizations” (VIII), and that furthermore, a revision of the quality of import statistics had shown that, “[i]n two words, then, their condition was even worse – much worse – than was publicly supposed [...]” (Del Mar 1868, XLIII). On Del Mar's report see Ely (1953), 270-272.

¹⁶ The legislation on obligatory declarations dated from 1820 and provided (until 1893) that exports had to be declared only if made in vessels. This led to a clear understatement of exports to the Canadian territories; see Del Mar (1868), V, IX, XXII-XXIII; Young (1875), XV-XVII; and Simon (1960), 631.

An additional problem for early years was present for imports under the Canadian-American Reciprocity Treaty (Elgin-Marcy Treaty) of 1854. The treaty, in force from 1855 to 1866, allowed the duty-free import of raw materials from Canada, mostly grains, meal and flour, hides and skins, wool, and wood. Imports under these special conditions seemingly were not reported in detail prior to the fiscal year 1861/62. For the fiscal years 1859/60 and 1860/61 values were re-estimated and published in a special table in 1863. For the earlier years, we lack complete information and had to re-estimate corresponding import volumes from figures for overall duty-free imports from British North American territories and the distribution of these imports across commodity groups in the mentioned 1863 table.

¹⁷ Del Mar (1868), XXIV-XXIX and XLV-XLIX.

for certain commodity groups were of a magnitude that did not systematically bias the trade figures we deal with.

Finally, it should be noted that due to wars the territorial coverage of several national statistics changed in the period covered. The most affected territory was that of Austria-Hungary: During the whole period it included the main parts of the Habsburg Monarchy, namely Cisleithania and Hungary, while Dalmatia remained outside the main customs area until 1880. From February, 1853, to October, 1857, the politically independent Duchies of Modena and Parma were included in Austrian statistics as they formed an ephemeral customs union with the Habsburg Monarchy. In 1859, Lombardy was lost to France (and subsequently annexed to Sardinia); in 1866 the remaining part of the Kingdom of Lombardy-Venetia fell to Italy. From 1867 to 1879 the customs area remained unchanged. As a consequence of the Austrian loss of Lombardy, in 1860 the formerly Italian territories of Nice and Savoy became part of France. In 1871, France lost Alsace and Lorraine to the nascent German Kaiserreich. The German Zollverein's area had already been extended before, when the former Danish Duchies of Schleswig and Holstein became a Prussian province in 1867 and when the Mecklenburgs and Lübeck entered the Zollverein in 1868.¹⁸ In 1871, Alsace and Lorraine were separated from France and annexed to the German Kaiserreich, and hence included into the German customs area. Different treatment of Alsace and Lorraine in French and German statistics in the single year of 1871 might have caused some distortions in the international comparability of statistics for this year.¹⁹ Finally, US statistics lack records on trade for ports of the Confederate States during the Civil War (1861-1865), as they were officially closed by the Union Blockade.

As we deal with a period predating the Brussels Tariff (1913), the Standard International Trade Classification (1950) and the Harmonized System (1996) no unified commodity classification was used across national statistics, and national classification schemes were derived almost directly from national tariff schemes which were elaborated according to domestic in-

¹⁸ The main bias that arises from these territorial changes in the Zollverein's customs area concerns trade with Scandinavia and probably Russia via the Baltic Sea, as Lübeck was a major port in this area and trade of the Zollverein with Lübeck and Schleswig-Holstein included an unknown amount of transit trade to Denmark and other places at the Baltic Sea.

¹⁹ In French statistics the two provinces might have been retained part of the customs area in at least some months, while in the Zollverein's statistics for 1871, trade with Alsace and Lorraine was reported in annotations to the main tables (as were exports to troops in France); see Richter (1901a), 286-289 and Soetbeer (1875), 769. On distortions that might have been caused to international trade in the early 1870s by the French war indemnity see Giffen (1882), 195, and Soetbeer (1875), 740-742.

dustry, import and protection structures and prevailing political convictions.²⁰ To constitute a commodity sample of reasonable coverage, complete import and export figures were gathered for all items enumerated in the trade statistics of all included countries for the year 1865. Then, from the 50 items with the highest individual import and export values for every country, harmonised commodity groups were constituted for imports and exports, 40 and 26 respectively. In the next step, some commodity groups were discarded despite being important in international trade because they were incompatible to the central aim to reconstruct bilateral trade among Europe's major trading nations for the following specific reasons:

- *Products of tropical agriculture and extraction*, namely cotton, tobacco, tea, coffee, cocoa, guano, indigo, cabinet woods and dyewoods, have not been covered to avoid problems of transit and re-export through Western and Central European countries where they were not produced.
- *Mining products* in general, such as zinc, tin, copper, coal and crude oil (petroleum) have been excluded as they could not be produced and exported by countries without natural deposits. This caused empty fields in the international trade matrix, because specific mining minerals were important for one or two countries only.²¹
- *Butter and cheese* made up an important share of Dutch exports (about 7% of uncorrected special exports), but did not rank high in other countries.
- *Sugar, unrefined and refined*, was excluded for two reasons: it proved difficult to distinguish non-European cane sugar from European beet sugar, and additionally sugar was one of the first sectors where export subsidies were implemented on a big scale, especially in France and Austria-Hungary.²²
- Finally, *haberdashery and the like* were excluded because it proved impossible to establish a definition that would have been even remotely homogeneous across differing national classifications.²³

Table 2 and 3 show the 21 remaining commodity groups along with their shares in every country's total imports and exports. A more detailed list of items can be found in the appen-

²⁰ On inconsistency in classifications see Bateman (1892-93), 535-541, for the 1880s and Estevadeordal (1997), appendix, and Flux (1923), 298-300, for even later periods.

²¹ The most prominent mining product was coal, which also was the central fuel for transportation. As national practices on recording varied, additional distortions evolved from exports of coal to steamships and trains that burnt it on their way; e.g. export records of Bremen reported for 1865 that 69% of coal exports as "ships' demand". In contrast, the UK did not consider coal exports to ships as exports; see Richter (1901b), 17.

²² See e.g. Láng (1906), 121-128, and Richter (1901a), 295.

²³ *Haberdashery* might have included a wide variety of fancy articles, perfumery, and small items of metal, porcelain, wood and other materials, such as buttons, soaps, costume jewellery and many other handicraft products.

dix. Especially due to the exclusion of tropical goods and mining products, the share of imports covered in the sample decreased to about 37% of total trade on average, while for most countries' exports it covers around 60-70%. The shares of exports of the US, the Netherlands and Belgium are below 50% due to their extensive produce of and trade in tropical and subtropical goods, and due to methodological differences in the calculation of commodity group values and total trade data taken from other sources (see table note). For the investigation of intra-European trade, this is not problematic, but one should be aware of these limitations in other contexts. Most of the other more important excluded categories (except haberdashery and dyewoods) consisted of only one or two individual items, for which additional data could be gathered relatively easily.²⁴

In the process of matching the classification on national schemes, some specific problems occurred that mainly had to do with changes in national classifications between 1857 and 1875. The most important of these changes occurred in Belgium in 1865 when the number of items in the foreign trade statistics was cut down to 141 for both imports and exports. This had noticeable consequences for records on cloth, where former detailed records were merged into summary accounts for the items 'cottons', 'woollens', 'linens', 'silk wares' and 'other cloth' in 1865. This presents a problem because in the classification elaborated for this paper, the 'silk wares' group also contains high-value items of other materials like jaconet, tulle, embroidery and laces, which were more similar to their equivalents of silk than to simple and heavy items of the same material. Furthermore, *fécules* (mostly potato starch) and *son* (bran) were grouped with meals, flours, and milling products from 1865 onward, but did not belong to this commodity group before 1865 and in the other countries covered. Data was adjusted for all years after 1864 based on the average share of non-*fécules* and non-*son* products in the sum of the new broad category from 1859 to 1863. For textiles and other items, since 1866 records were again more detailed (cf. table 1). For 1865, textiles figures were adjusted to the general scheme using the totals of individual items given in the more detailed tariff revenue records. As these did not contain information on geographical distribution, countries of origin were allotted in proportion to their share in the broader items of the import statistics.

A similar problem occurred with the notoriously broad textile items in the Zollverein's statistics prior to the second semester of 1865: All cotton textiles (light, heavy, dyed, undyed, mixed or pure) were merged into one heading and reported in quantities only. To improve in-

²⁴ In contrast, the 21 included commodity groups on average consist of six to seven items each, with wide variation between countries and from one commodity to another. The most detailed accounts are found for linen and silk textiles in France, where more than 20 different items are recorded, while Belgium sums them up one broad category in 1865 and to 3-5 in other years. In contrast, *wheat* and *rye* consist of only one item, just being differentiated in Austria-Hungary according to special tariff preferences.

ternational comparability, shares for high-value cottons have been extrapolated from reported cotton records for the period from 1857 to the first semester of 1865, and subsequently added to the silk wares group.²⁵

Table 2: Commodity groups and their share in countries' special import totals (excluding precious metals; percent)

Importer	UK	France	Zoll- verein/ Germany	Bel- gium uncorr.	Bel- gium corr.	Nether- lands uncorr.	Nether- lands corr.	Austria- Hungary	USA	Arith- metic mean	Coeff. of variation
Commodity group											
Wheat	6.62	1.73	3.23	3.13	3.41	1.12	1.12	0.77	0.81	2.52	0.84
Rye	0.04	0.00	2.55	0.52	0.56	1.95	1.95	0.34	0.06	0.79	1.31
Milling prod.	1.78	0.03	0.74	0.63	0.68	0.73	0.73	1.01	1.10	0.87	0.61
Wines	2.27	0.18	0.87	2.14	2.33	1.15	1.15	0.33	0.83	1.13	0.76
Spirits and liqueurs	0.73	0.19	0.15	0.08	0.09	0.07	0.07	0.12	0.17	0.22	1.06
Hides, skins and leather	1.88	3.77	3.68	4.73	1.24	1.03	0.33	4.62	1.40	2.42	0.66
Articles of leather/rubber	0.84	0.13	0.52	0.10	0.11	0.13	0.13	0.56	0.73	0.43	0.71
Wood	7.90	4.53	6.15	3.09	3.36	2.31	2.31	0.72	1.64	3.80	0.67
Wool	5.81	9.20	9.37	11.12	12.08	2.57	1.29	5.41	2.78	6.56	0.59
Woollen yarn	0.67	0.50	6.83	0.71	0.78	2.63	0.54	2.48	0.14	1.71	1.40
Woollens and worsteds	1.10	1.25	2.32	2.51	2.73	1.86	1.86	1.54	7.89	2.67	0.89
Cotton yarn	0.04	0.43	2.73	1.19	1.29	5.56	3.10	5.87	0.30	1.97	1.07
Cottons	0.33	0.18	0.25	1.67	1.81	1.93	1.93	0.25	3.55	1.19	1.09
Linen yarn	0.66	0.38	2.72	0.66	0.72	0.98	0.98	1.30	0.38	1.02	0.80
Linens	0.07	0.47	0.94	0.05	0.06	0.68	0.68	0.05	4.80	1.01	1.69
Silk	4.23	13.44	2.28	0.90	0.98	1.24	0.06	1.03	0.82	3.27	1.44
Silk wares	5.74	0.86	2.51	3.21	3.49	0.90	0.90	2.43	5.97	3.13	0.67
Glass and glassware	0.40	0.04	0.31	0.06	0.07	0.25	0.25	0.44	0.50	0.29	0.63
Pig iron	0.05	0.56	1.11	0.27	0.29	0.99	0.00	0.14	0.42	0.37	1.04
Bar iron and steel	0.39	0.64	0.29	0.55	0.60	2.70	1.62	0.38	3.74	1.09	1.15
Ironware	0.26	0.14	0.37	0.18	0.20	0.80	0.80	0.69	0.88	0.48	0.64
Total Trade	41.81	38.63	49.92	37.52	36.87	31.58	21.78	30.49	38.92	36.92	0.24

Notes: Totals for the *Zollverein* were taken from Bondi (1958), 145 (see discussion in section 3). *Belgium corrected* includes correction for disguised transit (see section 5) and uses revised totals by Horlings (2002), 138, on a comparable basis. *Netherlands uncorrected* includes updated current prices (see section 3), *Netherlands corrected* additionally includes correction for disguised transit (see section 5). For both Dutch figures, 'total trade' was taken from Smits, Horlings and van Zanden (2000, Table H.1). As Smits, Horlings and van Zanden correct for much less disguised transit than here (they do not correct trade volumes of yarns and raw silk), tables 2 and 3 understate the percentage of imports and exports covered in the sample to a substantial extent. *Austria-Hungary totals* are uncorrected, while data on some categories was calculated with corrected price data. As prices especially for cotton products were set revised upward, percentage shares of other commodities might be biased upward. *Arithmetic mean* and *coefficient of variation* include corrected series only for Belgium and the Netherlands.

²⁵ Their values were reconstructed according to their average shares of high-value cottons in the values for each trading partner in the second semester of 1865 and in 1867. The old and the new scheme have been consolidated using the concordance provided by Brämer (1868).

Table 3: Commodity groups and their share in countries' special export totals (excluding precious metals; percent)

Exporter	UK	France	Zoll- verein/ Germany	Bel- gium uncorr.	Bel- gium corr.	Nether- lands uncorr.	Nether- lands corr.	Austria- Hungary	USA	Arith- metic mean	Coeff. of Variation
Commodity group											
Wheat	0.02	1.62	5.84	0.28	0.28	0.39	0.39	5.05	3.78	2.42	1.00
Rye	0.00	0.43	1.13	0.49	0.50	0.02	0.02	1.43	0.07	0.51	1.11
Milling prod.	0.01	2.89	1.20	0.03	0.03	0.03	0.03	3.36	6.75	2.04	1.23
Wines	0.00	8.43	1.01	0.01	0.01	0.00	0.00	1.35	0.08	1.55	1.98
Spirits and liqueurs	0.15	1.92	1.29	0.14	0.14	0.54	0.54	0.51	0.36	0.70	0.95
Hides, skins and leather	0.60	2.37	2.04	5.25	0.47	0.91	0.24	1.59	0.49	1.11	0.78
Articles of leather/rubber	1.52	2.95	2.04	0.30	0.30	0.04	0.04	2.60	0.55	1.43	0.81
Wood	0.00	1.04	7.39	0.63	0.63	0.14	0.14	7.08	2.44	2.68	1.20
Wool	0.66	1.07	2.87	0.71	0.71	2.82	1.60	14.15	0.13	3.03	1.65
Woollen yarn	3.27	0.69	1.13	4.17	4.20	2.48	0.48	0.76	0.04	1.51	1.04
Woollens and worsteds	11.35	8.40	13.58	8.02	8.07	0.20	0.20	4.42	0.09	6.59	0.80
Cotton yarn	6.69	0.11	1.28	0.83	0.84	2.99	0.64	0.17	0.00	1.39	1.71
Cottons	22.62	2.58	4.59	2.60	2.62	2.33	2.33	1.25	0.57	5.22	1.49
Linen yarn	1.99	0.39	0.52	3.12	3.14	0.14	0.14	1.50	0.00	1.10	1.06
Linens	5.16	0.83	2.59	3.41	3.43	0.27	0.27	2.17	0.15	2.09	0.88
Silk	0.47	4.64	0.95	0.21	0.21	1.35	0.22	2.56	0.00	1.29	1.32
Silk wares	7.66	17.44	13.06	0.31	0.31	0.03	0.03	3.15	0.07	5.57	1.13
Glass and glassware	0.45	0.72	0.86	2.91	2.93	0.10	0.10	3.77	0.27	1.30	1.11
Pig iron	0.97	0.00	0.07	0.15	0.15	1.05	0.10	0.02	0.01	0.19	1.83
Bar iron and steel	5.84	0.57	0.46	3.58	3.60	1.13	0.10	0.79	0.04	1.63	1.36
Ironware	2.47	2.46	1.20	1.64	1.65	0.25	0.25	1.31	0.82	1.45	0.57
Total Trade	71.91	61.53	65.08	38.79	34.22	17.23	7.88	59.00	16.71	44.80	0.56

Notes: see table 2.

In the US, in the later 1860s due to the formation of broader items in the statistical classification, yarns disappeared from the statistical tables on trade by commodities and partner countries, and were summed up with 'other manufactures' of a certain textile fibre. Fortunately, the statistics for imports for domestic consumption (that did contain no information on origins of imports and reported totals only) continued to provide information on the amount of yarns imported. Hence it was possible to use the share of special imports of yarn in the broader category to reconstruct overall yarn imports and assign countries of origin proportionately. For exports, the problem could not be solved this way, but is of minor importance in the light of the small share of yarns in total exports of 1865 as given in table 1b.

Two additional problems mentioned by Del Mar (1868, XXIV-XXIX, XLV-XLIX) were of minor importance in for the present dataset: Wood originating from Maine was credited as imported from Canada after being transported via New Brunswick, and tin-plates were some-

times classified as re-exports instead of exports of national production, despite having received substantial modification in the US.²⁶

Minor changes had to be dealt with for the Netherlands, where prior to 1863 rubber shoes, other articles of gutta-percha and certain mirrors were reported in the sum of 'other articles'. Because of their negligible importance, mirrors (0.7 per cent of all glass imports in 1863) were not reconstructed. For articles of rubber, 7.8 per cent was added to the 1857 to 1861 values of the corresponding category based on their 1863 shares and geographical composition.

For transit tables, comparable problems occurred in the UK, the Netherlands and Austria-Hungary, where the degree of detail of the statistics was unsuitable and/or reduced over time. In the UK, prior to 1869 a large part of transit of manufactures was summed up under the broad heading of 'Silk, Woollen, Cotton, and Leather Manufactures, and other Manufactured Goods not separately specified'. This amount was assigned to the commodity groups woollens and worsteds, cottons, linens, articles of leather and rubber and silk wares in proportion to the import share of each of these groups in their sum for every country.²⁷ Since 1869, the statistics merged this broad heading with coffee, unrefined and refined sugar, wine and other articles into 'other articles not separately specified'. Hypothetical amounts of the manufactures category and wine were reconstructed for 1869, 1871, 1873 and 1875 based on these headings' 1867 share in the sum of the items in the new residual category.

In the Netherlands, after 1871 general and special imports as well as general and special exports were reported in four separate tables instead of two. For imports and exports for home consumption and of domestic production, statistics remained fairly detailed, but for overall imports and exports and the transit share of it, the degree of detail was substantially lowered, and was reported in quantities (kg) only. To reconstruct trade for every commodity group, general trade and transit accounts for 'yarns', 'textiles' (*manufacturen*), 'unwrought metal' and 'wrought metal/metal wares' had to be broken down into the more specific items reported for special trade. To achieve this, the share of each item in the total of the group in 1871 was used to reconstruct hypothetical general trade values for the corresponding commodity groups in 1873 and 1875. For transit, an analogous method was used, based on the transit export shares, to which transit import shares were assigned proportionately.²⁸

²⁶ Tin-plates made up a small fraction of total exports of the 'Bar iron and steel' group only and were almost exclusively exported to non-European countries (Cuba, Haiti, Canada, etc.), and about 99.9 percent of all wood imported into the US came from Canadian Territories, and the wood originating from Maine caused no major distortion in this pattern. Furthermore, trade with Canada lies outside the focus of this paper.

²⁷ The remaining small amount was interpreted as representing other articles not covered in the sample.

²⁸ For silk, no general trade and transit data were published after 1872, so the general trade/special trade ratio for 1871 was used to reconstruct general trade and transit volumes.

In Austria-Hungary, transit tables from 1863 to 1869 were divided into very broad categories, the 22 tariff-classes, and mainly reported quantities.²⁹ This means, we lack detailed accounts for transit in individual commodity groups. The shares for quantities in the more detailed transit records of 1859 and 1871 were used to estimate them.³⁰ For some commodity groups, transit records even in the more detailed period were broader than the commodity groups used here even in years with more detailed tables. Those records have been broken down according to each commodity group's quantity shares in bilateral trade with the Zollverein for the corresponding year. The reconstructed commodity-group specific transit figures were converted to values using mean prices of imports over every commodity group's total.

3. *Methodological challenges of historical foreign trade statistics*

Apart from differing degrees of detail and changing commodity composition, three methodological issues have to be treated when dealing with trade statistics for the 1850s to 1870s: a) general principles on what is foreign trade and in which subaggregates it should be divided, b) practice of pricing and valuation, and c) assignment of countries of origin and destination. This section discusses in which way idiosyncratic characteristics of national statistical publications present challenges to the comparability of the original trade data, and how these were dealt with during the harmonisation of the present dataset.

Regarding definitions of foreign trade and its main aggregates, 'foreign trade' in merchandise is defined in principle as the total of all operations of commodity exchange that transcend domestic borders. For the statistical recording of these transactions, concepts named 'general trade', 'special imports and exports', 'transit trade' and 're-exports' are employed. To provide a general definition, 'special trade' is what goes into or comes from the domestic market, while 'general trade' is a wider concept embracing all (recorded) trade passing a country, including transit, transshipment and re-export, i.e. merchandise passing national territory without being actually imported. Conceptional differences between national statistics in **our** period stemmed from the presence of two different systems of sorting and displaying imports, exports and transit: the Anglo-Saxon and the Continental model.³¹ The general defini-

²⁹ In addition, for the totals of the most important subclasses (c. 80 so-called *Waarengruppen*) official values were reported.

³⁰ The 1871 records were used to reconstruct detailed transit records for 1869 and 1867, and transit for 1863 was reconstructed from 1859 shares. For 1865, shares of 1871 were combined with shares for Venice of 1859.

³¹ Cf. Federico/Tena (1991), 261-262, Don (1968), 83.

tion of special and general trade employed in the present paper is derived from the Continental model that was prevalent in Central and Western Europe, i.e. in all countries of the sample except the UK and the US. In customs houses on the Continent, incoming merchandise was directly declared as being imported for the home market (special trade) or as transit, while exports were reported as being of domestic production or recognised as transit.³² This led theoretically to consistent statistics that had general imports as equivalent to the sum of special imports and imports in transit, while general exports were equivalent to the sum of special exports and exports in transit, with imports in transit being equivalent to exports in transit. In annual accounts, imports into and from customs-controlled warehouses could temporarily impair these identities.

In difference to the Continental Model, the Anglo-American model in principle recorded no special imports as such. Records were made for general imports, and imports for home consumption were devised only for commodities subject to duty. Furthermore, the ‘general imports’ recorded were not equal to those in the Continental Model, because ‘pure’ transit was recorded and published in separate tables. For exports, goods of ‘national growth and produce’, i.e. special exports, were distinguished from goods ‘of foreign and colonial growth and produce’, i.e. re-exports, either from bond or from the market (duty-free goods). The distinction between transit and re-export was somewhat arbitrary and mostly dependent on administrative procedures and the tariff scheme: merchandise in transit was exempt from import duties, an advantage that was not useful for imports of duty-free goods that could be re-exported duty-free without being subject to bonded warehouse-restrictions.³³

To sum up, the statistical tables under the Anglo-Saxon system reported special exports, re-exports, and transit, but did not inform about the share of ‘general imports’ that were re-exported, i.e. the countries of origin of special imports and re-exports were merged in one account. To achieve comparability with the Continental system, special imports then were reconstructed by deducting the amount of re-export from the ‘general imports’ amount.³⁴ Countries of origin for these reconstructed special imports were assigned proportionately to those

³² In the customs house where incoming merchandise was declared as transit, the outer packing of transit loads was sealed to prevent fraudulent imports for the home market.

³³ See Bourne (1872), Stafford, Maton and Venning (1953), 294-295, Richter (1901b), 21-22, and Hirth (1870), 426, for the UK. For the US we are lacking transit tables prior to the fiscal year 1867/68. Therefore, prior to the calendar year 1869, only re-exports could be included for the US, not transit. See Del Mar (1868), X, XLV, XLIX-LI, LXLIX, for a detailed discussion of the issue.

³⁴ Del Mar (1868), XVII, practised the method of deducting re-exports from general imports in an abstract of US statistics prior to 1867. On British records, Giffen (1882), 182, remarked that some newspaper and journal articles had failed to deduct re-exports from general exports, and therefore reported an alarming British trade deficit that obviously did not exist as such.

reported for ‘general imports’.³⁵ The same shares were also used to reconstruct the countries of origin of re-exports. Finally, re-exports and reported transit were then added up in one figure to achieve comparability with the transit figures published under the Continental model.

Additionally to general system differences, both under the Continental and the Anglo-American system, the re-export of processed imports was an issue. In general, the ‘substantial modification’ rule was applied. Problems of comparability resulted most prominently from special regulations for duty-free import contingents earmarked for export processing. This ‘improvement trade’, in principle was created on the Continent to foster economic activity in border regions, but was extended widely over time (v. Kalchberg 1871). It was most diffused in textiles, milling, sugar refining, and iron and steel processing. The main challenge during dataset construction resulted from the fact that these ‘temporary admissions’ were given different statistical treatment in different countries. In France, the commodities involved were booked as transit and therefore showed up in general, but not in special trade records. As they underwent substantial modification, the import and export classes of this ‘transit trade’ did not coincide, and thus at the commodity group level statistics were distorted. I therefore modified the official figures and treated imports and exports under this regime as special imports and special exports, as was the case in Belgium. In Germany and Austria-Hungary, imports and exports for ‘improvement trade’ were not recorded in separate tables. Because these tables lacked detail and systematic information on places of origin, improvement trade for Germany and Austria was not included in the dataset, although in some cases (most notably iron and steel processing and textiles) improvement trade was not negligible.³⁶

Additionally, the dataset does not include separately reported ‘transit without reloading’ in the Netherlands and ‘transit on short roads’ just touching German territories as well as trade with fairs, postal transport and different classes of *entrepôts* that were given as ‘places of origin’ without further information in the Zollverein’s statistics until 1871.³⁷

³⁵ Where data on the amount and/or geographical distribution of goods ‘entered for home consumption’ existed, they were used instead. This was the case for imports subject to duty in the UK and from tables of overall amounts of imports for home consumption and amount of duties received in the US from 1869 to 1875. To the latter countries of origin were assigned proportionately to their share in ‘general imports’ for which geographical distribution was published.

³⁶ Only duty-free imports for shipbuilding into the Zollverein have been included because they were reported in the main tables for imports and exports.

³⁷ After 1871, the geographical distribution of trade via *entrepôts* was included in the tables while postal transport continued to be recorded as such and an increasing amount of trade with ‘not determined’ partners appeared which should have accounted for the rest of the imports reported separately before; see Kaiserliches Statistisches Amt (1873a), 133-134, 137-138, 141-142, 145, Committee of the British Association Appointed to inquire into the Accuracy and Comparability of British and Foreign Statistics of International Trade (1904), 443-444, and Richter (1901b), 25, 29. In addition, in Germany some duty-free goods imported overland were not recorded, mostly due to “small border trade” provisions. The only items that matter to us were firewood and construction

Apart from issues of aggregation, a practical problem for the separation of special and transit trade resulted under the Continental model. For duty-free and low-duty commodities in transit the benefits of the transit regime were outbalanced by additional costs and restrictions associated with bureaucratic transit and bond procedures. This led to imports in transit being declared as special imports and re-exported as formally ‘nationalized’ products from the domestic market. As this form of re-export was not recorded as such (hence the denomination ‘disguised transit’), it distorted official figures. In consequence, the reported share of special trade in general trade was too high and the share of transit too low, thus leading to inflated figures for trade with neighbouring countries at the expense of countries of ‘real’ origin and destination. This phenomenon is supposed to have been most prominent in the statistics of the transit countries Belgium (Hornings 2002) and the Netherlands (Lindblad and van Zanden 1989), but suspicions also existed for French (Hirth 1870, 427), German (Soetbeer 1875, 747), Austro-Hungarian (Richter 1900, 249-250, Don 1968, 83) and even British (Fuchs 1893, 90) statistics. The problem was of a magnitude that could not be ignored. Therefore systematic tests for and corrections of disguised transit are performed and presented in section 5.

The second major problem consisted in methodological differences in recording prices and values. Of course, the most obvious way to generate values is to gather them directly from the declarations of importers and exporters. Nevertheless, this was practised a comprehensive way only by the UK and the US.

The British method of pricing was regarded as the best practice available. From 1853 to 1870, imported quantities were converted to values using ‘computed real values’ that were estimated on an annual basis from monthly reports of a group of around 50 important trading houses in London and additional information from special officers in Liverpool and Hull.³⁸ From 1871 onwards, declared values were used for imports and exports, as already had been practice for exports since 1798.³⁹ It was not known even to contemporary experts whether the switch from computed real values to declared values for imports led to some kind of structural break; Stafford, Maton and Venning (1953, 291) stated that contemporaries “regarded as at

wood, and amounts were supposed to be small; see Kaiserliches Statistisches Amt (1873a), 130, 137, Kaiserliches Statistisches Amt (1873b), X, and v. Borries (1970), 29. Other articles were hay, straw, forage, fresh fish, peat, beehives, etc.

³⁸ See Soetbeer (1864), 17-20, Hirth (1869), 84, 97-99, Hirth (1870), 429-30, and Stafford, Maton and Venning (1953), 289-293. For an important share of imports, mainly manufactured goods, declared values were directly recorded, and no quantities were published in the statistics.

³⁹ See Bourne (1872), 206-209, 213; Hirth (1869), 100-101, Richter (1901b), 16, 19; Platt (1971), 123-124, and Don (1968), 84-85, for details and evaluation.

least equal” computed real to declared values. Richter (1901b, 20), supposed that the change led to a rise import values, but was unable to state the amount or prove his proposition.⁴⁰

In the US, during the whole period all prices and values were obtained from declarations. Import values were given as “sworn specie values at foreign places of export”, as were re-exports “[mainly]”, while exports were reported with their declared *free on board (fob)* value as “sworn currency-value at domestic places of export”.⁴¹ In contrast to the values of exports the declared values of imports comprised the whole cost upon arrival in the US, together with a commission of at least 2.5 percent, therefore coming close to the concept of *cost, insurance, freight (cif)*.⁴²

In the other European countries, due to the level of training of 19th century customs officials’ and merchants’ unwillingness to declare values, duties were mostly specific, and original records on imports and exports were kept in hundredweights, meters, dozens, loads, etc. To obtain values, official valuing bodies within or outside statistical offices had to provide ‘official prices’ that were multiplied *ex post* with recorded quantities. Apart from data collection restraints, the main reasons given in favour of official pricing stemmed from suspicions about the accuracy of value declarations, especially referring to strategic underreporting to evade *ad valorem* duties and laziness to declare correctly.⁴³ Nevertheless, while value declarations had to be made for each individual consignment, official prices necessarily were estimated mean prices for aggregates whose constituent parts differed in form and quality. Reliability of official prices therefore depended not only on the competence of the price-estimating body, but even more on the conciseness and homogeneity of underlying categories and the frequency of revisions.⁴⁴

⁴⁰ See Giffen (1882), 188. Bateman (1892-93), 533-534, stated that the British method of obtaining declared values was the best available even in the 1890s. Nevertheless, Fuchs (1893, 88-89) blamed the cited eminent British statisticians for not having treated the subject at all. He expressed scepticism about British statistics in general.

⁴¹ Quotes are taken from Table 1 (p. 4) of the *Annual Report of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States for the Fiscal Year ended June 30, 1875*, Washington: Government Printing Office, 1876; see also Hirth (1869), 106. ‘Specie value’ referred to the gold value of exports from countries with a depreciated currency; see Bateman (1892-93), 533-534.

⁴² This was changed in 1883, when import values had to be declared as invoice values only, excluding insurance and transport costs and commissions. See Simon (1960), 639, 642-43, Committee of the British Association Appointed to Inquire into the Accuracy and Comparability of British and Foreign Statistics of International Trade (1904, 442), Bateman (1892-93), 533-534, Flux (1923), 302.

⁴³ Cf. Soetbeer (1882), 480-481 (dismissing these advantages); Flux (1923), 302; Don (1968), 84-85. It should be noted that Simon (1960, 642-644) concluded for the imports of the US that distortions caused by underdeclaration and smuggling together made up about 3 per cent of import values, and therefore presented no major problem. His judgment was based on estimates by the then Director of the Statistical Office in 1874.

⁴⁴ This applies especially when prices of certain market places were used to value the entire import and export volumes, cf. Paasche (1874), 168; Bourne (1872), 206. Hirth (1869) gives comprehensive accounts of official pricing in the UK, France, Belgium, Italy, Austria, Russia, the Netherlands and the Hanseatic Towns. See also v. Borries (1970), 7-9, and Flux (1923), 301.

Best practise in the field of official prices – apart from the mentioned British ‘computed real values’ – were the French ‘actual values’ estimated since 1849. They were based on current prices and annually revised by a “Permanent Valuing Commission”.⁴⁵ Soetbeer (1864, 26-7) concluded from his comparison of prices and values from French and Hamburg’s statistics that official import prices were “remarkably correct”, but exports were valued quite certainly at too high prices. Based on Soetbeer, Hirth (1869) and other sources, v. Borries (1870, 9) estimated that exports were overvalued by about 20% in the 1850s and early 1860s. The reason was mainly that export prices were fixed as equal or higher than import prices, despite the principle that trade costs (*cif*) should have been included in import prices.

Also in Belgium official prices were annually revised by a price commission, but as statistical categories were much broader, estimated prices were much less detailed and can hardly have been as accurate as the French ones.⁴⁶ The bigger part of prices was re-estimated annually, and imports of many manufactures were declared directly in values, although official prices for certain items remained unchanged for a long time.⁴⁷ For the dataset, import values have been taken to be fairly reliable although they might have been too high in some cases (see section 4), while doubts on the accuracy of export prices remained.⁴⁸ As the dataset is based mainly on import values only corrected by export shares, Belgian price data have not been corrected, except for one commodity in one year.⁴⁹

The main work in price corrections has been done for the statistics of the Netherlands, Austria-Hungary, and especially the German Zollverein. In the Netherlands and Austria-Hungary, the revision of official prices presented a considerable problem, while in German statistics prior to 1871 prices and values were completely lacking.

In the Netherlands, official ‘benchmark prices’ (*matstaaf*) remained almost unrevised from 1846 until World War I, and even their accuracy for the initial year was doubted.⁵⁰ I followed the example of Lindblad and van Zanden (1989), Smits (1995), and Smits, Horlings and van Zanden (2000) and reconstructed trade values for all years at the commodity level.

⁴⁵ See Soetbeer (1864), 22-27, Hirth (1869), 101-102, and Hirth (1870), 431.

⁴⁶ See Hirth (1869), 103-104, and Platt (1971), 124. The annual reports of the price commission were included in the introductory part of each year’s foreign trade statistics.

⁴⁷ E.g. the price for cullet in the official statistics of 1865 was still the same as in 1833; in 1875, anchors and marine chains were valued at their 1857 prices.

⁴⁸ Soetbeer (1864, 29-30) notes that Belgian prices might have overvalued exports by about 50%; see also Horlings (2002), 115-117, Buchheim (1982), 130, and Sydow (1977), 216.

⁴⁹ The extremely low price of 1.90 bfs/kg for wool was changed to 2.35 bfs/kg in 1869.

⁵⁰ In 1868 prices were newly fixed, but remained unchanged for the vast majority of items. See Lindblad and van Zanden (1989), 232; Platt (1971), 124; Hirth (1869), 106; Soetbeer (1864), 28-29.

British prices were used where available for comparable unities; otherwise (in many manufacturing positions), Hamburg prices were used.⁵¹

In Austria-Hungary, the first official prices of 1852 were only occasionally updated until the publication of the 1862 statistics. In 1864, the then president of the Austrian Commission for Statistical Administration, v. Czoernig-Czernhausen, undertook a comprehensive survey and gathered individual prices for 1.546 tariff items. Unfortunately, after Czoernig's departure from the Commission in 1865, the 1863 prices again were only occasionally updated until 1875. The official prices were revised again for the statistics of 1875 when additionally 'real commercial values' (*wirkliche Handelswerthe*) were introduced.⁵² Based on these facts, Don (1968, 86) claimed that Austro-Hungarian value statistics before 1875 were "[...] of no service for any analytical purpose". Giffen (1882, 190-191) stated that the introduction of commercial instead of official values had changed trade aggregates by 10 to 20 per cent. As prices generally were revised upward, foreign trade would have been undervalued by this amount before 1875. Official prices of 1857 to 1873 have been revised by comparing the values per kg from Austro-Hungarian statistics with the new estimated prices for the Zollverein (see below), Austria-Hungary's main trading partner for each commodity group.⁵³ Where differences were very high and trends antidromic, Austrian prices have been corrected conservatively.⁵⁴

The 'Commercial Records' of the German Zollverein prior to 1871 were quantity statistics that did not contain any values at all. Since 1872, the Imperial Statistical Office estimated official prices based on prices quoted at principal German markets, mainly Hamburg and Bremen, complemented by the expertise of competent Chambers of Commerce, especially when tariff items containing heterogeneous manufactured goods were concerned. These prices were taken to be more or less reliable, at least for imports.⁵⁵

⁵¹ Smits (1995), app. VI, uses prices from Spiethoff (1955), Posthumus (1943) and apparently unpublished work by Alain Callewaert I was unable to locate for most manufactures. Smits, Horlings and van Zanden (2000) additionally use the unpublished PhD thesis by Arthur van Riel (*Postponed conformity*, University of Utrecht), which I also have not assessed so far. German and UK prices have also been used to correct Dutch statistics by Lindblad and van Zanden (1989), 234-236, Buchheim (1982), 26-29, and app. A, and de Jonge (1968), 13-16. Where possible, I crosschecked prices between sources and with prices from Posthumus (1943).

⁵² See v. Neumann-Spallart (1876), 95-99, Richter (1900), 246-248, Hirth (1869), 104-105.

⁵³ I compared average prices per kg of bilateral exports to Germany from Austro-Hungarian statistics with those of bilateral imports from Austria-Hungary as reported in German statistics, and vice versa, to avoid composition biases due to different internal structure of trade in commodity groups.

⁵⁴ As a general rule, I moved up official revisions to previous years and avoided to construct artificially high or low prices that were never quoted in the publications. Revisions were clustered in certain items like wine, spirits, hides and skins, cotton and linen yarns, cottons, linens and silk.

⁵⁵ Soetbeer (1875, 751-3, 756-769) compared the official prices of the German tables for 1872 and 1873 to those of Hamburg and France and came to the conclusion that they were not the reason for the big German trade deficit reported for 1872 und 1873; he affirmed that half of reported deficit was real, while the other half was caused by statistical understatement of German exports, especially in textiles. Cf. Lotz (1892), 149-150.

The Hanseatic Towns of Hamburg and Bremen had a long history of recording their trade in values based on declarations. Contemporaries regarded their average prices as comparable in quality to those of the UK (Soetbeer 1864, 10). Because the Hanseatic Towns were Germany's main exchange centres, the officers of their statistical bureaus could easily crosscheck declarations with current market prices, thereby improving reliability even more (Hirth 1870, 416-418).⁵⁶ For years prior to the publication of official prices, different scholars and leading officials presented unofficial estimates for the value and balance of the Zollverein's foreign trade in one or more years, mainly based on Hamburg prices supplemented by other sources.⁵⁷ In 1958, Bondi joined these and other estimates and offered calculations of foreign trade totals and other aggregates for the entire life span of the Zollverein (1834-1871). Unfortunately, his figures suffer from severe shortcomings, as v. Borries (1970, 5-7) convincingly argued: Bondi mixed up contemporary estimations despite them not being really comparable, as some worked with fixed, some with current and some with outdated prices from earlier estimates.⁵⁸ For the present dataset, prices and values were reestimated for the period prior to 1871 based on prices quoted in Hamburg and Bremen where possible, complementing them in some cases with British prices. Unfortunately, the broad headings of the Zollverein's tariff rendered the estimation of appropriate prices for imports and exports difficult for commodity classes of heterogeneous composition whose internal composition remained unknown. In these cases, price series were extrapolated backwards from the official prices of the Kaiserreich's statistics for 1872 and 1873. In most of the items in question, the detailed official prices for comparable categories in French statistics could be employed, thus combining the movement of French prices with the absolute values of the German Imperial Statistical Office at the end of the period. For some minor items that were reformed by the tariff reform of 1865, values and/or price relations for earlier years were taken from Hübner's (1859, 1861) prices for 1857 and 1859 and Bienengraber's (1868) prices for the early 1860s. As seen in section 4, the resulting estimated values are far from perfect, but fairly useable for statistical analysis.

⁵⁶ Values in Bremen were "invoice values" for imports and exports, including for imports freight and "assurance as prevailing here". Prices were for net quantities when goods were sold by weight and for gross quantities when goods were sold by pieces, i.e. most manufactures (Hirth 1869, 76-82; Soetbeer 1882, 484). Hamburg values were values as quoted at the commodity exchange, i.e. including all trade costs and importers' gross revenue.

⁵⁷ Von Borries (1970, 33-46) presented a review of those early attempts; see also Soetbeer (1864), 31, and the discussion of Bienengraber's (1868) and other attempts in Hirth (1869), 110-113.

⁵⁸ v. Borries (1970) and Rosenberg (1960) accused Bondi also of systematically distorting values for some trade flows in order to prove Marxist arguments about the evolution of capitalist economies. (Interestingly, Rosenberg's "Die Weltwirtschaftskrisis von 1857-1859" on its part is included in a list of works criticized by v. Borries (1870, 4) for using statistical figures without taking account of their context.). Cf. Dumke (1994), part II, 2-16, for a general review of the discussion on the quality of existing estimates.

Still, according to contemporary and modern accounts, the most severe shortcoming of historical statistics was the incomparability of records on bilateral trade flows due to differing practices and limited capabilities in determining countries of origin and destination. In principle, the country of origin of a merchandise can be defined as a) the country from which the merchandise was directly received, i.e. the country of last land border crossed or last port entered before arriving at the final destination; b) the country of consignment, i.e. from where the goods were sold; or c) the country of original growth or production; i.e. the production/extraction country for raw materials and the country of last substantial transformation for manufactures. Analogous considerations apply for exports.

Despite being the least satisfying alternative, the ‘border approach’ (a) was prevailing for imports and exports until at least the 1890s in most countries. For exports, in general, the problem of misassignment was larger for more complex trading routes, and for exports possible reselling by exporters’ commercial counterparts made proper declaration and recording of final destinations even more difficult. Transshipment and re-export were most prominent in trade with products of tropical agriculture that were distributed in Europe through central commodity exchanges, but were also present for many other articles.⁵⁹ As section 6 will show, the share of merchandise imported after transit through other countries was between 26 and 29 percent of total trade and thus far from negligible. Thus, the ‘proximity bias’ has to be overcome to reconstruct a meaningful matrix of bilateral trade flows between ‘real’ countries of origin and destination, because otherwise bilateral trade between non-bordering countries would be systematically understated. To deal with this, a comprehensive ‘transit correction’ is performed in sections 5 and 6. Its basic idea is to use information from partner countries’ export and transit record to reconstruct the ‘real origin’ of recorded imports. The following literature survey aims to provide the necessary background concerning the quality of geographic assignments in each countries’ foreign trade statistics.

In the UK, countries devised as countries of origin or destination generally were the last/next ports visited by a ship (Bourne 1872, 202). From 1874 on, the attempt was made to record the initial harbour, while overland transit on the way to this harbour was not accounted for. This led to wide missassignments of countries of origin and destination, e.g. for trade with Germany transiting the Netherlands via the Rhine-Maas system, trade with Austria-Hungary via Hamburg or with Switzerland via Germany, Belgium and France.⁶⁰ In the US, also the

⁵⁹ On the general problem see e.g. Federico and Tena (1992), 262, 269; Platt (1971), esp. 119-121; Don (1968), 88-91; Flux (1923), 303-4; and Giffen (1882), 189.

⁶⁰ Switzerland did not show up at all in British statistics. On the Problem see Platt (1971), 122-124, Stafford, Maton and Venning (1953), 293, Committee of the British Association Appointed to inquire into the Accuracy

origins of incoming and the destinations of outgoing ships were recorded as initial ports, not taking into account overland transport before or after.⁶¹

In Continental European countries the pure border approach or a methodological mix was applied. French authorities started to record ‘real’ countries of origin and destination for landward trade in 1857 and for sea trade in 1870.⁶² In Belgium, since 1841 it was intended to use the ‘real origin/destination’ approach. Nevertheless, contemporary experts in the Commission for Further Development of the Statistics of the Zollverein reported with indirect proofs that this approach had been comprehensively implemented neither in France nor in Belgium.⁶³ This means that records on origins and to a greater extent those on destinations in French and Belgian statistics resulted from a methodological mix. The reliability tests in section 4 confirm this, possible distortions could only be dealt with partially, as is discussed in the final part of that section.

Dutch, Austro-Hungarian and German statistics were elaborated in principle strictly according to the border approach, although in the Netherlands small amounts of landward imports from non-bordering France were reported occasionally.⁶⁴ Austria-Hungary and the Zollverein/Germany presented a second particularity, because their statistics treated the free ports outside the customs border as points of origin and destination. Hence, most seaward trade with the Zollverein/Germany was accounted to as coming from or going to the free-ports of Hamburg and Bremen and smaller free-ports in the states of Hannover (since 1866 Prussia) and Oldenburg.⁶⁵ For the smaller share of sea trade through national ports that were not free ports, i.e. Prussian ports in the North and Baltic Sea, geographical distribution on origins and destinations was published since 1858 in separate tables, whose sums except for supposed transmission and printing errors matched the sum of trade reported in the main tables. I matched these statistics into the main tables for imports, exports and transit.

The actual countries of origin and destination of trade flows through Hamburg and Bremen for Germany, and Trieste, Fiume and Venice for Austria-Hungary have been recon-

and Comparability of British and Foreign Statistics of International Trade (1904), 444, Richter (1901b), 22-30, Fuchs (1893), 90, Giffen (1882), 189, and Bourne (1872), 202-204, 208-209.

⁶¹ Additional statistics for ‘indirect trade’ were published which recorded ‘real countries’ of origin for the share of imports that was not directly received from its ‘original origin’ (e.g., Switzerland).

⁶² See Platt (1971), 122, Richter (1901a), 292; Giffen (1882), 191; and Hirth (1869), 103.

⁶³ Kaiserliches Statistisches Amt (1873a), 131-132, Hirth (1870), 427, v. Neumann-Spallart (1876), 102-103, and Richter (1900), 292-294.

⁶⁴ For the Netherlands see Lindblad and van Zanden (1989, 232), Platt (1971, 122) and Vauthier (1953, 361); for Germany Kaiserliches Statistisches Amt (1873a), 131-132, Kaiserliches Statistisches Amt (1873b), XII; for Austria-Hungary v. Neumann-Spallart (1876), 103-104, Richter (1900), 250-252, and Don (1968), 88-91.

⁶⁵ Cf. among others Hirth (1869), 107; Soetbeer (1882), 485-487, and Zimmermann (1908), 312-317.

structed from the information on the geographic distribution for trade in every commodity group and year contained in the separate foreign trade statistics published by these free-ports. The underlying approach treats the Hanseatic Towns and the Austro-Hungarian ports as entrepôts without proper imports or exports for domestic consumption or of domestic production of these cities. Due to the small size of the ports in comparison with production and consumption in respectively the Zollverein and Austria-Hungary, possible errors resulting from this approach should be acceptable facing the lack of better alternatives (Cf. Buchheim 1982, 25). For the Austrian ports, Trieste's statistics had to be taken as representative for all ports, as for the other harbours comprehensive records were lacking. For Hamburg, there were no export statistics for the years 1856 to 1871. Hence, it was impossible to reconstruct complete records on the destinations of Zollverein's exports.⁶⁶

Finally, as a technical note: For countries whose statistics were lacking crosstabulations showing the share of commodities in transit or re-exported which was transferred from each single country of origin to each single country of destination (UK, US, France, Belgium), I constructed hypothetical transit tables by assigning countries of origin to countries of destination proportionately.⁶⁷

4. Statistical assessment of the quality of historical bilateral trade data

Before we can perform the comprehensive transit correction outlined above we have to assure that import, export and transit statistics serve our purpose. This is because notwithstanding the magnitude of the problem, one might doubt the feasibility of the proposed correction

⁶⁶ From 1872 on, tentative export statistics for Hamburg (quantities) were provided in a special table of the official German statistics. Additional errors for the Zollverein might result from the omission of imports via Altona in calculating the shares in Hamburg's foreign trade. Altona is now a part of Hamburg, but was a complete free-port without comprehensive statistics in period under study. As a large share of Altona's trade was supplied to or from its dominating neighbour (v. Borries 1970, 107-109, Krawehl 1977, 134-145 et. al), it was assumed as a best guess that its composition was comparable to that of Hamburg, and hence omission of this trade did not matter for shares. The small free ports of Brake and Geestemünde (now a part of Bremerhaven) have not been corrected due to negligible shares of imports coming through them, except of yarns of wool traded through Geestemünde that originated 100% from the UK (Hull), see Speerschneider (1866), 10, and *Statistik des Deutschen Reichs*, vol. 5, II. 10 (1872); vol. 11, II. 114 (1873); vol. 23, II. 244-245 (1875).

Trieste's statistics reported a considerable amount of trade with other Austrian ports. I interpret these amounts as internal trade and foreign trade distributed via Trieste, and accordingly omitted them in the calculation of shares of countries of origin and destination. Furthermore, shares calculated from Trieste's statistics were based on un-revised fixed official prices that have not been revised for the present study.

⁶⁷ In France, information on origins and destinations was less comprehensive in transit tables than in import and export tables. To enhance comparability, I disentangled the 'other parts' residual proportionately to the countries' shares in the difference of respective general and special imports and exports of categories in whose transit tables 'other parts' accounted for more than 10% of transit or 80.000 Francs in value.

of importers' statistics with information from partners' corresponding export and transit records. Corrections might yield inadequate results if corresponding import and export records were unreliable, inaccurate, and internationally incomparable, as judged by authors cited above. If bilateral import and export records did not coincide reasonably, it would be arbitrary to use the latter to correct the former, however well thought the correction might be. Although section 2 and 3 to some extent qualified overall criticisms and tried to manage resulting problems, incoherencies remained. Therefore, this section provides a systematic inquiry into the comparability of general export and import records. It compares general trade records because they accounted for all goods leaving exporting countries and entering importing countries, whether in transit or not, and the proposed transit correction is based on the identity of overall bilateral trade flows, not on the coincidence of special imports and special exports (that is explicitly doubted by stating the need for transit correction).⁶⁸

Although the reliability of foreign trade statistics cannot be measured in absolute terms,⁶⁹ there are three ways of assessing the consistency of bilateral records: First, we can measure the difference between individual bilateral import and export records on the same flow from country A to country B, second, we can investigate the correlation between corresponding series of imports and exports (in cross-section and time series), and third, we can try to find out whether differences between corresponding import and export records were systematic and statistically significant or not.

Table 4 reports results for tests of all three characteristics for all commodity groups and importing countries, respectively, in every single year. The tests have been done on two levels of aggregation: the left part of the table reports results for the sum of all commodity groups, i.e. the 'aggregate' bilateral trade for every country-pair, while the right part contains results on the pool of all individual trade flows in individual commodity groups. From 1857 to 1869, Zollverein's exports were omitted as exports via Hamburg could not be directly reconstructed. Column 1 reports import weighted averages of *Implicit Minimal Measurement Errors* (IMME)⁷⁰ for bilateral data for all flows between country pairs.⁷¹ Column 2 presents Pearson's r over all bilateral pairs in every commodity group and over all bilateral pairs in which a

⁶⁸ The tests were exploratively conducted also for records on special import and exports. They performed far worse and confirmed the perceived need to correct those records systematically.

⁶⁹ Morgenstern (1963, 132) expressed this tellingly: "If the series disagree, something is at fault; if they agree, they may, of course, still both be wrong."

⁷⁰ Following van Bergeijk (1995, 5), IMME is defined as
$$IMME = \frac{IM_{ij} - EX_{ji}}{IM_{ij} + EX_{ji}}$$

⁷¹ On weighting see Carreras Marín (2005).

country is importer, respectively. In Column 3 and 4, p-values from Wilcoxon’s signed rank pair tests are displayed for the same aggregates together with the information whether importers or exporters tended to report higher figures for the same flow (see Folchi/Rubio 2005).

Table 4: Overall indicators of data quality (general imports, general exports)

year	Sum over all commodity groups (<i>aggregate</i>)					All commodity groups individually (<i>pool</i>)				
	IMME	r (im, ex)	p-value signed rank pair test	Tenden- cially higher records (rank sum)	N	IMME	r (im, ex)	p-value signed rank pair test	Tenden- cially higher records (rank sum)	N
1857	0.117	0.936	0.654	Exporters	36	0.201	0.841	0.010	Exporters	610
1859	0.153	0.922	0.094	Exporters	36	0.238	0.774	0.008	Exporters	610
1861	0.116	0.962	0.383	Importers	36	0.213	0.915	0.793	Importers	614
1863	0.112	0.957	0.610	Importers	36	0.196	0.931	0.206	Exporters	609
1865	0.099	0.974	0.070	Exporters	35	0.180	0.944	0.041	Exporters	594
1867	0.085	0.966	0.514	Exporters	36	0.248	0.831	0.135	Importers	621
1869	0.098	0.965	0.418	Exporters	36	0.210	0.899	0.899	Exporters	624
1871	0.126	0.924	0.793	Exporters	42	0.220	0.851	0.988	Exporters	750
1873	0.099	0.957	0.453	Importers	42	0.203	0.904	0.525	Importers	747
1875	0.076	0.978	0.582	Importers	42	0.185	0.923	0.629	Importers	740
average	0.108	0.954	-	-	-	0.209	0.881	-	-	-

Source: Own calculations from dataset. Prior to 1871, no exporter records are available for Germany due to mis-sion export records from Hamburg.

The overall picture is encouraging: the average IMME for sums is 0.108, which implies that importers’ and exporters’ records differ by 24.2 per cent, on average. This is below the 25% Morgenstern (²1963, 177) established as the border of “good” results for the first half of the 20th century, i.e. after 30 to 80 years of progress in statistical unification and recording methods. It is also almost in line with the ‘freight factors’ Federico and Tena (1992, 263) assumed as reasonable margins of error based on data for German exports in 1951, 75 years after the end of our period. Even more important are the high correlations well above 0.9 for the sums and 0.8 for the pool of commodity groups. Nevertheless, the weighted averages of IMMEs at the commodity group level hint at a (weighted) mean error of about 50 percent, and the results of the signed rank pair test show that in no way import records are always higher than export records. The finding that in most cases records did not differ significantly can be

taken as an argument in favour of bilateral trade data.⁷² Indeed, the only significant results ($p < 0.05$) are obtained for higher export records in 1857, 1859 and 1865.

It can be assumed that the high individual differences in bilateral records at the commodity group level stem from two sources that tend to cancel each other out when considering totals. Both have been discussed above: a) underreporting of exports (quantities) and b) overvaluing of exports in some countries. To investigate these two problems in greater detail, the analysis was repeated for every country pair in every commodity group over the years. Table 5 presents evidence on the quality of the individual statistics in comparison with all export partners and in comparison with all import partners. Table 6 does the same for statistics for individual commodity groups.

Table 5: Indicators of data quality according to reporting country

Country	Records as importer (<i>pool</i>)					Records as exporter (<i>pool</i>)				
	IMME	r (im, ex) (average of individual years)	p-value signed rank pair test	Tenden- cially higher rec. (rank sum)	N	IMME	r (im, ex) (average of individual years)	p-value signed rank pair test	Tenden- cially higher rec. (rank sum)	N
UK	0.157	0.946	0.000	Exporters	1002	0.163	0.905	0.137	Importers	1188
France	0.214	0.881	0.810	Exporters	963	0.209	0.911	0.525	Exporters	1171
‘Germany’	0.252	0.795	0.302	Exporters	1234	0.277	0.701	0.299	Exporters	378
Belgium	0.292	0.841	0.000	Importers	885	0.228	0.828	0.000	Exporters	1122
Netherlands	0.177	0.936	0.788	Exporters	891	0.254	0.866	0.519	Exporters	1094
Austria-Hungary	0.197	0.730	0.000	Exporters	632	0.286	0.874	0.000	Importers	713
USA	0.148	0.928	0.848	Exporters	914	0.149	0.963	0.000	Exporters	855

Source: Own calculations from dataset. Values for Germany are for 1871, 1875, 1875 only, as prior to 1871 no exporter records are available for Germany due to missing export records from Hamburg.

Overall, British, US, French and – surprisingly – Dutch statistics score best, while the statistics of Belgium, Austria-Hungary and the Zollverein/Germany proved to be more problematic. Belgian records were significantly higher than partner records for imports as well as exports, while Austro-Hungarian records were significantly lower.

Results for Belgium were driven mainly by seemingly overvalued trade in silk wares, woollens and worsteds, silk and other articles, mainly textiles. The biggest share of these

⁷² Similarly encouraging findings on the non-significance of differences between import and export records have been obtained by Folchi and Rubio (2005) on petroleum and coal trade of main exporters with Latin American countries in 1926.

seemingly overvalued commodities passed Belgium in transit only (as well as wool from the US that also appears as overrecorded import in several years) and therefore might not have been valued with too much care. Furthermore, as special imports were not too affected by trade in these commodities, the problem is less severe for the construction of the dataset than initially appeared.

The ‘underreporting’ of Austria-Hungary should be referred to two phenomena: potential underreporting of trade amounts and too low prices, as mentioned above. Furthermore, one should take into account that Austro-Hungarian exports records to all countries except the bordering states of Southern Germany and Saxony are reconstructed from Trieste’s import and export records, which might contain a higher margin of error than other foreign trade statistics. Import statistics for 1867 – the year after the Austro-Prussian War and the loss of Venice – appear as problematic especially for textiles and distort the overall picture to a considerable extent. Especially bulk goods such as wool and wheat were valued by Austrian authorities at lower prices than those estimated for German trade during the dataset construction. Also, landward trade with France and Belgium appears at least partially in these countries’ statistics, causing thereby a bias against Austria-Hungary’s records on these bilateral flows. Finally, there seems to have been a problem with the proper recording of improvement trade, i.e. imports to be processed and immediately re-exported to the partner country, between Germany and Austro-Hungary which took place mainly in textiles of cotton and woollen and worsted yarn. This is suspected to have caused consistently lower export records of cotton yarns by Austria-Hungary and generally high margins of error in bilateral trade with cloth.⁷³

A similar phenomenon as for Austria-Hungary appears for the UK, where values are also lower than in partner records. For imports, this is explainable by permanently ‘overvalued’ exports of silk wares and woollens and worsteds from France and Belgium and by similar phenomena for silk exports of Belgium and leather exports from France.

According to table 5, the US recorded significantly higher values for its exports than its partners. This result is mainly driven by the fact that the US statistics were geographically more differentiated, and thus exports of small amounts were reported to partners whose statistics merged imports from the US into ‘other countries’. Despite the overall results the main exported commodity of the US, wheat, was reported by importers (most prominently the UK) at higher values than recorded in the US and with comfortably low IMMES.

German statistics are of acceptable quality, but appear as the most problematic in the sample. In addition to inaccuracies resulting from the complex reconstruction process and the

⁷³ For the complex see v. Kalchberg (1871), 105-118.

valuation based on broad categories, the geographical position of Germany in the centre of the country sample means that German statistics have to compare with the vices of all other statistics, which induces higher probabilities of incompatible bilateral records.

Table 6: Indicators of data quality according to commodity group

Commodity group (<i>pool</i>)	IMME	r (im, ex) (average of individual years)	p-value signed rank pair test	Tendentially higher re- cords (rank sum)	N
Wheat	0.151	0.960	0.223	Importers	288
Rye	0.189	0.943	0.811	Exporters	218
Milling products	0.160	0.942	0.594	Exporters	311
Wines	0.225	0.923	0.000	Exporters	351
Spirits and liqueurs	0.203	0.988	0.789	Importers	353
Hides, skins and leather	0.195	0.826	0.014	Importers	345
Articles of leather and rubber	0.197	0.959	0.210	Importers	318
Wood	0.259	0.893	0.427	Importers	309
Wool	0.220	0.910	0.540	Exporters	341
Woollen yarn	0.120	0.973	0.105	Exporters	251
Woollens and worsteds	0.189	0.894	0.001	Exporters	322
Cotton yarn	0.172	0.961	0.154	Exporters	267
Cottons	0.234	0.895	0.796	Exporters	340
Linen yarn	0.207	0.926	0.001	Importers	283
Linens	0.141	0.970	0.001	Exporters	322
Silk	0.215	0.923	0.912	Importers	257
Silk wares	0.298	0.842	0.000	Exporters	318
Glass and glassware	0.246	0.892	0.908	Importers	363
Pig iron	0.144	0.957	0.003	Importers	290
Bar iron and steel	0.137	0.979	0.244	Importers	325
Ironware	0.297	0.790	0.608	Importers	349

Source: Own calculations from dataset. Prior to 1871, no exporter records are available for Germany due to mission export records from Hamburg.

Without going to much into detail about the commodity groups, results can be seen as quite intuitive: data coincidence is highest mainly for homogeneous goods such as wheat, flours, pig iron, bar iron and steel, yarns, silk and spirits, while more complex categories such as iron ware, glass, articles of silk and other textiles present comparatively higher margins of error. Significant differences between importers' and exporters' records were found for 7 categories at the 5% level: while for hides, skins and leather, pig iron, and yarns of flax, etc. import values are significantly higher, the contrary is found for woollens and worsteds, linens, articles of silk, etc., and wine. The commodities for higher import records have in common that they are mainly homogeneous articles with low tare, while the latter are mostly heteroge-

neous textiles whose package makes up to more than a quarter of total weight for exports. The “undervaluation” of wine by importers is driven by repeatedly lower values for French wines, which seem not to have been differentiated according to quality in the pricing process of many import countries.

Furthermore, in the process of data evaluation three highly distorting data points were identified and corrected by partner values and interpolation from former and latter data: French imports and exports of meals and flours from and to Belgium in 1867 and the Zollverein’s imports of construction wood from Austria-Hungary in 1869.⁷⁴

In defiance of inconsistencies and problems in detail, the overall picture is highly encouraging for the feasibility of the proposed transit correction. Especially the consistently positive and high correlation coefficients enable us to use export records for the geographical correction of import records to overcome the bias that resulted from the prevailing use of the border approach in recording partner countries. The transit correction is performed in two steps: Section 5 describes the elimination of disguised transit at the national level, while section 6 presents the comprehensive treatment of the proximity bias.

5. Detection and elimination of disguised transit

The first problem concerning the omission of transit in import records can be dealt with at the national level. Remember that the double-counting of imports that resulted from the nationalisation of duty-free imports for re-export causes systematic errors, i.e. artificial increases in special trade volumes at the cost of declared transit. Naturally, the presence and – more important – the amount of disguised transit, and therefore its actual impact, can only be estimated or inferred. For Belgium, Horlings (2002, 117-126) detected disguised transit for wool (since 1850), raw hides and skins (since 1856), wheat (since 1870), and a variety of tropical and semi-tropical goods and minerals that are not part of the sample (Horlings 2002, 117-126). The systematic analysis for disguised transit in Dutch statistics by Lindblad and van Zanden (1989, 239-241) found a considerable amount of disguised transit in some items included in the present dataset for the period from 1872 to 1913, namely wool, pig iron, bar iron

⁷⁴ French records on flours and meals also appear as too high in 1868 and led French Customs Authorities to calculate long run records for foreign trade development without “grains, flours, and meals” in 1869. They might have to do with improvement trade (see v. Kalchberg 1871). Zollverein’s import records for duty-free construction wood in 1869 most certainly are distorted by a transmission error for imports to Saxony.

and steel, and rye. Smits (1995, 310) named wheat, rye, rye flour, wool, pig iron and bar iron and steel as commodities with notable disguised transit.

To assure that the results in the present study are comparable across countries, a comprehensive analysis of all commodity groups in all countries is done based on the method developed by Lindblad and van Zanden (1989, 236-241). It allows to diagnose disguised transit, at least when it is of overwhelming importance in recorded trade flows: If in a category both the modulus of the difference of special imports and special exports amounts to less than 50% of the maximum of special imports and special exports ($\frac{|IM - EX|}{\max(IM, EX)} < 0.5$) and the Pearson's r of special imports and special exports over time is higher than 0.95, the presence of a substantial and distorting share of disguised transit is 'certain'. In contrast, if the modulus of the difference amounts to more than 70% and/or the correlation coefficient is below 0.7, the existence of considerable disguised transit can be dismissed. Between these limits, disguised transit is possible, but not all-dominant. Lindblad and van Zanden assumed that in commodity groups with highly probable substantial presence of disguised transit, only the modulus of the difference between imports and exports was 'real' special trade while all other 'special trade' was in fact transit. For commodity groups they classify as containing 'possibly assured disguised transit' ($r > 0.95$ and $\frac{|IM - EX|}{\max(IM, EX)} > 0.5$) they take 50% of the minimum of special imports and special exports as disguised transit.

In his application of this method to Belgian data, Horlings (2002) developed two additional measures in order to classify with greater precision commodities with 'possible disguised transit'. The first is the 'propensity to declare transit', measured as $PDT = \frac{T}{(\max(IM, EX)) + T}$, where T is recorded transit and IM and EX are recorded special imports and special exports respectively. The second measure is the correlation of the first differences of special imports and special exports. Horlings assumes that when a high amount of transit is declared, the presence of disguised transit is less likely, and when the correlation coefficient of first differences is small, disguised transit does not move the series. He abstains from Lindblad and van Zanden's 50%-method for not completely 'certain' transit and only corrects – but radically – disguised transit in commodities where he can prove its presence.

The results of the analysis for the disguised transit in the present dataset are reported in table 7. Results for commodity groups and countries where an important presence of disguised transit could be dismissed, are omitted to save space. For the interpretation of table 7 it should be mentioned that some of the commodity groups are of quite heterogeneous composition.

Table 7: Indicators for disguised transit (selected commodity groups)

Country and commodity group	$\frac{ IM - EX }{\max(IM, EX)}$	Correlation (IM, EX)	T	Correlation (IM(-1), EX(-1))
	(average 1857-75)		$(\max(IM, EX) + T)$ (average 1857-75)	
UK / Articles of leather and rubber	0.47	0.67	0.20	-0.32
UK / Silk wares	0.30	0.52	0.24	0.10
UK / Glass and glassware	0.29	0.85	0.14	0.08
USA / Wood	0.35	0.36	0.02	0.16
USA / Ironware	0.26	0.49	0.09	0.20
France / Hides, skins and leather	0.31	0.87	0.08	0.32
France / Linen yarn	0.41	0.37	0.32	-0.23
France / Bar iron and steel	0.42	0.09	0.22	-0.30
Belgium / Hides, skins and leather	0.23	0.97	0.20	0.87
Belgium / Woollens and worsteds	0.48	0.66	0.69	0.64
Belgium / Cotton yarn	0.32	0.17	0.40	0.04
Belgium / Cottons	0.41	0.25	0.49	-0.19
Netherlands / Wines	0.98	0.96	0.58	0.83
Netherlands / Hides, skins, leather	0.16	0.98	0.38	0.89
Netherlands / Wool	0.18	0.55	0.07	0.14
Netherlands / Woollen yarn	0.45	0.88	0.37	0.81
Netherlands / Cotton yarn	0.54	0.98	0.23	0.86
Netherlands / Silk	0.22	0.79	0.23	0.45
Netherlands / Glass and glassware	0.47	0.87	0.37	0.55
Netherlands / Pig iron	0.14	0.95	0.02	0.96
Netherlands / Bar iron and steel	0.49	0.98	0.03	0.91
'Germany' / Wheat	0.38	0.89	0.06	0.95
'Germany' / Milling products	0.36	0.96	0.02	0.20
'Germany' / Wines	0.32	0.60	0.25	0.10
'Germany' / Hides, skins and leather	0.55	0.94	0.16	0.74
'Germany' / Wood	0.26	0.26	0.00	0.31
'Germany' / Linens	0.48	-0.32	0.21	-0.50
'Germany' / Glass and glassware	0.48	0.96	0.40	0.66
'Germany' / Bar iron and steel	0.47	0.59	0.50	0.13
'Germany' / Ironware	0.49	0.71	0.42	0.51
Austria / Woollens and worsteds	0.41	0.73	0.51	0.05
Austria / Linen yarn	0.42	0.34	0.09	0.06
Austria / Silk wares	0.44	0.14	0.42	0.81
Austria / Ironware	0.45	0.42	0.08	-0.47

Source: Dataset. IM = special imports, EX = Special Exports, T = declared transit and re-exports

Based on the results, I decided to perform complete transit corrections for raw hides and skins in Belgium and for raw hides and skins, raw silk, pig iron, bar iron and steel (plates and bars) in the Netherlands for the whole period. Furthermore, as results for wool in the Netherlands were not completely conclusive, Lindblad and van Zanden's 50%-approach was applied throughout the period. Additionally, disguised transit of cotton yarns and woollen and worsted

yarns was present in the Netherlands after 1861 when the tariff on these articles was substantially lowered. The evolution of disguised transit in these products can be seen in table 8a/b. A similar result has been obtained for the wheat trade of the Zollverein before and after 1865, where the application of the former preferential tariff for Austria to all imports led to an increase in disguised transit (table 8c). In the three cases, I partially corrected for disguised transit in a way that reconstructed constant transit shares for all years following the last ‘non-disguised transit year’, i.e. 88 percent transit in woollen and worsted yarns and 54 percent transit in cotton yarns in the Netherlands, and 36 percent transit in wheat in the Zollverein.⁷⁵

Table 8a: Indicators for disguised transit: Woollen yarn, the Netherlands

Year	Special im-ports (£)	Special ex-ports (£)	Declared transit (£)	$\frac{ IM - EX }{\max(IM, EX)}$	$\frac{T}{(\max(IM, EX) + T)}$
1857	118,880	2,493	628,164	0.98	0.84
1859	74,421	997	486,689	0.99	0.87
1861	84,071	1,085	600,096	0.99	0.88
1863	949,094	1,016,535	145,300	0.07	0.13
1865	1,074,884	1,059,103	146,111	0.01	0.12
1867	1,281,268	1,161,967	208,035	0.09	0.14
1869	1,369,051	1,229,716	233,122	0.10	0.15
1871	1,409,061	824,227	805,347	0.42	0.36
1873	1,633,602	758,513	168,452	0.54	0.09
1875	1,621,572	1,080,654	235,663	0.33	0.13

Table 8b: Indicators for disguised transit: Cotton yarn, the Netherlands

Year	Special im-ports (£)	Special ex-ports (£)	Declared transit (£)	$\frac{ IM - EX }{\max(IM, EX)}$	$\frac{T}{(\max(IM, EX) + T)}$
1857	543,511	41,977	1,330,143	0.92	0.71
1859	708,700	48,652	1,079,670	0.93	0.60
1861	1,007,565	93,354	1,176,631	0.91	0.54
1863	1,298,080	705,357	105,903	0.46	0.08
1865	2,269,732	1,277,830	72,339	0.44	0.03
1867	2,921,332	1,671,587	123,403	0.43	0.04
1869	2,673,674	1,837,890	107,193	0.31	0.04
1871	3,695,335	2,786,104	310,585	0.25	0.08
1873	3,605,204	2,371,583	346,038	0.34	0.09
1875	3,011,843	1,677,741	484,103	0.44	0.14

⁷⁵ I suppose that the low values in ‘propensity to transit’ for wheat in Germany in 1857 and 1859 were caused by limited transport facilities and not by disguised transit. Furthermore, milling products in Germany have not been corrected, as there is strong suspect that imports and exports were conducted locally with neighbouring countries instead comprehensive disguised transit. The share of meals and flours in German trade was very low, and therefore possible distortions due to disguised transit should be negligible.

Table 8c: Indicators for disguised transit: Wheat, Zollverein/Germany

Year	Special im-ports (£)	Special ex-ports (£)	Declared transit (£)	$\frac{ IM - EX }{\max(IM, EX)}$	$\frac{T}{(\max(IM, EX) + T)}$
1857	1,512,087	5,447,106	26,136	0.72	0.00
1859	1,170,542	3,750,396	3,781	0.69	0.00
1861	4,823,489	8,750,045	1,466,541	0.45	0.14
1863	1,426,633	4,275,058	1,489,023	0.67	0.26
1865/I	838,203	1,258,596	894,865	0.33	0.42
1865/II	1,254,298	2,324,327	10,624	0.46	0.00
1867	10,593,884	11,831,202	70,433	0.10	0.01
1869	4,695,335	7,452,780	26,642	0.37	0.00
1871	6,655,726	8,198,835	50,185	0.19	0.01
1873	5,087,870	4,793,179	21,408	0.06	0.00
1875	5,677,964	6,547,987	27,630	0.13	0.00

Source for 8a-8c: Dataset.

Additionally, Horlings found disguised transit of wheat through Belgium since 1870. Due to the fact that the present dataset ends in 1875, this could not be proven in the present study, but it was found that the propensity to declare transit dropped from 0.19 in 1871 to 0.01 in both 1873 and 1875, and was accompanied by implausible increases of special exports especially to the Netherlands (from £5,711 to £338,777 and £346,350 respectively). A similar trend was found for rye, where total special exports rose from around £75,000 per year on average of the years from 1857 to 1871 to £590,451 in 1873 and £414,743 in 1875). The data have thus been treated in order to raise the PTA for 1873 and 1875 to the average level for 1857 to 1871, which was 0.16 for wheat and 0.45 for rye.

In the following sections, the disguised transit-corrected version of the dataset is used, but uncorrected data are available on request.

6. Tackling the proximity bias: Corrections for unaccounted partner country transit

The second part of the transit correction consists in the treatment of the failure of official records to determine correctly countries of origin that were separated from them by more than one common border or direct shipping routes requires comprehensive treatment on an international level. The reconstruction of ‘real’ countries of origin therefore requires going beyond the level of national statistics.

To demonstrate the importance of trade that was sent from one country to another while transiting a third one and thus making clear the magnitude of resulting biases, Table 9 depicts the

average shares of imports exports in general imports and special exports in general exports for all countries and commodities across years. Two main results can be discerned: The first is that ratios varied widely across countries and commodities: In Belgium and the Netherlands, less than half the merchandise that entered the countries were for home consumption, and only about one third of all goods crossing the border were actually of domestic production. In contrast, in the US transit and re-exports were almost negligible. Bulk commodities like wood, wheat, pig and bar iron and steel were less likely to cross several borders than high-value articles (silk and silk wares, articles of leather and rubber, cottons, woollens) and spirits and liqueurs. Total special export shares are higher than total special import shares because the countries of the sample had a positive balance of trade with the rest of the world in the commodities covered, especially in textiles. The average of the shares of special imports in general imports and special exports in general exports changed slightly between years. It was 70.8% in 1857 and 71.2% in 1875, with a maximum of 74.1% in 1861 and a minimum of 70.8% in 1857 and 1871. In other words, about 26 to 29 percent of total imports and total exports were trade in transit and thus subject to the proximity bias, which was unequally distributed among country pairs and commodity groups.

Table 9a: Shares of special imports and exports in general imports and exports across countries (average for 1857-75; percent)

Country	Special imports in general imports (%)	Special exports in general exports (%)
Austria-Hungary	60.3	70.9
Belgium	37.0 (41.3)	31.2 (36.1)
France	73.1	79.9
Netherlands	50.5 (69.4)	29.1 (57.1)
United Kingdom	78.1	86.0
United States	99.1	89.8
'Germany'	63.6 (64.6)	64.5 (65.6)
All (unweighted)	66.0 (69.4)	64.5 (69.3)
All (weighted by special imports)	69.5 (71.3)	73.8 (75.4)

Source: own calculations from dataset,

Note: Shares prior to correction for disguised transit in parentheses (if applies)

Table 9b: Shares of special imports and exports in general imports and exports across commodity groups (average for 1857-75; percent)

Commodity group	Share of special imports in general imports	Share of special exports in general exports
Wheat	92.9 (95.0)	83.6 (87.6)
Rye	82.8 (83.5)	72.0 (73.6)
Milling products	95.3	94.1
Wines	73.0	78.1
Spirits and liqueurs	49.5	68.6
Hides, skins and leather	75.0 (82.3)	54.2 (66.9)
Articles of leather and rubber	62.8	83.0
Wood	97.3	94.6
Wool	74.7 (75.9)	46.4 (48.5)
Woollen yarn	73.5 (78.9)	82.0 (77.3)
Woollens and worsteds	56.9	77.0
Cotton yarn	62.3 (71.5)	79.0 (83.8)
Cottons	40.1	83.8
Linen yarn	82.3	81.2
Linens	80.9	89.5
Silk	72.0 (73.2)	43.4 (46.0)
Silk wares	40.9	57.2
Glass and glassware	60.2	80.1
Pig iron	77.6 (91.2)	76.6 (92.7)
Bar iron and steel	80.3 (86.2)	88.8 (91.7)
Ironware	63.9	85.7
All (unweighted)	71.1 (73.4)	75.9 (78.4)
All (weighted by special im-ports)	74.7 (76.6)	76.6 (78.0)

Notes: see Table 9a.

The attempt to tackle this bias and reconstruct the ‘real countries of origin’ of transited merchandise parts from one basic idea: Every record of importer A_i (e.g., Germany) on its special imports from partner country B_j (e.g., the Netherlands) in a specific commodity (e.g., pig iron) consists of special exports originating in the immediate partner country and transit from third countries (e.g., the UK, see below). The total value of special imports is taken from importer’s records, while the share of each of the two components is calculated from the partner’s export and transit statistics. The amount of trade that originates in the immediate partner country (cf. the last column of Table 9) is ‘direct bilateral special import’ and needs no correction. What remains is trade in transit not originating there, whose ‘real’ countries of origin can be assessed from the immediate partner’s transit statistics. The ‘real special imports’ for every country pair in every commodity group are then found by adding up the direct special imports from the partner country and the imports from the same country that arrive after tran-

sit though other countries to whom the original import statistics assigned this trade erroneously.

Formally, first for every bilateral special import record of every importer A_i from all direct partner countries B_j (IM_{A_i, B_j}^{spc}), the share of special exports of B_j in its general exports is used to reconstruct A_i 's 'direct bilateral special imports' from B_j , i.e. share of bilateral special imports actually originating in B_j , as $DIM_{A_i, B_j}^{spc} = IM_{A_i, B_j}^{spc} * \frac{EX_{B_j, A_i}^{spc}}{EX_{B_j, A_i}^{gen}}$.

Then, the share of transit exports of all other countries C_k through country B_j to in the reported special imports of A_i is from B_j is calculated as $T_{B_j} IM_{A_i, C_k}^{spc} = IM_{A_i, B_j}^{spc} * \frac{EX_{C_k, A_i}^{T_{B_j}}}{EX_{B_j, A_i}^{gen}}$, and named 'transited bilateral special imports'.⁷⁶ Of course, the sum of 'direct bilateral special imports' and all 'transited bilateral special imports' equals, i.e.

$$DIM_{A_i, B_j}^{spc} + \sum_{k=1}^n T_{B_j} IM_{A_i, C_k}^{spc} = IM_{A_i, B_j}^{spc}.$$

Finally, for every dyad of importers A_i and exporters B_j the 'transited bilateral special imports' through all C_k 's can be summed up as total indirect special imports $\sum_{j=1}^n T_{B_j} IM_{A_i, C_k}^{spc}$, which are added to the corresponding 'direct bilateral special imports' to give 'corrected bilateral special imports' $CIM_{A_i, B_j=C_k}^{spc} = DIM_{A_i, B_j}^{spc} + \sum_{j \neq k} T_{B_j} IM_{A_i, C_k}^{spc}$. For countries C_k that do not appear as B_j in the original import records of a specific A_i (e.g. Switzerland in British records), CIM_{A_i, C_k}^{spc} is equivalent to $\sum_{j=1}^n T_{B_j} IM_{A_i, C_k}^{spc}$.

For practical application of these considerations, it has to be noted that the dataset only consists of import, transit and export data for seven A_i and B_j , but many more C_k existed and appeared in the statistics. Thus, misassigned trade can be corrected only for transit through these seven countries. Although results remain biased for original bilateral special import records from and through other countries, this is of minor importance because the expected amounts of trade conducted between these seven countries in transit through countries can be taken as fairly low. They had the most developed infrastructures in the world, and five of them formed a geographical bloc in Western and Central Europe while for the only geo-

⁷⁶ As for the US and the UK separate statistics for re-exports and transits existed, separate calculations for transits and re-exports have been summed up in one figure in practise. Where disguised transit was corrected, the corrected figures excluding disguised transit were used in this section.

graphic outlier, the US, trade received via third countries from countries should have been of limited importance in the sample (territories in the north east might have been supplied in part via Canada in ice-free seasons). Nevertheless, for other countries, especially those outside Europe, statistics might remain biased and cannot be comprehensively treated as systematically assessable detailed statistics are missing. Within Europe uncorrected transit through Switzerland might have caused biases, which are of unknown extent because assessable Swiss statistics are lacking for the period under study.

Furthermore, no complete bilateral export records for the Zollverein prior to 1871 were disposable due to missing export statistics for Hamburg. As Hamburg was Germany's by far most important export harbour, the problem could not be ignored. I therefore calculated 'reconstructed Zollverein exports' for all partners using the separately devised records for imports from Hamburg in the statistics of all countries in the sample. Then, Hamburg (HH) and the Zollverein (ZV) were treated as separate B_j for every importer A_i . $DIM_{A_i,(ZV+HH)}^{spc}$ have been then calculated as

$$\left(\frac{IM_{A_i,ZV}^{spc}}{IM_{A_i,ZV}^{spc} + IM_{A_i,HH}^{spc}} * \frac{EX_{ZV,A_i}^{spc}}{EX_{ZV,A_i}^{gen}} + \frac{IM_{A_i,HH}^{spc}}{IM_{A_i,HH}^{spc} + IM_{A_i,HH}^{spc}} * \frac{EX_{ZV,HH}^{spc}}{EX_{ZV,HH}^{gen}} \right) * (IM_{A_i,ZV}^{spc} + IM_{A_i,HH}^{spc})$$

where $IM_{A_i,ZV}^{spc}$ is the recorded bilateral special import of A_i from the Zollverein and Bremen.⁷⁷ For transit via the Zollverein and Hamburg the formula was

$$T_{HH} IM_{A_i,C_k}^{spc} = IM_{A_i,HH}^{spc} * \frac{\sum_{k=1}^n EX_{C_k,HH}^{T_{ZV}}}{EX_{ZV,HH}^{gen}} * \frac{EX_{C_k,HH}^{T_{ZV}}}{\sum_{k=1}^n EX_{C_k,HH}^{T_{ZV}}}, \text{ which can be reduced to the product of}$$

special imports of A_i from Hamburg and the ratio of transit from C_k to Hamburg via Zollverein to the Zollverein's total general exports of a commodity to Hamburg. $T_{HH} IM_{A_i,C_k}^{spc}$ is added to $T_{ZV} IM_{A_i,C_k}^{spc}$, the transit via the Zollverein's ports in the North and Baltic Sea and Bremen, to perform complete transit corrections for the Zollverein.

Except for few cases it was not corrected for transit that passes two countries, as remaining possible biases can be rated as of minor importance in comparison the possible detriment

⁷⁷ In France and Belgium (and in some years in the US and the UK), Bremen is merged with Hamburg under 'Hanseatic Towns'. This presents no bigger problem, as trade with Hamburg accounts for more than 90% of trade with Hanseatic Towns and thus the possible bias resulting from the inclusion of Bremen (and Lübeck) in 'Hamburg figures' is small.

of creating artificial trade flows with very small values. The exceptions were trade of certain goods in the triad Netherlands-Belgium-Germany (mainly on the Rhine-Meuse-Scheldt river system), especially pig iron and steel transited through the Netherlands and then Germany (mostly from the UK), wine, leather articles, silk and silk wares transited through Belgium and then Germany (mostly from France) and leather and glass transited through the Netherlands and then Belgium, as well as some other products in certain years. The criteria applied for necessity of correction was that transits through ‘second transited countries’ from ‘first transited countries’ had to be higher than total special exports of the first transit country. This was done to avoid that transit correction led to an artificial increase in ‘reconstructed special exports’ of non-bordering countries. Transit records were corrected by allotting corresponding

$T_{Bj} IM_{A_i, C_k}^{spc}$ in proportion to $\frac{EX_{B_j, A_i}^{spc}}{EX_{B_j, A_i}^{gen}}$ and the respective transit shares from other countries.⁷⁸

An additional caveat had to be taken into account: In fact, Belgium and France tried at least partially to account for ‘real countries of origin and destination’. If properly implemented, this approach would have rendered unnecessary (and even harmful) any type of transit correction. This mix of methods was potentially disturbing for the landward trade of Belgium with Austria-Hungary and Switzerland as well as that of France with the Netherlands and Austria-Hungary. To control their values, the recorded bilateral values for these bilateral trade flows have been compared with reconstructed trade flows from the transit correction as described above. It resulted that recorded bilateral values were markedly lower than bilateral transit recorded in partner countries’ statistics.⁷⁹ This suggests that only transit on direct river and railway routes and transit with meaningful accompanying documents was recorded in practise. To avoid that trade recorded respectively in Belgium and France *and* reconstructed by the transit correction would appear as double-counted, the difference of respective Belgian and French special import records from the said countries and corresponding special export records was deducted from the respective CIM_{A_j, C_k}^{spc} .⁸⁰ This difference was then assigned as bilateral special import to all trade partners with transit to Belgium and France respectively ac-

⁷⁸ In the original transit corrections this trade would have been erroneously allotted to the first transit country as country of origin. In general, this concerns small amounts of trade only, but most notably in trade in iron and steel through the Netherlands and Germany to Austria-Hungary substantial distortions would have resulted, i.e. blown-up special export records for ‘Dutch’ iron and steel. According to Dutch transit tables this trade originated in the UK, but in the correction of German-Austrian through German transit tables it would be reassigned as being Dutch, because it entered Germany from the Netherlands, not from the UK.

⁷⁹ Similar evidence was reported by the Commission for Further Development of the Statistics of the Zollverein in Kaiserliches Statistisches Amt (1873a), 131-132.

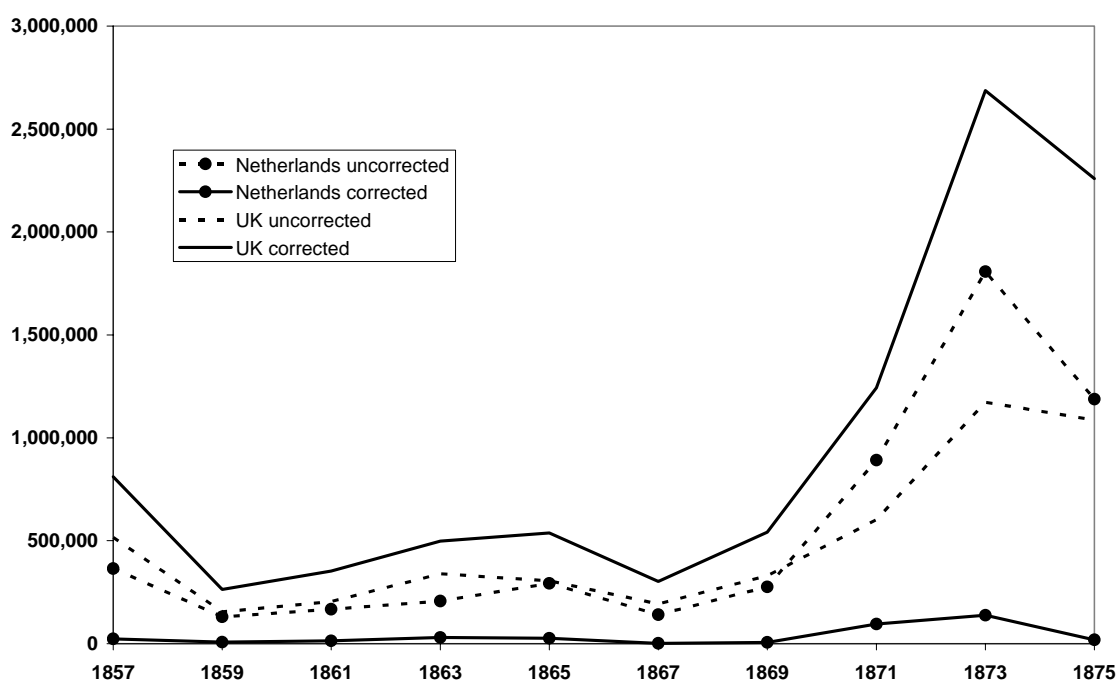
⁸⁰ The fact that there is no export data for Switzerland did not harm this approach as Switzerland was also unable to conduct direct seaward exports to Belgium due to the lack of ports.

ording to their share in $\sum_{k=1}^n T_{B_j} IM_{A_i, C_k}^{SPC}$ for the special import from those C_k that had to be corrected.⁸¹

While assembling the dataset direct bilateral special imports have been interpolated with bilateral special exports from partner statistics where they were not reported for being merged under ‘other countries’ in importers’ records. This interpolation is limited to small amounts whose omission would not have changed the overall picture substantially, but would have led to less complete trading matrixes at the commodity level.

To illustrate the importance of transit correction for certain trade flows, Figure 1 shows one of the many corrections performed, namely imports of pig iron by the Zollverein/Germany from two sources, the Netherlands and the UK. The series before correction for trade in transit suggest that the Netherlands were at least as important as the UK in providing pig iron to Germany, while the corrected series clearly illustrates that most of the apparently Dutch pig iron originated in fact in the Britain.

Figure 1: Pig iron and scrap imports into Germany from the UK and the Netherlands



⁸¹ Similar corrections for transit from those C_k though Belgium and France have not been conducted.

7. Finally: the dataset

Due to detailed and systematic collection, harmonisation and correction of trade values for the most important countries in international trade the resulting dataset is of acceptable quality for empirical analysis. While data for bilateral trade between certain countries with respect to particular commodities remains subject to a substantial margin of error, the dataset in general is suitable for comparative studies on international commerce in the period covered, especially those that require bilateral data. The dataset contains corrected bilateral trade values for 7 major European importers, 10 points in time and 21 commodity groups. As the correction is centred on trade flows into and through these 7 countries, bilateral data on the 42 country-pairs they constitute is supposed to be most reliable, but data on imports from other countries, mainly those of Europe should also be useable.⁸² The most interesting research designs could use the range of bilateral data to assess the spread and effects of international institutions and regimes after 1860 which brought down political barriers of trade, like the Cobden-Chevalier network (cf. Accominotti and Flandreau 2006, Lampe 2008), the Latin Monetary Union (cf. Flandreau 2000) or the gold standard, and assess their importance in comparison with decreasing physical barriers of trade (transport costs) in the decades of major trade growth in the 19th and 20th century. Subsamples can e.g. be used to trace the development of wheat imports into Europe and its geographical distribution, or to assess the changing fate of textile exporters according to location and fibres used. Although the commodity groups do not represent total trade and understate the participation of exporters of raw materials and other products of tropical and sub-tropical regions in 'real' total trade, a comprehensive and new account on the relative importance of countries and commodities in intra-European trade can be obtained.

To illustrate this and to give a more detailed insight into the dataset, three kinds of information are presented in the following: a) bilateral trade flows between countries in the form of shares of imports in the totals of all commodity groups covered, b) the most important providers for each commodity group to the sum of all European countries covered in the sample, and c) corresponding *ad valorem* equivalent average tariff rates for all commodity groups. Of course, the dataset contains much more detailed data on the commodity groups, which would exceed the limits of the present study.

Tables 10a-g present the trade relative importance of selected European and non-European countries (mainly the US) as providers of exports for other European countries and the US in

⁸² For some country pairs the margin of error might be higher due to the possible importance of transit through countries not covered in the dataset, e.g. Switzerland in the case of trade with Italy or Turkish and Russian ports in the Black Sea and Sweden and Denmark in the Baltic Sea.

Table 10a: Shares of imports into the UK, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
France	11.0	20.7	16.2	20.4	26.5	20.9	23.0	16.3	20.3	22.5	19.8
	8.3	18.0	12.7	16.6	21.4	16.0	18.7	15.5	17.1	19.0	16.3
'Germany'	11.5	10.2	10.5	9.6	9.8	9.6	8.1	7.0	5.7	7.4	8.9
	13.8	11.1	11.1	10.0	11.1	11.5	12.5	11.5	8.2	10.4	11.1
Belgium	2.3	3.2	2.1	3.7	4.6	4.0	6.2	6.6	5.0	5.7	4.3
	1.2	1.7	0.8	1.9	2.2	1.7	2.6	2.2	2.0	2.4	1.9
Netherlands	2.0	2.3	1.1	1.6	2.0	2.0	2.2	3.1	2.1	2.0	2.0
	0.5	0.8	0.2	0.3	0.4	0.3	0.5	0.6	0.6	0.6	0.5
Austria-	0.3	0.3	1.1	0.3	0.7	0.2	0.9	0.8	0.4	0.4	0.5
Hungary	0.6	1.6	1.3	0.5	1.0	1.2	1.3	1.3	0.7	0.9	1.0
Russia	6.8	8.0	8.1	7.7	11.7	15.5	9.8	13.6	9.7	9.1	10.0
	6.8	8.0	9.2	8.5	12.5	15.9	10.0	13.9	9.9	9.5	10.4
Scandinavia	5.5	6.5	5.2	5.9	6.7	5.2	5.7	5.4	7.2	5.6	5.9
	5.5	6.5	5.3	5.9	6.7	5.2	5.7	5.5	7.2	5.7	5.9
Switzerland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.0	1.6	2.9	3.1	3.3	2.7	3.7	1.3	3.0	3.2	2.6
Spain	2.2	2.1	3.9	2.9	2.4	2.8	2.6	2.7	3.4	2.2	2.7
	2.2	2.1	3.9	2.9	2.4	2.9	2.6	2.7	3.4	2.2	2.7
Portugal	2.1	1.5	1.1	1.4	1.6	1.1	1.1	1.6	1.5	1.4	1.4
	2.1	1.5	1.1	1.4	1.6	1.1	1.1	1.6	1.5	1.4	1.4
Italy	0.4	0.3	0.3	0.2	0.1	0.4	0.3	0.4	0.4	0.3	0.3
	0.7	0.8	0.5	0.5	0.5	0.6	0.4	0.5	0.5	0.5	0.5
Turkey	0.6	0.7	1.1	0.8	0.7	2.1	1.5	1.5	0.6	0.8	1.0
	0.8	0.8	1.3	0.8	0.7	2.6	1.7	1.6	0.6	0.8	1.2
USA	7.5	1.2	17.7	10.9	1.8	5.5	11.3	12.0	15.6	16.3	10.0
	7.1	1.2	17.6	10.8	1.7	5.3	11.0	11.6	15.2	15.5	9.7
Brit. North	8.7	8.7	11.0	10.6	7.4	5.2	7.4	6.9	7.7	6.3	8.0
America	8.8	8.7	11.0	10.6	7.4	5.3	7.7	7.3	8.0	7.1	8.2
British	3.2	3.3	2.5	2.9	2.3	1.7	1.9	3.0	3.2	3.3	2.7
India	3.2	3.3	2.5	2.9	2.3	1.7	1.9	3.0	3.2	3.3	2.7
Australia	6.8	8.3	6.0	6.8	8.9	9.2	7.5	7.8	7.9	8.5	7.8
	6.8	8.3	6.0	6.8	8.9	9.2	7.5	7.8	7.9	8.5	7.8

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States. Spain includes the Canary Islands. Portugal includes Azores and Madeira. British India in some years included Ceylon, Singapore and Eastern Straits Settlements.

Table 10b: Shares of imports into France, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	26.9	30.1	26.4	29.6	27.3	20.0	23.8	26.4	19.0	22.6	25.2
	12.0	9.3	12.3	12.9	11.1	9.4	11.9	15.8	10.3	14.2	11.9
'Germany'	8.7	9.1	9.6	6.5	6.1	8.5	7.1	3.2	7.9	10.2	7.7
	10.5	7.8	8.8	6.1	4.9	8.2	7.5	5.8	6.7	9.7	7.6
Belgium	5.8	4.8	6.4	6.6	6.4	9.6	5.4	10.3	8.5	9.4	7.3
	3.0	3.1	3.7	4.1	4.2	2.9	3.0	2.7	2.9	3.0	3.3
Netherlands	0.5	1.6	0.4	0.8	0.8	0.6	0.3	0.4	0.8	0.5	0.7
	1.0	1.5	0.7	0.6	0.7	0.6	0.4	0.7	0.4	0.7	0.7
Austria-	1.3	0.4	0.5	0.8	0.2	0.7	0.7	0.2	0.5	0.6	0.6
Hungary	1.2	3.0	1.4	2.1	1.9	1.5	0.4	0.3	0.4	0.4	1.3
Russia	6.4	5.0	10.7	5.6	4.7	5.4	4.6	9.4	5.7	7.7	6.8
	6.7	5.4	12.4	6.0	5.5	9.4	4.9	10.1	6.1	8.1	7.5
Scandinavia	4.9	7.4	5.4	5.6	6.9	5.4	7.5	2.2	4.3	3.6	5.3
	5.0	7.5	5.7	5.8	7.1	5.7	7.7	2.4	4.5	3.8	5.5
Switzerland	3.5	5.2	3.2	4.1	5.1	4.5	6.2	4.2	4.0	4.1	4.4
	3.6	5.2	3.2	4.1	5.1	4.7	6.2	4.3	6.1	6.2	4.9
Spain	7.1	2.7	3.3	1.3	1.3	2.1	2.4	2.2	4.3	1.8	2.8
	7.1	2.7	3.4	1.3	1.4	2.3	2.4	2.2	4.3	1.8	2.9
Portugal	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.1	0.1
	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.3	0.4	0.1	0.2
Italy	9.5	10.0	6.3	10.5	10.7	11.3	14.2	14.9	11.5	10.4	10.9
	9.6	10.1	6.3	10.5	10.7	11.8	14.3	15.0	11.6	10.5	11.0
Turkey	11.3	10.0	8.3	11.5	9.3	11.5	8.6	8.6	9.1	5.5	9.4
	11.5	10.3	8.5	11.8	9.4	12.3	8.7	9.0	9.3	5.6	9.6
USA	2.1	0.1	8.1	0.6	0.1	0.2	0.2	2.2	2.1	1.0	1.7
	2.3	0.1	10.4	0.9	0.2	0.3	0.3	2.9	2.5	1.2	2.1
Algeria	2.4	2.7	3.1	2.8	3.1	1.6	0.9	2.0	3.8	2.8	2.5
	2.4	2.7	3.1	2.8	3.1	1.7	0.9	2.0	3.8	2.8	2.5

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States.

Table 10c: Shares of imports into the Zollverein/German Customs Area, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	28.2	20.8	19.8	21.9	20.5	14.6	15.2	17.3	13.6	14.7	18.7
	37.8	30.6	28.6	29.4	27.2	19.3	21.0	23.9	20.9	19.6	25.8
France	5.4	4.8	3.7	4.6	5.3	5.7	5.3	2.2	9.1	9.6	5.5
	7.4	7.6	5.3	7.4	7.9	7.8	9.3	7.6	13.5	13.5	8.7
Belgium	11.6	10.7	9.1	10.7	11.1	9.4	14.2	15.0	15.2	14.8	12.2
	3.4	3.8	2.5	3.1	2.7	1.7	3.0	4.3	4.3	4.2	3.3
Netherlands	12.6	14.1	13.0	13.6	13.0	11.2	12.3	16.1	16.6	15.0	13.8
	1.1	1.6	2.1	3.4	4.4	2.5	3.6	3.4	2.9	3.4	2.8
Austria-	13.7	13.5	26.0	20.6	22.8	31.9	26.0	20.8	12.4	15.7	20.3
Hungary	12.8	12.3	25.0	19.3	21.6	27.7	21.0	17.8	9.9	11.5	17.9
Russia	15.9	18.7	13.8	13.3	14.0	14.2	12.1	11.9	17.6	13.9	14.5
	16.8	19.7	14.9	14.5	14.2	17.3	12.3	14.3	20.1	15.8	16.0
Scandinavia	1.1	1.5	1.0	0.9	0.9	1.0	1.3	1.2	1.2	0.7	1.1
	1.1	1.4	0.8	0.7	0.7	0.4	1.3	1.3	1.5	0.8	1.0
Switzerland	7.0	6.2	4.8	6.5	4.9	6.9	7.9	7.6	7.0	7.8	6.7
	7.0	6.3	5.0	6.7	5.1	7.4	7.7	7.9	7.2	8.2	6.9
Spain	0.2	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1
	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.2
Portugal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1
Italy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.5	1.9	1.6	0.5
Turkey	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	0.1	0.1	0.1	0.2	0.2	0.6	0.4	0.7	0.5	1.2	0.4
USA	0.5	0.3	0.5	0.3	0.1	0.2	0.2	0.2	0.8	0.7	0.4
	0.6	0.3	0.8	0.6	0.3	0.3	0.3	0.4	1.5	1.5	0.7

Note: Scandinavia: Denmark, Sweden, Norway and Schleswig-Holstein. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States. USA might contain a small share of imports from British North America, as the Zollverein's port statistics only contain information on imports from North America (but most imports were conducted via Hamburg and Bremen, who distinguished US from Canadian ports). Some European trade was not accounted for as it appeared as entered from fairies, free entrepôts and via postal trade.

Table 10d: Shares of imports into Belgium, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	21.3	18.4	16.6	14.9	15.9	17.2	17.7	19.3	21.7	23.5	18.7
	12.8	12.1	8.4	11.9	13.7	11.9	11.2	12.4	13.2	12.0	12.0
France	26.7	38.5	22.2	34.7	31.2	29.3	31.1	23.3	22.7	30.5	29.0
	25.8	40.1	25.3	36.7	33.4	30.0	33.9	24.8	24.9	33.1	30.8
'Germany'	15.5	11.2	18.8	18.3	9.2	15.3	14.4	21.6	10.5	12.8	14.8
	15.6	11.7	19.6	17.4	9.1	13.8	13.9	19.1	10.1	12.5	14.3
Netherlands	6.5	8.4	7.4	6.3	3.8	5.0	4.4	4.5	3.8	3.8	5.4
	4.6	4.4	4.8	4.0	2.6	2.7	2.8	2.3	2.7	3.1	3.4
Austria-	0.1	0.0	0.1	0.5	0.1	0.3	0.2	0.3	0.0	0.0	0.2
Hungary	2.2	1.8	1.3	3.7	0.7	1.5	0.8	1.7	0.5	0.5	1.5
Russia	3.2	1.9	5.6	2.3	2.5	5.5	0.9	3.5	6.1	6.3	3.8
Scandinavia	4.0	2.7	8.1	3.6	3.1	7.3	1.6	5.3	6.6	6.4	4.9
	2.1	2.9	5.5	5.4	4.0	2.9	3.4	5.7	4.4	4.8	4.1
Switzerland	2.4	3.3	6.3	6.2	4.4	3.2	3.9	6.4	5.0	5.6	4.7
	0.6	0.3	0.4	0.9	2.3	0.7	0.9	0.1	0.2	0.2	0.7
Spain	0.9	0.9	0.5	1.8	2.7	1.6	1.9	2.1	0.8	0.8	1.4
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.1	0.1
Portugal	0.2	0.5	0.2	0.1	0.1	0.2	0.1	0.1	1.2	0.2	0.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Italy	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.3	0.1	0.1
	0.3	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.1
Turkey	0.5	0.4	0.1	0.4	0.1	0.1	0.1	0.1	0.2	0.1	0.2
	0.1	0.0	0.7	0.8	0.1	1.4	0.7	1.5	0.1	0.8	0.6
USA	0.2	0.8	0.9	1.1	0.1	2.1	0.8	2.0	0.3	0.9	0.9
	1.7	0.2	3.9	2.9	0.4	0.6	0.4	3.0	5.7	3.6	2.2
	1.5	0.3	4.6	3.5	0.2	0.3	0.4	3.2	5.8	3.2	2.3

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States.

Table 10e: Shares of imports into the Netherlands, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	30.7	29.9	31.0	41.8	45.7	45.0	46.2	46.1	50.1	41.3	40.8
	26.8	26.9	27.3	31.4	34.0	33.0	31.9	33.1	32.1	28.6	30.5
France	7.2	10.6	6.6	6.9	5.7	5.7	4.7	5.2	4.8	4.7	6.2
	9.7	12.9	8.5	10.3	10.6	9.0	12.4	9.9	10.8	10.1	10.4
'Germany'	33.4	32.8	33.0	28.3	23.8	23.9	26.0	22.4	17.3	26.1	26.7
	30.3	30.6	31.5	26.8	26.3	26.4	30.5	23.6	21.5	29.1	27.7
Belgium	10.8	13.1	10.4	11.9	13.5	13.0	14.3	11.3	13.3	14.4	12.6
	7.2	6.7	5.8	6.7	8.1	6.8	6.4	5.5	6.6	5.7	6.5
Austria-	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0
Hungary	0.7	1.1	0.5	0.9	0.9	1.8	0.9	1.0	0.8	0.5	0.9
Russia	10.4	6.3	8.4	2.4	1.6	7.7	2.4	7.9	5.7	7.4	6.0
	12.9	8.1	11.9	9.2	4.2	12.5	4.2	12.2	9.5	11.8	9.7
Scandinavia	4.2	4.6	4.6	4.1	4.9	3.2	3.5	2.7	1.7	1.5	3.5
	5.2	5.4	5.2	5.8	7.0	4.5	5.2	3.7	2.6	2.2	4.7
Switzerland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2.3	3.8	2.6	1.8	1.9	1.7	1.3	2.7	1.2	1.6	2.1
Spain	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.4	0.2
	0.3	0.4	0.2	0.2	0.1	0.2	0.2	0.4	0.9	0.6	0.4
Portugal	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1
Italy	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1
	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.1
Turkey	0.2	0.3	0.7	0.8	1.2	0.3	1.3	1.6	0.6	0.9	0.8
	0.3	0.7	0.9	1.2	1.8	0.7	3.0	2.5	1.0	1.4	1.4
USA	0.2	0.1	1.6	1.1	0.0	0.1	0.1	0.8	2.7	1.4	0.8
	0.3	0.1	1.6	1.7	0.1	0.1	0.2	1.6	4.9	2.6	1.3
Java	1.0	0.7	0.8	0.6	0.6	0.5	0.7	1.3	1.7	1.7	1.0
	0.3	0.1	0.3	0.1	0.3	0.1	0.1	0.6	1.0	1.0	0.4

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States.

Table 10f: Shares of imports into Austria-Hungary, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	2.3	3.9	1.8	2.1	1.1	0.5	3.8	3.5	2.0	0.5	2.2
	21.7	16.9	22.6	19.4	20.2	27.0	26.7	23.8	14.0	14.7	20.7
France	0.8	0.7	0.3	0.1	0.2	0.1	0.7	0.2	0.2	0.1	0.3
	3.7	3.1	3.0	4.9	3.4	2.3	4.0	1.9	3.1	2.6	3.2
'Germany'	63.6	53.6	60.0	65.6	68.2	69.3	75.8	76.0	75.4	80.8	68.8
	28.4	27.0	25.1	30.4	33.0	28.2	32.4	33.5	38.2	41.6	31.8
Belgium	1.1	2.0	0.7	0.6	0.8	0.0	0.2	0.4	0.2	0.1	0.6
	1.8	2.7	1.4	1.3	1.9	1.1	4.2	6.7	5.4	5.3	3.2
Netherlands	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1
	0.2	0.2	0.3	0.2	0.4	0.5	0.5	0.9	0.7	1.4	0.5
Russia	6.9	12.4	7.1	5.9	4.2	2.4	3.4	2.4	6.4	2.7	5.4
	7.3	12.8	7.6	6.1	4.6	2.7	4.5	2.5	6.6	3.0	5.8
Scandinavia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2
Switzerland	2.3	0.7	0.4	0.4	0.5	0.5	0.3	0.3	0.2	0.5	0.6
	4.2	2.7	2.4	4.0	3.7	2.5	2.0	4.6	8.0	7.2	4.1
Spain	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Portugal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Italy	8.8	6.4	4.8	6.4	5.0	9.3	6.8	7.9	6.7	6.2	6.8
	8.8	6.4	4.8	6.4	5.0	9.3	6.8	7.9	6.7	6.2	6.8
Turkey	12.8	18.2	23.2	17.8	19.0	17.3	8.4	8.1	7.6	8.0	14.0
	12.8	18.2	23.2	17.8	19.0	17.3	8.4	8.1	7.6	8.0	14.0
USA	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.6	0.2	0.2	0.1	0.0	0.1	0.0	0.0	0.4	0.4	0.2
Egypt	0.3	0.3	1.0	0.4	0.4	0.2	0.1	0.1	0.3	0.4	0.4
	0.3	0.3	1.0	0.4	0.4	0.2	0.1	0.1	0.3	0.4	0.4

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States.

Table 10g: Shares of imports into the United States, 1857-1875. Totals of commodity groups in sample; percent. First line: uncorrected figured, second line corrected figures.

Partner	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	unweighted mean
UK	55.3	56.4	56.6	61.3	67.6	63.2	61.4	66.1	57.1	48.2	59.3
	48.8	47.0	46.6	47.7	55.5	53.9	53.8	56.0	50.1	39.7	49.9
France	19.2	16.8	12.4	4.5	5.8	10.4	13.0	9.0	11.3	22.4	12.5
	18.7	19.4	15.2	12.5	10.7	13.0	13.4	12.1	12.2	20.5	14.8
'Germany'	5.4	6.0	5.9	4.5	5.9	6.5	6.4	6.7	10.7	9.9	6.8
	6.2	6.5	6.1	4.5	6.5	6.4	6.3	5.2	9.2	10.1	6.7
Belgium	1.6	0.8	0.9	0.8	0.9	1.3	1.1	1.3	1.3	2.1	1.2
	2.9	2.0	2.0	1.5	2.1	2.2	1.7	2.1	1.5	1.8	2.0
Netherlands	0.7	0.9	0.9	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.5
	0.8	1.0	1.2	0.4	0.7	0.7	1.1	1.2	0.7	0.9	0.9
Austria-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Hungary	0.5	0.7	0.8	0.1	0.1	0.1	0.4	0.5	0.5	0.6	0.4
Russia	0.7	0.4	0.4	0.6	0.5	0.9	0.6	0.4	0.6	0.4	0.5
	0.8	0.4	0.7	0.8	0.6	1.0	0.6	0.5	0.7	0.5	0.7
Scandinavia	0.5	0.3	0.5	0.3	0.4	0.7	0.6	0.8	0.9	0.2	0.5
	0.5	0.4	0.6	0.5	0.5	0.8	0.8	1.0	1.3	0.6	0.7
Switzerland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3.3	2.5	1.8	0.1	0.7	1.1	2.7	1.9	3.2	4.3	2.2
Spain	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3
	0.4	0.4	0.4	0.4	0.3	0.5	0.5	0.4	0.4	0.4	0.4
Portugal	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Italy	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1
	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.4	0.1
Turkey	0.3	0.3	0.4	0.5	0.1	0.1	0.2	0.1	0.1	0.0	0.2
	0.4	0.3	0.4	0.6	0.1	0.2	0.3	0.5	0.2	0.4	0.3
Brit. North	(6.1)	(5.7)	11.9	15.6	11.0	7.0	6.5	5.1	5.6	3.7	7.8
America	(6.1)	(5.7)	11.9	15.6	11.0	7.0	6.5	5.1	5.6	3.7	7.8

Note: Scandinavia: Denmark, Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States. British North America includes all British Possessions, Provinces and Dominions in North America. Russia includes Alaska – imports under Reciprocity Treaty for 1857 and 1859 have been conservatively reconstructed and are probably too small. Spain includes the Canaries. Portugal includes Azores and Madeira, and in some years Cap Verde.

the total of the commodity sample. ‘Uncorrected’ refers to the share of imports prior to corrections for disguised and other transit, while ‘corrected’ refers to the figures after the treatment described in section 5 and 6.⁸³ The figures also give an idea about the magnitude of the proximity bias in the original statistics, especially when trade volumes with remote countries and main centres of commerce (UK, the Netherlands, and Belgium) are referred to.

Table 11 displays the main providers of imports into the six European countries of the sample for every commodity group, i.e. the share of exporters in the sum of imports of the UK, France, ‘Germany’, Belgium, the Netherlands and Austria-Hungary. The table makes clear that only few countries covered the full range of exports. All of these countries formed part of the core sample, but even for them the share in individual commodity groups was far from uniform. The countries not individually covered in the dataset – maybe with the exception of Switzerland – appear as providers of a small number of goods only: Scandinavia most notably exported wood and semi-manufactured iron. Italy was mainly an exporter of silk, leather and wine (to some degree), while Spain and Portugal almost exclusively exported wines. From today’s point of view it might surprise that the export portfolio of the US was much more similar to that of Russia and Turkey than to the industrialised core.⁸⁴ The main suggestion for the economic history of trade in the 19th century is thus that foreign trade should be treated more at the commodity level, as total exports for many countries were driven by few commodities, whose production and commerce depended on specific conditions and developments. It might be misleading to look for uniform developments of trade across countries.

This picture is reinforced by Table 12 which contains the average tariff rate for each commodity group prevailing in every country in each year covered by the sample. For the use of this table, two remarks have to be made: Firstly, as the overwhelming majority of duties were specific, *ad valorem* rates not only changed with tariff reforms, but also with price fluctuations. Secondly, the commodity groups consisted of various items and internal compositional changes influenced on the average tariff rate. Furthermore, duties for wines and spirits as shown here are not strictly comparable, because in some they included equivalents to national excises, while in others (e.g., the Netherlands) they did not, and in some (e.g. Belgium, France) practise varied across years. Reported tariff rates in France for wheat, pig iron and steel include duty free imports under the regime of temporary admission for re-export manufacture; actual tariff levels for imports administratively declared for home consumption were

⁸³ ‘uncorrected’ includes price corrections and other adjustments at the national level described in section 3.

⁸⁴ Of course, as mentioned above, the US was also a major exporter of raw cotton, tobacco, and the like.

higher.⁸⁵ Reported rates for imports into the US do not include duty-free imports of raw materials from British North America under the Reciprocity Treaty of 1854 (wheat, rye, meals and flours, hides and skins, wood, and wool), as European exporters and the duties they faced form the focus here; average tariffs including these imports naturally were lower.⁸⁶

The data illustrates well that tariff reductions during the ‘European free-trade era’ that is conventionally dated from 1860 to the late 1870s were most prominent in manufacturing, as tariffs on industrial raw materials and foodstuffs generally were low already at the beginning of that period, mostly due to previous unilateral tariff reforms. Tariff levels of the US during and after the Civil War illustrate that it was far from participating in the European liberalisations, neither unilaterally nor by its integration into the institutional framework of bilateral MFN treaties that spread all over Europe during that period.

⁸⁵ These higher rates were:

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
Wheat	1.2	1.6	1.2	1.2	0.5	1.7	2.4	1.6	1.4	2.1
Pig iron	23.6	34.4	21.9	22.3	22.2	21.9	11.7	19.4	15.2	18.9
Bar iron and steel	9.1	42.1	22.8	23.2	15.4	11.1	7.4	9.8	8.2	9.6

⁸⁶ Including duty-free imports under the Reciprocity Treaty for the period it was in force leads to the following alternative average tariffs:

	1857	1859	1861	1863	1865
Wheat	0.1	0.1	0.0	0.1	0.7
Rye	0.1	0.0	0.0	0.0	0.1
Milling products	0.0	0.2	0.1	0.0	0.7
Hides, skins and leather	7.0	6.6	7.6	12.2	20.0
Wood	0.2	0.0	0.1	0.1	2.2
Wool	10.2	1.1	3.3	7.6	28.7

average *ad valorem* equivalents:

Table 11: Exporters' mean shares in the sum of imports of the UK, France, 'Germany', Belgium, the Netherlands, and Austria-Hungary for every commodity group, 1857-1875 (unweighted average of percent shares, corrected figures).

Commodity group	Wheat	Rye	Mill. prod.	Wines	Spirits & liqu.	Hides, skins and leather	Articles of leather and rubber	Wood	Wool	Woolen yarn	Woolens and worsteds	Cotton yarn	Cottons	Linen yarn	Linen	Silk	Silk wares	Glass and glassware	Pig iron	Bar iron and Steel	Ironware	Sum
Exporter																						
UK	1.2	0.1	1.0	0.1	1.4	8.1	16.8	0.1	4.3	60.1	39.3	73.7	40.2	34.3	26.9	4.5	5.8	1.9	68.7	33.5	32.1	11.6
France	4.9	10.9	30.3	44.1	51.7	6.7	50.3	1.8	4.4	8.6	24.1	0.9	13.8	8.2	3.5	4.0	39.9	13.2	0.5	2.4	11.0	11.2
'Germany'	13.8	6.4	17.0	4.6	6.5	10.2	12.7	10.6	6.2	9.8	18.6	6.6	14.0	3.2	8.7	1.4	17.8	16.3	7.5	14.3	17.9	9.9
Belgium	0.6	1.7	0.7	0.1	0.4	2.2	3.5	0.8	1.6	13.6	3.7	2.1	5.5	15.4	29.4	0.4	0.5	25.8	6.3	17.7	17.1	2.8
Netherlands	0.9	1.9	0.9	0.2	2.2	1.6	0.4	0.3	2.7	1.9	1.1	2.4	2.5	2.1	1.5	0.3	0.2	2.4	1.7	1.4	2.3	1.3
Austria-Hungary	6.9	14.2	12.8	1.5	0.1	1.9	3.9	4.3	7.4	2.6	1.2	0.2	0.5	14.1	21.7	0.6	1.0	29.8	0.3	1.5	2.5	4.9
Russia	28.2	52.3	1.7	0.0	0.6	2.0	0.3	25.3	5.8	0.0	0.1	0.3	0.0	16.2	2.9	0.6	0.0	0.1	0.2	0.7	0.6	10.5
Scandinavia	2.4	2.0	1.3	0.0	0.2	0.8	0.4	29.3	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	5.3	23.2	0.6	4.3
Switzerland	0.5	0.2	0.5	0.4	0.3	2.3	1.3	2.5	0.4	1.2	0.4	7.0	12.3	0.1	0.3	13.6	21.3	0.4	0.5	0.2	2.2	4.2
Spain	0.8	0.1	2.7	29.9	0.1	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.0	1.7
Portugal	0.1	0.0	0.0	13.1	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.6
Italy	1.2	0.3	0.7	2.2	0.1	3.3	2.2	0.6	0.4	0.0	0.1	0.1	0.1	0.7	0.4	21.6	1.3	3.5	0.3	0.1	0.4	3.3
Turkey	7.2	4.6	0.5	0.3	0.0	5.5	0.0	0.1	5.8	0.0	0.5	0.0	0.0	0.0	0.0	8.1	0.1	0.0	0.0	0.0	0.0	3.6
USA	18.8	1.2	19.4	0.0	0.7	3.3	1.0	2.2	0.2	0.0	0.1	0.0	0.8	0.0	0.5	0.0	0.0	0.3	0.0	0.1	3.9	4.6

Note: Scandinavia: Denmark (including imports of Zollverein members from Schleswig-Holstein), Sweden and Norway. Figures for Turkey include imports from Moldavia and Wallachia. Italy includes the Papal States. Spain in most cases includes the Canary Islands. Portugal in most cases includes Azores and Madeira.

Table 12: *Ad valorem* equivalent tariff rates for every commodity group and country, 1857-1875 (per cent of import value).

Wheat										
	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	1.8	2.3	1.8	2.3	2.7	1.7	0.7	0.0	0.0	0.0
France	0.7	1.1	1.1	1.1	0.1	1.0	0.7	1.5	0.9	1.5
'Germany'	1.6	2.2	0.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0
Belgium	0.0	2.5	1.7	2.2	2.4	1.6	2.1	1.5	0.0	0.0
Netherlands	0.0	0.0	0.0	0.6	0.6	0.4	0.5	0.5	0.4	0.5
Austria-Hungary	2.7	1.0	1.2	3.1	1.2	0.5	0.4	0.8	0.5	0.2
USA	15.2	15.0	20.2	23.7	12.0	11.8	16.5	14.1	14.8	17.7
Rye										
	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	2.8	3.2	2.8	3.4	4.0	2.9	1.6	0.0	0.0	0.0
France	1.1	1.7	1.0	0.4	3.0	0.2	0.0	0.0	0.3	0.0
'Germany'	0.7	0.7	0.7	0.6	0.2	0.0	0.0	0.0	0.0	0.0
Belgium	0.0	3.6	2.6	3.2	3.7	2.3	2.9	1.9	0.0	0.0
Netherlands	0.0	0.1	0.0	0.8	1.0	0.7	0.7	0.8	0.7	0.7
Austria-Hungary	5.7	2.5	2.3	2.2	4.4	0.5	0.6	3.6	1.8	0.7
USA	15.0	15.0	15.0	23.8	14.5	18.3	18.8	21.5	13.1	9.6
Milling products										
	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	2.1	2.6	2.3	2.7	2.8	1.8	0.8	0.0	0.0	0.0
France	1.4	2.2	1.5	3.3	1.2	2.3	2.4	1.9	1.4	1.8
'Germany'	2.5	2.4	0.8	1.2	0.2	0.0	0.0	0.0	0.0	0.0
Belgium	0.0	3.6	2.7	3.3	3.6	2.4	2.7	2.5	0.0	0.0
Netherlands	0.7	1.0	0.7	2.8	2.9	2.2	2.4	2.0	1.8	2.2
Austria-Hungary	1.7	1.2	0.6	0.3	0.1	0.1	0.0	0.1	0.1	0.1
USA	15.3	13.3	14.9	10.0	19.6	19.3	18.3	17.7	18.0	15.5
Wines										
	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	68.6	89.4	36.2	36.6	40.9	32.8	32.8	26.1	25.8	26.8
France	0.4	0.5	0.7	0.6	0.7	0.8	0.8	6.0	11.0	10.7
'Germany'	39.3	62.9	47.6	53.1	41.3	37.6	24.8	27.3	22.1	19.8
Belgium	0.5	0.6	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Netherlands	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Austria-Hungary	32.8	27.6	31.4	31.6	30.5	23.6	16.4	18.2	18.1	18.5
USA	35.7	30.0	34.9	40.0	81.7	77.1	77.0	81.5	69.0	68.5
Spirits and liqueurs										
	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	178.5	294.7	251.5	289.9	320.8	300.3	265.0	242.7	237.0	237.7
France	16.7	12.3	16.3	10.1	8.6	6.2	11.2	8.9	4.1	2.8
'Germany'	53.7	71.1	66.6	74.0	60.5	52.5	43.0	49.4	41.8	42.7
Belgium	6.2	9.2	27.0	65.1	64.4	58.3	43.7	87.5	99.5	112.2
Netherlands	0.0	0.0	0.1	16.0	10.4	8.7	7.0	7.6	6.4	6.9
Austria-Hungary	51.4	58.2	59.5	44.7	44.8	36.4	31.5	26.8	31.1	24.5
USA	65.6	30.0	47.3	107.5	273.8	283.3	272.6	192.0	168.2	158.0

Hides, skins and leather

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	0.6	0.8	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3
'Germany'	0.6	0.4	0.3	0.2	0.3	0.2	0.2	0.3	0.6	0.7
Belgium	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3
Netherlands	0.7	1.0	1.0	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Austria-Hungary	1.3	1.2	1.0	1.3	0.8	0.6	1.0	1.3	1.5	1.4
USA	7.0	6.7	7.7	12.3	20.8	16.2	16.0	14.9	6.3	5.4

Articles of leather and rubber

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	14.8	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	8.2	11.6	8.8	10.8	8.5	7.9	4.3	5.8	5.0	4.9
'Germany'	4.3	2.1	3.7	3.8	2.5	1.4	1.5	1.5	2.7	2.3
Belgium	18.8	24.8	17.4	10.2	10.7	9.9	9.3	5.8	9.9	9.6
Netherlands	5.2	5.1	5.2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Austria-Hungary	2.7	2.5	3.3	3.8	3.0	3.1	2.4	1.9	2.3	2.5
USA	27.0	24.0	24.6	33.7	44.6	46.2	46.3	46.3	44.5	47.8

Wood

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	7.8	8.1	2.5	2.5	2.6	0.0	0.0	0.0	0.0	0.0
France	0.9	0.8	0.6	0.5	0.1	0.1	0.0	0.0	0.1	0.1
'Germany'	0.7	0.7	0.6	0.6	0.1	0.0	0.0	0.0	0.0	0.0
Belgium	4.8	5.8	5.8	6.5	6.3	7.2	7.2	5.6	4.4	5.0
Netherlands	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.6
Austria-Hungary	0.6	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2
USA	29.1	24.0	17.8	20.0	20.0	20.7	19.9	20.0	16.4	16.2

Wool

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	6.8	5.9	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2
'Germany'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Belgium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Austria-Hungary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
USA	11.1	1.2	3.5	8.2	32.6	38.7	37.3	49.4	39.5	35.5

Woollen yarn

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	70.0	80.0	4.0	3.3	3.6	4.3	4.5	3.7	4.3	4.7
'Germany'	1.6	1.7	1.4	0.9	0.7	0.8	1.0	0.9	0.9	1.0
Belgium	7.4	8.1	7.2	3.5	2.7	3.2	3.6	3.4	2.8	2.5
Netherlands	1.6	2.4	2.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Austria-Hungary	3.8	3.6	3.5	2.4	2.4	1.2	0.9	0.9	1.1	1.2
USA	25.0	19.0	24.6	35.7	48.7	57.6	79.0	80.7	66.2	70.9

Woollens and worsteds

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	45.5	48.1	14.9	15.0	10.2	10.0	10.0	10.0	9.9	10.0
'Germany'	10.2	10.4	11.7	11.6	8.8	6.7	8.3	8.5	7.6	8.1
Belgium	12.7	14.9	14.5	9.1	10.0	10.1	10.0	10.0	10.0	10.0
Netherlands	3.6	3.3	3.5	5.1	5.0	5.0	5.0	5.0	5.0	5.0
Austria-Hungary	17.7	17.5	15.9	14.9	13.2	11.6	10.4	8.5	8.3	7.7
USA	24.9	21.7	24.3	38.1	60.6	58.3	67.1	67.4	59.1	63.1

Cotton yarn

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	36.1	36.1	10.7	6.5	5.5	10.0	9.3	6.5	7.3	9.3
'Germany'	10.7	10.1	8.9	4.4	4.4	4.4	5.3	5.8	5.5	5.9
Belgium	2.6	4.6	4.9	1.6	1.7	2.5	2.0	2.1	2.6	2.3
Netherlands	1.2	1.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Austria-Hungary	6.6	6.5	7.2	3.0	4.4	6.2	5.6	5.6	5.6	4.5
USA	22.4	19.0	24.1	40.0	31.1	63.5	61.6	51.7	45.0	51.0

Cottons

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	11.4	21.3	15.5	12.0	12.0	13.1	14.0	13.6	13.0	13.6
'Germany'	40.9	56.5	62.4	42.9	22.1	17.3	17.0	18.9	18.9	17.2
Belgium	14.5	19.1	19.4	7.8	3.7	8.6	9.0	8.8	8.2	7.8
Netherlands	4.1	4.1	4.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Austria-Hungary	27.7	29.1	29.3	27.3	18.7	15.8	12.2	9.0	5.0	9.9
USA	21.7	24.0	25.6	32.7	47.3	42.5	44.6	40.6	36.7	39.0

Linen yarn

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	18.9	21.5	9.1	6.8	6.7	8.9	9.4	8.5	7.7	7.8
'Germany'	4.0	4.8	3.5	2.3	2.7	4.1	2.5	2.1	2.2	2.1
Belgium	0.8	0.5	0.4	0.2	0.3	0.2	0.2	0.5	0.2	0.1
Netherlands	1.0	1.1	1.1	0.3	0.3	0.3	0.3	0.3	0.4	0.5
Austria-Hungary	3.6	3.4	2.5	2.4	2.5	2.7	1.4	1.4	1.4	1.1
USA	18.5	15.0	23.4	34.0	36.6	36.9	34.0	30.3	34.0	35.4

Linens

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	22.8	19.1	14.9	12.2	10.8	10.0	11.2	10.5	11.1	11.7
'Germany'	2.8	3.7	4.1	3.0	2.4	2.2	1.4	2.9	4.2	4.2
Belgium	23.5	31.5	16.2	8.6	9.4	9.3	7.7	7.7	7.0	7.7
Netherlands	1.2	1.2	1.2	3.8	4.0	3.9	3.7	3.7	3.6	3.7
Austria-Hungary	19.8	15.2	19.7	17.0	13.6	4.2	4.0	4.0	4.3	3.5
USA	17.9	15.0	18.1	29.8	38.4	37.7	37.9	34.4	33.7	35.5

Silk

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.1
'Germany'	0.0	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.0	0.0
Belgium	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	0.1	0.0	0.2	0.1	0.2	0.2	0.1	0.4	0.3	0.3
Austria-Hungary	0.5	0.5	0.5	0.6	0.6	0.4	0.1	0.1	0.1	0.1
USA	4.5	3.9	11.2	1.2	6.6	5.5	1.6	1.1	0.5	0.3

Silk wares

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	14.0	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	21.4	9.0	10.7	8.7	5.9	4.3	4.6	2.3	3.8	4.4
'Germany'	10.1	9.4	9.2	9.0	6.1	4.1	4.4	4.4	4.1	4.0
Belgium	4.6	5.1	5.4	3.9	3.8	2.3	2.0	2.1	2.5	3.7
Netherlands	4.7	3.8	3.4	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Austria-Hungary	14.1	14.0	12.3	11.1	9.9	3.2	3.4	2.9	2.5	4.7
USA	22.8	19.0	21.2	30.3	59.1	58.6	54.9	53.8	53.3	53.7

Glass and glassware

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	1.9	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	44.4	42.5	26.1	18.6	8.0	7.5	6.0	5.7	4.0	7.7
'Germany'	6.6	5.9	4.1	6.4	6.8	6.9	4.5	6.1	7.9	7.7
Belgium	11.7	12.1	7.4	6.0	8.7	7.9	6.9	9.7	9.4	9.6
Netherlands	5.0	5.8	5.0	4.7	4.8	4.9	4.9	4.8	4.8	4.2
Austria-Hungary	3.0	2.5	2.8	5.3	3.5	6.4	4.1	4.2	4.3	4.1
USA	24.3	21.0	26.4	52.8	48.8	48.1	51.2	53.8	44.5	43.0

Pig iron

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	19.1	19.2	17.6	18.7	8.9	13.1	0.7	9.5	5.2	7.5
'Germany'	23.1	30.4	32.3	26.9	21.9	24.5	14.9	6.9	4.0	0.0
Belgium	18.2	10.0	5.6	9.8	6.7	5.4	4.6	4.7	3.2	3.5
Netherlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Austria-Hungary	15.0	15.5	15.4	15.6	16.2	16.1	10.0	10.0	10.0	10.0
USA	27.4	24.0	29.8	47.0	52.6	50.5	50.1	34.6	21.2	28.9

Bar iron and steel

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	10.9	10.1	5.8	7.0	2.6	2.4	2.1	5.8	4.7	6.2
'Germany'	29.4	31.2	25.7	27.8	16.5	17.8	15.5	14.2	11.8	8.8
Belgium	2.9	3.3	3.2	4.1	2.4	1.5	1.9	2.0	2.0	2.4
Netherlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Austria-Hungary	15.7	21.1	20.1	10.9	11.1	8.6	22.1	22.1	20.6	19.6
USA	23.1	17.8	21.8	37.5	36.4	40.2	43.6	40.2	27.1	23.2

Ironware

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	12.4	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	23.7	33.2	12.5	13.1	11.5	11.5	13.2	12.3	12.0	11.7
'Germany'	37.8	31.0	29.4	34.9	31.3	15.9	12.9	15.0	7.1	7.0
Belgium	18.0	22.6	19.6	13.3	5.4	2.8	3.1	4.0	3.3	4.3
Netherlands	3.6	3.6	3.7	3.9	3.1	3.4	3.1	3.2	2.2	2.4
Austria-Hungary	11.9	16.5	15.4	10.0	10.4	12.8	17.5	13.6	13.4	13.5
USA	24.1	19.8	26.3	37.2	42.9	42.7	42.1	41.7	35.0	35.4

Total average tariff

	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875
UK	14.0	16.3	12.9	11.9	10.0	9.8	8.9	7.6	6.7	6.3
France	9.9	11.8	5.3	6.9	4.7	4.0	3.8	4.4	6.1	6.5
'Germany'	7.5	7.1	6.2	6.8	5.9	3.7	3.1	3.3	2.5	2.5
Belgium	2.8	3.2	3.0	2.7	2.3	2.4	2.1	1.9	1.7	1.6
Netherlands	1.0	1.2	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
Austria-Hungary	7.8	7.3	6.1	5.6	4.9	4.1	4.8	4.5	4.5	3.6
USA	18.2	15.8	21.0	32.2	42.8	46.9	45.7	39.8	27.9	30.8

Notes: Total average tariff: Ratio of duties recollected (excluding transit and navigation fees) to total imports for home consumption. Sources: Database for all commodity groups. Overall average tariffs calculated using duty figures from national statistics except for the US, where Mitchell's (²2003, *The Americas*, Table G.6) figures were used. For years where import duties were accessible from the original statistics, values quoted by Mitchell were \$3-4 Mio higher, which led to no substantial change in figures. As always, data for the US is the mean of two fiscal years, ending June 30 each. Imports for home consumption (excluding precious metals in coins and bullions) were taken from original national statistics for France, the UK, the US and Austria-Hungary. For the UK in all years and for the US prior to the fiscal year 1867/68 imports for home consumption were calculated as imports – re-exports; from the fiscal year 1868/69 newly reported imports for home consumption were used. Austria-Hungary totals are unrevised original totals and subject to a higher margin of error. Revised import totals were used for Belgium from Horlings (2002, 138) and for the Netherlands from Smits, Horlings and van Zanden (2000, table H.1). For the Zollverein from 1857 to 1871 estimates by Bondi (1958, 145) were used, complemented with official values for 1873 and 1875.

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Appendix 1: Commodity groups

Wheat; Rye; Milling products (meals and flours); Wood, lumber and timber, planed, sawed (incl. firewood, excl. staves, dyewood & tropical); Hides, skins and leather (excl. furs); Wool (sheep’s, goats’, etc.); Silk (raw, floss, tram, organzine, sewing); Pig iron (and scrap iron); Bar iron and steel (incl. plates, wires, rails, tinplate, iron girders, etc.); Simple products of iron and steel (chains, tubes, anvils, nails, screws, structures, etc.); Articles of leather and rubber (caoutchouc and gutta-percha); Woollen and worsted yarn; Woollens and worsteds (cloth, stuffs, etc.); Cotton yarn; Cottons (cloth, fabrics, stuffs); Linen yarn and thread (and yarn of hemp, jute, phormium-tenax, etc., incl. twine); Linens (and cloth of flax and jute); Articles of silk (incl. mixed, and laces, trimmings, ribbons, tulles, muslins, passements and embroidery of other materials); Glass and glassware; Wine; Spirits and liqueurs.

Appendix 2: Historical Statistics used for the dataset

UNITED KINGDOM: Statistical Department, Board of Trade (-1869) / Statistical Office, Customs and Excise Department (1871-), *Annual Statement of the Trade and Navigation of the United Kingdom with Foreign Countries and British Possessions in the Year [1857-1875]*, London: Her Majesty’s Stationary Office, various years.

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BELGIUM: Ministre des Finances, *Tableau général du commerce avec les pays étrangers, pendant l'année [1857-1875]*, Brussels: M. Hayez, Imprimeur de L'Académie Royale, various years.

NETHERLANDS: Departement van Financiën, *Statistiek van den handel en de scheepvaart van het Koninkrijk der Nederlanden over het jaar [1857-1875]*, 's Gravenhage: Gebroeders Giunta D'Albani, various years.

AUSTRIA-HUNGARY: Direction der administrativen Statistik im Kaiserl. Königl. Ministerium für Handel, Gewerbe und Öffentliche Bauten, *Ausweise über den auswärtigen Handel Österreich's und der mit Österreich zollvereinten Staaten im Sonnen-Jahre 1857*, Vienna: Kaiserlich-Königliche Hof- und Staats-Druckerei, 1859. / Rechnungs-Departement des Kaiserl.-Königl. Finanz-Ministeriums (1859) / Direction der Administrativen Statistik (1861) / K.K. Statistische Central-Commission (1863-1865), *Ausweise über den auswärtigen Handel Österreich's im Sonnen-Jahre [1859-1865]*, Vienna: Kaiserlich-Königliche Hof- und Staats-Druckerei, 1861-1866. / K.K. Statistische Central-Commission, *Ausweise über den auswärtigen Handel der Österreichisch-Ungarischen Monarchie im Sonnen-Jahre [1867-1875]*, Vienna: Kaiserlich-Königliche Hof- und Staats-Druckerei, 1869-1876.

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