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CROSS-CHECKING THE SOUND DATABASE WITH THE FRENCH *BALANCE DU COMMERCE* DATA

Loïc Charles (Paris 8/Ined)
Guillaume Daudin (Dauphine/OFCE)¹²³⁴

Loïc Charles is Professor of economics at the University of Paris 8 Vincenne Saint-Denis and associate researcher at Ined. He specialises in history of economic thought and economic history of eighteenth-century France. His recent publications include “The Colonial Machine Dismantled: Knowledge and Empire in the French Atlantic” with Paul Cheney, *Past and Present*, 2013, vol. 219, n°1: p. 127-163 and he co-edited *Le cercle de Vincent de Gournay : savoirs économiques et pratiques administratives au milieu du XVIII^e siècle* with Christine Théré et Frédéric Lefebvre, Paris, Ined, 2011.

Guillaume Daudin is Professor of economics at the University of Paris-Dauphine (Dial/Leda) and associate researcher at SciencesPo (OFCE). He specialises in trade economics and the history of eighteenth-century French trade. His recent publications include *Commerce et prospérité : la France au XVIII^e siècle*, second edition, Lulu, 2011 and «Who produce for Whom in

¹ The authors thank Jan Wilhem Veluwenkamp and Ubo Kooijinga for sharing the SoundToll Register online project, Werner Scheltjens for sharing his work on merchandize names and units of measure in this database and Alexandre Aubourg for stellar research assistance with units of measure in the *Balance du commerce* database. This paper is part of the research project TOFLIT18 «Transformations of the French Economy through the Lense of International Trade, 1716-1821» funded by the Agence Nationale de la Recherche (ANR-13-BSH1-0005-03).

² PSL, Université Paris-Dauphine, LEDa-DIAL UMR IRD 225, F-75016 Paris, France

³ PSL, IRD, DIAL UMR IRD 225, F-75016 Paris, France

⁴ SciencesPo, OFCE, F-75007 Paris, France

the World Economy?», with Christine Riffart and Danièle Schweisguth, *Canadian Journal of Economics*, vol. 44, n°4, 2011.

1. Introduction

It is during the 18th century that Europe set the cultural, political and economic conditions for its entry in the industrial era. While the role of international trade has been for a long time considered as a minor factor in the industrial revolution, the trend of economic history have changed somewhat across the last two decades. The emergence of a global perspective in economic history has led prominent scholars to account for an important role of international trade in the rise of Europe over other world regions.⁵ But whereas extra-European trade is comparatively well known and has been the object of recent synthesis,⁶ intra-European trade has been neglected. The scarcity of works on foreign trade statistics of the early-modern period is all the more unfortunate as external trade flows are the single economic data that early modern states have collected with the most care. Indeed, the first attempts at measuring foreign trade regularly can be dated from the seventeenth century. From 1696 on, the English crown was able to collect a continuous series of customs data and release a yearly evaluation of the English balance of trade. The French royal administration created the *Bureau de la balance du commerce* in 1713. Its task was to produce a yearly document that detailed the French external trade and

⁵ Robert C. Allen. *The industrial Revolution in Global Perspective* (Cambridge University Press, 2009); John V. C. Nye, *War, Wine, and Taxes: The Political Economy of Anglo-French Trade 1689-1900*. (Princeton University Press, 2007) ; Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy*, (Princeton University Press, 2000).

⁶ P.K. O'Brien and L.P. Escosura, eds., "The Costs and Benefits for Europeans from Their Empires Overseas," *Revista de Historia Económica (Second Series)* 16, no. 01 (1998); J.V. Roitman, O. Pétré-Grenouilleau, and P.C. Emmer, eds., *A Deus Ex Machina Revisited: Atlantic Colonial Trade and European Economic Development* (Brill, 2006).

calculated its general balance. There was a pan-European move to more and better measure external trade throughout the century, as various countries gathered the same data through their central administration. Annual series have been located for Sweden from 1732⁷, Austrian Netherlands from 1759⁸, Hambourg from 1733, Milan in 1762, 1769, 1778 and 1791, Venice from 1769/1770 onward⁹, Portugal in 1776-77, 1783, 1789, and from 1796 onward, Spain from 1778 onward, etc. Research on trade of the British Isles is more advanced than for other countries. A recent book has renewed the research on Scottish trade in the 18th century¹⁰. A team coordinated by David Jacks, Kevin O'Rourke and Alan Taylor is currently gathering data on English and British trade from 1696 to the early 20th century. A Dutch team headed Jan-Willem Veluwenkamp is studying the Sound Toll Registers and building up a public database (<http://www.soundtoll.nl>).

However, despite this spurt of recent interest for early modern trade statistics, economic historians consider them as difficult to use. Issues of under-registration of trade because of smuggling and bad training of personnel registering trade seem to make these data unreliable. One way to get around these criticisms is to compare two of these sets of data and see whether they actually depict the same economic trend or not. Many of these data sources cover the same trade flows, registered by different administrative authorities. However they did it from a different

⁷ Statistiska Centralbyran, *Historisk Statistik För Sverige Del 3 Utrikeshandel 1732-1970 - 1972*, 1972; Georg Luther, "The Birth of Official Statistics in 18th Century Sweden," in *Proceedings of the 52nd ISI Session* (presented at the 52nd International statistical conference Session, Helsinki, 1999).

⁸ Herman Coopens, "Bureau Voor Het Beheer van de Douanerechten (1737-1794)," in *De Centrale Overheidsinstellingen van de Habsburgse Nederlanden (1482-1795)*, ed. Erik Aerts (Brussel, 1995), pp. 523–30.

⁹ Giordano Campos, "Il Commercio Esterno Veneziano Della Seconda Metà Del '700 Secondo Le Statistiche Ufficiali," *Archivio Veneto* LXVI, no. serie V, 19 (1936): pp. 145–83.

¹⁰ Philipp Robinson Rössner, *Scottish Trade in the Wake of Union (1700-1760): The Rise of a Warehouse Economy* (Stuttgart: Franz Steiner Verlag, 2008).

perspective. Moreover, the information gathered by these institutions often differed: some like the Sound toll measure trade flows by quantity, others like the French bureau of balance of trade by value.

Still, trade between the Sound and France reported by the French authorities should have the same general shape as the same trade reported by the Danish authorities. Previous studies have provided such a cross-checking, either between the Sound and other places¹¹ or between different countries¹², or even between different sources in the same country¹³. Most of these studies offer pessimistic results. Reconciliation between mirror trade flows is still an issue even today with the help of modern and standardized statistics, so perfect correspondence in eighteenth century data should not be expected either. Accordingly, our objective is more limited: we are looking for some common trends and structures that may be identified. At the very least, we believe that our exercise in comparison would give new information on the datasets and provide hints for further research. A first study on the subject gave deceptive results. However we are now working with an enhanced Sound Toll database (a number of goods were excluded in

¹¹ Guillaume Daudin and Pierrick Pourchasse, “Cross-Checking the Sound Database with the French Balance Du Commerce” (presented at the Sound Toll Registers online – to the test STR online as an instrument for historical research, Leuwarden (Netherlands), October 2010); Jari Ojala and Lauri Karvonen, “Assessing the Reliability of the Sound Toll Accounts: Comparing the Data to the Swedish and Portuguese Sources” (presented at the STRO conference, Groningen (Netherlands), October 25, 2012).

¹² Philipp Robinson Rössner, *Scottish Trade with German Ports, 1700–1770* (Stuttgart: Franz Steiner Verlag, 2008), <http://www.steiner-verlag.de/programm/fachbuch/geschichte/mittelalter-und-neuzeit/reihen/view/titel/56561/print.html>; Loïc Charles, Ann Coenen, and Guillaume Daudin, “Comparing Early Trade Statistics: The Case of Austrian Netherlands and France from 1759 to 1791” (presented at the ESSHC Conference, Glasgow (United Kingdom), April 2012); Cristina Moreira et al., “Comparing Trade Flows between Portugal and Scandinavia: Methodological Lessons Arising from the Use of Multiple Sources” (presented at the Early trade statistics: What are they and why do we care, Paris (France), May 2014).

¹³ Rössner, *Scottish Trade in the Wake of Union (1700-1760)*.

the previous study because they were not translated from the original Danish) and a bigger set of flows from the French side.¹⁴ Before, beginning our investigation, it is worth to recall that we do not expect a perfect fit of the information given by the two database, we are barely looking for common elements. At this stage of our research our aim is to use a comparative methodology to explore the two datasets in order to better understand the nature of the information they contain and how economic historians can use them meaningfully.¹⁵ Another purpose for our work is provide new tools and methodologies to further the development of comparative works on early modern trade databases.

In the first part we briefly discuss the features of our two datasets. In the second part, we present the methodology we followed in order make them comparable. In the third part, we provide some results of the comparison and comment upon them.

2. Datasets

The Sound dataset

¹⁴ G. Daudin and P. Pourchasse, “Cross-Checking...”, op. cit.

¹⁵ The authors of this chapter are engaged in a project – TOFLIT18 – financed by the French National Research Agency (*Agence Nationale de la Recherche*). In the context of this project which will run from 2014 to 2017, they are actually developing a database that will contained informations not only on the national trade floxs (the only one available at the time we are writing this chapter), but also at the regional/port level. Hence, because the later type of data is much more precise and closer to the kind of information given by the Sound Toll, we are expecting to be able to reach a much better fit for the two sets of data in the future.

The Sound Toll Registers are preserved at the Danish National Archives¹⁶. They contain information about every ship that went through the Sound from 1497 to 1857. Each ship was subjected to various Danish tolls. The collectors of the tolls in the Elsinor castle documented all their levies in these documents. The Sound (between Copenhagen island and what is now mainland Sweden) was the main route in or out the Baltic, as the Great and Little Belts are difficult to navigate and the Schleswig-Holstein canal only opened in 1784. 1.8 million passages in total are recorded in the archives. Some trade to and from Rostock and Lübeck is probably missing, but not much compared to what has been preserved. The levy was initially per vessel (ship toll). The information included in the individual ship records has varied. After 1567 a cargo toll was introduced and information on the goods carried by each ship was written down in the Registers. However, the ships were not systematically searched, which makes the cargo information, often based on declaration rather than direct observation, less reliable than the shipping information¹⁷. Furthermore, Danish cargoes were exempted throughout the period and Swedish cargoes before 1720. Still, maritime and economic historians of the Sound generally believed that the information on cargoes after 1710 is reliable¹⁸.

¹⁶ For more details, see Erik Gøbel, "The Sound Toll Registers Online Project, 1497-1857," *International Journal of Maritime History* 22, no. 2 (2010).

¹⁷ Erik Gøbel, "The Sound Toll Registers Online Project, 1497-1857.," *International Journal of Maritime History* 22, no. 2 (2010),

<http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=08438714&AN=60759956&h=VO3%2B9f3PNEEWHV2LkrGs2R8om44JitnIcEB9a7HI74C3kSk4PxYVvUHQ0r%2BwcvpQgKGwAUA5NshfDGG17g4INSQ%3D%3D&crl=c>.

¹⁸ See for example : Pierre Jeannin, "Les Comptes Du Sund Comme Source Pour La Construction D'indices Généraux de L'activité Économique En Europe (XVIe-XVIIIe Siècle)," *Revue Historique* 88 (1964): pp. 55–102 ; 307–340.

There is probably little need in this book to present the Soundtoll Registers Online database (<http://www.soundtoll.nl>). Thanks to the collaboration of the University of Groningen and Tresoar, Frisian Historical and Literary Centre at Leeuwarden, it includes all passages through the Sound from 1634 to 1857. This includes nearly 1.5 million passages and more than 4 million single-merchandise cargoes (a ship carrying salt and wine would count as one passage and two cargoes).

The French dataset

In France, a *bureau de la balance du commerce* was created in 1713.¹⁹ The bureau was a small unit: in addition to its director, originally one of the directors of the General Farms, there were no more than four clerks for most of the period.²⁰ It was put under the direct supervision of the Director of Trade, the most important official in the French economic administration after the controller general of finances, who accommodated the bureau in his Parisian house. Until 1781, the bureau held the task of computing the data and presenting them once a year to the controller general and the Council of commerce in a synthetic form, the *Objet général*. There was no

¹⁹ The following paragraphs are mostly based on L. Charles and G. Daudin, "La Collecte Du Chiffre Au XVIIIe Siècle: Le Bureau de La Balance Du Commerce et La Production Des Données Sur Le Commerce Extérieur de La France," *Revue D'histoire Moderne et Contemporaine*, no. 1 (2011): pp. 128–55.. This is the most recent and detailed reference on the bureau, but added information on the bureau and the data it produced can also be found in : Michel Morineau, 1965, "La Balance du commerce franco-néerlandais et le resserrement économique des Provinces-Unies au XVIIIe siècle" *Economisch Historisch Jaarboek*, 30, 1965, p. 170-233; Jean Tarrade, *Le Commerce colonial de la France à la fin de l'Ancien Régime : l'évolution du régime de l'exclusif de 1763 à 1782*, Paris, PUF, 1972 ; Pierre Dardel, 1963, *Navires et marchandises dans les ports de Rouen et du Havre au XVIIIe*. Paris: SEVPEN.

²⁰ In Ancien Régime France, taxes were farmed to private companies. The most important of them, which held a quasi-monopoly on taxes, was the General Farms company. It was in particular in charge of the collection of the various custom duties.

significant change in the structure until the beginning of the 1780s when it underwent a major reform. Necker, the new controller general of finances, wanted the bureau to become a more general centre of economic expertise. In the following years, its workforce rose steadily to seven in 1784 and more than a dozen in 1787. At that time, the bureau of the balance of trade was able to conduct wider economic surveys, most notably to prepare and, subsequently, evaluate the consequences the trade treaties France made with the newly born United States (1778), Russia (1785) and England (1786). However, the piling up of reforms and new tasks had a major negative effect: the bureau was overloaded and was no longer able to produce the French balance of trade within reasonable time. The French balance for 1782 was only released in 1786 and the balances for 1783 to 1786 were never completed.²¹ The bureau disappeared in 1791 altogether with the Council of commerce and most of the Ancien regime former administration, swept away by the revolutionary government.

How the bureau created the dataset that was consigned in the *Objet général*? At the local level, the information was gathered by some 230 General Farms bureaus. They sent to Paris an extract, that is a summary made of a list of goods and their total quantities imported or exported at the end of each month. These extracts were then treated by the bureau: it added up the extracts by province (*généralités*) and proceeded to standardize the quantity units. Prices were sometimes recorded by the General Farms' employees, but not systematically. As the bureau wished to compute values rather than quantities, it sent to each province's chamber of commerce (or to the intendant when there was none) the list of goods asking the representatives of the merchants to provide estimated price or to check the price given by the General Farms local bureaus²². Economic historians have shown that prices included in the *Objet général* showed no

²¹ Before 1782, it took usually less than two years to complete the *Objet général*.

²² It must be noted that the bureau asked an average price or "just value" and was not concerned with registering the short term variations, see Nederlandsch Economisch-Historisch Archief, Pierre Bruyard papers, files 76-77.

systematical bias and were close enough to international prices (as given by the Amsterdam market price).²³

Up to 1745, the *Objet général* was made of several folders (*cabiers*), one for each *généralité*²⁴. In these books, goods were classified in alphabetical order with their respective value – the quantities were also mentioned for some goods. Each entry was disaggregated according to the geographical area or country from which the goods came or went to²⁵. From the year 1746 to 1751 included, the books were made according to each country instead of the regional entity (likewise the goods were listed by *généralité* instead of country). Finally from 1752 to 1780, it took its best-known design: the whole trade is listed by alphabetical order of goods name, with indication of where the good went or came; information on the *généralité* was not recorded anymore.²⁶ In the *Objet général*, the flows of trade were given in value only from 1752 to 1770, but quantities were also systematically recorded from 1771 onward.²⁷ Following the 1781 reform,

²³ See Michel Morineau, 1965, "La Balance du commerce franco-néerlandais et le resserrement économique des Provinces-Unis au XVIIIe siècle" *Economisch Historisch Jaarboek*, Vol 30, p. 183-184; Jean Tarrade, *Le Commerce colonial de la France à la fin de l'Ancien Régime : l'évolution du régime de l'exclusif de 1763 à 1782*, Paris, PUF, 1972, p. 770-771 ; Pierre Dardel, 1963, *Navires et marchandises dans les ports de Rouen et du Havre au XVIIIe*. Paris: SEVPEN, p. 20.

²⁴ The number of the *généralités* or *Directions de Fermes*, since these two sub-divisions corresponded, has changed marginally across the eighteenth century, but it was 18 for most of the period.

²⁵ Country is a short-hand term for geographical regions: If some these regions actually account for countries such as Sweden, Spain or Portugal, others were in fact including several countries such as England (England, Ireland and Scotland) or Guinea (whole Africa).

²⁶ However, we can recover some of this information by using provincial registers, which have been partially preserved for several maritime provinces or *généralités*, such as Bayonne, Bordeaux, Caen, Marseille, Nantes, Rennes and Rouen. All together these provinces amounted for more than 80% of French external trade.

²⁷ Before 1771, one can use the provincial registers to get information on the quantities since they were systematically recorded.

some changes occurred and, among other things, the list of countries was changed but these were marginal at least for the issue taken up in this paper²⁸.

At the present time, our database includes about 27 years, from 1750 to 1789 with occasional lapses, of French external trade. It includes a total of more than 150,000 flows – each flow being made of one specific type good described by an individual name, in a specific year, to or from a specific country. In the future the dataset will be expanded in two ways. First, more years – especially revolutionary and post revolutionary – (up to 1823) will be included. Second, we will include regional data, i.e. data on flows between French *généralités* and foreign countries. This latter aspect will be missing here since it could have afforded the possibility of matching more closely the information given by the Sound registers, which mentions the port rather than the country of destination, but there is nothing to do but wait for future developments of the project to make it available.²⁹

3. Making them comparable

In this section, we document the methodology we followed to make the two datasets comparable at least to some degree. In effect, they are originally of a very different nature, which in turn make a direct match completely impossible. On the one hand, the Sound registers include information that concerns ships and to a lesser extent cargoes rather than flows. Moreover, the Danish authorities were registering the physical description of the cargo rather than its value. On the other hand, the French bureau of trade measures flows of trade, not cargoes, and it looks for values rather than quantities of goods.

²⁸ For more details on these changes, see Charles and Daudin ‘La balance’, pp. 143-154.

²⁹ For more details on the state of progress of the project and the data to be included in the database in the near-future, see <http://toflit18.hypotheses.org/>.

3.1. Sound

In order to match the two datasets, we needed to modify the Soundtoll Register data. We are now going to detail step by step this process. All the STATA programming is available from the authors. We used a text extraction (under .csv) from the database dated November 3rd 2013, made available by Jan Wilhem Veluwenkamp and Ubo Kooijinga. Two files include all the data we used: the “ladingen.csv” file (including 4.25 million single-merchandise cargoes) and the “doorvaarten.csv” (including 1.5 million passages). We did not have to use the tax file. The file “all_places_standard.csv” includes all that was necessary for the treatment of place names, including an impressive standardization of 21,576 place name variants into 1,704 standardized place names, 37 small and 15 big categories. Thanks to that, it was very easy to identify passages to or from France. Reducing these databases to trade with France between 1749 and 1795 (as the available merchandise level-French data are from 1750 to 1789) brings the number of cargoes down to 111,000.

The identification of goods was much more difficult than the identification of place names. The Soundtoll database project has started treating all the denomination of goods, but that was still incomplete when we conducted our work. We used a professional translator and benefited from the work by Werner Scheltjens (to whom we are very grateful). “Our” 111,000 cargoes include 5,218 different *soort*. 24 appear more than 1,000 times, 163 more than 100 times, 602 more than 10 times. 3,217 are hapax used only once. These 5,218 different *soort* are standardized into 470 Danish names, but 2,535 (nearly 50%) were not identified, for 3018 cargoes (less than 3% of total number of cargoes). These were translated into 399 *marchandises* in French (and further normalized into 367 *marchandises normalisées*). The final operation was to classify these 367 categories into 16 SITC-based sectors (see Table 1). 13,530 cargoes (12%) were not classified; most of them consisted of ballast (2,193), “varied goods” (5,722) and “provisions” (977).

Table 1: Classification of goods

0: Foodstuff, various	0a: Foodstuff, European
0b: Foodstuff, Exotic	1: Beverages and tobacco
2: Raw materials	3: Fuels
4: Oils	5: Chemicals
6: Manuf. goods, by material	6a: Manuf. goods, linen
6b: Manuf. goods, wool	6c: Manuf. goods, silk
6d: Manuf. goods, cotton	7: Machinery and transport goods
8: Misc. manuf. goods	9: Other (incl. weapons)
9a: Species	

Another issue is how to measure the size of the trade flows. As mentioned above, the Sound Toll Registers do not include the value of goods. A first option would be to use the information included on the value of the cargo toll paid since most of these were ad-valorem. However, besides the value of each good, the amount of tax paid depended also on the nationality of the owners of the cargoes (there was an exemption for Danish owners during the period of interest) and the nature of cargoes (different kind of produce were taxed differently). Hence, it is extremely complicated, almost impossible in fact, to calculate the value of the cargo using only the toll assigned to it. This variable may however be used as a proxy, if only to check what kind of information it may give us.

A second option is to use the quantities given by the registers. In that case, the first issue is to provide some standardization of the quantities units. 524 different names of quantity units are present in the sample we are studying. Thanks to STRO team and Werner Scheltjens, we were able to unify several units and reduce their total number to 114 standardized names of quantity units. This left 3,852 cargoes without a recognizable measure unit: we treated them as “pieces”. The second step was to convert these 114 units into a common yardstick. Building up on Scheltjens’s work, we settled for a metric unit. There are all kind of difficulties when working

with eighteenth century units.³⁰ Again, Werner Scheltjens provides us with a way out of this conundrum since he had already done this work on the Dutch and French trade in the Baltic based on the Sound Toll Registers Online and had solved most of the problems we were faced with³¹. Based to a large extent on a nineteenth century dictionary by Horace Doursther³², he was able to take into account the name of the measure, the nature of the merchandise and the place of origin of the merchandise, to translate each of the 114 units into a common metric one. All liquids volumes were transformed into weights by assuming a volumetric mass density of one. If that fails, the destination is used to identify the measure unit instead of the origin. If that fails again, we have used either external information or the means and modes in the existing data to identify measure units³³.

Table 2 sums up the conversion procedure. We were not able to convert 1,919 cargoes.

³⁰ In particular, the same word/unit (for example the 'last') might designate different metric quantities depending on the nature of the goods (e. g. a 'last' of stockfish does not equate a last of 'coal') and the region it refers to (e. g. a 'last' in Amsterdam does not represent the same quantity as a 'last' in Königsberg).

³¹ Werner Scheltjens, "The Volume of Dutch Baltic Shipping at the End of the Eighteenth Century: A New Estimation Based on the Danish Sound Toll Registers," *Scripta Mercaturae – Zeitschrift Für Wirtschafts- Und Sozialgeschichte* 43, no. 1/2 (2009): 83–110; Werner Scheltjens, "French Imports to the Baltic, 1670-1850" (presented at the Early trade statistics: What are they and why do we care, Paris (France), May 2014), <http://f.hypotheses.org/wp-content/blogs.dir/1688/files/2014/05/SCHELTJENS-French-imports-to-the-Baltic-1670-1850.pdf>.

³² Horace Doursther, *Dictionnaire universel des poids et mesures anciens et modernes: contenant des tables de monnaies de tous les pays* (Bruxelles: M. Hayez, 1840).

³³ Including Hans Christian Johansen, *Shipping and Trade between the Baltic Area and Western Europe 1784-95* (Odense: University Press of Southern Denmark, 1983).

Table 2: Converting measure units

	Scheltjens's procedure	Using destination instead of departure	Using other information	Total
Weight	48,533	914	18,474	67,921
Number of pieces	8,023	469	21,832	30,324
Rigsdaler			10,613	10,613
Other	11		102	113
Total	56,567	1,383	51,021	108,971

3.2. French balance of trade

Since it registers flows rather than cargoes, the French database is smaller than the Sund Toll Registers Online. It is under STATA format and included around 150,000 observations in mid-August 2014. Only a limited part of these observations concern trade with the Baltic and identifying them is a bit tricky³⁴. Before 1733, the only designation found in the French balance of trade reports is “Nord”. It designates a region that comprises Sweden, Denmark, hanseatic ports (mainly Hamburg, Bremen, Lübeck and Dantzig), Prussia and Russia. Trade with Denmark is identified separately from 1733, trade with Sweden from 1734 and trade with Russia from 1744. The first difficulty is that some of this trade did not pass through the Sound, such as the trade with Arkhangelsk, Hamburg, Bremen, Norway, Gothenburg and, more generally, the North and Arctic seas. There is also a category “Allemagne” which includes land trade only³⁵. So it is not possible to identify trade with the Sound. After 1780, trade with Sweden, Denmark and Russia is still reported separately. “Nord” disappears and is replaced by “Quatre villes

³⁴ See the discussion in Pierre Jeannin, “Les Marchés Du Nord Dans Le Commerce Français Au XVIIIe,” in *Aires et Structures Du Commerce Français Au XVIIIe Siècle* (Lyon: Centre d'histoire économique et social de la région lyonnaise, 1975), 47–74; Pierrick Pourchasse, *Le Commerce Du Nord: Les Échanges Commerciaux Entre La France et l'Europe Septentrionale Au XVIIIe Siècle* (PU Rennes, 2006).

³⁵ On one document, the category is further specified as “l'Allemagne, la Lorraine et le Pays de Liège”, see. Bibliothèque municipale de Saint-Brieuc, fonds Gournay, ms. 87, folder n° 2. Trade with “Allemagne et Pologne” is indicated as being only conducted by land in Archives Nationales (Paris), F12/1834B, “Tableau estimatif du commerce...”.

hanséatiques” (Hamburg, Bremen, Lübeck, Dantzig) and Prussia. Trade with Prussia is indicated as being only by sea in the aforementioned F12/1834B archive document. Including all trade flows potentially with the Baltic (i.e. Sweden, Denmark, Russia, “Nord”, “Villes hanséatiques” and Prussia), the French data include 15,004 observations, covering 26 years between 1750 and 1789. Still, there is no way to differentiate trade with the Baltic from trade with Hamburg and Bremen – which was probably quite important. The only comparisons possible with the STRO data are for trade between France and Sweden (except Gothenburg), Denmark (except North Sea and Norway ports) and Russia (except Archangel). In the STRO dataset, this corresponds to the small categories “Sweden and Finland”, “Esthonia” + “Kurland” + “Livland” + “Russia around St. Petersburg” and the standard places “Stralsund” and “Greifswald” for Swedish Pomerania.

On the cargo designation side, the French database uses 3,320 designations for trade with the “Nord”. This number was reduced to 1,761 after correcting spelling mistakes and unifying similar forms. Ten goods are mentioned more than 100 times: *Marchandises*: 205; *Eau de vie*: 141; *Mercerie*: 139; *Merrain*: 136; *Vin de Bordeaux*: 136; *Indigo*: 123; *Planches de sapin*: 111; *Mâts*: 108; *Huile d'Olive* 106; *Fer en barre*: 106. Fifty-nine goods are mentioned more than 50 times. All goods are then classified into the same 16 SITC-based sectors that are used for the treatment of the STRO database.

In the French statistics, all trade flows are assigned a value expressed in a single unit: the Livre tournoi (which would be transformed into the Franc during the Revolutionary era). Only flows from thirteen years (1750, and all years from 1771 except 1788) are also recorded in quantities. About 80% of the flows for each of these years contain a record in quantity, which makes 6,720 in total for the eleven years. A large majority of these quantities are expressed in *livres* (4,802 out of 6,720). Others are recorded in numbers (615), *muids* (241), *tonneaux* (178), *barils* (156), etc. Using the name of the merchandize and the place of origin most of these units

can be translated in numbers and metric measures using a variety of sources³⁶. We categorize some unit measures as bundles when neither the corresponding weight, volume or number of pieces can be found: e.g. baskets of glasses, crates of citrus, etc.

4. Two sources, one story?

Our work on the raw data allows us now to compare trade flows reported by the French balance of trade and the Sund toll. However, crucial differences remain. Firstly, despite the fact that we aggregated the ports mentioned in Sound register, the geographical areas registered in both sources do not match perfectly. Secondly and it is even more problematic, the flows extracted from each source are measured quite differently: mostly values in the French balance of trade, mostly physical quantities in the Sound registers. Although we do not underestimate the methodological issues at stake here, it is useful exercise to check what knowledge we can gain from the comparison of two sets of data, which *ceteris paribus* should both provide a similar evaluation of trade between France and the Baltic area trade.

In the following we will develop three approaches to build a useful comparison between our two sources. We will first look at the absolute volume of trade using values value for the French balance of trade and either number of cargoes, kilograms or collected taxes for the Sound data. In a second section, we will refine our analysis by decomposing total trade into sectors for a

³⁶ Including Wikipedia, Werner's work, <http://www.genefourneau.com/mesures.html>, <http://www.cnrtl.fr/definition/millerolle>, Doursther, *Dictionnaire universel des poids et mesures anciens et modernes*; Louis-Benjamin Francœur et al., *Dictionnaire technologique, ou Nouveau dictionnaire universel des arts et métiers, et de l'économie industrielle et commerciale* (Paris: Thomine et Fortic, 1828); Jacques Savary Des Brulons, *Dictionnaire universel de commerce* (Paris: Jacques Estienne, 1723); Harald Witthöft and Gerhard W. Göbel, *Deutsche Masse und Gewichte des 19. Jahrhunderts: Die Mass- und Gewichtseinheiten* (St. Katharinen: Scripta Mercaturae Verlag, 1993); Yvette Darcy-Bertuletti, "Tableau Des Mesures Les plus Courantes En Usage Dans Le Pays Beaunois [Table of the Most Widely Used Measurement in the Beaune Locality]," 2005, <http://www.beaune.fr/IMG/pdf/Metrologie.pdf>.

given year or period. Finally, we will provide some reflections on trends by looking at the longitudinal evolution of trade throughout the period.

4.1. Comparing the absolute volume of trade

Table 3 compares the absolute volume of trade in terms of kilograms, number of pieces, etc. as given by the Sound and the French sources. Some differences are expected, as the Sound Toll collectors and the French employees did not use the same units of measure and the geographical coverage of both sources is not the same. Most of the times, the reported flows are quite different. In some instances there is an important, often massive gap. However, it must be stressed that some of these gaps make a lot of sense. First, as expected both French exports and imports to and from Denmark are hugely undervalued in the Sound registers. Here we have a combination of trade flows that went to Norway directly and, therefore, bypassing the Sound toll and the fact that most of the Danish trade was free from taxes and therefore loosely measured by the Sound fiscal administration. Another source of discrepancy is the variation in measuring: a pole might be measured by the piece by the French General Farm, but in kilogram by the Sound and inversely.³⁷ This might explain why there is such gap between the number of pieces registered in the French source from France to Denmark, Sweden and Russia. This suggestion might be tested by looking how individual goods, or types of goods, such as planks or poles are covered in the two types of sources.

³⁷ This in turn might be explained by the nature of the tax collected (by the piece, *ad valorem* or by the weight/volume of the cargo).

Table 3: Absolute value of trade, 1750-1789 (-)

		Denmark		Russia		Sweden	
		French source	Sound source	French source	Sound source	French source	Sound source
Exports from France	Bundles	208		50		3,613	
	Kilograms	70,092,128	23,113,600	68,041,336	81,677,504	123,220,336	62,321,928
	Litres	68,656,016		11,898,402		16,880,192	
	Meters	2,073		29,261		6,279	
	Pieces	6,232,975	16,600,235	1,322,931	11,714,780	4,925,995	12,808,564
	Silver kg	37,562	401,393	39,623	57,459	16,574	40,736
Imports to France	Bundles	1,964				220	
	Kilograms	259,623,472	1,270,031	69,724,144	115,677,840	289,704,160	112,079,064
	Litres	4,038,574		273,907		2,551,001	
	Meters	7,285,050		273,907		17,345,048	11,150
	Pieces	9,239,616	700,267	1,371,481	3,653,125	9,445,241	2,803,068
	Silver kg	20,069	50	32,793	96,187	36,192	1,283

Notes: Years covered are 1750, 1771-1777, 1779, 1780, 1782, 1787 and 1789. Silver kg is the converted value of goods not covered in the other categories (when available).

Looking at individual industrial categories,³⁸ we see that the discrepancy between the French and the Sound sources for the French imports from Denmark are concentrated in sector 2 “Raw materials”, which includes wood products (coming from Norway). All in all, though, there is not much there than can dramatically increase our trust in the pertinence of the comparison.

4.2. Comparing the sectorial composition of trade

Another way to compare the sources is to check the sectorial composition of trade. As to the French balance of trade, we have chosen to compute the shares of each sector in total trade by using the values indicated in the French source. For the Sound, it is more complicated. As it is impossible to add together kilograms, pieces and rigsdalers, we have selected three types of indicators: kilograms (Table 3 shows it is the dominant measure), cargo taxes (but remember that they are missing for 45% of the cargos – in particular trade with Denmark is excluded) and number of cargos.

³⁸ The excel tables for each industrial sector are available on the website <http://toflit18.hypotheses.org/241>

Table 4: Correlation of industrial composition of trade, 1750-1789 (-)

	Unit in the Sound Toll Registers	Denmark	Russia	Sweden
Exports from France	Kilograms	0,64	-0,01	0,07
	Number of cargos	0,41	0,24	0,19
	Taxes	0,64	0,58	0,62
Imports to France	Kilograms	-0,12	0,67	0,02
	Number of cargos	0,19	0,83	0,08
	Taxes	-0,06	0,89	0,04

Notes: Years covered are 1750, 1752, 1754, 1756, 1757, 1758, 1759, 1760, 1761, 1767, 1768, 1769, 1770, 1771-1777, 1779, 1780, 1782, 1787-1789. The units in the French source is always the value of trade

Like Table 3, Table 4 shows that the French and the Sound sources are not measuring the same French imports from Denmark. Again, trade with Norway is probably part of the explanation. French imports from Sweden also seem very different. In all the other cases (French imports from Russia, and French exports), the data are more alike. For all French exports, it is the Sound taxes indicator that provides the best fit for the French sources. They are positively coorelated for all three countries in the case of French exports. Moreover, they do a good job for French imports from Russia. It suggests that the Sound Toll Register taxes might be a reasonable indicator of trade composition.

Table 5: Industrial compositions of French exports, 1750-1789 (-)³⁹

	Russia				Denmark				Sweden			
	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos
0		0%		0%						0%		0%
0a	1%	4%	5%	19%	3%	3%	7%	22%	3%	8%	13%	20%
0b	50%	35%	8%	9%	40%	38%	14%	5%	58%	44%	68%	11%
1	26%	36%	8%	32%	41%	49%	48%	32%	20%	33%	8%	27%
2	11%	13%	76%	16%	10%	3%	26%	7%	13%	3%	8%	8%
3									0%			
4	0%		0%	0%	1%		0%	0%	1%	0%	0%	0%
5	1%	0%	0%	3%	1%	1%	2%	9%	1%	1%	0%	7%
6	4%	1%	0%	4%	1%	1%	0%	7%	1%	1%	1%	9%
6a	1%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%
6b	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%
6c	2%	0%	0%	0%	1%				1%			0%
6d	0%				0%	0%	0%	0%	0%			
7	0%			0%	0%			0%	0%			
8	2%	0%	0%	0%	1%	0%	0%	0%	1%	0%		0%
9	0%			0%	0%				0%			
???	0%	2%	1%	6%	0%	2%	2%	6%	0%	4%	2%	7%
Mixed	2%	9%	2%	10%	1%	4%	0%	10%	1%	4%	2%	9%

Notes: Years covered are 1750, 1752, 1754, 1756, 1757, 1758, 1759, 1760, 1761, 1767, 1768, 1769, 1770, 1771-1777, 1779, 1780, 1782, 1787-1789. When no number is mentioned, no trade in that category is recorded.

Table 5 and Table 6 provide a closer look at the composition of French imports and exports. The main French exports are colonial foodstuffs (0b) and drinks (1, mainly wine and spirits) and, to a lesser extent, European foodstuffs (0a, including vinegar and mediterranean products (prunes, etc.) and raw materials (2, mainly indigo and salt – this last one being very important for French-Russian trade). If we concentrate on colonial foodstuffs and drinks (by far the two most important categories according to the French sources) two points needs to be underlined. Firstly, colonial foodstuffs as expected are usually more important in values and taxes than in kilograms and cargoes, as they are high value-to-weight goods. Secondly, the gap between the French source and the indicator of Sound taxes are of the same magnitude for the three countries. The category 0b weights slightly more in the French source (between 40 and 50%) than in the Sound,

³⁹ This stage allowed us to correct a mistake in the conversion of the *lispund* than made the “???” category represent 94% of French exports to Sweden in kg.

while category 1 weights slightly more according to the Sound tax registers (between 33 and 46 %) than in the French source. This suggests that the Sound administration goods from category 0b are more taxed in proportion to their values at departure (France) than goods from category 1. If such a result were confirmed, it would clearly show that the two sources provide the same kind of information on the composition of French-Baltic trade, a fresh and unexpected result.

The main French imports are made of European foodstuffs (0a, especially grain), raw materials (2, including wood) and manufactured products (6, including iron). Each country had its own specialty: Raw materials for Russia and Denmark, manufactured products (mainly iron and its derivatives) for Sweden. There are several odd features of our statistics that are interesting to reflect upon. First, according to the Sound registers a significant share of Danish exports to France was made of colonial goods and drinks: that seems odd. There are three plausible explanations. The simplest is that it is an error in STRO – a large cargo of coffee wrongly registered might be enough to explain a large part of this difference. It is not rare in the STRO database to see errors in the direction of trade. Another explanation is that the cargo(es) did not go to France, but to other country(ies). Finally, it might be a case of falsification of the registers to carry goods from France at a better tax rate. A similar case of obvious problem in the Sound statistics is the significant proportion of linen in the Swedish exports to France. Here, it might be a more obvious case of falsification since we know linen goods were coming from German states (the only significant exporter of these goods in the Baltic area), but maybe the tax rate was significantly lower for Sweden exports. Re-exports from Swedish Pomerania are another possibility. Finally, the discrepancy between the proportion of Swedish exports in iron and iron wares measured by the French balance of trade, might be explained by the fact that some of this trade was coming from Gothenburgh rather than Swedish Baltic ports.

Table 6: Industrial compositions of French imports, 1750-1789 (-)

	Russia				Denmark				Sweden			
	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos	French source Values	Sound source Taxes	Sound sources Kg	Sound sources Cargos
0a	4%	2%	13%	6%	22%	7%	39%	12%	2%	3%	8%	4%
0b	0%	0%	0%	0%	0%	29%	7%	3%	0%	2%	0%	0%
1	1%	8%	1%	1%	0%	35%	10%	7%	0%	2%	0%	1%
2	62%	70%	65%	50%	53%	10%	8%	24%	4%	8%	28%	25%
3	0%	0%	0%	0%	1%	1%	9%	2%	1%	5%	15%	7%
4	14%	6%	5%	5%	1%				0%	0%	0%	0%
5	2%	1%	0%	1%	3%	0%	1%	2%	2%	2%	1%	5%
6	10%	7%	15%	20%	13%	12%	11%	19%	90%	56%	41%	47%
6a	2%	2%	0%	3%	0%			0%	0%	19%	4%	5%
6b		0%	0%	0%	0%					0%	0%	0%
6c	0%				0%				0%			0%
6d	0%				4%	1%		0%	0%	0%		0%
7	3%	0%	0%	5%	2%	0%	0%	1%	0%	0%	0%	1%
8	0%	0%	0%	0%	0%			0%	0%	0%	0%	0%
9		1%		4%	0%			0%	0%	1%	1%	1%
9a					0%				0%			
???	0%	1%	0%	3%	0%	5%	15%	25%	0%	2%	1%	3%
Mixed	1%	2%	0%	2%	1%	2%		4%	0%	0%	0%	1%

Notes: Years covered are 1750, 1752, 1754, 1756, 1757, 1758, 1759, 1760, 1761, 1767, 1768, 1769, 1770, 1771-1777, 1779, 1780, 1782, 1787-1789. When no number is mentioned, no trade in that category is recorded.

4.3. Comparing the chronological evolution of trade

The last approach to compare the data provided by the two sources is to examine the evolution of trade throughout the period, i. e. the trend. Table 7 confirms that French exports are easier to reconcile in the two sources than French imports, except French imports from Russia. Besides, the indicator of the Sund taxes tracks the value from French sources much better than weight or number of cargoes, which is a confirmation of the result we obtained in the first two sections. We have selected two series for illustration. Figure 1 gives the best fitting series (French imports from Russia, using Sound Toll taxes) and Figure 2 gives not-so-good fitting series (French exports to Sweden, using Sound Toll taxes).

Table 7: Correlation of the evolution of French trade, 1750-1789 (-)

Sector	Denmark			Russia			Sweden			
	Kg	Nbr	Taxes	Kg	Nbr	Taxes	Kg	Nbr	Taxes	
Exports	0a	.69	.84	.85	.40	.73	.79	-.17	.27	.17
	0b	.41	.49	.44	.27	.38	.29	-.20	.45	.48
	1	.85	.84	.80	.54	.47	.53	-.05		.08
	2	.14	.80	-.20	-.33	-.26	-.20	-.23	-.01	-.06
	6	.59	.68	.42	.36	.62	.36	-.09	.10	
	8	-.36	-.09	-.75		-.38	.82		-.38	-.43
	Total	.48	.64	.70	-.27	.47	.46	-.21	.27	.31
	0a	-.33	.08	-.25	.28	.31	.19	-.02	-.18	-.23
Imports	0b						-.58		-.88	
	1				.53	-.44	.20			
	2	-.61	-.14	.45	.50	.78	.85	.16	.54	.57
	4				.88	.77	.85	-.13	-.09	.05
	6	-.13	.13	.11	.89	.80	.59	-.11	-.10	-.11
	6a				.52	.72	.73	.09	.76	.22
	Total	.11	.13	.27	.62	.81	.84	-.12	-.07	-.09

Notes: Years covered are 1750, 1752, 1754, 1756, 1757, 1758, 1759, 1760, 1761, 1767, 1768, 1769, 1770, 1771-1777, 1779, 1780, 1782, 1787-1789. The units in the French source is always the value of trade

Figure 1: Total French imports from Russia, 1750-1795

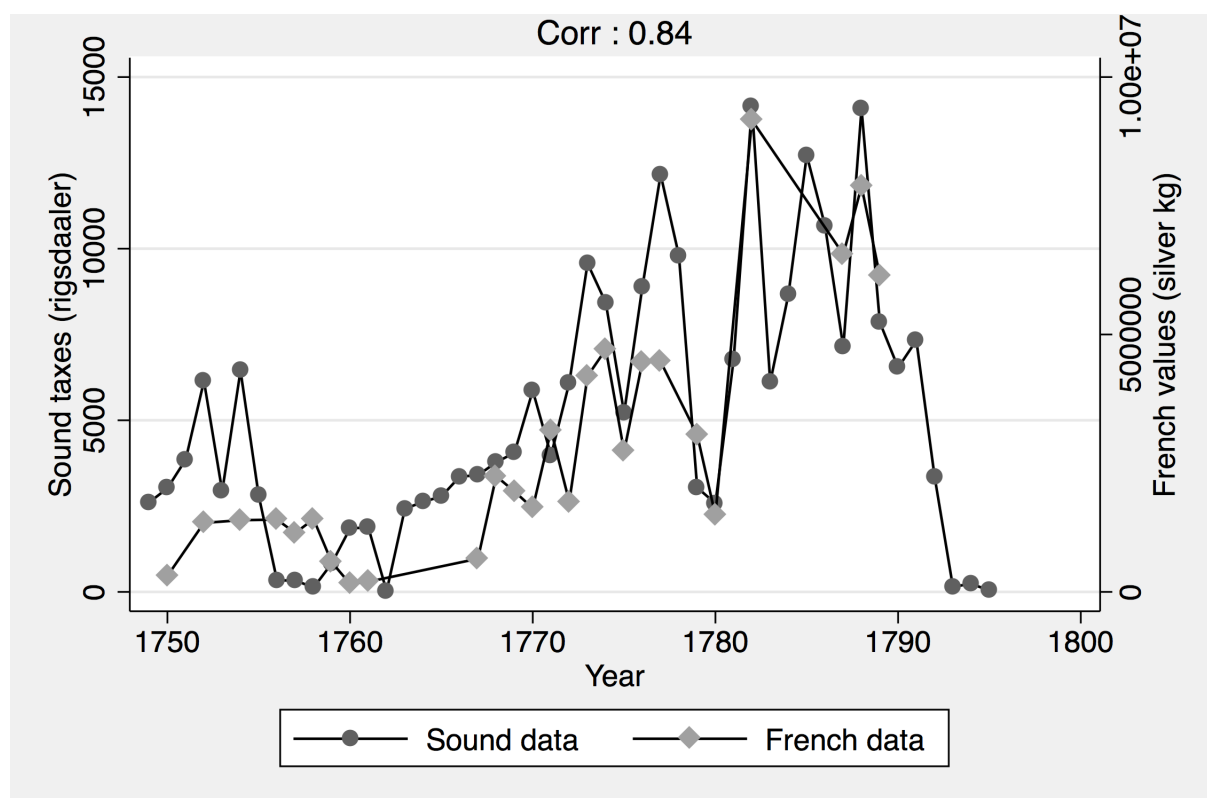
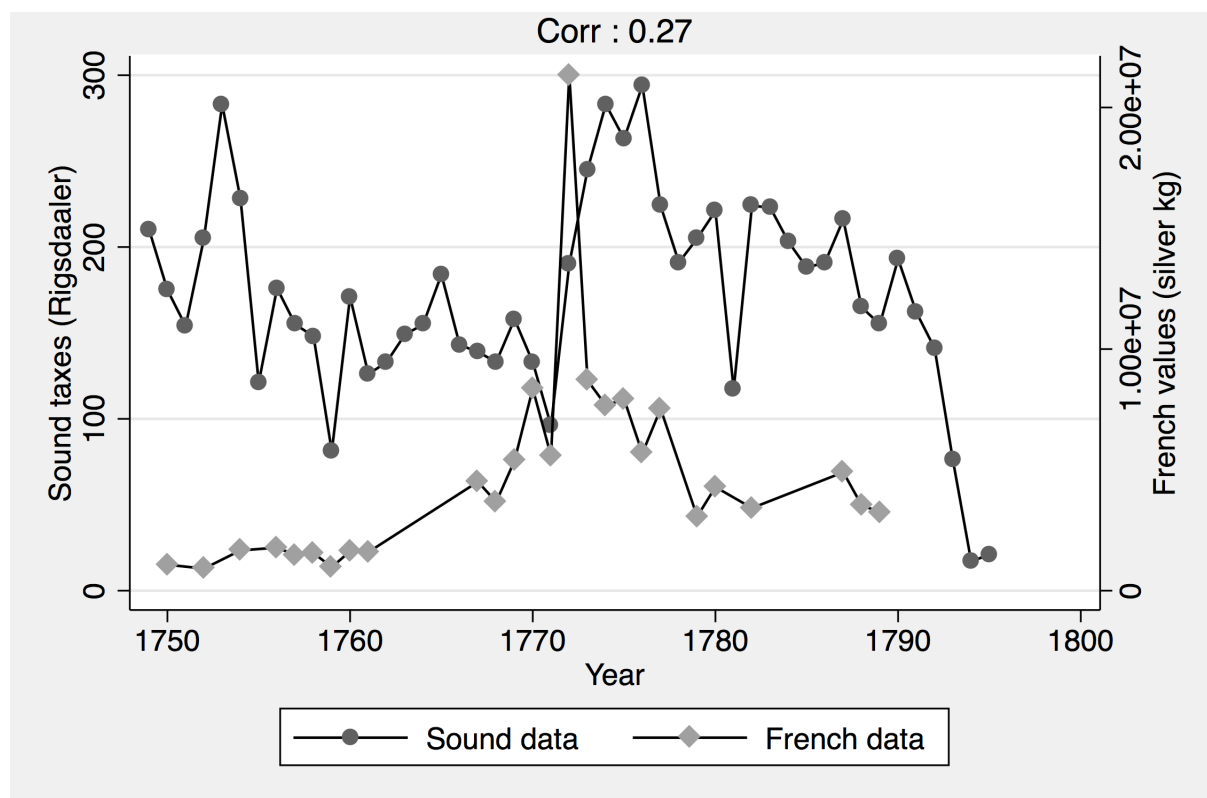


Figure 2: Total French exports to Sweden, 1750-1795



Both the tables and the graphics offer interesting information on our sources. First, we can see that the low correlation of French statistics to Sound taxes is not due to the presence of extreme values – it is visually evident in figure 2. Moreover, correcting for those by removing the highest and lowest 5 percent observations does not improve the fit by much for the other series as well. There seem to be fundamental differences in the series, except French exports to Denmark and French imports from Russia. In the case of French trade with Sweden and French imports from Denmark, the most likely explanation is that a large part of the trade escaped the Sound statistics: a large part of Danish exports to France consisted in Norway’s wood and a significant share of Swedish trade to and from France went through Gothenburg. Conversely, the good correlation of both sets of data for French exports to Denmark and Russian trade corresponded to routes that essentially went through the Sound: While France imported wood

from relatively inhabited and poor Norway, its colonial goods and drinks went to denser and richer areas in Copenhagen and its surroundings.

Correlation measures the similitude in short-term variations. Another way to check the similarity of the data is to look at long-term variations. Table 8 provides this information. The way to read it is the following: the rate of growth of French exports to Russia measured using the French values is equal to 155 of the rate of growth measured using the Sound Toll taxes. On the whole, little positive information can be extracted from this table.

Table 8: Ratio of annual growth, 1750-1789 (-), in of the rate of growth measured by the Sound sources

Sector	Denmark			Russia			Sweden			
	Kg	Nbr	Taxes	Kg	Nbr	Taxes	Kg	Nbr	Taxes	
Exports	0a	131	171	3%	34%	100%	-6%	631%	-2276%	90%
	0b	-50%	113%	-23%	-9%	108%	3%	-31878%	177%	82%
	1	-38%	17%	28%	17%	76%	9%	-505%	-359%	-480%
	2	-118%	-30%	212%	-356%	-3278%	-1494%	-183%	400%	109%
	6	-77%	-79%	-94%	65%	75%	16%	-110%	-76%	-173%
	8	-73%	-5220%	1431%	-79%	3762%	462%		-9%	-197%
	Total	148%	135%	3%	-1484%	193%	55%	-364%	7072%	305%
Imports	0a	-85%	-40%	-74%	44%	368%	78%	302%	1312%	-2252%
	0b	-107%	9%	-119%		2552%	-65%	-440%	3341%	-429%
	1	-203%	-296%	-214%	34%	439%	9%	78%	-7464%	-459%
	2	127%	-482%	69%	49%	67%	36%	74%	26%	8%
	4				9%	208%	61%	-1%	-1261%	419%
	6	36%	-3436%	231%	42%	68%	50%	-29%	13%	-19%
	6a				38%	575%	271%	531%	-2266%	-553%
	Total	39%	-539%	93%	37%	72%	39%	12%	39%	16%

Notes: Years covered are 1750, 1752, 1754, 1756, 1757, 1758, 1759, 1760, 1761, 1767, 1768, 1769, 1770, 1771, 1772, 1774, 1775, 1776, 1777, 1780, 1787, 1788 and 1789. The units in the French source is always the value of trade

5. Conclusion

In this chapter, we have presented two sources of French-Baltic trade flows in the second part of eighteenth-century, the French balance of trade general objects and the Sound Toll Registers. Despite their difference in nature, we have built a comparison between these two sets of data. Although a lot of methodological issues that we opened have not been cleared at this stage of our research, it is significant to note that we have been able to produce some fresh and interesting results from this exercise.

A first and important conclusion is that in the context of the French-Baltic trade physical quantities are not good proxy for economic values. The comparison of the flows registered by the Sund in physical quantities and the French data registered in value is disappointing. The two series do not match, whatever approach we used, and we have not been able to extract valuable economic information from the comparison. The same is also true for the number of cargoes: even if the match is slightly better than with kilograms, it does not make a lot of sense. Conversely, the Sound Toll Registers tax indicator is a reasonable proxy for the flows' values measured by the French bureau. Interestingly, that is true whether we test the comparison for the total volume of trade for each country, for the sectorial composition of trade or for the dynamics of trade. By looking at the sectorial composition of trade, we have been able to trace some issues with the Sound source. It seems that the employees of the Sound (or the retranscribers) made significant mistakes when writing the ledgers. Consequently, the Sound registers should be used with caution when working on relatively small sample – such as French trade to and from and one of the Baltic countries. On the whole, the French data seemed more consistent, or at least we were not able to spot significant bias in the information it contains.

Although, the present article is mostly concerned with methodological issues, it should be underlined that it has also produced some positive results: Norway accounts for a significant part of French imports from Denmark, but it is not the case for French exports to the same country. It is also clear that, while French exports to each of the Baltic countries share a similar structure and are dominated, in terms of value, by wine and colonial goods, there is a strong differentiation of French imports from these countries: Swedish exports are made almost exclusively of iron and its derivatives, Danish exports are made mostly of wood coming from Norway and to a lesser extent of European foodstuff from Denmark and Russian exports are dominated by primary goods.

A way to deepen the analysis would be to use more local data, direction from ports rather than countries. It has not been possible here because such information does not yet exist in the French database, but it will be available in the near future.