

Not “easy to win”: The British war on French trade, 1744-1815*

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Abstract

International trade is one of the main issues at stake in the rivalry between powers. The British war on French trade from the War of Austrian Succession to the fall of Napoleon gives us a lesson on how to win it when outright destruction is not an option. We suggest a measure of the achievements of a war on French trade. We present the policies implemented by Britain to wage it: establishment of naval supremacy, overseas territorial capture, predation on French ships and extension of this predation to neutral carriers. We compute that, compared to loses inflicted on the French economy, waging this war on trade was a costly endeavour. Finally, we show that long term success implied a durable change in the structure of French trade.

1 Introduction

A recent call to “unleash” US privateers against the Chinese merchant fleet (Cancian and Schwartz, 2020) reminds us that maritime war on trade is an integral part of great power rivalry. Alfred T. Mahan, a hugely influential naval thinker, argued that the nineteenth-century British preeminence was the product of naval dominance beginning in the seventeenth century (Mahan, 2004, 2016a,b). Attacking and protecting trade are major military activities, as illustrated during US Civil War, World War I and World War II (both in the Atlantic and the Pacific). Belligerents routinely succeed in reducing each other’s trade. Sometimes, attacks on trade arguably achieve military decisive results, such as the blockade of Japanese Home Islands during World War II, sometimes less so, such

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as the blockades of Germany during World War I and World War II or the submarine campaigns by Germany. Long term changes in relative economic fortunes are even more difficult to achieve for attacks on trade. The relative economic decline of Britain compared to Germany suffered only a momentary setback because of World War I. Germany and Japan transformed themselves into prosperous export powers a few decades after their decisive military defeat in 1945.

Yet Britain seems to have achieved a long lasting change in relative economic fortune with its attacks on Dutch trade in the seventeenth century and on French trade in the long eighteenth century.

War has many causes, yet especially after the consolidation of the Hanoverian dynasty on the United Kingdom's throne, mercantile rivalry was an important motivation of French wars (Crouzet, 2008; Davis and Engerman, 2006; Tracy, 1991; Wallerstein, 1980); the British state, at the urging of mercantile interests, believed war was a good way to curtail French trade, despite the huge resources it required (Baugh, 1965; Brewer, 2002; Neal, 1977). French trade was indeed reduced during each war (figure 2). This was not decisive, as French mercantile interests never were strong enough to convince France to make peace on their behalf, in contrast to the Dutch. Furthermore, before 1815, it is not obvious that French peacetime trade was systematically affected by British efforts: despite a clear decrease in wartime, French trade was recovering quite fast during some peace periods. Not all wars were enough to curtail French trade. Still, the long-term success of Britain was clear as British domination of world trade was an essential part of the nineteenth century *Pax Britannica*.

British long-term success has inspired generations of naval strategists such as Mahan. How it was exactly achieved is not clear. Mahan believed in decisive battles and blockade conducted by capital ships. He was especially dismissive of direct attacks on enemy's trade. The French *Jeune école* believed attack on trade could be efficient Aube (1882) (these ideas would lead to the German U-boat strategy and US attacks on Japanese trade during World War II). Britain both attacked French trade and put in place a blockade based on the action of capital ships. This paper examines which was decisive in explaining the success of the British war on French trade from 1744 to 1815.

This is an important question. During Trump's presidency, trade wars have come again at the forefront. Trump's infamous 2018 tweet that «Trade wars are good, and easy to win » was not an appeal to a military resolution of the economic conflict between the US and China. Yet, it might be tempting at some point to put the US blue-water navy to the service of economic competition. The consequences of trade wars can be far-reaching and it is important to understand them better. E.g. the latter part of the conflict between France and Britain was central to deglobalisation from 1790 to the 1830s (O'Rourke (2006),(O'Rourke et al., 2010, table 4.5)). Furthermore, the « Second Hundred Years War » (1688-1815) between France and Britain has a central place in the history of

the eighteenth and the nineteenth century and deserves to be better understood in its own right. Certainly, for literate eighteenth-century Britons, the war with France seemed a more important subject than anything linked the Industrial Revolution (figure 1).

Trade and war have been intermingled for a long time Findlay and O'Rourke (2009). Opinions vary substantially as to whether trade encourages or discourages war. The so called “liberal” strand of the literature concerned with the impact of trade on war posits that it promotes peace since it is a better method of expansion than wars (Doyle, 1997; Oneal and Russet, 1997; Polacheck, 1980). On the other hand, the “realist” standpoint claims that there is no impact of trade on wars and, if any, that is a positive one. Countries in facts will be pushed to move war to maintain trade supremacy (Buzan, 1984; Levy, 1990; Ripsman and Blanchard, 1996). McMillan (1997) give a review of the two strands. This debate has been renewed by Martin et al. (2008a,b). This paper contributes by discussing a case where trade lead to war because it was one of the prize Britain hoped to win through conflict. Trade rivalry, notably for the control of carry trade between the Western Hemisphere and Europe was one of the cause of war.

The British economy has been extensively shaped by war. John (1955) believes it was positive in the first half of the eighteenth century as it increased demand and spurred innovation in crucial sectors. Eloranta and Land (2011) underlines the large effect of wars on British public debt. Williamson (1984) argues that this large public debt crowded out civilian capital accumulation. Ventura and Voth (2015) have that the large public debt was positive as it encouraged capital to flow out of agriculture. More generally, O’Brien (2018) discusses how the economic history of Britain from 1651 to 1914 can be seen as an exemplary case of successful belligerent mercantilism. In a zero-sum game, reducing French trade and its potential competition was as important to establish British supremacy as encouraging the British economy. We contribute to these literature by taking the point of view of the country at the receiving end of British militarism (though France was obviously not an irenic power either).

There is a general agreement on the fact that war, or even the preparation of war, has negative effects on trade, and the debate focuses more on its size, persistence, and whether trade with neutral powers, or even between neutral powers, is affected. Anderton and Carter (2001) distinguish between conflicts with major and minor powers and observe significant pre and post war effects only in the former case, whereas Levy and Barbieri (2004) find a mild and temporary impact of war on trade with adversary country, using a panel between 1870 and 1992. Blomberg and Hess (2006) shows large and negative impact of all kinds of conflicts on trade. Glick and Taylor (2010) find large, persistent effects of war. In the case of the two World Wars, the negative effects extend to neutral countries

and have persisted up to ten years. They claim that the indirect cost of forgone trade was at least as large as the direct effect of lost human capital. Karlsson and Hedberg (2021) argues that war in the nineteenth century reduced trade only between belligerent and only during the actual war. Rahman (2010) demonstrates that from the eighteenth century to the mid-twentieth century, conflicts with a major naval power are particularly disruptive. Glaser and Rahman (2016) estimates that at the end of the nineteenth century (1870-1914), the naval arm race by itself was damaging trade potential around the world. We contribute to this literature by looking at the exact channels through which war between Britain and France had an effect on French trade.

More recent literature: Chang and Wu (2020) GD – looking at this paper, I am not sure it is relevant. .)

Some of the channels through which trade would be reduced during wars are self-evident. War leads to a destruction of trading and production capacity. Even the threat of destruction of ships will lead, *inter alia*, to increased trading costs. It is often associated with partial or complete embargos. This paper discusses these channels and as such engages with the literature debating war on trade strategies. Tracy (1991) aims at understanding the strategy thought behind attacks on maritime trade based on historical evidence, mainly from World War I. He notices that scholarship has come to conflicting conclusions on the utility of mercantilist warfare (p. 59). Pugh (1986) affirms that the cost of the World War II U-Boat campaign to the Germans was superior to the direct and indirect cost imposed on the Allies between October 1942 and June 1943. Davis and Engerman (2006) evaluates the effect of blockades in a number of case studies, often looking at evolving trade and shipping statistics. They judge that the success rate of blockades has never been very high. Riley (1986) underplays the role the Seven Years War on French trade because of the compensatory activity of merchants. In addition to looking at war-time channels and strategies, this paper innovates by focusing on how Britain managed to change the long-term trends of French trade even after peace between Britain and France became firmly established.

The aim of this paper is [to write up] Roadmap [to write up]

We aim to show the war on trade was a costly and difficult endeavor; the key factor was not to reduce the level of trade, but to force its structural change. It succeeded partly because the French cooperated through their own attempt at changing the structure of their trade during the period of the Continental System.

2 Measuring the achievements of trade wars

To assess the British success and explain its causes, we need to measure it. In this section we define a loss function that quantifies the disruption in French trade due to wars. We reckon this is an approximate measure (see section 4) however it provides at least an approximation of which wars were more disruptive and the length of their effects.

Our data on French trade come from the *Bureau de la Balance du Commerce* through the TOFLIT18 project (see appendix B). We construct the loss function as the difference between predicted trade value in the absence of war (assuming a geometric trend) and the actual value of trade, divided by the predicted trade value:

$$\text{Loss} = \frac{\text{Expected value based on past peace trend} - \text{Observed value}}{\text{Expected value based on past peace trend}} \quad (1)$$

Figure 5 shows the annual loss function and the mean loss function by peace and war period for France. The lower green line shows observed trade versus trade predicted using all preceding peace periods, whereas the lower yellow line shows observed trade versus trade predicted using only the immediately preceding peace period (“memoryless loss”).¹

Our graphs need to be color-independent

Figure 5 shows that some wars were more disruptive than other. We want to explain that. Wars were such massive events that so obviously affected French trade that the existence of a causal effect of wars on these trend deviations is quite plausible. Still, other events presumably affected French trade, notably the political upheavals linked to the French Revolution. Yet, disentangling the effects of war from the effects of the Revolution is probably impossible (Charles et al., 2021)). The same issue would apply to other periods where the evolution of French trade was the result of multiple factors. Even if causality is not rigorously proven, we will use the language of causality in the rest of the paper.

Figure 5 suggests that the most successful wars from the point of view of Britain were the Revolutionary & Napoleonic War and the Seven Years War. The loss function was substantially higher during these conflicts (more than 40% and 60% for loss and memoryless loss respectively) than during the Austrian Succession War and the American Revolutionary War (respectively 20% and

¹We exclude 1792 from the computation of peace time trends when computing the “memoryless loss”. Its value is doubtful and dependant on inflation and has an inordinate effect on the peace time trend (it increases it from 1.4 p.c. to 2.9 p.c.) because there are so few peace years with data available from 1784 to 1792: only 4 (including 1792). Including it dramatically increases the estimated trade losses. Including it does not change much when computing the peace trend based on all past peace periods: it stays at 2.65 p.c.)

30%). Furthermore, the loss stayed positive after the end of the the Revolutionary & Napoleonic War and the Seven Years War, meaning their effects were long lasting, whereas it became negative after the Austrian Succession War and the American Revolutionary War. That peace-time loss post Seven Years War loss is of the same order of magnitude than the war-time loss during the American Revolutionary War.

For the sake of comparison, we also compute the loss function for Great Britain (figure 6). We observe here that losses are much less significant than for France for the overall period. In particular, the British loss function is negative - which suggests war increased trade compared to peace time - between 1756 and 1778 and after 1781 - at least while using all past period to predict the trend.

Altogether the loss function for the two countries suggests that British trade was not negatively affected by wars and that Britain was always successful at curtailing French trade during wars and sometimes even after the war.

3 War-time strategies

How did Britain curtail French trade in war time ? Most of French international trade was conducted by sea (see Figure 4). Reducing French trade could thus be done either by intercepting trade-carrying vessels or discouraging them. Both actions were complementary, as systematic interception would discourage trade. In this section, we study how interception was done, what counter-measures were implemented by the French and what ressources Britain deployed in response. Along the way, we study the quantitative link between the the loss function of French trade and these measures, counter-measures and further responses.

3.1 Interception of French trade

The interception of French trade came from the activities of the British Navy and privateers, either private men-of-war, whose main aim was the capture of ships, or merchant vessels, that would have been happy to profit from enemy ships if the occasion were to arise. Both needed letters of marque procured by the State. Great Britain had three ways of directly affecting French sea trade: outright destruction of merchant vessels, ransoming, and prize taking. Direct destruction of merchant vessels by the British Navy and privateers was rare as it was not a gainful activity. Ransoming implied coercing a merchant vessel into paying a ransom to the privateer or the Navy ship. However, it left the door open to abuse. This induced the British government to limit it more and more drastically from 1744, and forbade it altogether by the time of American Revolutionary war (see Hillmann and

Gathmann, 2011, p. 734). Prize taking was much easier to monitor by the British state. French vessels were threatened into submission. Once captured, the French vessel was brought back along with some members of its crew to a British port. The captors had to demonstrate “the prize was lawful and the rights of neutral and allied ships engaged in legal trade had not been harmed” (see Hillmann and Gathmann, 2011, p. 734) in front of the High Court of Admiralty if the captor was a civilian ship. The procedure was different but similar for captures by the British Navy. This procedure led to a paper trail that deemed or not the prizes as “fair”.

Because direct destruction was rare and ransoming was limited, prizes captured by the British navy and privateers provides a good measure of the pressure war-time predation exerted on trade. English and British trade statistics provide the value of prize goods imported in Great Britain up to 1800 (see figure 11). Still, the numbers are very telling, especially when we look at the value of prizes as shares of total trade. In fact, at its peak, the value of prizes captured amounted to 10% of the value of total French trade. This happened during the War of American Independence, while during the Revolutionary War it gets as low as 3%. These numbers are not given in post 1800 source.

They can be complemented by indictments on the total value of captured ships given in the High Court of Admiralty. For example, the impact of privateering on the French merchant fleet was especially strong during the War of American Independence (see table 1 “Impact of British privateering on French trade” in Hillmann and Gathmann (2011), Figure 10 and Figure 11). Hillmann and Gathmann (2011) estimates that about 11.5% of French merchant ships were intercepted by British privateers, for a total of 4 percent of the value of French overseas trade during the War of Austrian Succession, the Seven Years War and the War of American Independence. Thanks to additional data provided by Henning Hillmann (These data come mainly from records at the PRO High Court of the Admiralty archives and underlying Hillmann and Gathmann (2011)) we can compute approximately the number and the nationality of prizes captured by privateers up to 1809. The share of privateering activity was very significant until the War of American Independence but became marginal during the Revolutionary & Napoleonic Wars. We need to complement data on prizes captured by privateers by data on the actions of the British Navy. We use data from Starkey (1990) and Benjamin (2009). The former provides the number of prizes condemned as legal by the High Court of the Admiralty in London, both from privateers and the Royal Navy from 1702 to 1785, while the latter provides the annual number of prizes taken by the Royal Navy from 1793 to 1815 from the sample gathered, but not published, by Hill (1998). Data from these sources are summarised in figure 10.

Together with the threat to cargo and ship, captivity for sailors also represented a problem. Even though they were liberated at peace time (and sometime earlier through exchange of prisoners),

mortality in British prisons was such that their capture represented a long-term loss for the French navy and merchant fleet (Le Goff, 1998). We have not found data on the total British captures.

Interception of French trade increases trade costs. This discouraged trade as these increases had to be absorbed by producers or passed on to consumer. Both options decreased the volume of trade and hence should have increased the loss function.

To quantify the effect of the interception of trade, we estimate the following four equations. We first consider a linear model for war years only, then we do so considering discounted running sum². We repeat this exercise in log, therefore estimating semi-elasticities. In the linear regression specification we rescale the covariates to their maximum level, in order to ease their interpretation.

Write down the estimated four equations (just for war years))

We perform a regression on the loss function of the following explanatory variables; prizes imports, number of prizes and number of privateer's prizes.

There is no statistical link between prize imports and the French loss function. This is not very surprising, as many observations are missing for this variable (see column 1 in tables 8, 9, 11 and 12).

We should have only 20 years for the running sum regression on prizes imports

Data on privateers prizes is much more abundant. Yet, we know that the British privateer activity depended on the attractiveness of alternative profit-making activities (Hillmann and Gathmann, 2011; Villiers, 2002, p. 673) - e.g. on the degree to which regular trade was endangered. That explains the sharp decline in privateer prizes after 1793, when French predation on British trade was strongly reduced. Privateering became relatively less interesting for British merchants and investors. The total number of prizes however, remained high until 1813, suggesting that the British navy compensated for the lack of privateers actions and kept the threat of predation high. So this change in the variable was not linked to a change in the pressure applied on French shipping. Accordingly, column 3 in tables 8, 9, 11 and 12 suggest that privateers prize-taking had a positive effect on French trade. This is easily explained : the decline of privateers coincided with the worst years for French trade.

The total number of prizes is more promising, despite the fact that In 1813 the total number of prizes declines abruptly. This does not necessarily mean that probability of capture became smaller but could be due to a smaller number of French ships sailing altogether.. The coefficients in the linear specifications are positive and significant (see column 2 in tables 8 and 9. They vary substantially across specifications, ranging from 6 to 16 percent (so for a percentage point increase in number of

²the discounted running sum is defined as $\sum_{t=1}^N \text{value} * e^{N-t}$

prizes with respect to their maximum level there is an increase of 6 to 16 percentage points for the loss function).

Really ? This seems way too large. Did you scale to 100 or to 1 ?

The R squared is also higher, between 20 and 40 percent.

I see 8 percents in table 8 ?

In the log-specification the picture change quite substantially (column 2 in tables 11 and 12). The coefficient range from 0.8 percent to 11 percent and R square is also between 5 and 40 percent.

I see 5 and 0.08. That is quite a large difference. Again, it does not seem plausible

Why not use the value of prizes ?

3.2 French counter-measures: insurance

Large uncertainty on ships' security increased trade costs. Merchants often increased their profit margins to justify the risk. Still, that discouraged consumers and producers. To mitigate risk, outfitters relied on insurance. Ironically, the most advantageous market place for French merchants in that period often was London. As the British market for merchant ships became glutted because of the arrival of prizes, French shippers would buy them back with insurance money (Tracy, 1991, p. 55). This could only go so far. Forgone profits however could not be insured ((Ducoin, 1993, p. 160), Villiers (2002), (Butel, 1973, p. 690-720)). Insurance is most efficient to mitigate idiosyncratic risk. War and British predation were a "market risks", correlated for all ships. As a result, Insurance rates often increased so much in war time that insurance became prohibitive and shipping was discouraged altogether. We do not know of any long-term series on insurance rates for French shipping that would allow to relate them with the evolution of French trade. Anyway, the British made insurance on enemy vessel illegal in 1748 and from 1793 to the end of the period. (Tracy, 1991, p.55).

3.3 French counter-measures: French naval power

Other responses relied on French naval power. If the French Navy could deny the British Navy mastery of the sea through naval victories or because of strategic overreach, the risk for French ships was much smaller. That seemed only attainable during the War of American Independence. Another possibility)was, in the eighteenth century as in the twentieth century, to organize convoys protected by military warships (Villiers, 2002, p. 393, 407, 448, 641). Despite the misgivings of merchants that saw their commercial liberty curtailed, convoys were a good solution, as long as the French navy was

powerful enough to defend the merchants vessels. This, however, was no longer the case during the Seven Year War or the Revolution and Napoleonic Wars, as the British became better at organizing the blockade of French ports (more details on the British blockade is reported in appendix B.1). In both cases, French warships could only interfere because of favourable odds.

Naval superiority was thus the primary input into the British war on trade. As a measure of the superiority of the British navy over its enemies we compare the number of warships available to Great Britain and its allies to the number of warships available to France and its allies thanks to the data in Modelska and Thompson (1988). A complete discussion of what we classify as ally or enemy during each war is provided in appendix B.2. Figure 12 reports the ratio between the number of warships of France and Great Britain, France and its allies and Britain and its allies, France its allies and neutral countries and Britain and its allies (co-belligerants are treated as allies). The most favourable war for France, its allies and neutral countries was the Seven Years War. In this war, the number of neutral warships or ships on the French side was more than twice the number of ships on the British side. During the American Revolutionary War and the Napoleonic Wars the ratio is lower, even though there are spikes close to one, which depend on shifting alliances (eg both Spain and Russia were neutral in 1795, the Ottoman Empire became neutral in 1802, etc.). The least favourable of all wars was the Austrian Succession War, as the Dutch and the Russians were then allied to Britain. Regressing the ratios on the loss function provides significant results of the right sign only when comparing the French and the British fleet by themselves (see columns 7, 8 and 9 in tables 8, 9, 11 and 12.) It is quite small, though, suggesting an increase in the loss function of 0.043 percentage points for a one percentage point increase in the ratio between navy sizes Similar result for the semi elasticity ? Makes sense as the variable is not too far from 1. Including both allies and neutral brings the coefficient in negative territory in one regressions. Overall the correlation with the loss function is always very mild, as suggested by the very low R squared, which never reaches 50%.

it is even smaller, non ?

That suggests that only the fleet of naval powers had an importance.

Another way to measure naval supremacy is to look at its most important output according to Mahan : naval battles.

Present results and give the list of battles ?

3.4 French counter-measures: neutral carriers

Another solution was to rely on neutral shipping. Neutral carriers were somewhat protected from British predation on the sea and, when possible, French merchants hid their cargo ownership behind a neutral partner or moved to neutral countries and operated from there altogether (Marzagalli, 2016). This happened to the extent that historians have even reflected that war periods might have been necessary to the functioning of the *Exclusif Colonial*, i.e. the theoretical monopoly of French merchants on French colonial trade (Lespagnol, 1997; Marzagalli, 2016; Morineau, 1997).³ Again, this was a viable solution only as long as the British and the French accepted the possibility of the other benefiting from trade with neutral partners. This was no longer the case during the Seven Years War and the Continental Blockade, when more and more severe measure towards neutral countries were introduced.

What do we want to say with this section?

3.5 Ship building and alliance making

British ships were doing the concrete activity of blockading French ports and capturing French ships. This was easier to do if

Yet, our measure provides a rough idea of what was the extent of the damage due to naval superiority and it suggests that the efforts of the British to curtail trade were not necessarily always successful. These difficulties suggest it might be wise move the focus from the inputs of naval superiority to its outputs: the capture of territories and destruction of trade.

3.6 Capture of colonies

West Indian French colonies were major sources of sugar, coffee and other colonial goods whose imports and re-exports were the most dynamic part of French trade. They were also important markets for French products, hence the loss of these colonies was bound to be disruptive. As a consequence, the British steadily tried to erode the French colonial empire. Guadeloupe was taken by the British in 1759, given back in late 1763; taken again in 1810, given back in 1816. Maurice was taken in 1811. Réunion and the Indian trade posts were taken in 1811, given back in 1815. French

³The argument rests on the large peace time trade imbalances between France and its Northern European clients for colonial goods that could have been balanced by large service income of Northern European merchants during war time as they, as neutrals, provided shipping and various trade services to the French empire. The quality of the available balance of payment data is not good enough to test that hypothesis. Along these lines, Juhász (2018) finds that regions of the French Empire which were protected from trade with the British during the Continental Blockade increased capacity in mechanized cotton spinning to a larger extent than regions which remained more exposed to trade.

Guyana was taken in 1810 and given back in 1817. Tobago was taken in 1793. Martinique was taken if 1794 and given back in 1815. Saint-Domingue is a special case: It revolted in 1793, was partly integrated back to the French trade network in 1796 and gained its independence in 1805.

To provide a measure of the evolution of the French colonial empire, we proxy the importance of each territory by its share in colonial imports in 1788, when the empire was at its maximum (neglecting Canada which was not a major source of trade products). Hence, the variable is set at 1 in 1788 and gets reduced by an amount proportional to the share of trade whenever a colony is lost.

Assigning colonial supremacy over Saint-Domingue requires additional explanations as it experienced a complex transition to independence. The revolt of the slaves in Haiti was a long and bloody episode and sugar production was lost well before independence was ultimately acquired. We have coded it as “lost” between 1793 and 1795, when the revolt started, and production was mostly destroyed or fields burnt. In 1796, order was partly restored and a portion of the plantation was being cultivated normally - so we consider it again as a colony - but ultimately in 1805 Haiti became independent and the production was lost completely. In 1814, the *Restauration* attempted to re-create the late eighteenth century colonial system. This included the re-establishment of the *Exclusif* and reconquest of Saint-Domingue or the establishment of some substitute colony (Todd, 2011). In a secret clause of the 1814 peace treaty, Great-Britain pledged not to hinder the re-instauration of French sovereignty on Saint-Domingue (Schefer, 1907). Yet, France never managed to re-create its “first” empire, and the economic loss was not recouped.

Figure 13 shows the evolution of the colonial empire measure. This figure suggests that the French colonial empire was roughly halved around the year 1800, to become only 25% of its maximum expansion later in the nineteenth century. During the second half of the eighteenth century, on the other hand, it remained at its maximum extension almost constantly (Canada was not an important trade partner for France). The regressions in this case all show a negative and significant coefficient and a higher R squared. In the linear case the coefficients range between an effect of -0.3 and -0.03 percentage points, depending on whether we consider war years only or all years and discounted sum. The R squared also varies, and it is between 20 and 50 percent. Considering semi-elasticities also provides similar results. Coefficients are again negative and significant, ranging between -0.123 and -0.03 percent loss for a one percent increase in the extension of the colonial empire. R squared are also similar to the linear case and range between 15 and 40 percent. Overall, for what our measures reveal so far, the extension of colonial empire was more decisive than the action of the British Navy. Still, the correlation between lost trade and lost colonies (which is the R square of the regression) is as high as one would expect.

3.7 Predation on French shipping

The destruction of merchant vessels could be direct or indirect. Dangers linked to potential capture by the British led French merchant ships to take more navigational risks, such as sailing off-season to escape them. This was likely to lead to more shipwrecks due to weather or sailing through dangerous waters, which we define “indirect” way of destruction. We have little information on the size of this effects.

use insurance rates in Ducoin ?

----- Move up, along with the beginning of 3.3 ? -----

3.8 Predation on neutral shipping

The role of neutrals in wars, and especially during wars on trade, is very important. On the one hand they were the only ones who could provide goods that were not otherwise available due to the war (Hedberg and Karlsson, 2015). On the other hand, they were an expedient for merchants who hid their cargoes as neutral cargo and could continue to trade (see Carrière, 1973; Schnakenbourg, 2013, 2015). It was well accepted by international law that enemy cargo and contraband (e.g. weapons and munitions) could be seized. The difficulty was how to define and identify enemy cargo and contraband.

British policy regarding neutral trade varied. During the War of Austrian Succession, shipping between a non-belligerent country and a non-blockaded port in France was allowed by the rule of war, provided that both the ship and the goods belonged to neutral merchants. Shipping to “closely blockaded” ports on the other hand could be seized (Schnakenbourg, 2013, p. 112). The true nationality of the cargo, however, was difficult to ascertain, as neutral ships would not yield to inspection, especially when they were escorted by neutral warships. They had claimed from the seventeenth century the “right of convoys”, that is “immunity from search for neutral merchant vessels sailing under the convoy of a warship of the neutral” (The Editors of Encyclopaedia Britannica, 2014).

Citer Tracy plutôt ?

This left the door open to trade under neutral flag, especially for French merchants. During the second half of the eighteenth century, Great Britain decided to close off these ways for French trade to continue. In 1756, during Seven Years War, the British introduced the *Doctrine of Continuous Voyage* along with the *Rule of War of 1756*. They stated that the very beginning of the journey

and the very end should be taken into account to determine the nationality of the cargo. They also claimed the right to seize neutral shipping to look for contraband and exercised it, as figure 14 shows.

Moreover, they forbid neutrals, in time of war, to enjoy a trade from which they were barred in time of peace. As the French colonies were under the regime of the *Exclusif* (Tarrade, 1972), and that all their trade had to be conducted by French ships, that basically barred neutrals from trading with the French colonies. This had a considerable impact on French trade, which was heavily relying on Dutch ships to transport colonial goods. It also created great discontent among neutral countries, whose loss function is nearly as high as that of a belligerent countries, as shown in figures 15 and 16. These figures show the loss function, as explained in section 2, for countries grouped by war status⁴ and provide evidence of how neutral countries, during the Seven Years Wars and the subsequent years, had losses sometimes higher than foes (this is the case for imports). As a consequence, on the eve of the American Independence War, Russia, Denmark and Sweden funded the *League of Armed Neutrality* to protect their interest against the threat of new losses. Their claim was that neutral ships travelling under the protection of neutral warships were not to be inspected as the absence of “enemy cargo” was guaranteed by the neutral sovereign (Schnakenbourg, 2013, p. 121-125). This experiment however did not have a long lasting success and it was finally put to an end in 1783 with the treaty of Paris⁵ (Griffiths, 1971). Nonetheless, France remained active at protecting the rights of neutral shipping, as it saw it as a means to continue its trade during war years (Schnakenbourg, 2013, p. 129). This came to the extent that in 1784, France gave the West Indies island of St. Barthelemy to Sweden partly to encourage neutral trade during wars (Schnakenbourg, 2013, p. 326). However this attitude changed during the Revolutionary & Napoleonic wars.

In 1793, with the outburst of the French Revolution and, subsequently, the Revolutionary Wars, most British goods were prohibited in France. As a response, the British adopted a policy of blockading the whole coast of France from afar. France initially gave access to its colonies to neutral shipping and encouraged neutral trade. Britain took action against neutrals and France found neutral shipping too compliant to British demands (e.g. the 1794 Jay treaty was an important point of conflict between France and the United States). Tensions between France and the neutrals multiplied up to the acme of the Quasi-War between France and the United States from 1798 to 1800 (Marzagalli, 2015, pp. 106-118). From 1800 however, Bonaparte reconciled France with the neutrals and encouraged the formation of the *Second League of Armed Neutrality*, between Denmark, Sweden, Russia and Prussia. The league attempted to protect their rights mainly against Britain. No later than 1801, though, the

⁴more on the grouping by war status to be found in appendix B.2

⁵The number of vessels Russia, Denmark and Sweden owned combined were still less than the entire British navy, therefore this league was bound to be weak from the very beginning.

British blockaded them (with the exception of Prussia) and bombed Copenhagen to end the League for good.

The situation deteriorated further for the neutrals in the subsequent years. In 1806 Napoleon enacted the Berlin decree, that provided the basic structure of the Continental System. The provisions of the Berlin Decree included: (1) prohibition of all trade with the British; (2) all British subjects in French-occupied areas were prisoners of war and their property was “fair prize”; (3) all trade in British goods was prohibited and all goods from England and her colonies were “fair prize” (and one-half their value was to be used to indemnify French merchants for losses to the British); and (4) no ships coming from the ports of Britain or its colonies would be permitted to use any port on the Continent (Davis and Engerman, 2006). Britain responded to this policy with a related Order in Council, which required that neutral vessels call at a British port before proceeding to the continent. The Napoleonic Milan Decree (1807) declared that all neutral shipping using British ports or paying British tariffs were to be regarded as British and seized. This clearly created an unsustainable situation where all countries were barred from trading with either French or Britain and a war started that engulfed the whole of Europe (see figure 3). The situation started to unravel only around 1810, when Russia pulled out of the Continental Blockade, pushing Napoleon to attempt an invasion, which ultimately led to his final defeat, and put an end to the Blockade System and to the threat for neutral trade.

It has to be noted here that the United States had become a new powerful actor in international trade (Cuenca-Esteban, 2014). Considering the size and dynamism of their economy, they were not as easy to dismiss as other small neutral trading nations when peace returned. Therefore, when both France and Britain threatened their trade, they attempted to fight back, as during the Quasi-War. They first enacted, in 1807, an Embargo Act directed against trade with both France and Britain, which was followed by the Non-Intercourse Act of 1809, and finally, after failure of both provisions, by a war against Britain (1812-1814). Despite their size and newly gained role, however, they had no better luck than France in the war, which was ultimately won by the British. Nonetheless, losses were substantial on both sides.⁶

We want to relate these events with the loss function. We acknowledge there is no one-to-one relation with the policy adopted towards neutral trade however we claim that the higher losses were experienced when neutral trade was mostly reduced. The mechanism we want to justify is the following. French merchants continued trading under neutral flag, even in war time, which explains the limited loss in the first half of the century. When British understood the trick, they started

⁶less than 10 Million US\$ in 1820 vs. 40 Million US\$ in 1807, (North, 1960, tables A-4 and B-2)

seizing neutral ships and effectively curtailing trade in war time.

Maybe separate the peace-time consequences and the war-time consequences? Or use this as transition even more than you already do?

They did so to the extent that, even when peace was restored, French trade could not go back to its initial level. In section 5 we explain and quantify how the structure of trade was changed permanently.

4 Can we do a cost-benefit analysis?

Discuss political cost of Neutral policy (Spain 1760, US 1812, League of armed Neutrality)

In a cost-benefit analysis of the efficiency of the British war on French trade, the reduction of French trade would be a good place to start. The cost for the French economy however cannot be identified to lost trade per-se. It is rather the loss of economic activity entailed by the reduction in trade. What were the decrease in wages and profits, both for French actors of trade and French producer? This is a tricky question. Daudin (2005) (p. 408) evaluate the income of French actor at 38.5% of the value of intercontinental trade (i.e. trade with Africa, America and Asia, minus Mediterranean trade) and 27.5-35% of the total value of trade. Intercontinental trade was more affected by the British war on French trade, so maybe we should favour the higher estimate (35%). Of course, at least part of the workers, entrepreneurs and capital could find alternative use and did not stand completely idle after the reduction of trade. Daudin (2005), p. 421, estimate the net loss was 40% of the value of the production, or 14% of the value of trade (i.e. $0.4 \times 0.35 = 0.14$). To put it in another way, a 100 livres tournois decline in the value of French trade forced workers, entrepreneurs, capitalists earning 35 livres tournois to find another employment for their labour and their capital. This other occupation only yielded an income of 21 livres tournois ($35 \times (1 - 0.4) = 21$). Hence a decline of 100 livres tournois in French trade induced a loss of 14 livres tournois for French GDP ($21 - 35 = -14$).

This number is highly uncertain. Daudin (2005) argues we should take into account the dynamic effect of this income loss through lost savings and investments. This means that we can include in French losses also the expenditures on military Navy, - as one of its main goal was to protect trade⁷ - and the destruction or capture of French ships. This is tentatively possible thanks to information on French prizes captured both by the British Navy and British privateers, discussed in section 3.5.

Finally, we are left to estimate the amount paid by the British to reduce French trade. Again, that is probably not possible to compute. A good place to start, though, is the budget of the British Navy. Mitchell (1988), pp. 570-587, provides the net expenditures up to 1801 (1800 is incomplete)

⁷See appendix B.5

and the gross ones from 1802. Figure 7 presents these data. Except for the War of the American Independence, the French Navy budget was always smaller than the British one. The total value of prizes was rather small, except during the early Seven Years War.⁸ Figure 9 compares the cumulative British expenditures and French losses. A value less than one means that the war on trade is costing more resources to the British than to the French (neglecting the value of French prizes). The result depends on the hypothesis one makes about the existence of alternative employment opportunities for French production factors pushed out of trade. The “no alternative occupation” hypothesis is the most favourable to the trade war policy, as it assumes that French labour and French capital invested in trade just become unemployed when trade is reduced: hence French income losses are 35% of French trade losses. The “alternative occupation” hypothesis is probably more reasonable and assumes that French labour and capital find alternative, less remunerating, employment: hence French income losses are 14% of French trade losses.

5 Peace-time consequences

and finally we compute discounted sums for all years

[Discuss regressions including peace time here](#)

In this section we exploit statistical tools to investigate whether the secret of an effective trade war was to force the enemy into restructuring its trade permanently. We consider the structure of trade in terms of goods, trade partners and French custom regions.

In terms of the former, we use an adapted version of the SITC classification, which is reported in table 14 in the appendix.⁹ As per what concerns trade partners, we have grouped countries into 9 different destinations, which are reported in table 15, also in appendix. Finally, for French custom regions we consider all the XX ports the goods were shipped from, which we also report in appendix in table XX.

[I wanted to make a clarifying table – 18 see table 18](#)

We test this hypothesis using different linear regressions of a loss function on the share of trade of each of these categories, i.e. SITC, trade partners and French trade regions. We run individual regressions because of collinearity of the explanatory variables (which are share, therefore highly correlated) and the little number of observations, which compromises the individual estimation

⁸Prizes are pretty important in the cost/benefit analysis during the Seven Years War, partly because of the success of the British predation of French trade before the official declaration of war, but they loose their importance in the latter part of the period.

⁹More on how this SITC18 classification is defined is available [here](#)

of each coefficient. Tables 2 and 3 show that, even when controlling for a time trend and the contemporaneous effect of war, the changing level of total French trade losses is associated with changes in the industrial structure of trade: reduction in the export share of plantation foodstuffs, crude materials and increase in the export share of leather, wood and paper products, wool and silk threads and fabrics, and other industrial products). Changes in the import structure are less clear, but again higher losses are associated with higher share of leather, wood and paper products and wool and silk threads and fabrics and other industrial products and lower imports of cotton threads and fabrics. This does not establish causality. Yet, the most plausible channel explaining these findings is that “successful” wars (from the British point of view) forced the structure of French trade to adapt. These adaptations were difficult to reverse after the wars and French trade was durably locked into a less dynamic structure.

Tables 4 and 5 show similar changes in the partner share of French trade. The share of exports to Germany, Switzerland, Spain and Portugal increased when French trade was reduced, as the share of imports from Spain, Portugal and Italy. Again, this suggests that wars forced French trade to develop its links with close eastern and southern neighbours, further away from the British influence.

Tables 6 and 7 show similar changes in the regional share of French trade up to 1789. Even if the pattern is clearer for imports than for exports, it seems that landlocked regions (Bourgogne, Châlons, Lyon and Saint-Quentin), secondary coastal regions (Amiens, Bayonne, Caen and Rennes), and Marseille have a larger share of trade when French trade is reduced. While large Atlantic ports (Bordeaux and Nantes) have a smaller share of trade.

6 Conclusion

In this paper we have analysed the effects of different conflicts on French trade in the eighteenth century. We have first created a loss measure by comparing the amount of trade that would have taken place in the absence of conflicts with the observed trade. We have done so both by using all the preceding peace periods to compute expected trade and just the period immediately before the conflict. From this computation we have observed mainly two things; first that the main losses were during the Seven Years War and the Revolutionary Wars-Continental Blockade, second that only as a consequence of these two conflicts there were long lasting effects. This leads us to think that there must have been a common factor that made these two wars so disruptive. We analyse several cases. Naval supremacy is a possible explanation and for this reason we construct a measure to account for it. We take the ratio first of France and Great Britain’s number of warships, then that of France

and Great Britain including their allies, and finally France with neutral countries and Great Britain including their allies. Contrary to our expectations, we find rather a positive relation, meaning that an increase in the number of warship was linked to a bigger loss in trade. This can possibly be explained by the fact that countries were investing in their navies in the attempt to protect their trade or to fight wars. However, this does not seem to explain the loss in trade per-se. Another option was the loss of colonies. Especially towards the end of the century, France lost some of its richest colonies, which had a consequence on their imports. We have created a measure to account for the colonies loss, weighted for the share of trade those colonies accounted for. We find in this case little more correlation with the loss function, however this does still not entirely explain the losses of the Seven Years War, nor the fluctuations in this measure seem to be related to the loss in the Blockade period. Finally, we have investigated the policy towards neutral countries, which had been changing throughout the century. We find that, whenever the policy with respect to trade with neutral countries were looser, war losses were limited and commerce could recover its pre-war level very quickly, even outperform it. On the other hand, when the British started blockading neutral countries as well, French trade experienced a massive drop and a long convalescence.

We conclude that, even if all these factors probably were contributing to the loss in trade during conflicts, the turning point was strictly related to policy towards neutral countries. British could efficiently curtail French trade only by blockading neutral countries.

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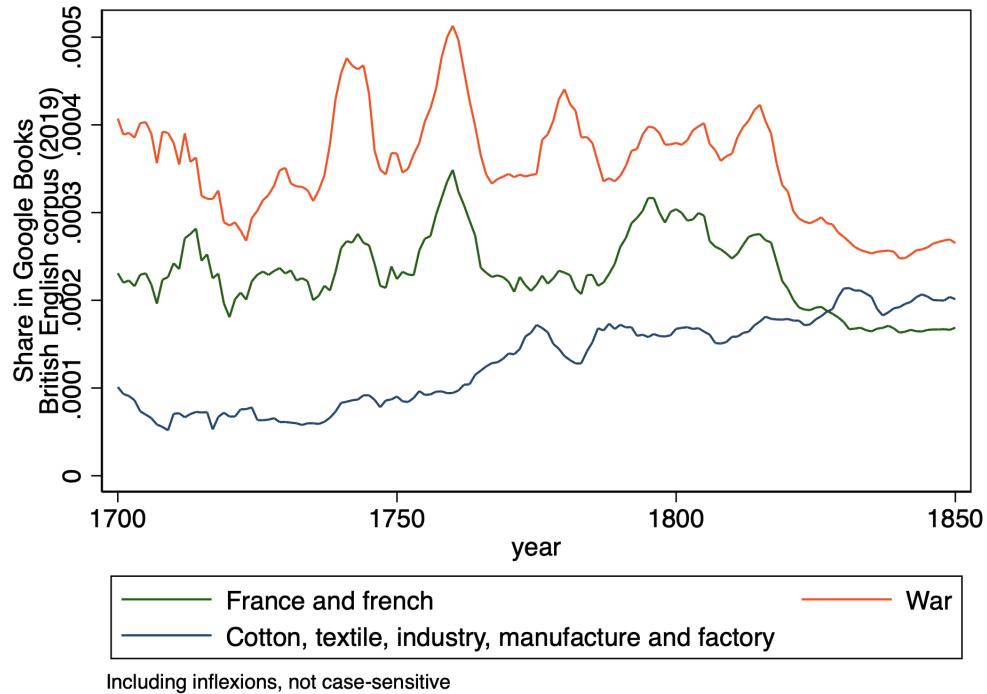
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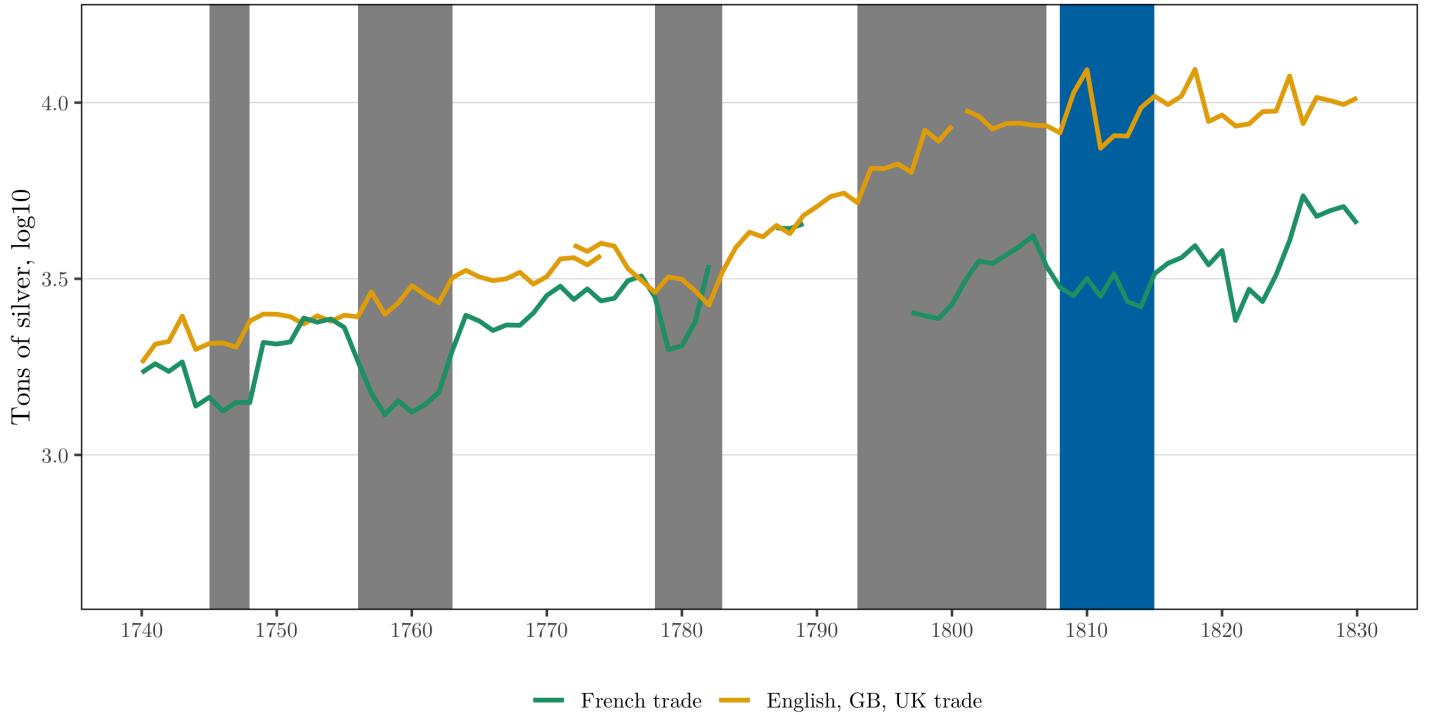
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Figure 1: What were eighteenth-century Britons preoccupied by?



Source: <https://books.google.com/ngrams>

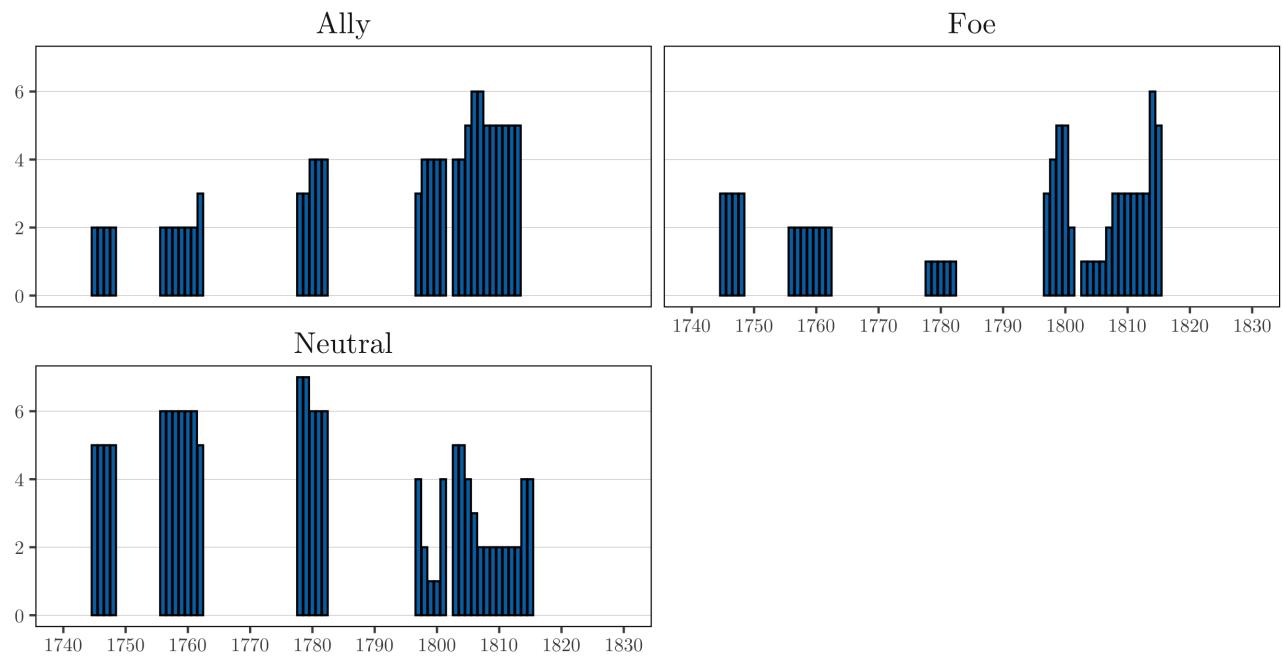
Figure 2: French, British trade and Anglo-French wars



The lines represent the value of trade for France and Britain in tons of silver (log scale). The shading in grey corresponds to the war periods, the shading in blue to the Continental Blockade.

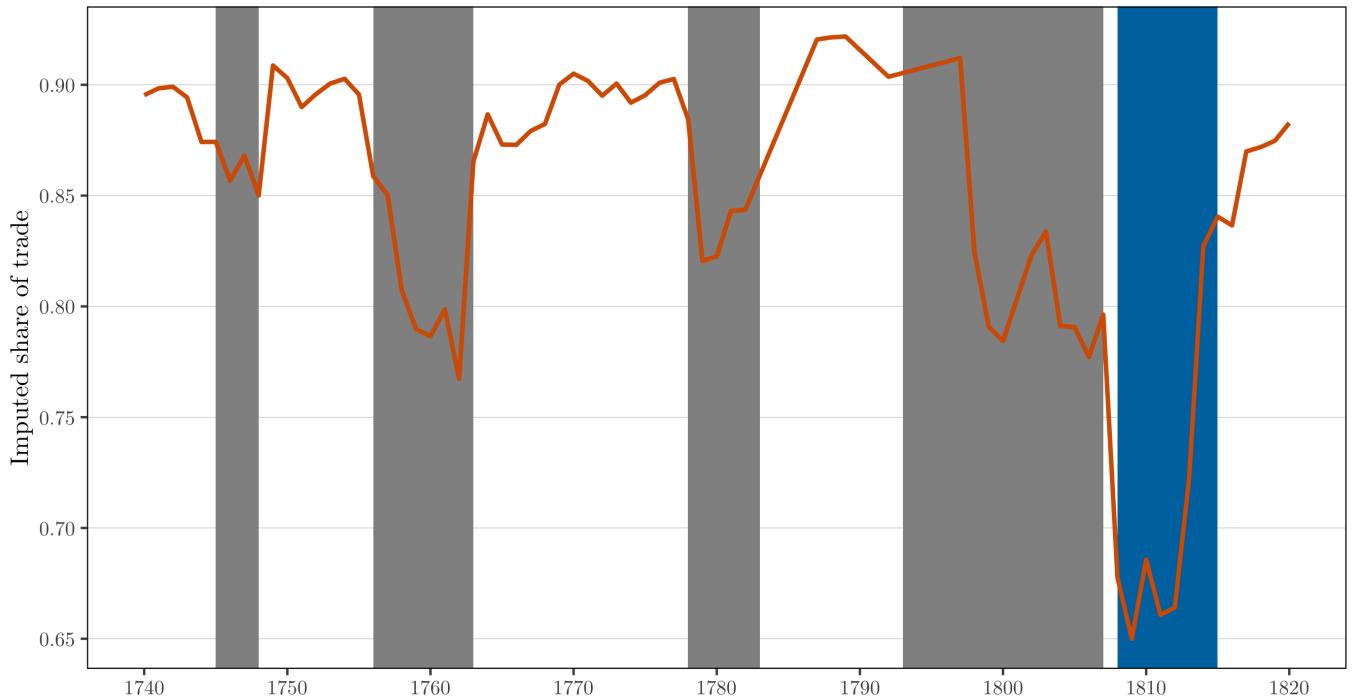
Source: French trade up to 1821: Daudin et al. (2020). French trade 1822-1830: Federico and Tena-Junguito (2016) / Dedinger and Girard (2017), England/British trade up to 1800: Deane and Cole (1969). UK trade from 1801 to 1830: Federico and Tena-Junguito (2016) / Dedinger and Girard (2017), Livre tournois silver value: de Wailly (1857) and Hoffman et al. (2000); Pound sterling silver value: Clark and Lindert (2006) and Jastram (1981).

Figure 3: Number of protagonists



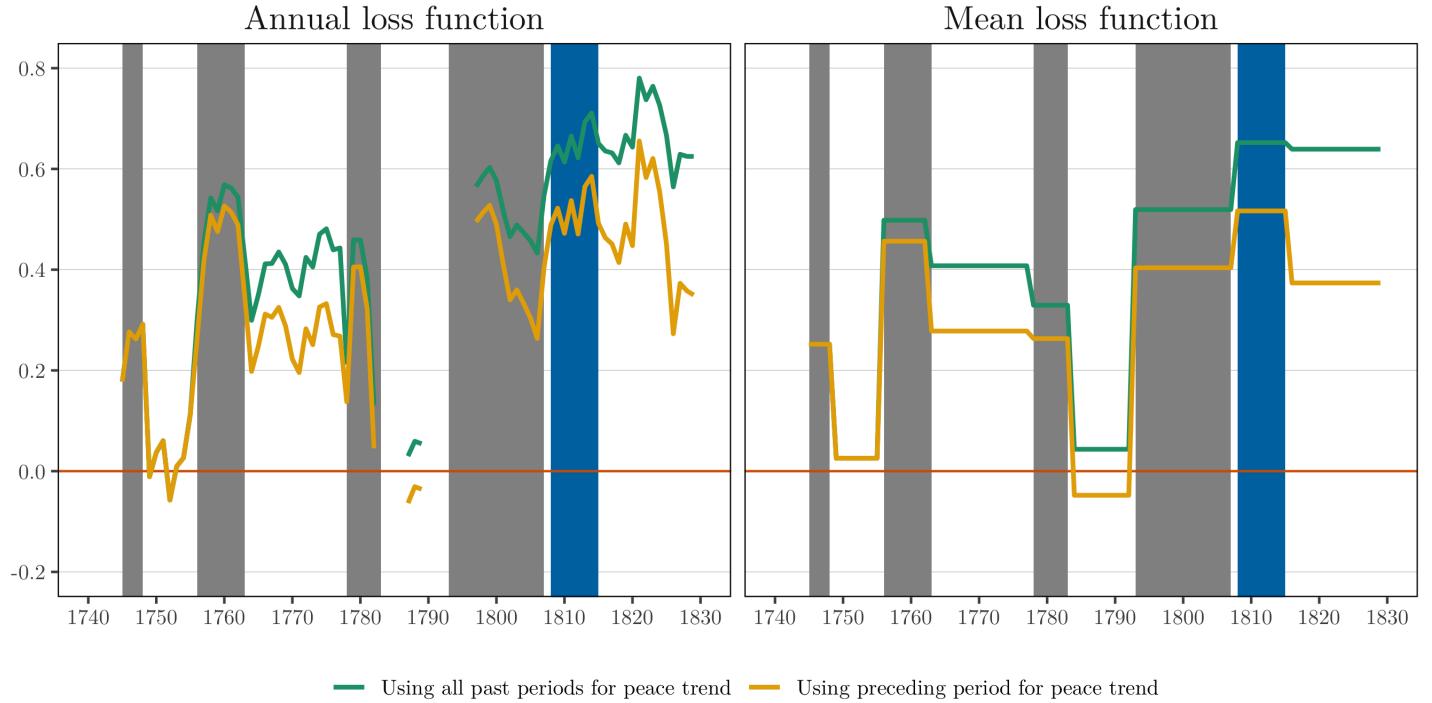
Number of protagonist by war status for each war in the period 1740 to 1830.

Figure 4: Share of French trade conducted by sea



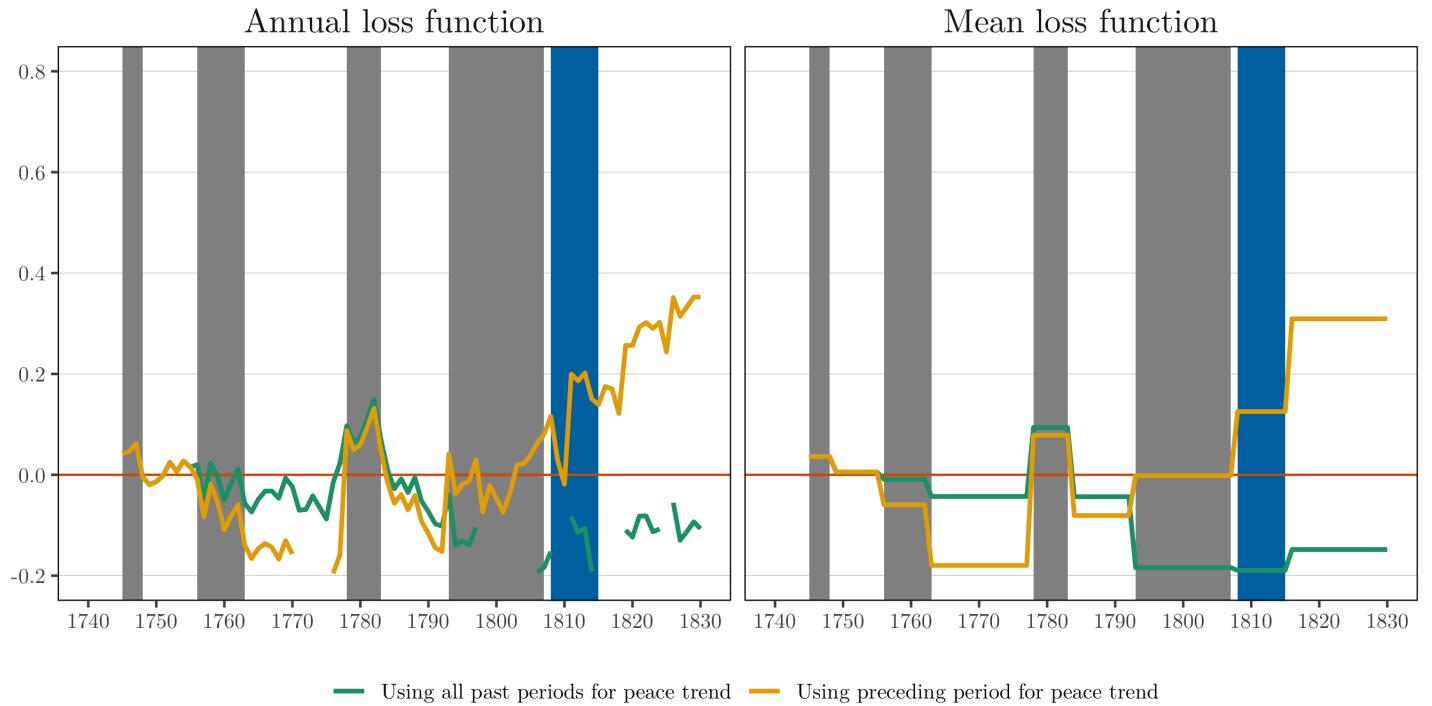
Share of imports in French trade conducted by sea. Source: TOFLIT and 1792 data on the share of sea trade per country in AN F/12/1834 B

Figure 5: Annual and Mean Loss Function - France



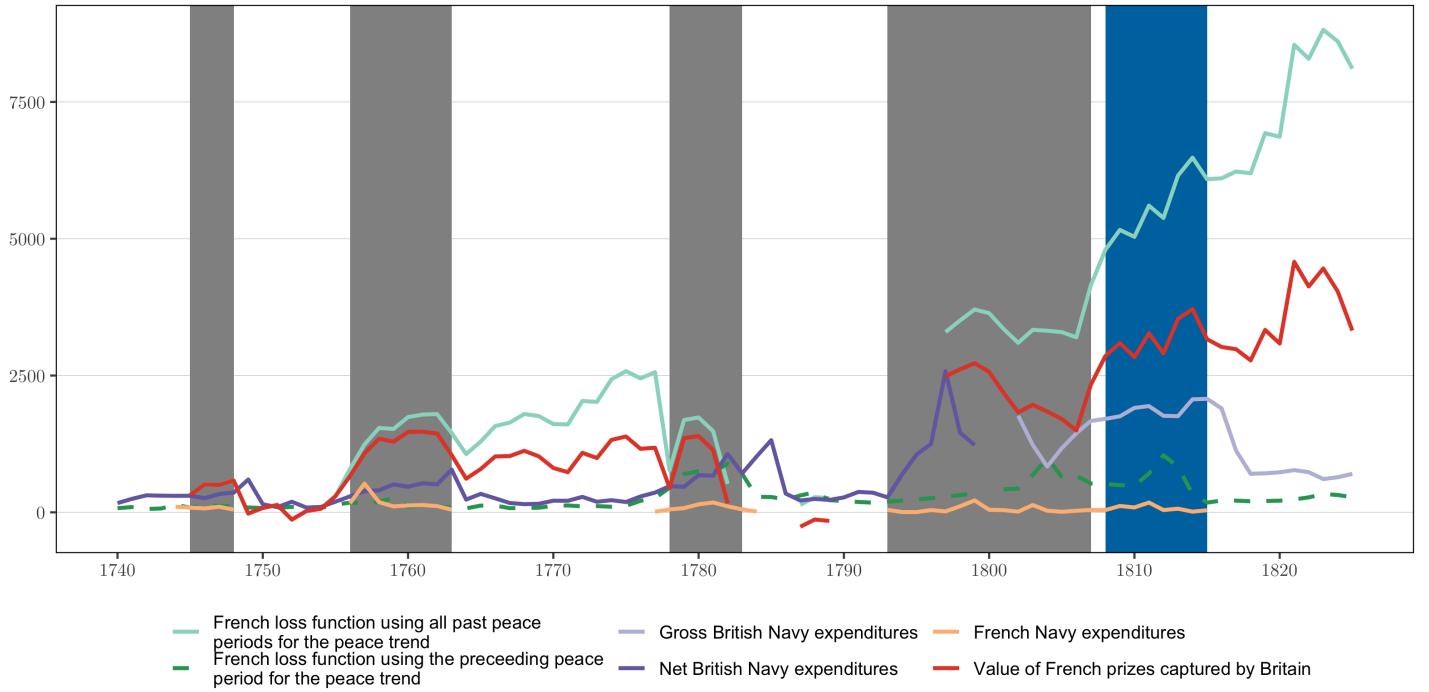
Left panel: annual loss function for France computed using all preceding periods in green and only one preceding period in yellow. Right panel: mean loss function for France over each war and peace period, computed using all preceding periods in green and only one preceding period in yellow.

Figure 6: Annual and Mean Loss Function - GB



Left panel: annual loss function for Great Britain computed using all preceding periods in green and only one preceding period in yellow. Right panel: mean loss function for Great Britain over each war and peace period, computed using all preceding periods in green and only one preceding period in yellow.

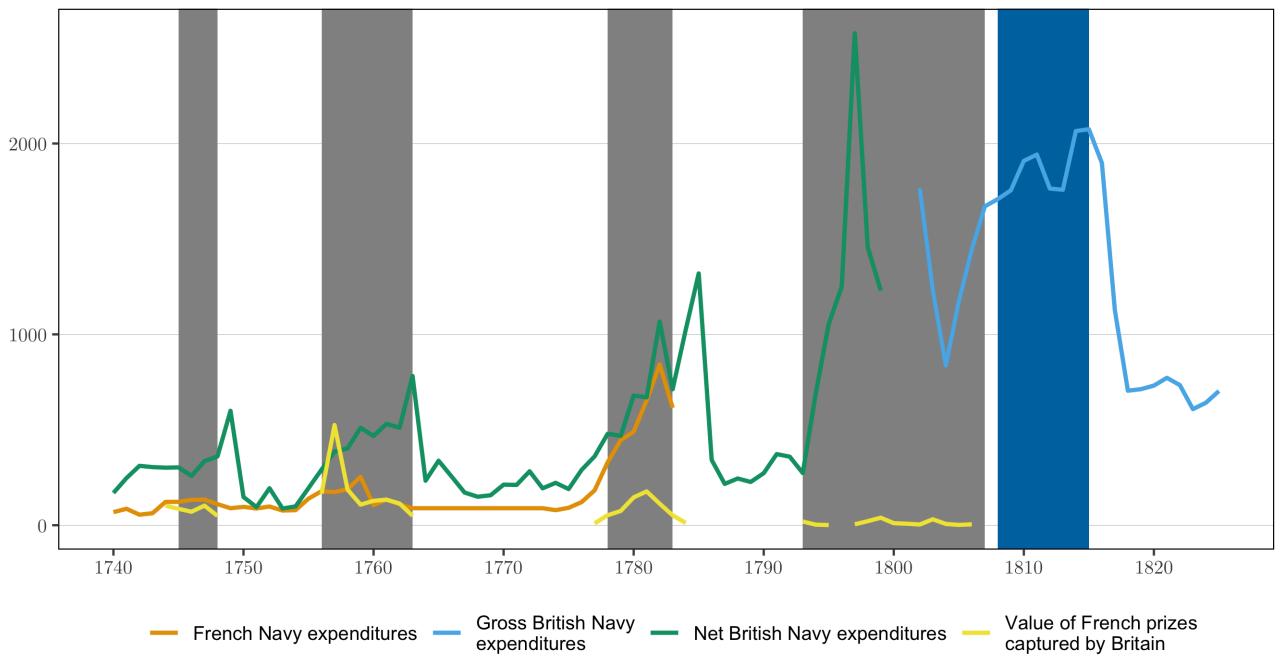
Figure 7: British Navy budget and French trade losses



This graph shows the comparison of French losses with British expenditures to cause these losses. Gross expenses are total expensive of the British Navy for the trade war. Net expenses are meant of the British Navy net of their budget. The loss function is reported both using all past peace period to impute the trend and just one preceding period.

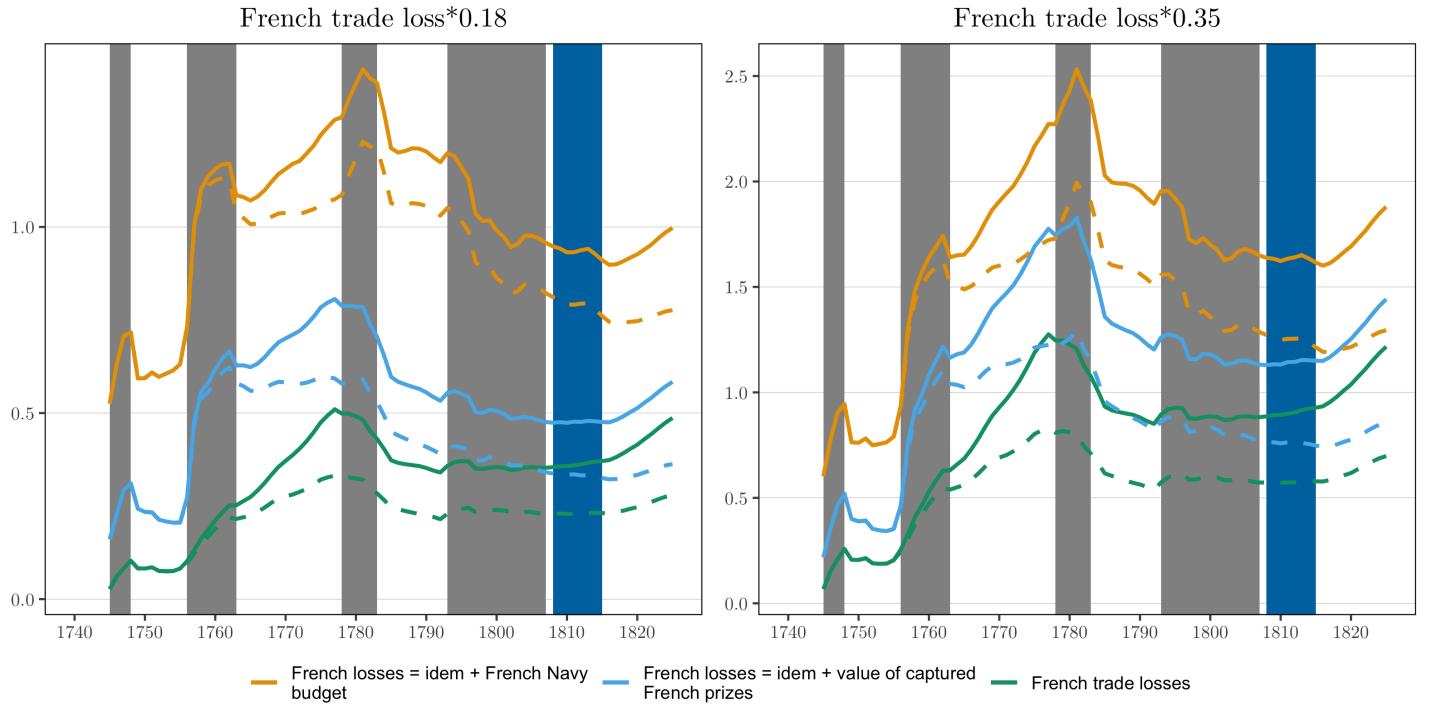
Source: See text and Mitchell (1988), pp. 570-587

Figure 8: Costs and benefits



This figure is a zoomed-in picture of figure 7. Therefore gross expenses are total expensive of the British Navy for the trade war. Net expenses are meant of the British Navy net of their budget.

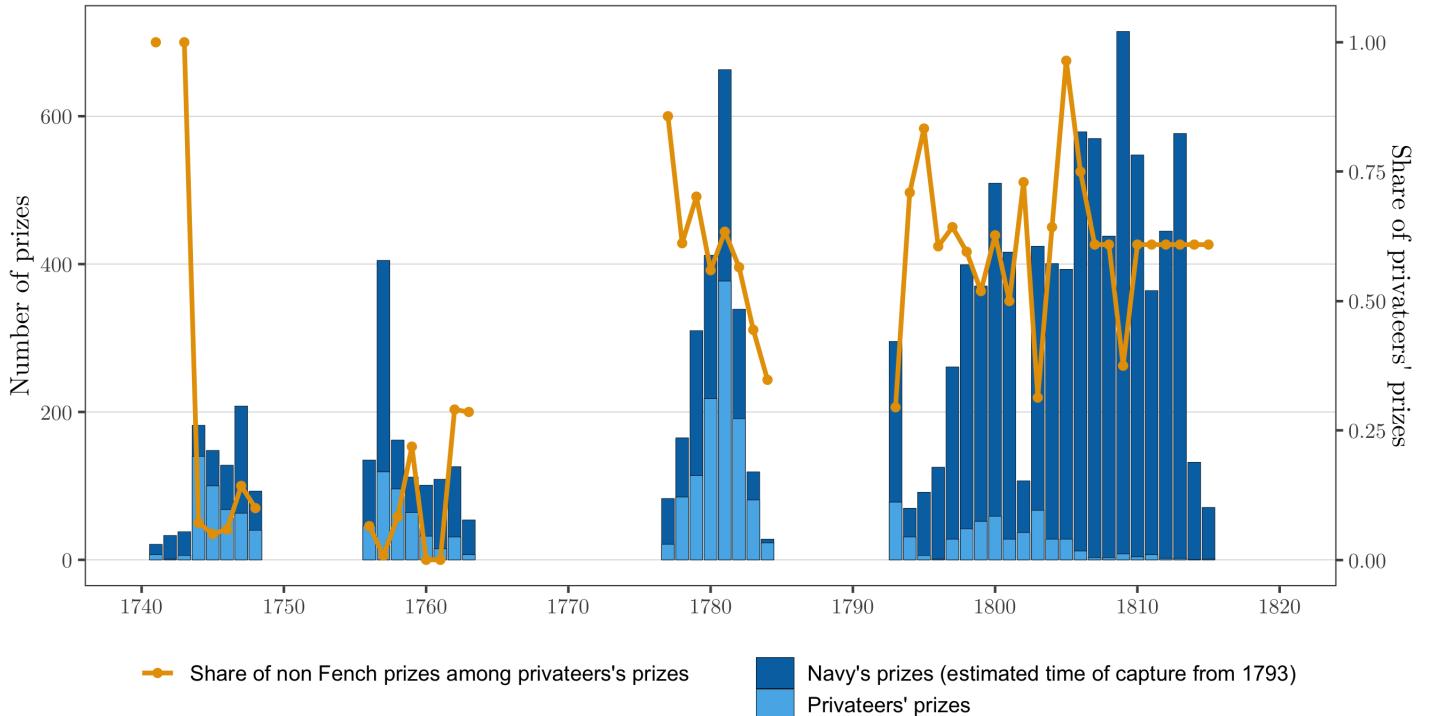
Figure 9: Ratio between French trade losses and the British Navy budget, high and low hypothesis



This graph shows French trade losses (green line), to which we added the value of captured French prizes (blue line), to which we then add also the French Navy budget (orange line). The solid line represents the loss function using one preceding peace period for the peace trend while the dashed line represents the loss function using all preceding peace period for the peace trend.

Source: See text and Mitchell (1988), pp. 570-587. For these graphs, French trade loss are assumed to be nil for 1783-1786, 1790-1791 and at the 1797 level for 1793-1796.

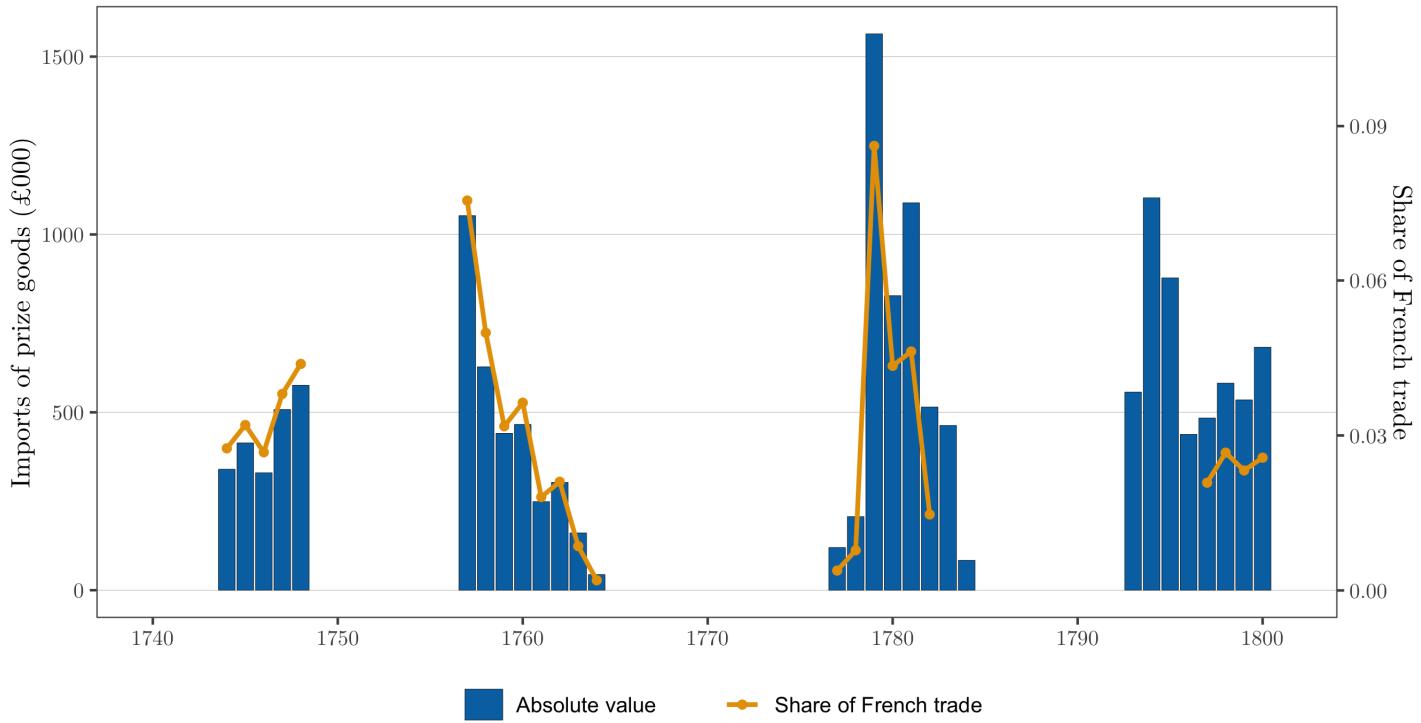
Figure 10: Ships captured by Great-Britain



The bars depict the total number of French prizes taken by capturer type (Navy or privateers, left y-axis). The line shows the percentage of non-French prizes out of all prizes captured by Great Britain (right y-axis). It is relevant in the context of predation of French shipping as these non-French prizes might be actually French owned, or carrying French cargo, or supplying France.

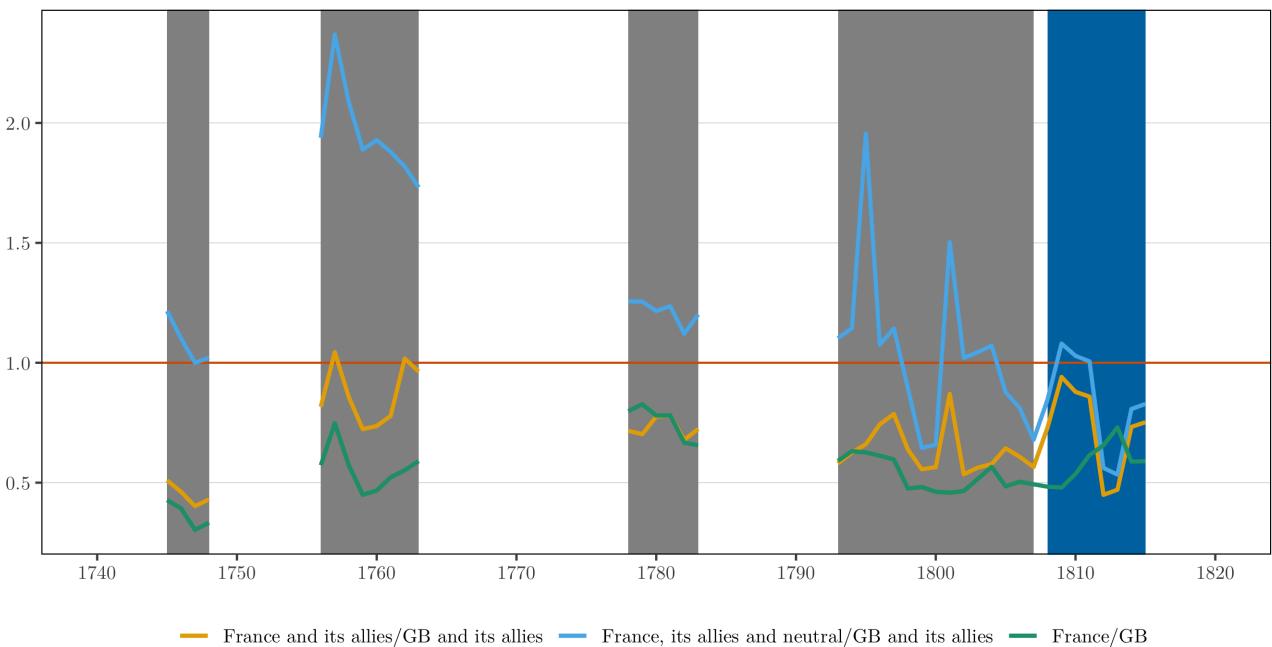
Source: For privateers and before 1785 for the Royal Navy, Hillmann and Gathmann (2011); Starkey (1990). For post-1793 Royal Navy prizes, we use the data on the value of Navy Prizes from Benjamin (2009), based on Hill (1998).

Figure 11: Prize goods imports in Great-Britain



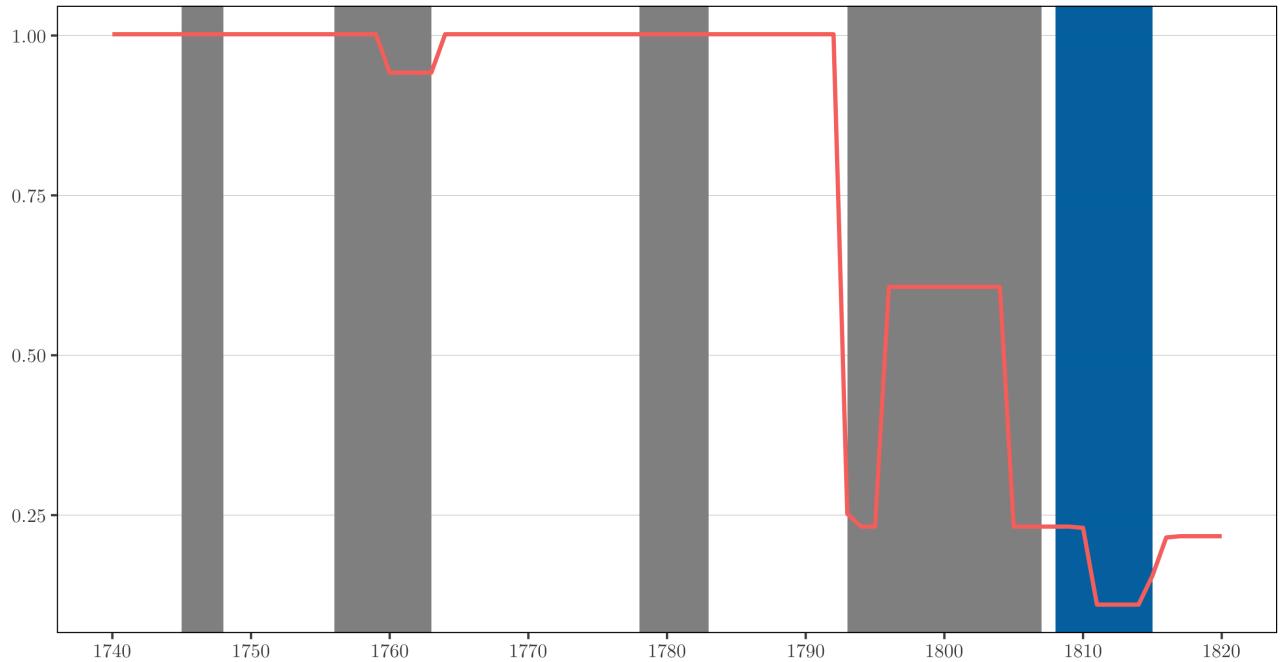
The bars show the absolute value of prize goods imports in Great Britain in pounds. The yellow line shows the percentage of the value of the prizes captured by Great Britain on total French trade. Source: Ashton (1960)

Figure 12: Naval Supremacy Ratio



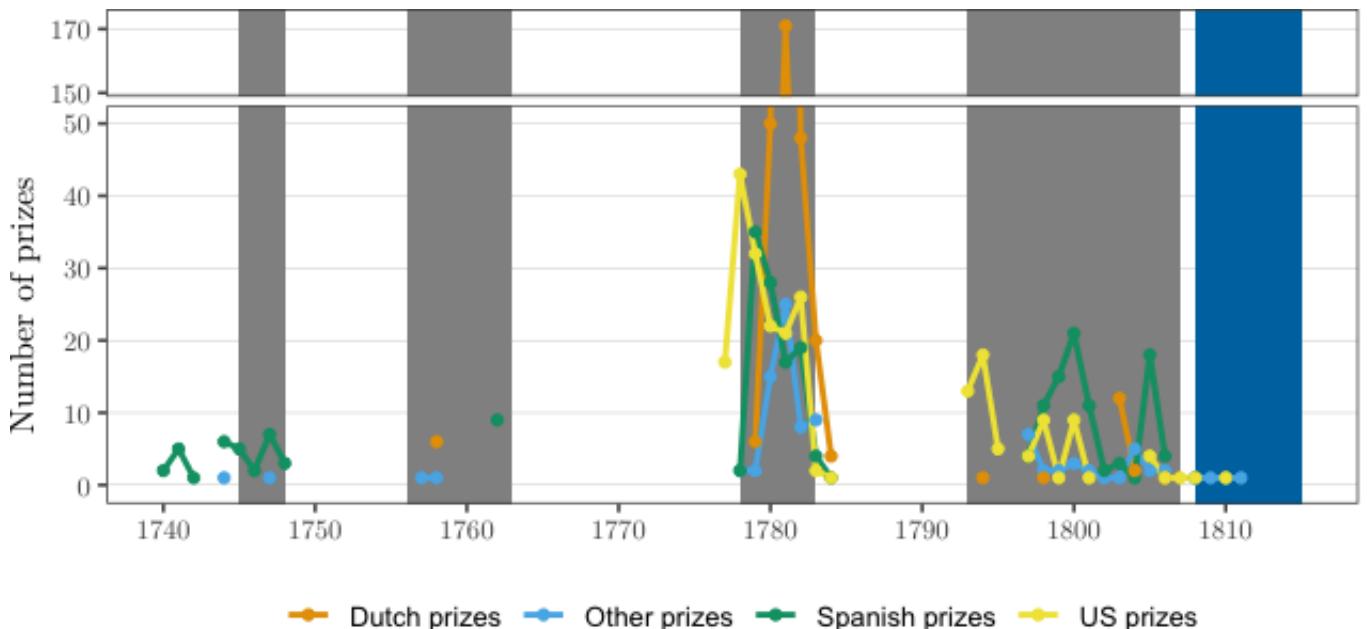
This graph shows the ratio of the French and British Navy. The green line only shows the ration between the two navy, the yellow line takes into account French navy + navy of French allies over British navy + navy of British allies, the green line takes into account French navy + navy of French allies + navy of neutral countries over British navy + navy of British allies.

Figure 13: Colonial empire loss



The line shows the proportion of French colonial empire as of 1740 owned at each subsequent period. Clearly it is equal 1 in 1740 and it gets reduced proportionally to the share of trade represented by the colony lost at each period.

Figure 14: Nationality of non-French British prizes



Source: For privateers and before 1785 for the Royal Navy, Starkey (1990) and Hillmann and Gathmann (2011). For post-1793 Royal Navy prizes, we use the data on the value of Navy Prizes from Benjamin (2009), based on Hill (1998). The peak in 1781 comes from the beginning of the 4th Anglo-Dutch War.

Figure 15: Trade loss by war status - Total trade



This figure shows the average loss over of total trade by war status over the war period, computed as explained in section 2.

Source: This figure is constructed by computing the mean country-specific trade loss function by war status based on all preceding peace periods. We have both a trade-weighted measure and a non-trade weighted measure, where we had to exclude *Empereur* after 1794, because of a territorial change- trade was mainly with current Belgium before 1794 and mainly with Austria after 1794 - and *Hollande* after 1814 as it included current day Belgium from 1815. The negative trade loss number for trade with foes in 1787-1789 can be explained by the large effect of the Eden treaty.

Figure 16: Trade loss by war status



This figure shows the average loss over of imports and exports separately by war status over the war period, computed as explained in section 2.

Source: This figure is constructed by computing the mean country-specific trade loss function by war status based on all preceding peace periods. We have both a trade-weighted measure and a non-trade weighted measure, where we had to exclude *Empereur* after 1794, because of a territorial change- trade was mainly with current Belgium before 1794 and mainly with Austria after 1794 - and *Hollande* after 1814 as it included current day Belgium from 1815. The negative trade loss number for trade with foes in 1787-1789 can be explained by the large effect of the Eden treaty.

Figure 17: Directed acyclical graphs (DAG) of causality between war and peacetime losses (Pearl (2000); Pearl and Mackenzie (2018); Schneider (2020))

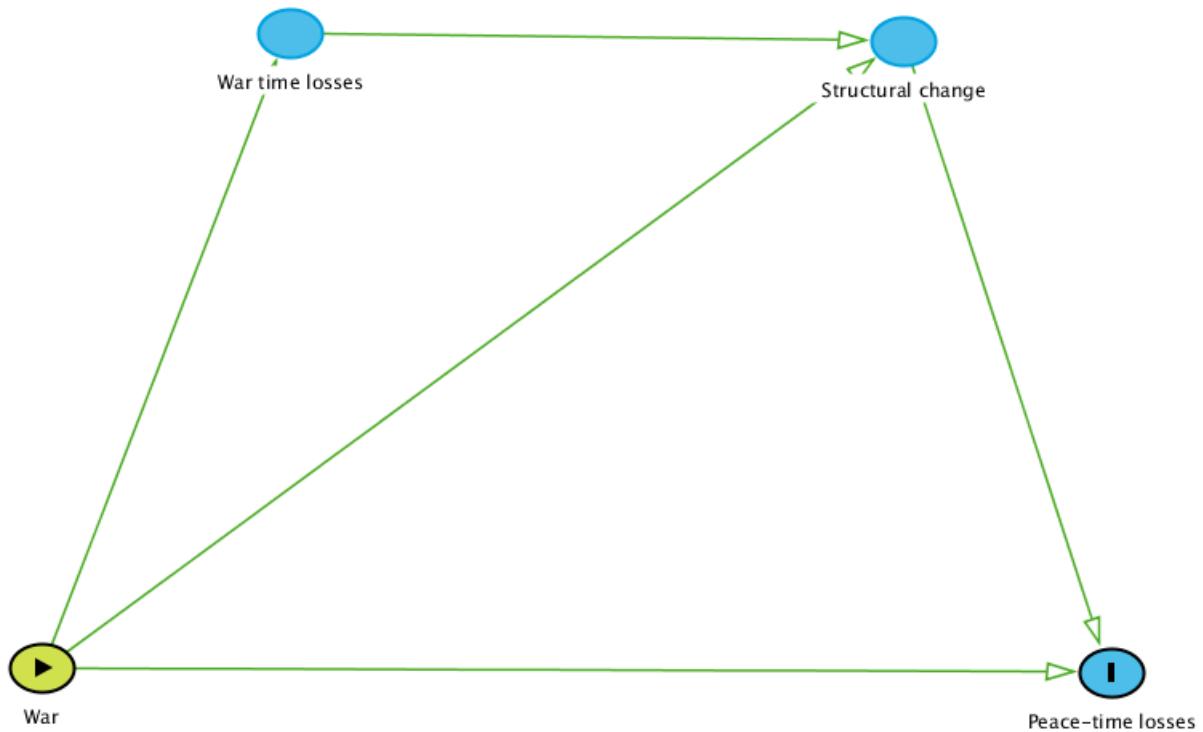
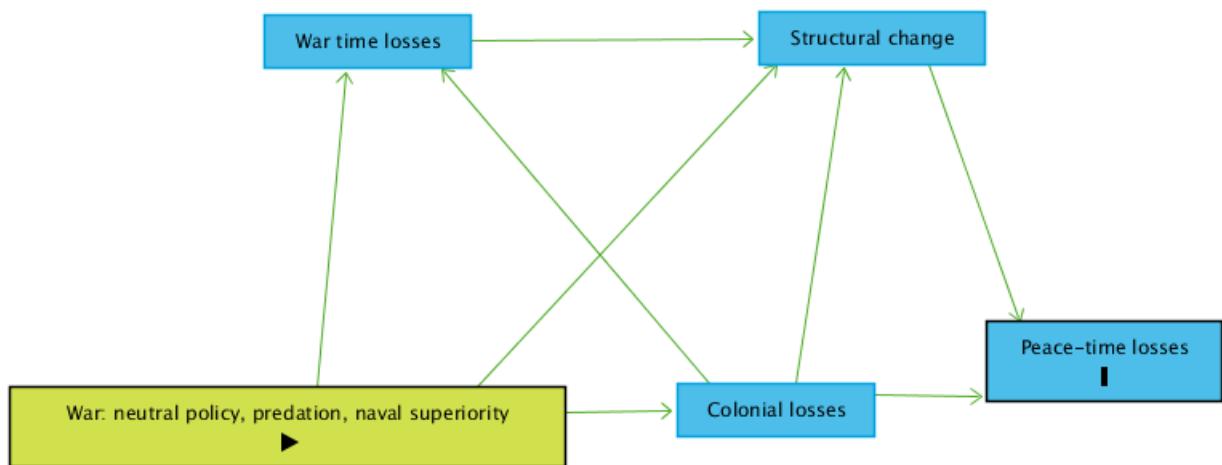


Figure 18: Directed acyclical graphs (DAG) of causality between war and peacetime losses (Pearl (2000); Pearl and Mackenzie (2018); Schneider (2020))



War time losses —————→ Structural change

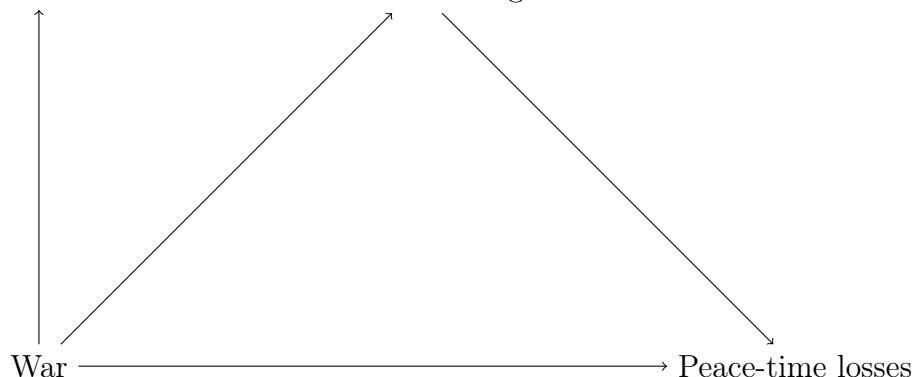


Table 1: Summary of war status for trade partners, 1792-1815

Country	Foe	Neutral	Ally
Allemagne	1792-1800 1814-1815	1801-1804	1805-1813
Angleterre	1793-1815	1792	
Espagne	1793-1794 1808-1815	1792 1795	1796-1807
Empereur	1792-1800 1805 1809 1813-1815	1801-1804 1806-1808	1810-1812
États-Unis	1798-1800	1792-1797 1801-1815	
Hollande	1793-1794 1814-1815	1792	1795-1813
Italie	1792-1796 1814-1815		1797-1813
Levant	1798-1801	1792-1797 1802-1815	
Nord		1792-1807 1814-1815	1808-1813
Outre-mers			1792-1815
Portugal	1793-1797 1799-1800 1807-1815	1792 1798 1801-1806	
Suisse		1792-1797 1814-1815	1798-1813

Table 2: Regression of the various the loss functions on the log of sectorial shares of exports (N=54)

	Other foodstuff	Plantation foodstuff	Drinks and tobacco	Crude material	Oils	Chemical products	Leather wood and paper products	Other threads and fabric	Wool threads and fabrics	Silk threads and fabrics	Cotton threads and fabrics	Other industrial products
loss	-0.608*	-2.712*	0.223	-0.746**	-0.231	-0.317	0.554*	0.140	0.689**	1.313***	-0.622	0.861**
	(-2.51)	(-2.40)	(0.97)	(-2.78)	(-0.66)	(-0.92)	(2.47)	(0.56)	(3.22)	(7.49)	(-1.59)	(3.50)
war	0.192**	-1.005**	0.190**	-0.101	0.395***	-0.175	0.221**	0.265***	0.057	0.065	-0.338**	-0.134
	(2.76)	(-3.09)	(2.87)	(-1.30)	(3.92)	(-1.78)	(3.44)	(3.72)	(0.94)	(1.28)	(-3.00)	(-1.89)
year	0.015***	-0.046***	0.008***	0.022***	0.019***	-0.004	0.008***	-0.011***	-0.019***	0.002	0.020***	0.002
	(7.67)	(-4.97)	(4.02)	(10.19)	(6.54)	(-1.47)	(4.17)	(-5.27)	(-10.96)	(1.43)	(6.35)	(0.92)
loss_nm	-0.513*	-3.005*	0.219	-0.704*	-0.233	-0.317	0.683**	0.224	0.783***	1.322***	-0.444	1.009***
	(-2.05)	(-2.65)	(0.94)	(-2.55)	(-0.65)	(-0.91)	(3.10)	(0.89)	(3.72)	(7.36)	(-1.10)	(4.22)
war	0.203**	-0.853*	0.182*	-0.077	0.405***	-0.163	0.180**	0.247**	0.016	0.010	-0.339**	-0.190*
	(2.69)	(-2.50)	(2.58)	(-0.92)	(3.77)	(-1.55)	(2.72)	(3.28)	(0.25)	(0.19)	(-2.79)	(-2.64)
year	0.014***	-0.050***	0.008***	0.021***	0.018***	-0.005	0.008***	-0.011***	-0.018***	0.004**	0.019***	0.003
	(7.82)	(-6.24)	(4.87)	(10.82)	(7.36)	(-1.91)	(5.25)	(-6.13)	(-12.39)	(3.43)	(6.57)	(1.66)
ln(loss)	-0.154**	-0.315	0.053	-0.191**	-0.057	-0.025	0.094	0.039	0.120*	0.245***	-0.260**	0.101
	(-2.99)	(-1.23)	(1.06)	(-3.37)	(-0.75)	(-0.33)	(1.88)	(0.72)	(2.50)	(5.64)	(-3.29)	(1.74)
war	0.203**	-1.134**	0.188**	-0.086	0.399***	-0.196	0.233***	0.261***	0.071	0.082	-0.277*	-0.093
	(2.99)	(-3.34)	(2.83)	(-1.14)	(3.95)	(-1.97)	(3.53)	(3.66)	(1.11)	(1.42)	(-2.64)	(-1.21)
year	0.014***	-0.056***	0.008***	0.021***	0.018***	-0.005*	0.009***	-0.011***	-0.017***	0.005***	0.021***	0.005**
	(8.71)	(-6.82)	(4.97)	(11.79)	(7.55)	(-2.28)	(5.75)	(-6.12)	(-11.20)	(3.83)	(8.38)	(2.68)
ln(loss_nm)	-0.115*	-0.453*	0.049	-0.168**	-0.035	-0.031	0.118**	0.057	0.132**	0.246***	-0.186*	0.144**
	(-2.49)	(-2.07)	(1.11)	(-3.37)	(-0.52)	(-0.47)	(2.81)	(1.22)	(3.24)	(7.18)	(-2.59)	(2.97)
war	0.209**	-0.972**	0.180*	-0.062	0.395***	-0.187	0.197**	0.240**	0.038	0.031	-0.274*	-0.144
	(2.88)	(-2.84)	(2.61)	(-0.79)	(3.76)	(-1.81)	(2.99)	(3.28)	(0.59)	(0.57)	(-2.43)	(-1.90)
year	0.014***	-0.054***	0.008***	0.021***	0.018***	-0.005*	0.009***	-0.011***	-0.017***	0.006***	0.020***	0.005**
	(8.43)	(-7.16)	(5.33)	(12.05)	(7.75)	(-2.37)	(6.14)	(-6.64)	(-12.24)	(4.81)	(7.89)	(2.68)

Source: The log of "negative" losses is replaced by the log of the minimum loss in the data

Table 3: Regression the loss functions on the log of the sectorial shares of imports(N=54)

	Other foodstuff	Plantation foodstuff	Drinks and tobacco	Crude material	Oils	Chemical products	Leather wood and paper products	Other threads and fabric	Wool threads and fabrics	Silk threads and fabrics	Cotton threads and fabrics	Other industrial products
loss	0.101 (0.22)	-2.352** (-3.04)	-0.402 (-0.56)	-0.106 (-0.39)	0.869 (1.93)	0.373 (1.38)	2.019*** (4.27)	0.834 (1.62)	1.281 (1.89)	3.422** (3.14)	-3.807* (-2.58)	1.069** (3.11)
war	-0.146 (-1.09)	-0.041 (-0.19)	0.250 (1.20)	0.310*** (3.98)	-0.354** (-2.74)	0.176* (2.26)	-0.245 (-1.80)	-0.139 (-0.94)	0.171 (0.66)	-1.148*** (-3.66)	1.268** (2.92)	-0.180 (-1.82)
year	-0.002 (-0.57)	0.006 (0.99)	0.001 (0.09)	0.007** (3.14)	-0.000 (-0.12)	-0.004 (-1.91)	-0.011** (-2.82)	-0.003 (-0.61)	-0.064*** (-9.62)	-0.050*** (-5.58)	-0.017 (-1.38)	-0.007* (-2.51)
loss_nm	-0.230 (-0.49)	-2.894*** (-3.86)	-0.379 (-0.52)	-0.022 (-0.08)	1.099* (2.46)	0.371 (1.35)	2.136*** (4.53)	1.051* (2.04)	1.120 (1.53)	4.242*** (4.04)	-4.230** (-2.86)	1.210*** (3.56)
war	-0.103 (-0.72)	0.132 (0.59)	0.262 (1.19)	0.302*** (3.64)	-0.423** (-3.14)	0.161 (1.94)	-0.343* (-2.42)	-0.204 (-1.32)	0.140 (0.49)	-1.405*** (-4.45)	1.486** (3.27)	-0.244* (-2.38)
year	-0.001 (-0.22)	0.004 (0.81)	-0.000 (-0.06)	0.006** (3.33)	0.000 (0.06)	-0.004 (-1.85)	-0.008* (-2.35)	-0.002 (-0.54)	-0.061*** (-9.80)	-0.047*** (-6.38)	-0.022* (-2.07)	-0.006* (-2.40)
ln(loss)	0.058 (0.57)	-0.268 (-1.49)	0.014 (0.09)	-0.073 (-1.26)	0.174 (1.76)	0.083 (1.41)	0.314** (2.80)	0.018 (0.16)	0.274 (1.93)	0.321 (1.25)	-0.474 (-1.41)	0.125 (1.57)
war	-0.164 (-1.22)	-0.156 (-0.65)	0.201 (0.96)	0.334*** (4.35)	-0.348* (-2.67)	0.175* (2.23)	-0.187 (-1.26)	-0.061 (-0.40)	0.180 (0.71)	-0.948** (-2.79)	1.111* (2.43)	-0.130 (-1.22)
year	-0.003 (-0.80)	-0.002 (-0.43)	-0.002 (-0.39)	0.008*** (4.07)	0.002 (0.49)	-0.004 (-1.87)	-0.005 (-1.33)	0.002 (0.49)	-0.061*** (-10.67)	-0.036*** (-4.38)	-0.030** (-2.73)	-0.003 (-1.23)
ln(loss_nm)	-0.001 (-0.01)	-0.334* (-2.17)	-0.040 (-0.29)	-0.023 (-0.45)	0.179* (2.10)	0.079 (1.53)	0.351*** (3.77)	0.049 (0.48)	0.210 (1.64)	0.401 (1.82)	-0.541 (-1.86)	0.151* (2.20)
war	-0.135 (-0.97)	-0.054 (-0.22)	0.235 (1.09)	0.315*** (3.89)	-0.389** (-2.91)	0.160 (1.98)	-0.278 (-1.91)	-0.086 (-0.55)	0.172 (0.64)	-1.071** (-3.09)	1.258** (2.69)	-0.174 (-1.62)
year	-0.002 (-0.52)	-0.002 (-0.35)	-0.001 (-0.24)	0.007*** (3.74)	0.002 (0.58)	-0.003 (-1.87)	-0.005 (-1.51)	0.001 (0.39)	-0.059*** (-10.64)	-0.037*** (-4.79)	-0.030** (-2.88)	-0.003 (-1.41)

Source: The log of "negative" losses is replaces by the log of the minimum loss in the data

Table 4: Regression the loss functions on the log of the geography of exports(N=66)

	Germany and Switzerland by land	Iberia	Italy	Low Countries	North of Holland by sea	Overseas N=62	United Kingdom	United States N=33
loss	0.976*** (4.16)	0.605* (2.52)	0.234 (1.15)	-0.045 (-0.16)	-0.737 (-1.77)	-0.192 (-0.29)	-0.348 (-0.32)	1.473 (0.75)
war	0.468*** (6.29)	0.033 (0.43)	0.008 (0.12)	0.031 (0.34)	-0.301* (-2.29)	-1.063*** (-5.03)	-1.437*** (-4.03)	0.014 (0.03)
year	0.002 (1.23)	-0.009*** (-4.62)	-0.003 (-1.55)	0.001 (0.49)	-0.001 (-0.19)	-0.033*** (-5.93)	0.017 (1.82)	0.034 (1.08)
loss_nm	1.087*** (4.42)	0.749** (2.99)	0.234 (1.08)	-0.033 (-0.11)	-0.932* (-2.13)	-0.426 (-0.60)	-0.293 (-0.25)	0.732 (0.42)
war	0.411*** (5.21)	-0.016 (-0.19)	-0.001 (-0.02)	0.030 (0.31)	-0.240 (-1.71)	-1.015*** (-4.48)	-1.434*** (-3.75)	0.138 (0.24)
year	0.004* (2.44)	-0.009*** (-5.04)	-0.002 (-1.47)	0.001 (0.51)	-0.001 (-0.50)	-0.033*** (-6.82)	0.016 (1.99)	0.045 (1.80)
ln(loss)	0.107* (2.48)	0.054 (1.27)	0.011 (0.32)	0.022 (0.45)	-0.010 (-0.14)	0.083 (0.74)	-0.132 (-0.71)	0.731 (1.70)
war	0.517*** (6.47)	0.073 (0.92)	0.031 (0.47)	0.008 (0.09)	-0.393** (-2.92)	-1.154*** (-5.50)	-1.379*** (-3.89)	-0.357 (-0.63)
year	0.006** (3.23)	-0.007*** (-3.95)	-0.002 (-1.06)	0.000 (0.23)	-0.005 (-1.56)	-0.036*** (-7.67)	0.018* (2.26)	0.022 (0.89)
ln(loss_nm)	0.139*** (4.24)	0.085* (2.52)	0.020 (0.71)	-0.009 (-0.22)	-0.058 (-0.98)	-0.028 (-0.30)	-0.104 (-0.68)	0.434 (1.83)
war	0.447*** (5.88)	0.021 (0.27)	0.017 (0.25)	0.035 (0.37)	-0.337* (-2.45)	-1.059*** (-4.88)	-1.369*** (-3.75)	-0.413 (-0.73)
year	0.006*** (3.81)	-0.007*** (-4.63)	-0.002 (-1.23)	0.001 (0.58)	-0.004 (-1.45)	-0.034*** (-7.82)	0.017* (2.31)	0.025 (1.16)

Source: The log of "negative" losses is replaced by the log of the minimum loss in the data

Table 5: Regression the loss functions on the log of the geography of imports(N=66)

	Germany and Switzerland by land	Iberia	Italy	Low Countries	North of Holland by sea	Overseas N=62	United Kingdom	United States N=33
loss	0.537 (1.39)	0.753** (3.10)	0.677* (2.56)	0.270 (0.76)	-0.089 (-0.15)	-0.378 (-0.47)	0.234 (0.29)	-1.910 (-1.19)
war	0.797*** (6.50)	0.206** (2.68)	0.159 (1.89)	0.342** (3.04)	-0.186 (-0.95)	-1.294*** (-5.10)	-0.518 (-1.90)	0.402 (0.87)
year	0.013*** (3.99)	-0.006** (-2.77)	-0.003 (-1.30)	-0.004 (-1.24)	0.001 (0.19)	-0.030*** (-4.39)	0.011 (1.57)	0.074** (2.93)
loss_nm	0.700 (1.72)	0.895*** (3.54)	0.818** (2.95)	0.440 (1.18)	0.087 (0.13)	-0.954 (-1.13)	0.566 (0.66)	-2.025 (-1.44)
war	0.749*** (5.72)	0.153 (1.88)	0.108 (1.22)	0.302* (2.52)	-0.213 (-1.02)	-1.179*** (-4.36)	-0.588* (-2.01)	0.473 (1.03)
year	0.014*** (4.86)	-0.005** (-2.66)	-0.002 (-1.05)	-0.004 (-1.47)	0.000 (0.03)	-0.028*** (-4.92)	0.010 (1.68)	0.071** (3.50)
ln(loss)	0.001 (0.01)	0.086 (1.99)	0.056 (1.20)	0.038 (0.62)	0.023 (0.22)	0.089 (0.65)	-0.170 (-1.28)	-0.093 (-0.25)
war	0.870*** (7.01)	0.241** (3.02)	0.206* (2.37)	0.349** (3.12)	-0.216 (-1.11)	-1.414*** (-5.60)	-0.336 (-1.26)	0.122 (0.25)
year	0.016*** (5.77)	-0.003 (-1.74)	-0.000 (-0.09)	-0.003 (-1.17)	-0.000 (-0.01)	-0.034*** (-5.94)	0.017** (2.78)	0.052* (2.50)
ln(loss_nm)	0.080 (1.47)	0.104** (3.04)	0.059 (1.55)	0.050 (1.01)	0.034 (0.39)	-0.045 (-0.40)	-0.106 (-0.96)	-0.019 (-0.09)
war	0.782*** (6.22)	0.194* (2.44)	0.185* (2.08)	0.324** (2.81)	-0.235 (-1.17)	-1.295*** (-4.96)	-0.360 (-1.31)	0.071 (0.14)
year	0.015*** (5.88)	-0.003 (-1.89)	0.000 (0.03)	-0.003 (-1.29)	-0.000 (-0.03)	-0.031*** (-5.96)	0.014* (2.65)	0.049* (2.62)

Source: The log of "negative" losses is replaced by the log of the minimum loss in the data

Table 6: Regression of the various the loss functions on the log of regional shares of exports (up to 1789)

	Amiens N=14	Bayonne N=35	Bordeaux N=37	Bourgogne N=14	Caen N=17	Châlons N=14	Lyon N=15	Marseille N=33	Nantes N=33	Rennes N=33	Saint-Quentin N=14
loss	1.266 (2.21)	0.342 (1.14)	-0.433 (-1.76)	-1.342** (-3.33)	-0.058 (-0.04)	-0.043 (-0.08)	1.721** (4.38)	-0.297 (-1.49)	-1.293* (-2.41)	0.321 (0.65)	8.557** (4.08)
war	0.084 (0.46)	0.608*** (5.86)	-0.207* (-2.47)	0.035 (0.27)	-1.063 (-2.00)	0.024 (0.13)	0.330* (2.44)	-0.222** (-3.33)	-0.315 (-1.90)	0.074 (0.44)	0.764 (1.14)
year	-0.014 (-1.71)	-0.014** (-3.21)	0.021*** (5.56)	0.046*** (7.79)	0.042 (1.69)	-0.023* (-2.86)	-0.023** (-3.81)	-0.006* (-2.11)	0.014 (1.62)	-0.019* (-2.58)	-0.150*** (-4.90)
loss_nm	1.441 (2.14)	0.538 (1.56)	-0.489 (-1.71)	-1.438* (-2.83)	-0.513 (-0.27)	-0.094 (-0.14)	2.015** (4.31)	-0.428 (-1.89)	-1.695** (-2.87)	0.412 (0.71)	9.321** (3.48)
war	-0.025 (-0.13)	0.551*** (4.77)	-0.181 (-1.92)	0.139 (0.92)	-1.013 (-1.80)	0.033 (0.17)	0.176 (1.19)	-0.185* (-2.54)	-0.180 (-0.99)	0.042 (0.22)	0.082 (0.10)
year	-0.010 (-1.28)	-0.014** (-3.48)	0.019*** (5.77)	0.041*** (6.94)	0.043 (1.85)	-0.023* (-3.08)	-0.017** (-3.12)	-0.007* (-2.63)	0.011 (1.48)	-0.018* (-2.69)	-0.121** (-3.86)
ln(loss)	0.156 (1.72)	0.048 (1.08)	-0.072 (-1.93)	-0.194* (-3.15)	0.056 (0.23)	0.045 (0.55)	0.186* (2.52)	-0.011 (-0.35)	-0.076 (-0.92)	-0.008 (-0.11)	1.075* (2.86)
war	0.086 (0.44)	0.616*** (6.06)	-0.201* (-2.42)	0.045 (0.34)	-1.081 (-2.02)	-0.000 (-0.00)	0.348 (1.94)	-0.259*** (-3.77)	-0.469* (-2.73)	0.143 (0.88)	0.774 (0.95)
year	-0.015 (-1.56)	-0.014** (-3.14)	0.021*** (5.68)	0.048*** (7.51)	0.039 (1.50)	-0.026* (-3.07)	-0.022* (-2.60)	-0.008* (-2.63)	0.006 (0.60)	-0.017* (-2.08)	-0.153** (-3.95)
ln(loss_nm)	0.164* (2.39)	0.021 (0.50)	-0.061 (-1.78)	-0.180** (-4.11)	0.034 (0.17)	-0.002 (-0.02)	0.201** (3.90)	-0.029 (-1.05)	-0.091 (-1.06)	0.035 (0.51)	1.063** (4.21)
war	0.001 (0.00)	0.647*** (6.17)	-0.204* (-2.42)	0.130 (1.08)	-1.090 (-1.98)	0.023 (0.12)	0.239 (1.57)	-0.234** (-3.41)	-0.438* (-2.42)	0.090 (0.54)	0.245 (0.35)
year	-0.010 (-1.27)	-0.012** (-3.01)	0.019*** (5.83)	0.041*** (8.49)	0.041 (1.78)	-0.024* (-3.12)	-0.016* (-2.80)	-0.008** (-2.90)	0.005 (0.61)	-0.018* (-2.61)	-0.117** (-4.23)

Source: The log of "negative" losses is replaced by the log of the minimum loss in the data. Results for Charleville, Flandres, La Rochelle, Langres, Montpellier, Narbonne and Rouen are not statistically significant and are not shown

Table 7: Regression the loss functions on the log of the regional shares of imports (up to 1789)

	Amiens N=14	Bayonne N=35	Bordeaux N=37	Bourgogne N=14	Caen N=17	Châlons N=14	Lyon N=15	Marseille N=33	Nantes N=33	Rennes N=33	Saint-Quentin N=14
loss	4.675*** (4.61)	1.906*** (4.04)	-1.324* (-2.62)	0.901 (1.45)	6.845*** (4.45)	6.412** (4.29)	-2.143 (-1.62)	0.659** (3.03)	-2.399*** (-4.38)	1.807* (2.59)	5.254** (3.79)
war	0.199 (0.61)	0.205 (1.20)	-0.049 (-0.28)	0.770*** (5.94)	0.112 (0.23)	0.918 (1.92)	1.674** (3.96)	-0.170* (-2.37)	-0.433** (-2.80)	-0.132 (-0.54)	1.089* (2.46)
year	-0.065** (-4.38)	-0.053*** (-6.95)	0.033*** (4.35)	0.029* (2.97)	-0.087** (-3.81)	-0.105*** (-4.81)	-0.010 (-0.54)	-0.009** (-2.78)	0.022* (2.66)	0.012 (1.09)	-0.124*** (-6.14)
loss_nm	5.125** (3.90)	2.296*** (4.19)	-1.831** (-3.28)	1.388* (2.50)	7.692** (4.00)	7.193** (3.89)	-1.593 (-0.96)	0.783** (3.11)	-2.800*** (-4.80)	1.937* (2.33)	6.016** (3.65)
war	-0.178 (-0.45)	0.040 (0.21)	0.105 (0.57)	0.661*** (5.67)	-0.478 (-0.84)	0.380 (0.69)	1.749** (3.53)	-0.217* (-2.72)	-0.251 (-1.48)	-0.229 (-0.81)	0.633 (1.28)
year	-0.049** (-3.19)	-0.046*** (-6.73)	0.030*** (4.65)	0.030** (4.51)	-0.064* (-2.82)	-0.084** (-3.87)	-0.019 (-1.01)	-0.007* (-2.39)	0.015* (2.06)	0.019 (1.87)	-0.107*** (-5.54)
ln(loss)	0.594* (3.16)	0.275*** (3.73)	-0.111 (-1.34)	0.015 (0.18)	0.780* (2.55)	0.759* (2.65)	-0.447* (-2.64)	0.084* (2.36)	-0.231* (-2.32)	0.173 (1.54)	0.592* (2.27)
war	0.201 (0.49)	0.283 (1.70)	-0.163 (-0.87)	0.755*** (5.27)	0.120 (0.18)	0.948 (1.53)	1.757*** (4.78)	-0.149 (-1.98)	-0.583** (-3.22)	0.017 (0.07)	1.128 (2.00)
year	-0.067** (-3.47)	-0.056*** (-6.68)	0.028** (3.41)	0.039** (3.85)	-0.084* (-2.66)	-0.105** (-3.57)	-0.001 (-0.03)	-0.008* (-2.34)	0.014 (1.38)	0.015 (1.21)	-0.123** (-4.57)
ln(loss_nm)	0.561** (4.30)	0.307*** (5.28)	-0.103 (-1.35)	0.078 (0.94)	0.738** (3.26)	0.765** (3.96)	-0.307 (-1.98)	0.078* (2.44)	-0.250* (-2.49)	0.175 (1.72)	0.617** (3.42)
war	-0.065 (-0.18)	0.178 (1.20)	-0.158 (-0.84)	0.729*** (5.21)	-0.208 (-0.34)	0.560 (1.06)	1.844** (4.35)	-0.155* (-2.05)	-0.522* (-2.75)	-0.020 (-0.08)	0.806 (1.63)
year	-0.047** (-3.26)	-0.050*** (-7.88)	0.026** (3.51)	0.035** (4.00)	-0.059* (-2.34)	-0.080** (-3.77)	-0.018 (-1.05)	-0.006 (-1.97)	0.012 (1.27)	0.020 (1.79)	-0.103*** (-5.22)

Source: The log of "negative" losses is replaced by the log of the minimum loss in the data. Results for Charleville, Flandres, La Rochelle, Langres, Montpellier, Narbonne and Rouen are not statistically significant and are not shown

Table 8: Single and multivariate regressions for war years only

	Loss								
Prizes import	8.255								
	(16.452)								
Number of prizes		16.106*							0.025
		(9.256)							(0.102)
Privateers prizes			-35.686***						-0.095
			(11.301)						(0.167)
Colonial Empire				-0.288***					-0.295*
				(0.052)					(0.148)
France vs Britain					0.061				0.047
					(0.199)				(0.183)
France vs Britain + allies						0.214			0.125
						(0.146)			(0.194)
France vs Britain + allies + foes							-0.068		0.078
							(0.053)		(0.093)
Battle dummy								0.214***	0.034
								(0.048)	(0.070)
Constant	39.910***	41.468***	54.071***	0.675***	0.452***	0.337***	0.567***	0.438***	0.468***
	(7.023)	(4.756)	(2.811)	(0.039)	(0.113)	(0.105)	(0.068)	(0.023)	(0.141)
Observations	20	36	36	36	36	36	36	36	36
R ²	0.014	0.082	0.227	0.474	0.003	0.059	0.046	0.367	0.600
Adjusted R ²	-0.041	0.055	0.204	0.458	-0.027	0.032	0.018	0.348	0.501

Note:

*p<0.1; **p<0.05; ***p<0.01

The regression should be numbered, please

It should be France + allies vs Britain + foes and France + allies + neutrals vs Britain + foes, no ?

Table 9: Single and multivariate regressions for war years only and running sum

	Loss								
Prizes import	1.509								
	(3.706)								
Number of prizes		5.606***							0.038
		(1.106)							(0.026)
Privateers prizes			-14.264**						-0.096*
			(6.059)						(0.056)
Colonial Empire				-0.029**					-0.055
				(0.011)					(0.039)
France vs Britain					0.043**				0.134***
					(0.018)				(0.040)
France vs Britain + allies						0.015			-0.169***
						(0.013)			(0.032)
France vs Britain + allies + foes							0.001		0.087***
							(0.008)		(0.024)
Battle dummy								0.023*	0.014
								(0.013)	(0.013)
Constant	46.370***	33.719***	61.214***	0.687***	0.271***	0.387***	0.469***	0.405***	0.235*
	(6.022)	(3.497)	(5.844)	(0.083)	(0.093)	(0.086)	(0.099)	(0.050)	(0.129)
Observations	36	36	36	36	36	36	36	36	36
R ²	0.005	0.430	0.140	0.160	0.145	0.041	0.001	0.090	0.795
Adjusted R ²	-0.024	0.414	0.115	0.135	0.120	0.012	-0.029	0.064	0.743

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 10: Single and multivariate regressions for all years and running sum

	Loss								
Prizes import		-6.503**							
		(3.118)							
Number of prizes			5.996***						-0.003
			(1.368)						(0.012)
Privateers prizes				-21.131***					-0.003
				(4.619)					(0.048)
Colonial Empire					-0.038***				-0.170***
					(0.006)				(0.018)
France vs Britain						-0.001			0.042
						(0.014)			(0.031)
France vs Britain + allies							-0.004		-0.106***
							(0.009)		(0.031)
France vs Britain + allies + foes								-0.012**	0.143***
								(0.005)	(0.019)
Battle dummy									-0.019*
									(0.010)
Constant	52.057***	35.126***	58.368***	0.683***	0.462***	0.486***	0.582***	0.530***	0.518***
	(3.690)	(3.230)	(3.408)	(0.038)	(0.065)	(0.057)	(0.053)	(0.043)	(0.032)
Observations	86	86	86	86	86	86	86	86	86
R ²	0.049	0.186	0.199	0.354	0.00003	0.003	0.073	0.041	0.827
Adjusted R ²	0.038	0.176	0.190	0.347	-0.012	-0.009	0.062	0.030	0.812

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 11: Single and multivariate regressions for war years only, semi-elasticities

	Loss								
Prizes import	3.996 (6.331)								
Number of prizes	4.804 (3.446)								0.031 (0.043)
Privateers prizes		-6.216*** (1.353)							-0.040 (0.032)
Colonial Empire			-0.123*** (0.024)						-0.035 (0.079)
France vs Britain				0.084 (0.109)					-0.053 (0.100)
France vs Britain + allies					0.153 (0.098)				0.244 (0.145)
France vs Britain + allies + foes						-0.116* (0.064)			-0.059 (0.123)
Battle dummy							0.214*** (0.048)	-0.003 (0.086)	
Constant	18.130 (39.514)	21.995 (19.237)	68.509*** (4.883)	0.405*** (0.025)	0.538*** (0.072)	0.546*** (0.045)	0.499*** (0.025)	0.438*** (0.023)	0.492** (0.238)
Observations	20	36	35	36	36	36	36	36	35
R ²	0.022	0.054	0.390	0.437	0.017	0.068	0.088	0.367	0.548
Adjusted R ²	-0.033	0.026	0.372	0.421	-0.012	0.040	0.061	0.348	0.430

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 12: Single and multivariate regressions for war years only and running sum, semi-elasticities

	Loss								
Prizes import	0.001 (0.002)								
Number of prizes		0.008*** (0.002)							0.0001 (0.00004)
Privateers prizes			-0.038** (0.016)						-0.0003* (0.0001)
Colonial Empire				-0.029** (0.011)					-0.055 (0.039)
France vs Britain					0.043** (0.018)				0.134*** (0.040)
France vs Britain + allies						0.015 (0.013)			-0.169*** (0.032)
France vs Britain + allies + foes							0.001 (0.008)		0.087*** (0.024)
Battle dummy								0.023* (0.013)	0.014 (0.013)
Constant	46.370*** (6.022)	33.719*** (3.497)	61.214*** (5.844)	0.687*** (0.083)	0.271*** (0.093)	0.387*** (0.086)	0.469*** (0.099)	0.405*** (0.050)	0.235* (0.129)
Observations	36	36	36	36	36	36	36	36	36
R ²	0.005	0.430	0.140	0.160	0.145	0.041	0.001	0.090	0.795
Adjusted R ²	-0.024	0.414	0.115	0.135	0.120	0.012	-0.029	0.064	0.743

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 13: Single and multivariate regressions for all years and running sum, semi-elasticities

	Loss								
Prizes import		-6.850***							
		(1.965)							
Number of prizes			11.110***						0.155***
			(2.562)						(0.043)
Privateers prizes				-9.127**					-0.127**
				(1.977)					(0.052)
Colonial Empire					-0.114***				-0.488***
					(0.021)				(0.135)
France vs Britain						-0.009			-0.288
						(0.043)			(0.204)
France vs Britain + allies							-0.016		-0.227
							(0.039)		(0.270)
France vs Britain + allies + foes								-0.084**	1.126***
								(0.033)	(0.268)
Battle dummy								-0.019*	-0.018
								(0.010)	(0.012)
Constant	92.913***	-29.932*	91.617***	0.627***	0.472***	0.486***	0.640***	0.530***	-0.824***
	(13.640)	(17.625)	(10.103)	(0.036)	(0.063)	(0.068)	(0.074)	(0.043)	(0.256)
Observations	86	86	86	86	86	86	86	86	86
R ²	0.126	0.183	0.202	0.266	0.0005	0.002	0.072	0.041	0.802
Adjusted R ²	0.116	0.173	0.193	0.258	-0.011	-0.010	0.060	0.030	0.784

Note:

*p<0.1; **p<0.05; ***p<0.01

A MANOVA test

Table 14: SITC18 Classification

Other foodstuff and live animals	Chemical products	Other
Cotton threads and fabrics	Other industrial products	Oils
Crude materials, inedible, except com	Other threads and fabrics	Wool threads and fabrics
Leather, wood and paper products	Drinks and tobacco	Plantation foodstuff
Silk threads and fabrics		

Table 15: Country Classification

Italy	United Kingdom
Spain	Holland (including Belgium and Habsburg Monarchy)
Germany (including Switzerland)	Ottoman Empire
Spain (including Portugal)	United States
Baltic, Scandinavia and Russia	

Table 16: Multivariate Analisys of Variance - by SITC

	Exports 1	Exports 0	Imports 1	Imports 0	X I 1	X I 0
peace war	0	0	0	0	0	0
seven peace1764 1777	.01	.01	.03	.02	.01	.01
peace1764 1777 indep	.16	.02	.45	.22	.29	.35
rev block	.06	.03	.01	0	.03	.05
peace1816 1840 block	.86	.52	.69	.09	.91	.37
peace1749 1755 peace1764 1777	.35	.27	.77	.39	.74	.29
peace1764 1777 peace1784 1792	.66	.11	.56	.16	.64	.1

Table 17: Multivariate Analisys of Variance - by geography

	Exports 1	Exports 0	Imports 1	Imports 0	X I 1	X I 0
peace war	0	0	0	0	0	0
seven peace1764 1777	0	0	0	0	0	0
peace1764 1777 indep	0	0	0	0	0	0
rev block	.02	.02	.02	.01	.03	.01
peace1816 1840 block	.07	.09	.12	.21	.08	.12
peace1749 1755 peace1764 1777	.01	.01	.01	.01	.12	.12
peace1764 1777 peace1784 1792	0	0	0	0	0	0
peace1784 1792 peace1816 1840	.53	.73	.55	.76	.73	.75

Table 18: Multivariate Analisys of Variance - by aggregate SITC

	Exports 1	Exports 0	Imports 1	Imports 0	X I 1	X I 0
peace war	0	0	0	0	0	.03
seven peace1764 1777	0	.01	0	.01	0	.01
peace1764 1777 indep	.14	.15	.04	.04	.13	.03
rev block	0	0	0	0	.01	.02
peace1816 1840 block	.15	.07	.02	.01	.03	.03
peace1749 1755 peace1764 1777	0	.01	.01	0	.05	.05
peace1764 1777 peace1784 1792	0	0	.01	.02	.01	0
peace1784 1792 peace1816 1840	.65	.12	.44	.02	.44	.08

Figure 19: Change in composition of trade

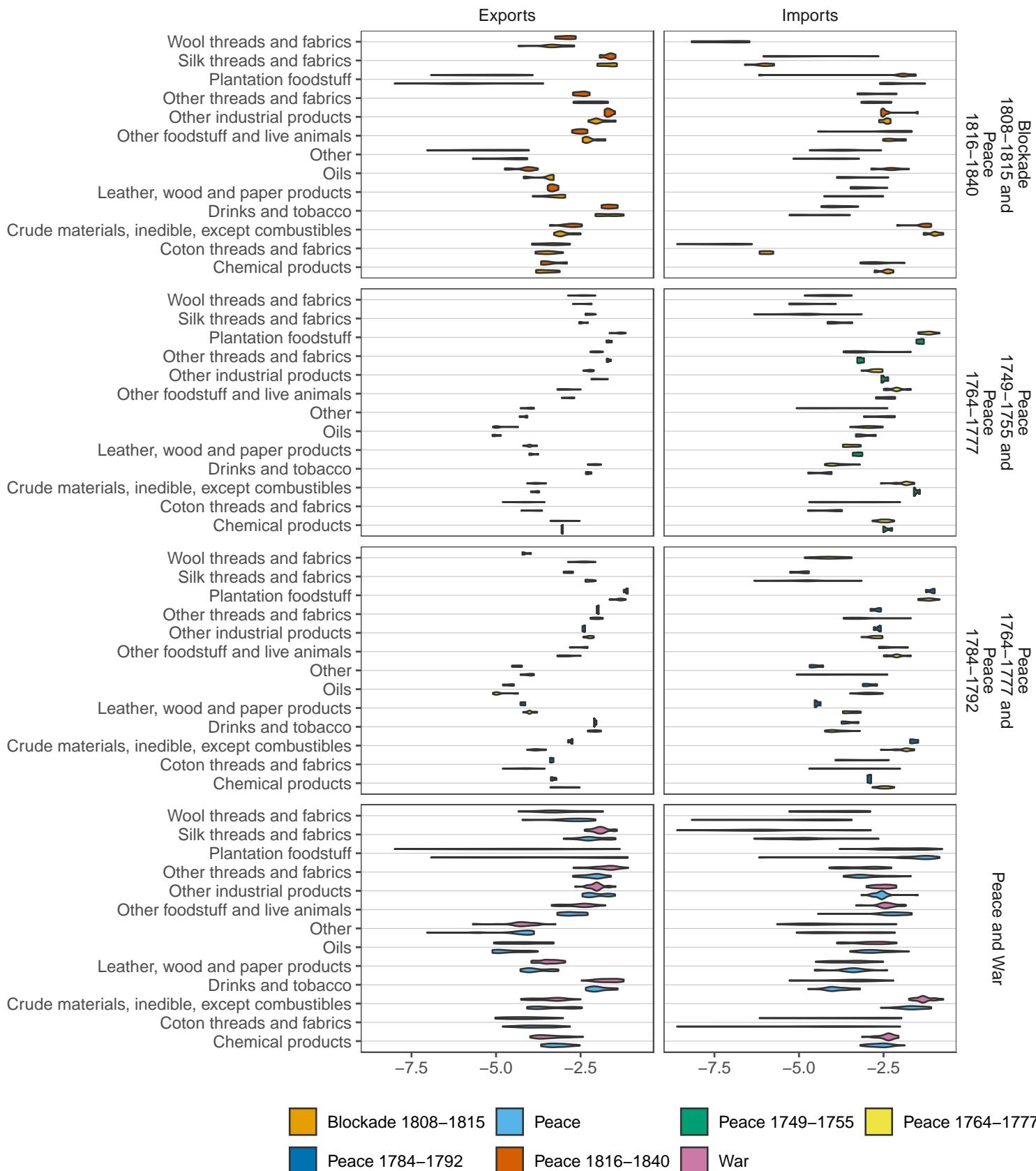


Figure 20: Change in composition of trade

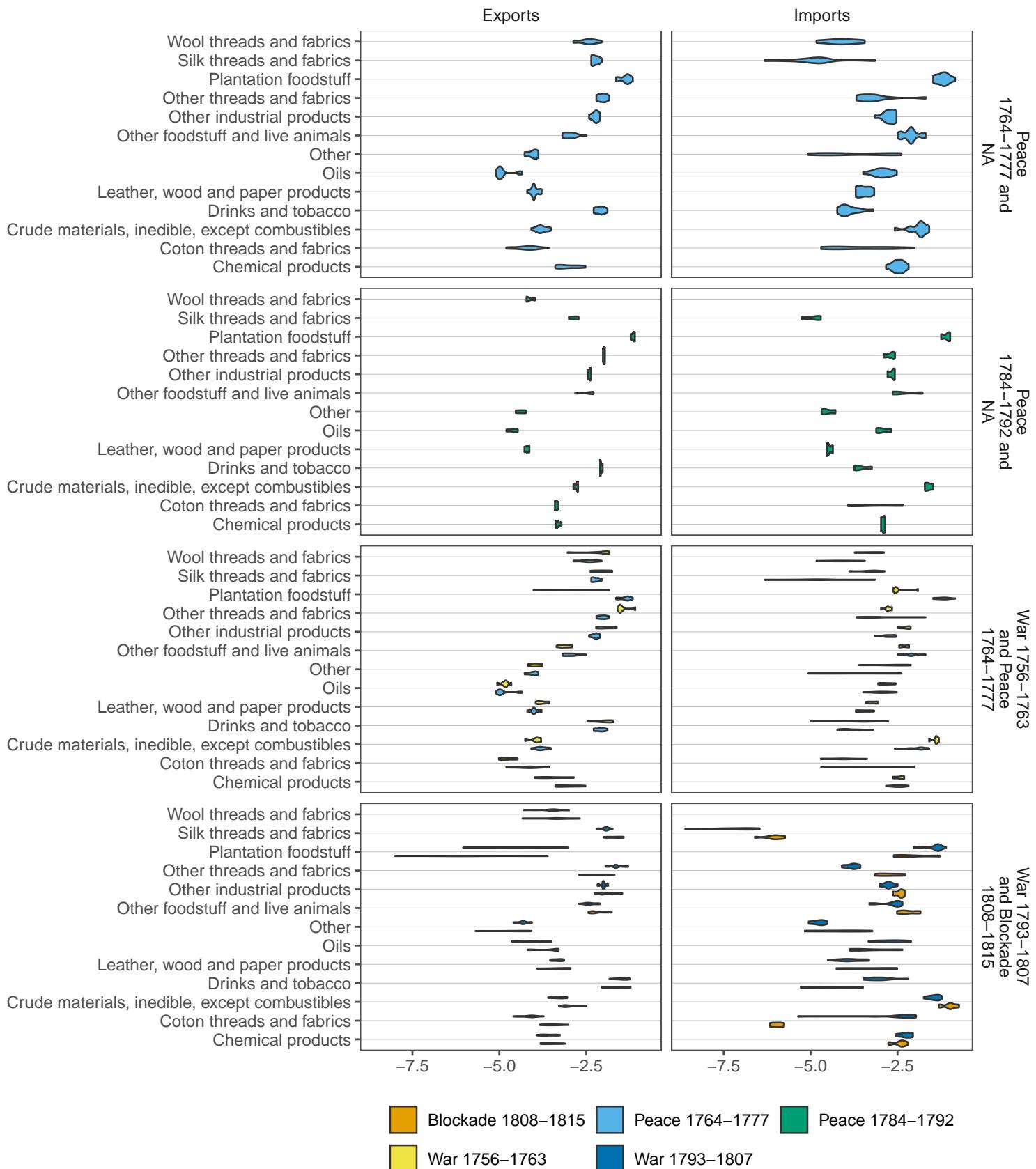


Figure 21: Change in composition of trade - Without plantation foodstuff

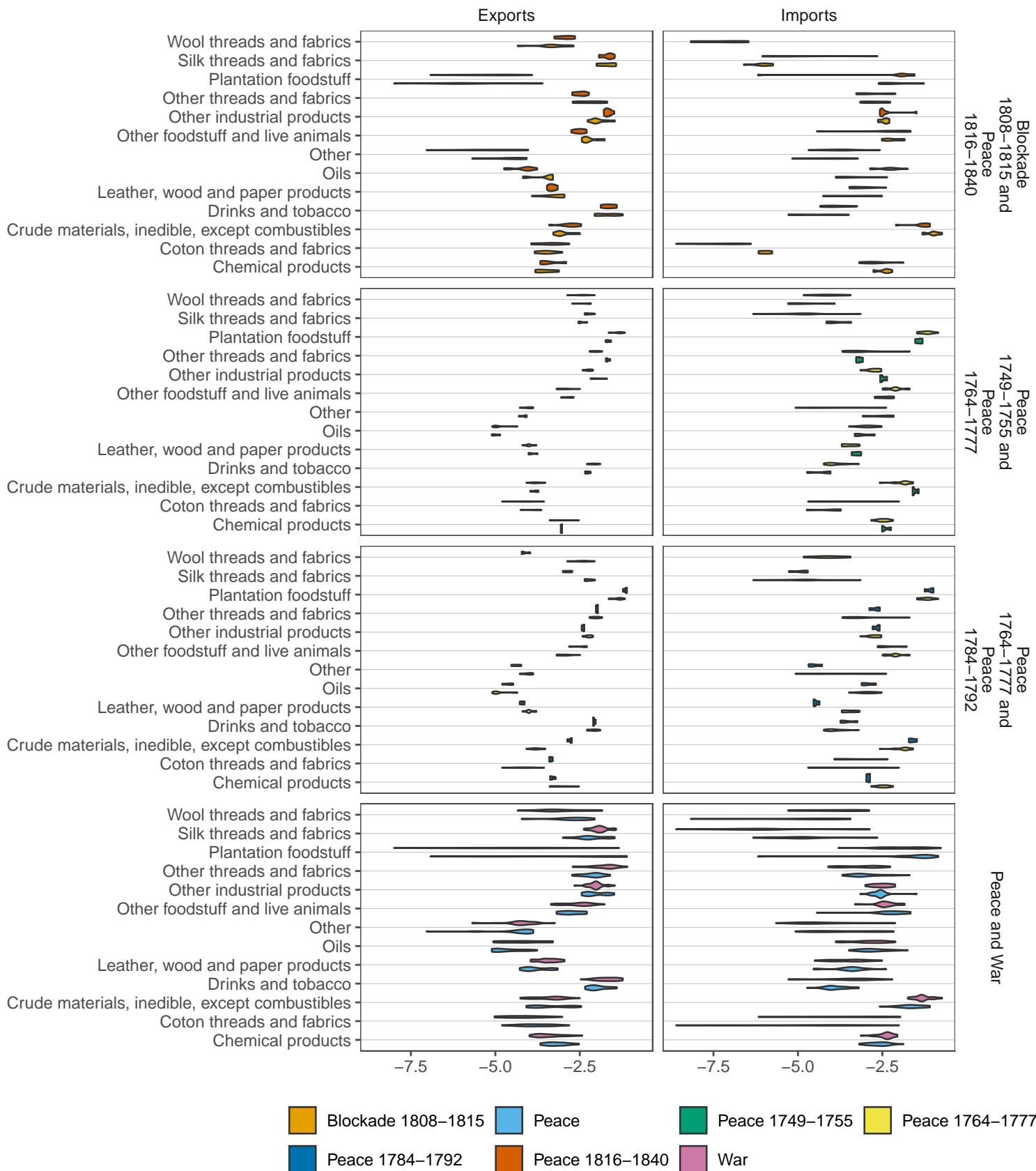


Figure 22: Change in composition of trade - Without plantation foodstuff

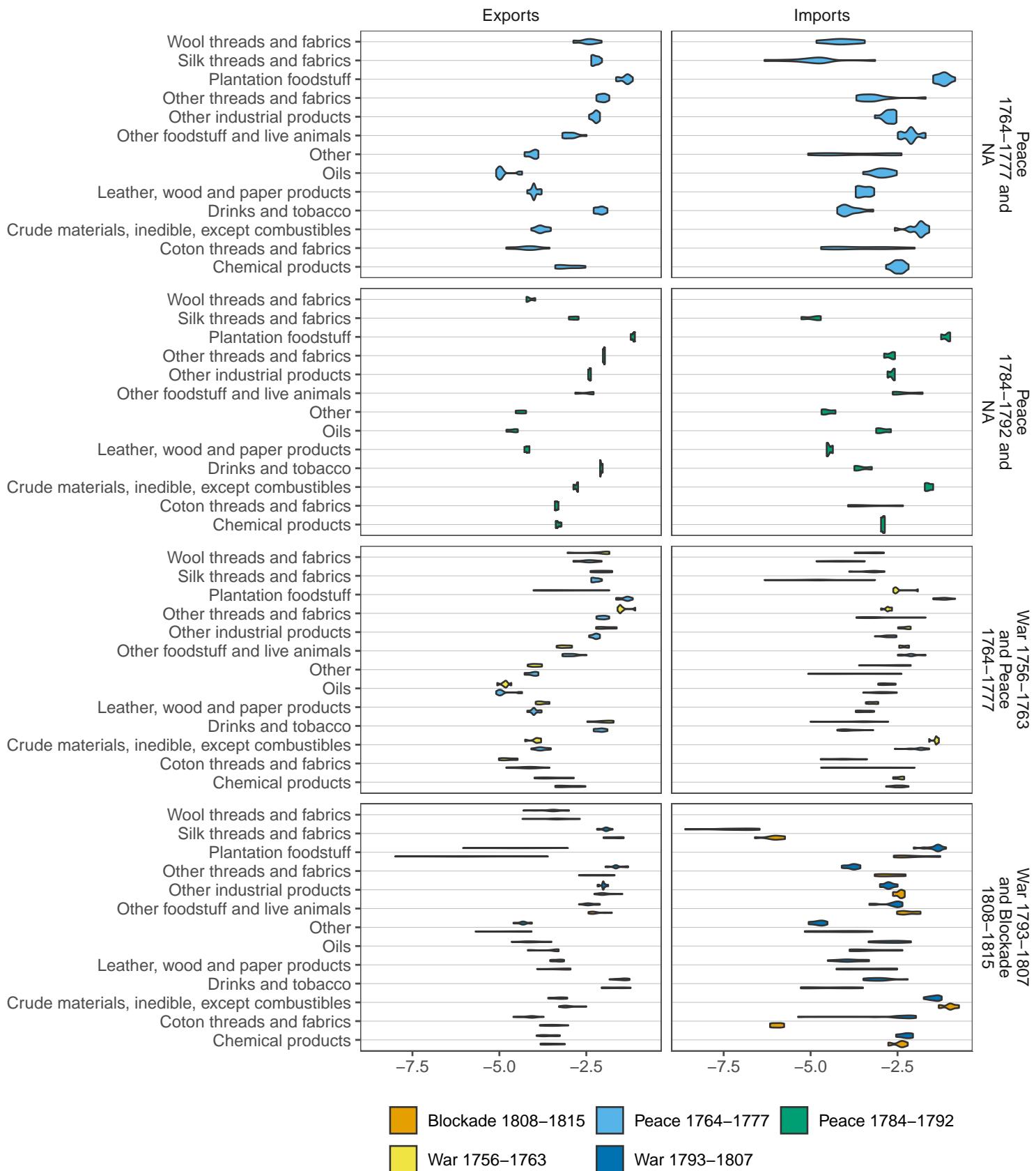


Figure 23: Change in geography of trade

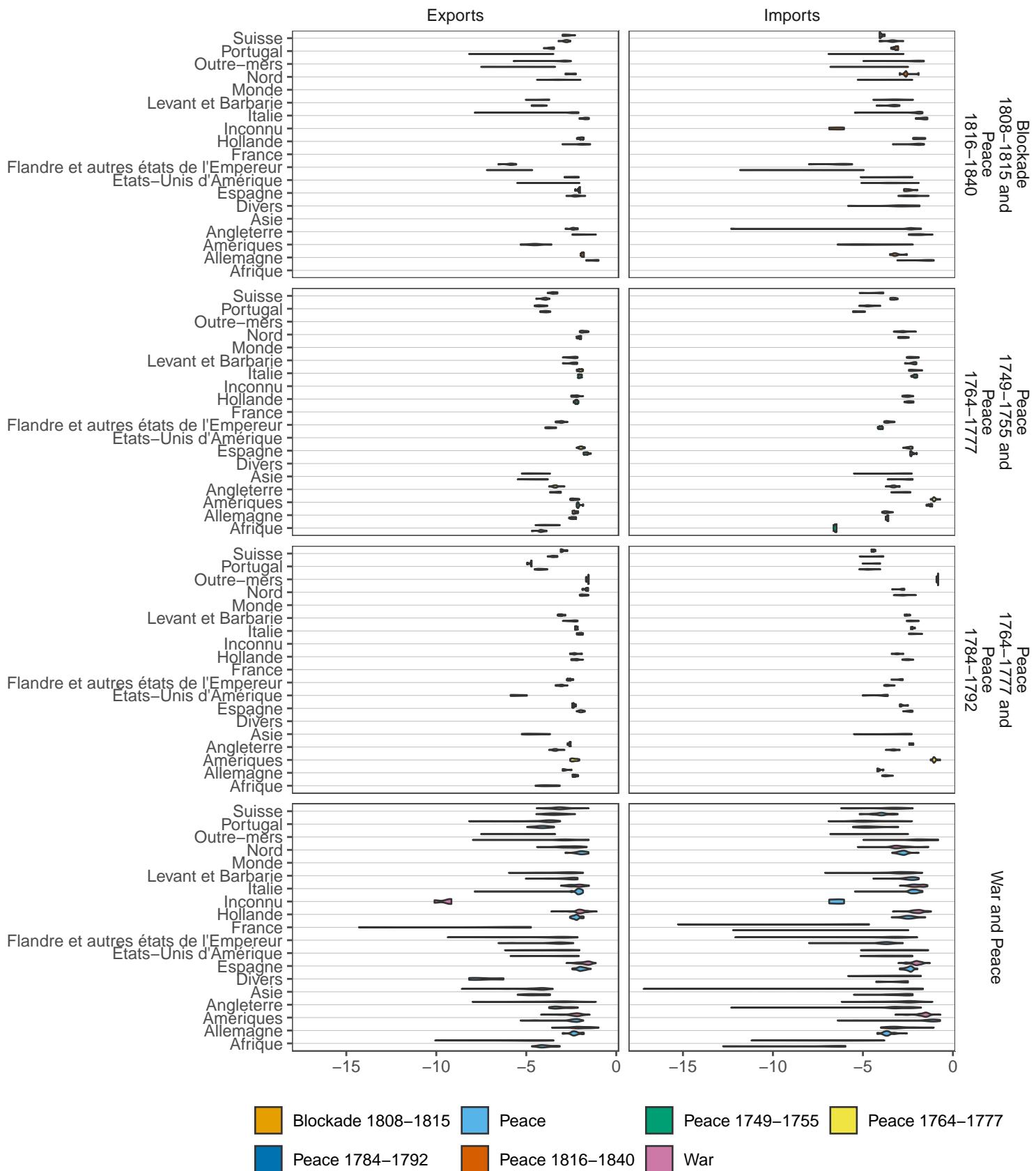


Figure 24: Change in geography of trade

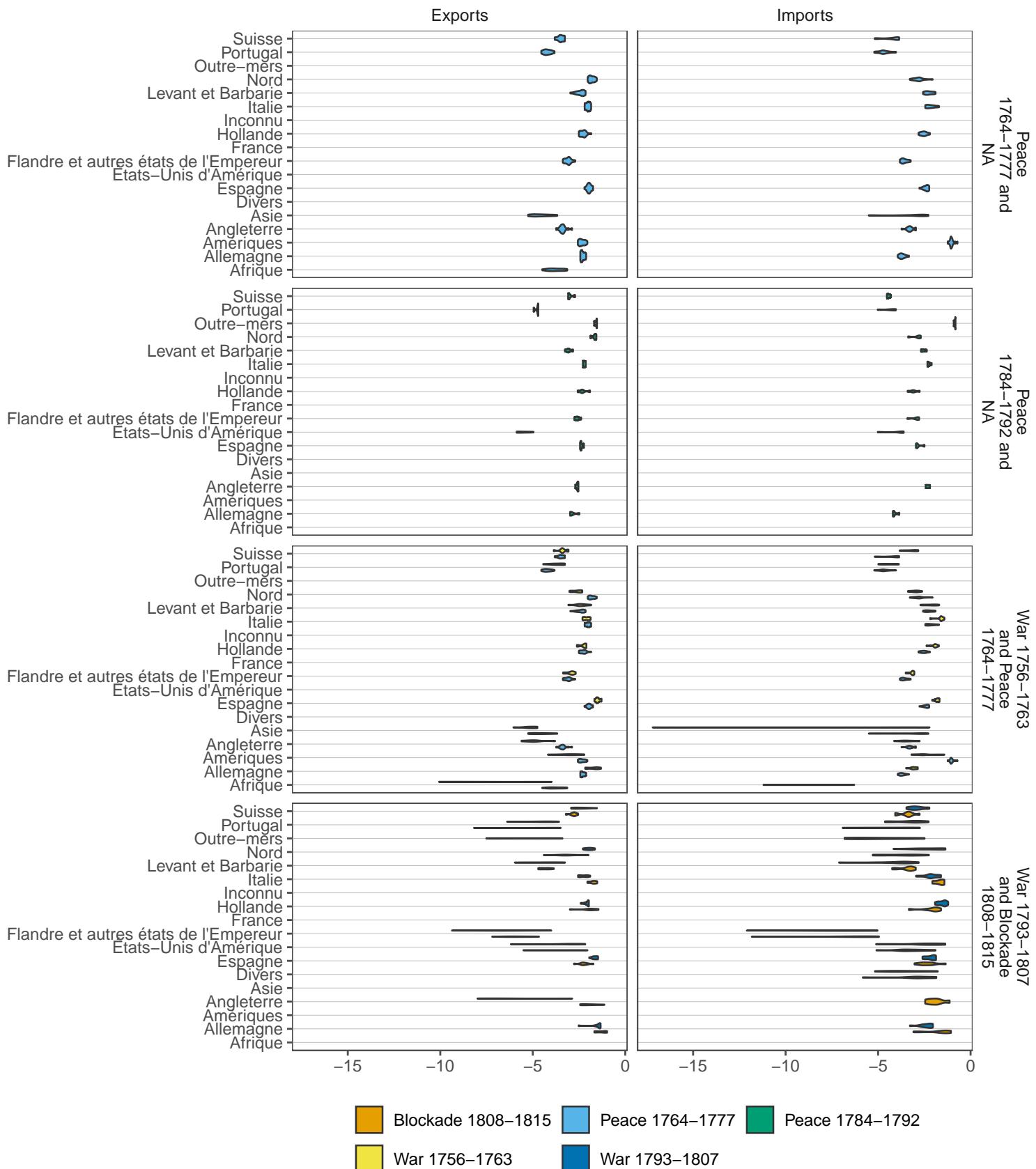


Figure 25: Change in geography of trade - Without plantation foodstuff

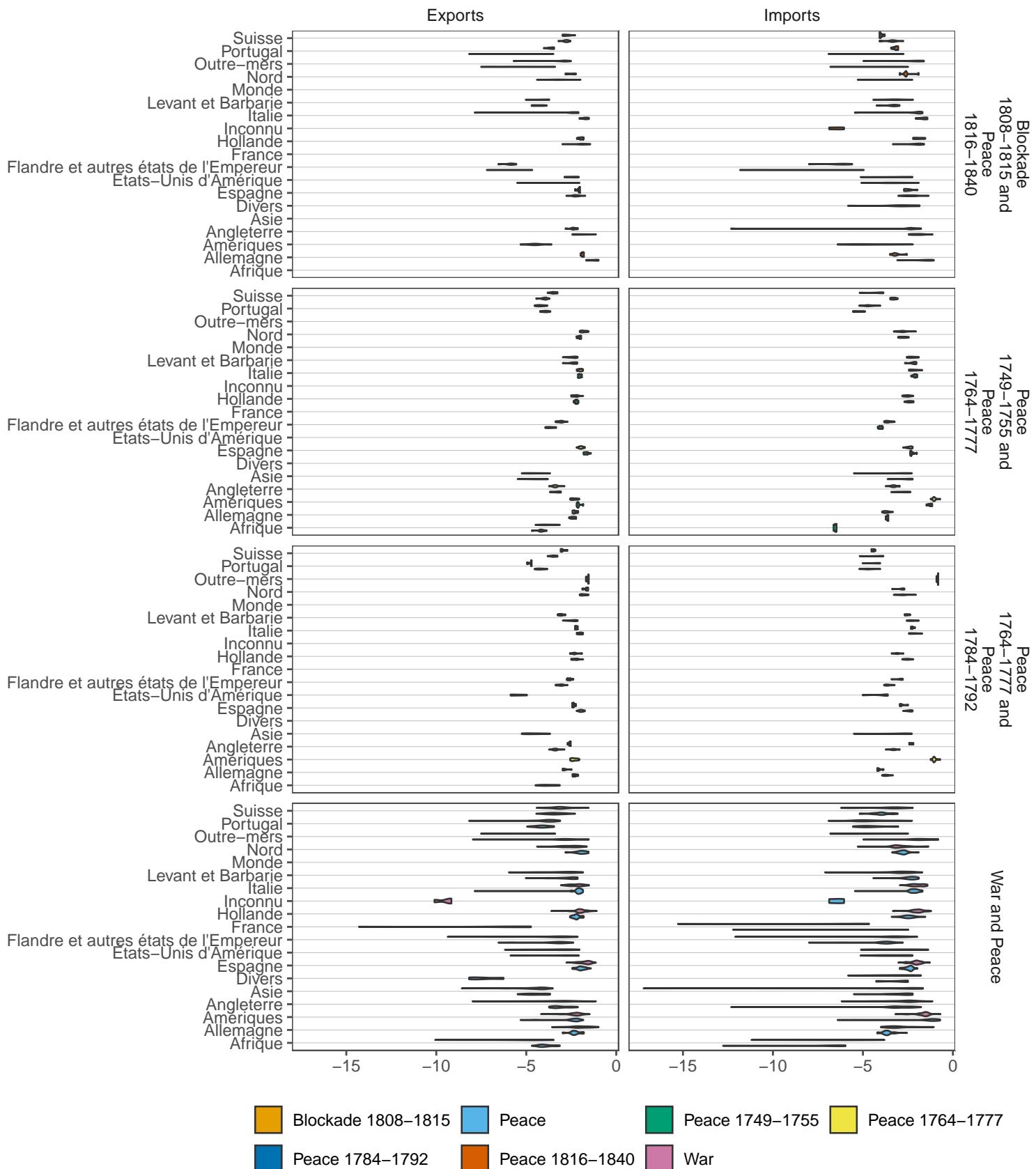
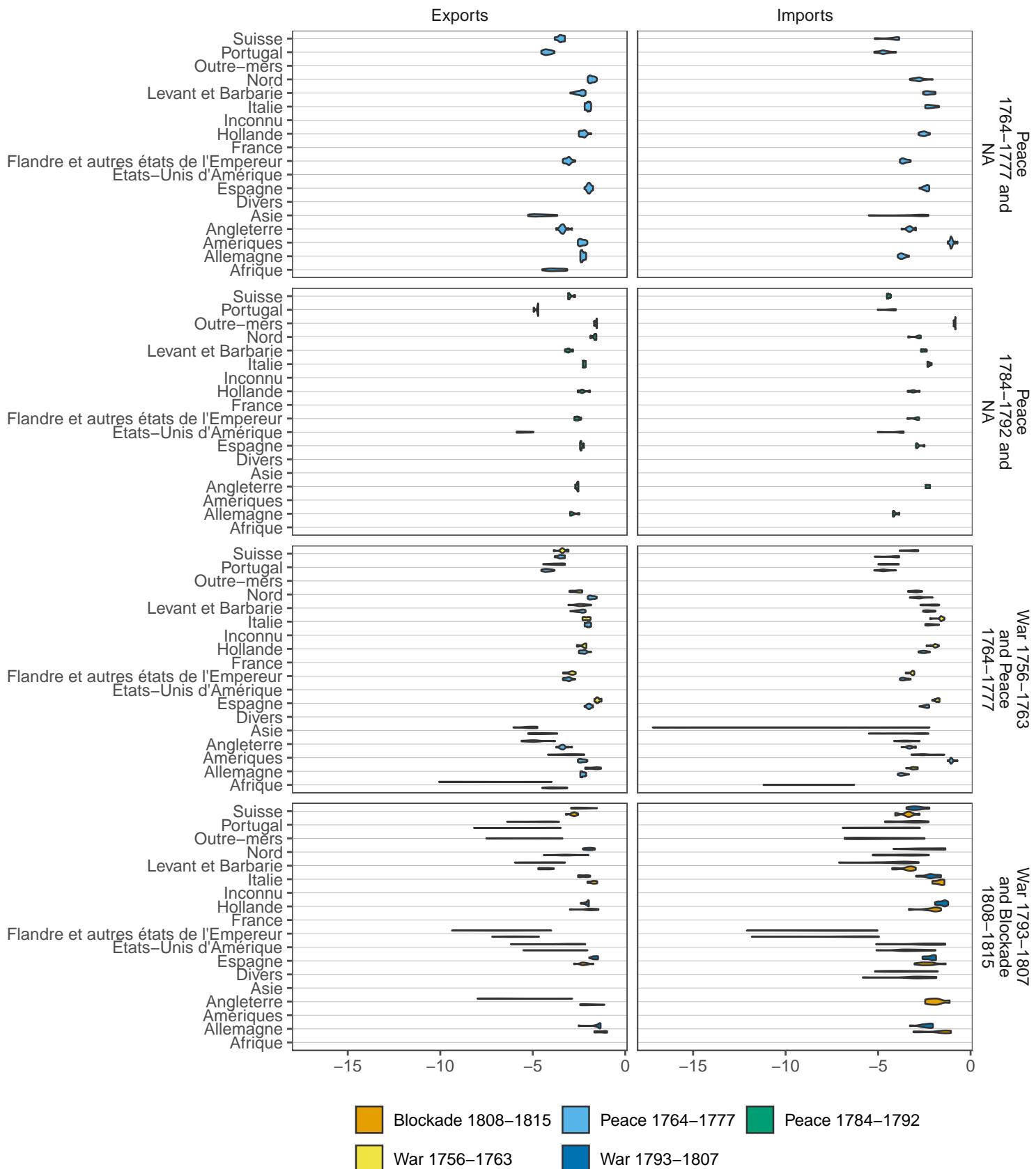


Figure 26: Change in geography of trade - Without plantation foodstuff



B Data and sources

We use data from the TOFLIT18 project (see here). They come from the archives of the French *Bureau de la Balance du Commerce* and, subsequently, the *Bureau des archives du commerce*. This institution was created in 1713, after the Treaty of Utrecht, which followed the Spanish Succession War. While discussing a trade treaty with the British, the French negotiators were positively impressed by the detailed knowledge shown on trade flows by their counterparts, and they convinced the government of the necessity of creating an institution that would keep track of exports and imports from and to France (Charles and Daudin, 2011)¹⁰. Starting with the year 1716, local *bureaux des fermes* sent their trade records to the *Bureau* in Paris. The *Bureau* would then compute aggregate yearly figures for each *direction* (port) and then send them back to the local Chamber of Commerce, so that they could add the values up to 1780. A mix of local and central source survive from this process. Unfortunately the “local sources” mostly did not survive; what we have left are parts of the centralised records. From 1781 to 1791, the work methods of the *Bureau* changed and a number of years of trade have left little record (1783-1786, 1790-1791). In 1792, through a decree of the National Assembly, the *Bureau de la Balance du commerce* was abolished and replaced by the *Bureau des archives du commerce*. We have some data on 1792 trade, but trade collection properly started again in 1797, so that we are missing information on 1793-1796.

The data which survived come from different sources. The two most exhaustive ones are the *Objet Général* and the *Résumé*, which contain trade by product and by partner. The former is available for the years between 1754 and 1780 and between 1782 and 1788. There are some missing years, especially in the period between 1761 and 1767, however starting from 1771 it also contains information on quantities and/or unit prices. The latter is available between 1787 and 1789 and between 1797 and 1821. It does not include quantities, only values, and the classification of goods it uses is less precise than the one from the *Objet Général*. Lesser complete sources are Local sources and the *Tableau Général*. Local data are available from 1716 to 1780 and in 1789, which allows for partial reconstruction of total trade. The *Tableau Général* exists in the French archives that provides French bilateral trade, though not broken down by product (Romano (1957)).

All sources provide the value of trade in the current French currency. This is the *livre tournois* up to 1795 and the *franc* afterward. The value of the *livre* was fluctuating in the early eighteenth century. In 1726, its value was fixed at a value of 4.505 grams of fine silver (de Wailly, 1857). Because of the monetary crisis during the revolution, we use data extracted from published appreciation tables to fix the value of the *livre* at 2.9 grams of silver in 1792 (Hoffman et al. (2000)). The French *franc*

¹⁰Charles and Daudin (2011), in their paper, provide the complete history of the *Bureau*.

contained 4.5 grams of fine silver. We convert the trade flows in fine silver; obviously, this does not solve the inflation issue, but we argue that inflation in terms of silver was relatively limited during that period.

Citation here? – GD Yes, we need to have a deep long conversation about inflation (including how it changes the loss function. Still mulling this one.).

B.1 Blockade

There were essentially two possible types of blockades (Corbett, 1911); the open and the closed blockade. The former consisted of keeping the ships at port, but ready to sail, as soon as the enemy fleet left its harbour. This technique was much less straining for men and ships, but less efficient when it came to blockading. On the other hand, the closed blockade consisted of keeping the rival fleet blocked in its own port, impeding it from exiting. This was much more of an efficient technique, however, the maintenance of both ships and men at sea for such a long time was a substantial issue. By the end of eighteenth century, the British had implemented a very efficient system of resupply, in which supply ships delivered victuals to the fleet at sea, thus allowing it not to return at port regularly for supplies. Also, they were being very careful to provide a balanced diet against scurvy, which passed from being a major issue for sailors, to accounting for only 2 per cent of British naval patients between 1795 and 1800 (Rodger, 2005). On top of this, Britain had started to coat their ships with copper, to fight the issue of barnacles, oysters and the shipworm, which were seriously hindering the speed and the security of their vessels. This dramatically reduced the possibility of avoiding the blockade and allowed Britain to impede unwanted trade more efficiently. One would think that the number of ships captured declined as not many ships tried to run the blockade, but that is not confirmed by data on prizes Benjamin (2009).

B.2 Historical summary and classification of country grouping

In this section we provide a brief overview of the main wars that took place in Europe in the period of analysis and we explain how we classify the belligerent status (compared to France) of the country grouping at stake. As a general rule, we consider *Outre-mers* as ally and *Levant* as neutral.

In 1733, the king of Poland August II, died heirless and his succession soon became a conflict at European level. France, Prussia and Spain were trying to limit the desire of expansion of the Habsburg monarchy in Poland. Britain stayed neutral and the war saw an end in 1738, with the recognition of August III as king of Poland, as the Habsburgs had wished. In the country classification we used, the ally countries were *Espagne* and the foe was *Empereur* and *Allemagne* (as Lorraine and West Germany were at that point mostly controlled by the Habsburg). It was a land conflict,

as opposed to the naval conflicts that followed.

No longer than two years later, a very similar event occurred as a consequence of the death of Charles IV. The Habsburg emperor had not died heirless, however his only heir was a woman; Maria Theresa of Austria. France, Prussia and the Electorate of Bavaria used the pretext that she was ineligible to succeed to her father, to challenge, once again, the Habsburg power. Maria Theresa was supported by the Kingdom of Great Britain and the Dutch Republic as well as the Kingdom of Sardinia and the Electorate of Saxony. This conflict, which was born as a succession issue, soon extended to the New World and became a competition between the French and the British for the control of American colonies. It ended in 1748 with the Treaty of Aix la Chapelle, where France gave back most the territories it had conquered during the war. Ally country in this case was *Espagne* and foes were *Angleterre* and *Empereur*.

Roughly until the end of the Austrian Succession war, a sort of geopolitical and economic equilibrium between France and British colonies on the North American mainland had prevailed. That was broken as a consequence of an uneven population growth (Findlay and O'Rourke, 2009). This set the stage to the following war; the Seven Years War, or French and Indian War, which, as the name suggests, was a world-wide conflict. As opposed to the previous wars, this was a decisive triumph of Britain over France, which was forced to give up Canada, Cape Breton Island and Grenada, recognized the Mississippi River as the Eastern boundary of its possessions in North America, then ceded those possession to Spain. France also lost enough influence in its colonies to lead to the end of French colonial ambition in India and, subsequently, to the dissolution of the first Compagnies des Indes (Riley, 1986). French allies in this war were *Allemagne*¹¹, *Empereur*, and *Espagne* for 1762. Foes were *Angleterre*, and *Portugal*.

At the end of the Seven Years War, with the victory of Britain and the subsequent departure of the French, the American colonies, no longer feeling the threat of the French presence on the continent, soon started demanding independence from Great Britain¹². In 1775 they rebelled against British control over their trade and in 1776 they declared independence. France, still feeling the humiliation subsequent to the Seven Year War, in 1778 entered the fray on the colonies' side, soon followed by Spain. Spanish and French ¹³ fleet together outnumbered the British Navy and were able to force Britain to surrender and end the war with the Treaty of Versailles in 1783. In this setting, ally were

¹¹As mentioned in section ??, *Allemagne* was mainly Alsace, Lorraine and Western Germany, which were allied to France. Our assumption is that "Prussia" is sea trade through the Baltic, i.e. a minor portion of *North*, which, however we code as neutral, since it was dominated by Hamburg - despite the fact that Russia and Sweden were allied to France for most of the war.

¹²The French chief minister, the duc de Choiseul, made a prediction to the effect that with no French presence on the continent to threaten them any longer, the American colonies would soon demand independence from Great Britain (Findlay and O'Rourke, 2009). This prediction, as it turned out, was prescient.

¹³France had been investing in its Navy following the preceding defeat (Findlay and O'Rourke, 2009).

there *Espagne*, *Etats-Unis*, and *Hollande* from 1780; foe was only *Angleterre*.

At the end of the war, despite the victory obtained, French finances were suffering to the extent that Calonne, the finance minister at the time, was forced to the summoning of the Estates-Generales in 1789, which then led to the start of the French Revolution. This event was followed by a larger conflagration with respect to previous mercanilist wars, into which an ideological dimension had been injected (O'Rourke, 2006). In 1792 France declared war on Austria and Prussia, and the following year to Great Britain. The subsequent conflict lasted for nearly thirty years, with only two brief interruption between 1802 and 1803 (Peace of Amiens) and between 1814 and 1815. Almost immediately, France banned the import of all British goods; Britain responded by blockading French coasts and impeding French ships to exit the port. From the very beginning, this created a big problem for neutral countries, which wished to continue trade with both belligerent actors. As a consequence, a second League of Armed Neutrality was created, in which Russia, Prussia, Denmark and Sweden took part. This alliance was not long-lasting, as Britain responded with a ban on trade with the league, and bombed Copenhagen, thus ending this agreement. This conflict ultimately ended with Napoleon's disastrous invasion of Russia in 1812, which was followed by the invasion of France in 1814 and a subsequent peace treaty signed in Ghent. The two main players of this conflict were, of course, Britain and France. However, because of the victories and defeats of one and the other, sides of other countries changed continuously and it was harder to code in our country classification. Table 1 reports our choices of the position of all countries in all wars throughout the century. *Allemagne* was mainly aligned with Austria till 1800: so it was a foe between 1792 and 1800, neutral between Campo Formio became an ally in 1805 (till 1813), and then became again a foe after the battle of Leipzig to France. *Angleterre* was an enemy all throughout. *Espagne* fought France for the period 1793 and 1794, she became then an ally until 1807 (with the exception of 1795, in which she was neutral), and then again an enemy from 1808 onwards. *Empereur* is Austria, whose position was easy to adjudicate. It was a foe until Campo Formio (June 1801), neutral till the Third Coalition (1805), then a foe in 1805, to become neutral again in 1806 until 1808. Lastly, after one more year of neutrality in 1809, she became an ally starting from 1810, and declared war again in 1813. *États Unis* was always neutral throughout the war, except for the un-declared war between 1798 and 1800 and it co-belligerance against the United Kingdom from 1812 to 1814. We classify them as "Allies" during this period of co-belligerence. *Hollande* fought France till 1794 and was then aligned to it till late 1813, when William-Frederik of Orange-Nassau took power. *Italy* was briefly a foe until 1796, then neutral until 1813, and then again a foe starting 1814. *Levant* stayed out of the war, except when the French invaded Egypt from 1798 to 1801. Concerning *Nord*, Sweden

and Russia were alternatively neutral, foes or allies. Denmark was an ally. Yet, as the biggest share of trade was represented by Hamburg, whenever the component of *Nord* were not on the same side in a war, we code them all in the position of Hamburg. *Nord* was mainly neutral, except when it was occupied and then annexed by France from 1808 to 1813.¹⁴ *Outre-mers* mainly includes French colonies and we treat it as an ally throughout. *Portugal* was neutral until 1798 and then became a foe in 1802. It was again neutral for a short period between 1803 to 1806 and then became a foe starting from 1807. Finally, *Suisse* was neutral until 1797 and then an ally until 1813, and then neutral again in 1814.

Figure ?? sums up the data by showing the number of French allies, foes and neutral for each war and year of interest.

B.3 Trade partners

Trade partners are not consistently designed in the original data. For example, In the *Tableau Général* (from 1716 to 1782), the number of partners varies between 14 and 23 and between 16 and 26 in the *Résumé* (from 1787 to 1821). Often, partners are not single countries but rather groups of countries. Many destinations get broken down into smaller destinations in later periods or even disappear to be replaced by other smaller entities. To bypass this problem we have created a classification of countries, which is consistent for the whole period (such that we have nearly one observation for each group for each year). This classification identifies only twelve groups: *Allemagne*, *Angleterre*, *Espagne*, *Flandre et autres États de l'Empereur*, *Hollande*, *Portugal*, *Suisse*, *Levant*, *Italie*, *États-Unis*, *Outre-mers* and *Nord*. Many are self-explanatory, though it should be underlined that trade with *Angleterre*, *Portugal* and *Espagne* includes trade with all their controlled territories.

Outre-mers regroups all intercontinental French trade (mainly with French colonies) except for North Africa and the Ottoman Empire that are included (along with Greece) in *Levant*.

Nord designates trade north of the Low Countries. This region comprises Sweden, Denmark, Hanseatic ports (mainly Hamburg, Bremen, Lubeck and Danzig), Prussia and Russia¹⁵ (Charles and Daudin, 2018).

Italie was used as a geographical expression. The main French trade partners there were the Kingdom of Piedmont and Sardinia and Genoa. Still, minor flows were also directed to Milan, Naples, Venice, Tuscany, Papal States...

Flandre et autres États de l'Empereur (*Empereur* for short) is mainly modern Belgium before the Revolutionary and Napoleonic Wars and mainly Austria after it. At that point, modern Belgium is

¹⁴Obviously, we cannot proceed this way for the computation of naval supremacy, see *infra*.

¹⁵Trade with Denmark is identified separately from 1733, trade with Sweden from 1734 and trade with Russia from 1744. We always account for them together under *Nord*

annexed by *Hollande*.

Allemagne encompasses mainly Western Germany, including Alsace, Lorraine during the *Ancien Régime*.

We have not attempted to take into account the extensive territorial re-arrangements during the Revolutionary and Napoleonic Wars. The extension of France in the Low Countries, Germany and Italy changed the actual extent of the *Allemagne* and *Italie* partner.

B.4 MANOVA test

In order to test this we conduct a Multivariate Analysis of Variance (MANOVA), allowing for heterogeneous co-variances, using the affine-invariant modification by Krishnamoorthy and Yu (2004) of the test proposed by Nel and Van der Merwe (1986). The two mean vectors here are the 13- or 9-dimensional vectors whose components are the SITC or the country trade shares respectively and the groups are the war-peace periods or the pre-war and post-war peace periods. We do it for imports, exports and imports exports together and then excluding plantation foodstuff. Resulting p-values are reported in tables 16 and 17 and figures 19 to 26 show the distribution for each sitc and country in each period.

Considering a 5% threshold for rejecting the null hypothesis of equality of means, we observe from table 16 that there is undoubtedly a change in trade structure by products between war and peace periods overall. The p-value is zero, which implies that at least one sitc category (which is not necessarily Plantation foodstuff, because the p-value increases after removing it from the analysis) changes between the two periods. Narrowing down our analysis we proceed to observe the difference between trade structure in war and preceding or following peace periods. Both because of lack of data and of very short peace periods, the comparison is not always possible. We could only examine the difference between Seven Years Wars and the 1764-1777 peace, 1764-1777 peace and War of American Independence, French Revolutionary Wars and Continental Blockade and Continental Blockade and the 1816-1840 peace. In the first case we observe that we can reject the hypothesis that the two mean vectors are the same, i.e. at the end of the Seven Years War there was a clear shift in composition of trade. The only exception is for the case of aggregate imports and exports, including Plantation Foodstuff, where we fail to reject the null hypothesis, however individually on imports and exports the significance for rejection is quite high. Such dramatic change did not happen with the beginning of the War of American Independence, we observe in fact that the p-values are all above the 5% level, and even if they decrease upon eliminating Plantation Foodstuff, they remain above the threshold. Hence in this case we can say that the outburst of the conflict did not have consequences on French trading pattern. The same cannot be said for the difference between

French Revolutionary Wars and Continental Blockade, when there was once again a clear shift in composition of trade, which does not only depend on Plantation Foodstuff, i.e. the share of at least another category of the SITC classification changed significantly between the two periods. We also observe that the change was longer lasting. At the end of the Continental Blockade in fact, France does not seem to recover its pre-Blockade trade structure. This cannot only be due to the fact that it lost its main source of Plantation Foodstuff import and re-export, because even excluding this category the result is consistent.

B.5 French Budget

The French Navy budget is one of the better known of the Ancien Régime budgets. Unfortunately, it is still quite difficult to determine. We try to compute a serie from 1740. The canonical source is Legohérel (1965). An important printed source is Neuville (1898). Dull (1975); Villiers (2002) have useful insights. There is a long-term serie (1691-1782) probably coming from *La Cour des Comptes* in the Bibliothèque Nationale (*Nouvelles Acquisitions Françaises*, 5399). It is notoriously an under-estimation (Villiers (2002)). We exclude the source from 1740 to 1760 that is found in the *Archives Nationales* (G7 1830) because, according to Villiers (2002), it includes the colonial budget. For 1745 and 1748-1770, Neuville and Villiers provide numbers from the intendant du Trouset d'Héricourt that are plausible. We use them. They are 2.5 % higher than the BN source. So for 1740-1744, 1746 and 1747 we use the BN numbers multiplied by 1.025 For 1776-1783, Dull (1975)[p.348-350] has worked out that the "best" source comes from Castrie. We use them. They are 6% higher than the BN source. So for 1771-1775, we use the BN source multiplied by 1.06.

For 1783-1788, we use Pierre-Victor Malouët as reported by Villiers (2002). For 1789-1791, we use rough estimates by Charles-François Lebrun as reported in (Marion, 1914, p. 259 and 332). For 1801, we use Branda (2007),. We distribute the "imperial arrears" (i.e. the money still owned by the State at the fall of Napoleon that had not been affected to a budget year) over the years 1812-1814 on a pro-rata temporis basis. Finally, for 1816-1825, we use the official publications named "Compte Rendu... ..." (181, 1814, 1818; 182, 1826))

Better ? These are coming from the BNF

We try to determine what has been actually expended each year rather than each year's budget, as before the reform of 1822 these were not the same thing (see Kott (2019)). Finally, for 1793-1800, the lack of sources due the total disorganisation of French finances at the time leads us to simply assume a constant growth rate of the budget between the (quite uncertain) 1792 budget and the (much more reliable) 1801 budget.

The resulting series is used in the paper.

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Notes

█	More recent literature: Chang and Wu (2020) GD – looking at this paper, I am not sure it is relevant. . .)	4
█	Our graphs need to be color-independent	5
█	Write down the estimated four equations (just for war years))	8
█	We should have only 20 years for the running sum regression on prizes imports	8
█	Really ? This seems way too large. Did you scale to 100 or to 1 ?	9
█	I see 8 percents in table 8 ?	9
█	I see 5 and 0.08. That is quite a large difference. Again, it does not seem plausible	9
█	Why not use the value of prizes ?	9
█	What do we want to say with this section?	10
█	use insurance rates in Ducoin ?	12
█	Citer Tracy plutôt ?	13
█	Maybe separate the peace-time consequences and the war-time consequences? Or use this as transition even more than you already do?	15
█	Discuss political cost of Neutral policy (Spain 1760, US 1812, League of armed Neutrality) .	15
█	Discuss regressions including peace time here	17
█	I wanted to make a clarifying table – 18 see table 18	17
█	Add 1792 data ? Start earlier to see the catch-up ?	25

■	The regression should be numbered, please	43
■	Citation here? – GD Yes, we need to have a deep long conversation about inflation (including how it changes the loss function. Still mulling this one.).	60
■	Better ? These are coming from the BNF	65