

# A “phantom border” effect - The (lack of) effect of the 1870 Franco-Prussian War on French trade.

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## Abstract

We investigate the impact of the Franco-Prussian War of 1870 and the annexation of *Alsace-Lorraine* on French international trade. Using a synthetic control approach, we first show that the war’s effect was moderate and extremely short-lived, a finding consistent with broader patterns observed in the nineteenth century ([Karlsson and Hedberg, 2021](#)). We then examine two potential mechanisms underlying this result: the substitution of trading partners and the role of sunk costs. While trade with Germany declined sharply during the conflict, it returned to pre-war levels immediately afterward. Furthermore, products associated with industrial centers near the border experienced increases in trade following the war. These patterns suggest that sunk costs, rather than partner substitution, best explain the resilience of French trade.

**Keywords:** War 1870; International trade; France; Nineteenth century.

**JEL classification codes:** ...

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# 1 Introduction

There is now substantial evidence that wars strongly and negatively affect international trade (Martin et al., 2008; Glick and Taylor, 2010; Qureshi, 2013; Schultz, 2015; Kamin, 2022). For instance, Glick and Taylor (2010) find that wars reduce trade among adversaries by approximately 80% during the conflict, and that it typically takes about ten years for trade to return to its pre-war, “peace” level.<sup>1</sup> They also show that wars negatively impact neutral countries, with trade reductions estimated at around 5–12%.<sup>2</sup>

However, the negative impact of war on trade appears to have been considerably smaller during the nineteenth century (Karlsson and Hedberg, 2021). In particular, wars primarily disrupted trade between belligerents, with effects that largely disappeared once peace was restored. Moreover, trade between belligerents and neutral countries may even have increased during wartime. Karlsson and Hedberg (2021) propose several explanations for this limited impact, emphasizing the relatively low level of trade specialization, which would have facilitated the substitution of trading partners.<sup>3</sup> Moreover, some authors (Barbieri and Levy, 1999) contrast the destructive effect of conflict in providing evidence that trade between adversaries continues during wartime.

For a country involved in a military conflict, the ability to easily substitute products and commercial partners could permit to maintain its level of trade (Feldman and Sadeh, 2018; Gowa and Hicks, 2017).

However, the predictions of this substitution mechanism regarding postwar trade between belligerents are ambiguous. On the one hand, following the end of hostilities, countries could

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<sup>1</sup>The influence of the two world wars in this study is suspected to largely increase the amplitude of the results.

<sup>2</sup>Alternatively, Blomberg and Hess (2006) estimate that violence (including interstate conflict) has an effect equivalent to a 30% tariff.

<sup>3</sup>Karlsson and Hedberg (2021) also suggest that trade played an important role in government revenues during the nineteenth century, providing incentives for states to preserve trade flows during conflicts. Additionally, blockades were likely less effective prior to the development of technologies such as submarines.

(re)substitute trading partners and swiftly return to prewar trade levels. On the other hand, if political tensions persist, economic actors may prefer to retain the new partners established during the war, inhibiting the return to previous trade patterns.

Although based on contemporary data, [Davis and Meunier \(2011\)](#) propose an alternative mechanism that would also predict a limited effect of conflicts on trade: the existence of sunk costs. They argue that “intrafirm contracting relationships, but also consumer purchase decisions, exhibit strong path dependence.” Under this mechanism, firms would find it too costly to switch trading partners, regardless of political tensions. In the extreme, this would imply little to no effect of conflict on trade, as firms would not substitute their commercial partners at all. Such an idea was further explored in [?](#) and [?](#) who respectively explore the effect of uncertainty shocks and the effect of the China-US trade war. In both cases, they show that “relationship stickiness” reduces the effect of the shocks.<sup>4</sup>

In the specific case where war leads to territorial annexation, the implications of these two mechanisms diverge markedly. Territorial changes are likely to increase trade costs between the losing country and its annexed territories. If substitution of products and partners is relatively easy, firms may relocate production sites to adapt to the new political boundaries. Historical examples include the partition of Germany after the Second World War ([Redding and Sturm, 2008](#)) and the loss of Korea by Japan in 1945 ([Nakajima, 2008](#)). Similarly, [Wolf \(2007\)](#) studies shifts in industrial location following the (re)unification of Poland at the end of the First World War. Territorial changes may thus alter the spatial equilibrium within countries and reinforce adjustments in trade relationships between countries. By contrast, if sunk costs dominate, territorial annexations

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<sup>4</sup>[Zeng et al. \(2022\)](#) also study the US-China relationships, with a focus on the 2018 trade war. They nuance the role of “sunk costs” as they do find a reduction in trade, that might have been concentrated on the industries with supply chains highly linked to China.

would not disrupt existing commercial relationships, and high levels of trade would persist between annexed territories and their former country.

Building on the two mechanisms outlined above — (a) partner substitution and (b) sunk costs of trade — the objective of this article is to measure the consequences of the Franco-Prussian War of 1870–71 on French international trade. As we have access to detailed data for France, our focus is primarily on this country. Although the conflict was relatively brief, lasting from July 1870 to January 1871 - while German occupation in September was already near-total in Northeastern departments, it had significant political and economic repercussions. Most notably, France ceded Alsace, Moselle and parts of Lorraine to Germany, and political tensions between the two nations remained elevated for years afterward (at least until 1887), potentially encouraging exporters and importers to seek alternative markets. Consequently, regions most commercially integrated with Germany could have experienced trade declines, particularly if partner substitution or firm relocation was relatively easy. Alternatively, the limited integration of the annexed territories into Germany ([Silverman, 1971](#)) may have helped sustain important levels of trade between France and Germany, in part through continued exchanges with Alsace-Moselle.

Previous research offers mixed findings on the trade effects of the 1870 war. On one hand, [Dedinger \(2012\)](#) argues that the war had a major impact on Franco-Prussian trade, notably inverting the comparative advantages of the two countries in food and manufactured goods. On the other hand, [Kuga \(2016\)](#) finds that French communes near the new Prussian border grew faster than other communes after the war. Although he emphasizes the role of state interventions, such as fort construction and garrison deployment, his findings suggest localized economic dynamism and a potential for sustained cross-border trade.

These contrasting perspectives raise important questions: Did France experience a reduction in

trade flows following the war? More specifically, was trade with Germany affected? If not, why? Could sunk costs have played a role in maintaining significant trade between the two countries?

To address these questions, we proceed in two steps. First, using state-level trade data and synthetic control methodology, we analyze France's overall trade with foreign countries. We find that (i) the aggregate level of French trade was impacted by the war (between -8 and -28% between 1870 and 1875) but quickly return to its pre-war level. (ii) Trade between France and Germany experienced a strong decline during the war, but then return to its expected level. That said, in line with [Dedinger \(2012\)](#), we do not rule out the possibility that the war altered the balance of trade between the two countries, though this finding appears sensitive to the measurement and specification employed. Moreover, the financial transfer related to the payment of the war indemnity is likely to have induced such a shift in trade positions [Angell \(1930\)](#); [Monroe \(1919\)](#).<sup>5</sup>

Second, we draw on regional and product-level data to explore the mechanisms underlying the resilience of trade flows.<sup>6</sup> (i) We first provide descriptive evidence, consistent with [Kuga \(2016\)](#), that the German border region remained an important industrial center after the war - or even grew - suggesting a small relocation of economic activity. (ii) We then use OLS and PPML regressions with large number of fixed effects to show that products corresponding to the industrial specializations of the annexed and adjacent regions actually experienced increases in trade after the war, at least in customs centers located along the border. It is likely that firms in the annexed territories continued trading with their French partners, sustaining and even expanding trade flows on some products. This offers indirect evidence supporting the sunk costs mechanism.

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<sup>5</sup>The large reduction in French consumption and the rise in German consumption following the war might be explained by wealth effects of the transfer and then, these shifts in the composition of world spending would have turned the terms of trade in Germany's favor [Gavin \(1992\)](#).

<sup>6</sup>Our data are reported at the customs center level, which we aggregate into a "German Border" level for some analyses.

Our analysis contributes to two strands of the literature. First, we add to the extensive body of research on the effects of wars on trade. As noted above, many studies emphasize the large and sometimes persistent negative impacts of conflict on trade (Martin et al., 2008; Glick and Taylor, 2010; Qureshi, 2013; Schultz, 2015; Kamin, 2022). Recent events, notably the Russian invasion of Ukraine, have renewed interest in this question (Ahn et al., 2023; Goyal and Steinbach, 2023; Steinbach, 2023). This growing literature benefits from highly disaggregated data, which allow scholars to trace the effects of conflict and the patterns of partner, product, or port substitution in great detail.<sup>7</sup> Although our data are less detailed than those used in recent studies, they are highly disaggregated by nineteenth-century standards, enabling us to track the geographic dimension of trade flows and to show that a country undergoing territorial loss could maintain significant commercial activity, at least with the annexed territory. In addition, it has been shown that using disaggregated trade data at the product level is essential to better understand the relationship between war and trade.(Dorussen, 2006; Chatagnier and Kavaklı, 2017).

Second, we contribute to the understanding of nineteenth-century French trade. Most existing studies focus primarily on trade policy (e.g., Bairoch, 1972; Becuwe and Blancheton, 2013; Becuwe et al., 2018; Becuwe, 2020). However, the effects of shocks -such as the Franco-Prussian War - have also been explored, particularly by Dedinger (2012). We complement her work by employing different methodologies and more geographically disaggregated data. Although we agree that the war may have affected the structure of trade, we highlight the important role of sunk costs in sustaining trade flows<sup>8</sup>

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<sup>7</sup>This literature also relates to studies of how shocks such as natural disasters and pandemics affect trade patterns. See, for example, Glick and Taylor (2010); Hamano and Vermeulen (2019); Friedt (2021); Arita et al. (2022); Steinbach (2022).

<sup>8</sup>While the focus differs, our approach using customs-center-level data is similar to Lévéque et al. (2024), who study how the development of local railways influenced international trade.

The remainder of the article is organized as follows. Section 2 presents the historical background of the study. Section 3 develops our empirical hypotheses. Section 4 describes the data. Section 5 analyzes the aggregate effects of the war on French trade. Section 6 investigates the underlying mechanisms using regional and product-level data. Section 7 concludes.

## 2 Historical background

### 2.1 The 1870 war

Detailed accounts of the causes of the Franco-Prussian War can be found in [Showalter \(2015\)](#); for a shorter exposition, see also [Derluermoz \(2012\)](#). Diplomatic tensions between France and Prussia had been mounting since 1866, following Prussia's victory over Austria. France accused its neighbor of reneging on a promise to cede Luxembourg, a dispute known as the *Luxembourg Crisis*. This was soon followed by another diplomatic confrontation concerning the succession to the Spanish throne. The candidacy of Léopold de Hohenzollern-Sigmaringen - a distant cousin of the Prussian King (William I) - raised fears in France of encirclement by Prussian-controlled territories, providing a *casus belli* for the French government. Although William I persuaded his cousin to withdraw his candidacy, Bismarck's manipulation in the famous *Ems Dispatch* portrayed the French diplomats, who came to negotiate the withdrawal, as insulted, provoking France to declare war on Prussia on 19 July 1870.

French mobilization difficulties and its inefficient centralized command, combined with the superiority of Prussian artillery ([Roth, 2014](#)), led to a series of French defeats in August 1870. Emperor Napoléon III surrendered on 1 September ([Carr, 2014](#); [Derluermoz, 2012](#), respectively, pp. 204 and 311). This defeat precipitated a dramatic political shift: the fall of the Second Empire

and the proclamation of the French Third Republic on 4 September. Although the new republican government initially attempted to continue the war effort, it ultimately accepted Prussia's peace terms, signing the armistice on 28 January 1871.

For France, military casualties are estimated between 105,000 and 140,000 soldiers; as far as we know, civilian losses remain undocumented ([Derluermoz, 2012](#), p. 318). The financial cost of the war amounted to approximately 7.5 billion francs: 2.5 billion in direct military expenditures and an indemnity of 5 billion francs payable to Germany. In addition, about one-third of French territory was occupied by German forces following the armistice (an occupation that lasted until 1873). Most significantly, Alsace and parts of Moselle were annexed by Germany, representing approximately 14,500 square kilometers and 1.6 million inhabitants. While the direct economic impact of the war on France's industrial and agricultural sectors is considered relatively limited ([Derluermoz, 2012](#), p. 318), certain sectors such as metallurgy and textiles - both leading industries in Alsace and Lorraine - were strongly impacted ([Asselain, 1984](#); [Dormois, 2009](#); [Silverman, 1971](#), p. 160).

It is also important to note that France endured a brief but violent civil conflict - the Paris *Commune*<sup>9</sup> - partly triggered by divisions over whether to continue the war against Prussia. Estimates of casualties vary, but human losses likely ranged between 10,000 and 20,000. The civil war culminated in the *Semaine Sanglante* and the widespread destruction during the *Fires of the Paris Commune*, exacerbating the damages already caused by the prolonged siege of Paris.

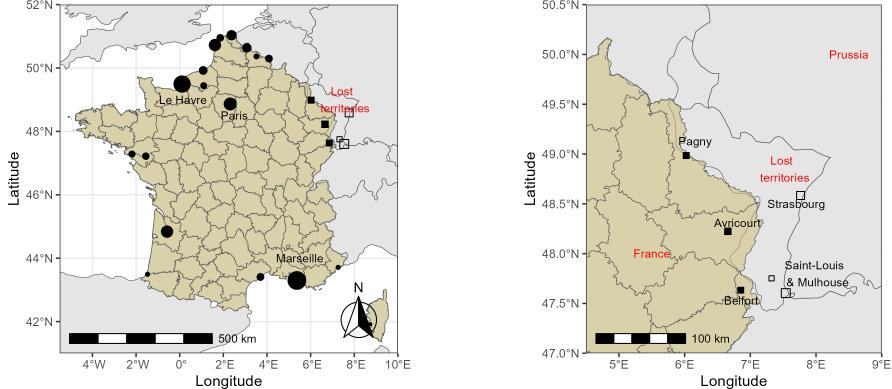
Finally, for the purposes of our analysis, it is important to note that the territorial losses required France to modify the organization of its customs centers. In particular, three customs centers were relocated from the previous frontier to the new border. Figure 1 illustrates the main French customs centers (left panel), with a focus on the relocated centers following the war (right

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<sup>9</sup>Actually, the Paris *Commune* inspired several regional insurrections all over France

panel).

**Figure 1:** A map of the custom centers.



Note: this map uses the shapefiles from [Gay \(2020\)](#) and [Schvitz et al. \(2022\)](#) as well as trade data from the *Montesquieu* project. See the text for more details. The map displays the main custom centers in France between 1860 and 1880 (left panel). In particular, it shows the customs centers affected by the 1870 war (right panel).

## 2.2 French trade and the war

The 1870 war occurred in the broader context of the sharp decline in transportation costs during the nineteenth century, which contributed to the First Globalization ([Findlay and O'Rourke, 2007](#); [Jacks et al., 2011](#)). It also took place during a period of relative “laissez-faire” in French trade policy, following the Cobden–Chevalier Treaty of 1860 and preceding the protectionist turn of the mid-1880s, a shift ultimately reinforced by the M  line Tariff of 1892.

To the best of our knowledge, [Dedinger \(2012\)](#) provides the most detailed existing study of the consequences of the 1870 war on Franco-German trade relations. She highlights three main points. (a) Although Franco-German trade had been steadily increasing since the 1840s, the war reversed this trend. As a result, Germany was underrepresented in French trade during the First Globalization. (b) In the very short run (1872–73) - likely due to the temporary free-trade privileges

granted to industrialists in Alsace-Lorraine under Article 11 of the Treaty of Frankfurt - there was a spike in French imports. (c) Finally, the Franco-German pattern of comparative advantages shifted after the war. Whereas France had previously exhibited a comparative advantage in manufactured goods and a disadvantage in food products, this pattern had reversed by the turn of the twentieth century.

### 2.3 Franco-German bilateral relationships

Franco-German bilateral relations remained strained long after the end of the war and the occupation (which ended relatively early in 1873 thanks to the anticipated payment of the war indemnity). This persistent tension may partly explain why - despite declining transportation costs - bilateral trade costs between the two countries potentially remained high.

Several episodes reactivated the risk of conflict between the two neighbors. This began as early as 1875 with the *Krieg-in-Sicht crisis*, when Bismarck expressed concerns about the rebuilding of French military capacities. Later, in 1887, both Bismarck and the French government engaged in nationalist and militaristic rhetoric ([Houte, 2014](#), p.176). Although historians generally agree that the probability of escalation remained low during both episodes, these events nevertheless kept the possibility of war alive. Diplomatic tensions resurfaced again in the early twentieth century during Morocco's colonization, particularly during the Tangier Crisis (1905) and the Agadir Crisis (1911).<sup>10</sup>

In addition to diplomatic tensions, the period from 1870 to 1914 was marked by enduring cultural resentment. As [Carr \(2014\)](#) notes (p.152), "anti-French feeling on the German side and anti-Prussian feeling on the French side became prominent features of Franco-German relations" even

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<sup>10</sup>[Houte \(2014\)](#) (p.387) suggests that the second episode led the French military to recognize that the risk of war was serious in the short term.

before 1870. The annexation of Alsace and Moselle only deepened these animosities. For instance, as early as 1871, the popular song *Alsace et Lorraine* called for revenge. This sentiment appears to have remained strong until the First World War, although it may have softened somewhat during the period from 1898 to 1905 (see [Poidevin, 1996](#)). Anti-German sentiment was often mobilized by economic interests, with industrialists and bankers advocating for greater protectionism against German competition (for a discussion focused on the years leading up to WWI, see: [Poidevin, 1996](#)). Noteworthy, the German tariff of 1879 marked symbolically the return of protectionism in Europe ([Bairoch, 1993](#)).

It is always difficult to measure the true intensity of Franco-German animosity and its precise impact on trade.<sup>11</sup> However, recent research emphasizes that *cultural distance* can significantly hinder trade (see, e.g., [Boisso and Ferrantino, 1997](#); [Guiso et al., 2009](#); [Cyrus, 2012](#); [Gokmen, 2017](#)). In this context, the persistence of cultural resentment may have negatively affected Franco-German commercial relations.

## 2.4 The status of the annexed territories

Although Alsace and Moselle were annexed to Germany, and despite efforts to germanize these territories, their integration into the German Empire remained incomplete.<sup>12</sup> As [Silverman \(1971\)](#) recalls, “German manufacturing interests had done their best to thwart the economic integration of Alsace-Lorraine into the empire.” In particular, in 1870, Alsace produced roughly the same quantity of cotton as the entire Zollverein, raising fears that Alsatian producers - if cut off from the French market - would be forced to sell within Germany and severely disrupt domestic competition. Some

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<sup>11</sup>As noted by [Yon \(2021\)](#) (p.129), this animosity could be nuanced; for instance, there was considerable admiration for German science in France.

<sup>12</sup>For instance, while political integration began in 1874, Alsace-Lorraine had to wait until 1911 to obtain its own constitutional laws, which still did not guarantee the same rights as those enjoyed in other parts of the German Reich.

southern German industrialists even advocated abandoning the annexation of northern Alsace.<sup>13</sup>

To prevent the collapse of the Alsatian economy, trade agreements were implemented to maintain links between Alsace-Moselle and France. These measures included: (1) the free circulation of goods between Alsace-Moselle and France until December 31, 1871; (2) the gradual introduction of tariffs only after that date; (3) the postponement of mandatory adoption of the German Mark until 1876, protecting Alsatian producers from the currency's initially low value; and (4) low reciprocal tariffs on French goods and raw materials. The last point was reinforced by the fact that Germany was granted a most-favored-nation clause as part of the 1871 peace treaty.

Additionally, the treaty allowed residents of Alsace-Moselle to opt for French citizenship and migrate to France. Up to 10 percent of the population chose this option, with significant local variations. For instance, [Vaillot \(2020\)](#) reports that about half of Metz's population migrated.<sup>14</sup> Many of these migrants resettled near the new Franco-German border ([Eiler, 1979](#)).

Overall, it appears that after the annexation, trade between France and the annexed territories remained relatively facilitated, at least in the short term. By contrast, the integration of Alsatian firms into the German market may have been considerably more difficult.

### 3 Mechanism and empirical hypotheses

The conceptual framework we consider is extremely simple and summarized in Figure 2. Suppose that a firm initially earns a profit  $\Pi$  from its existing trading partners. Following a military conflict, the firm experiences a “trade shock” of magnitude  $C$  when trading with these partners. The firm

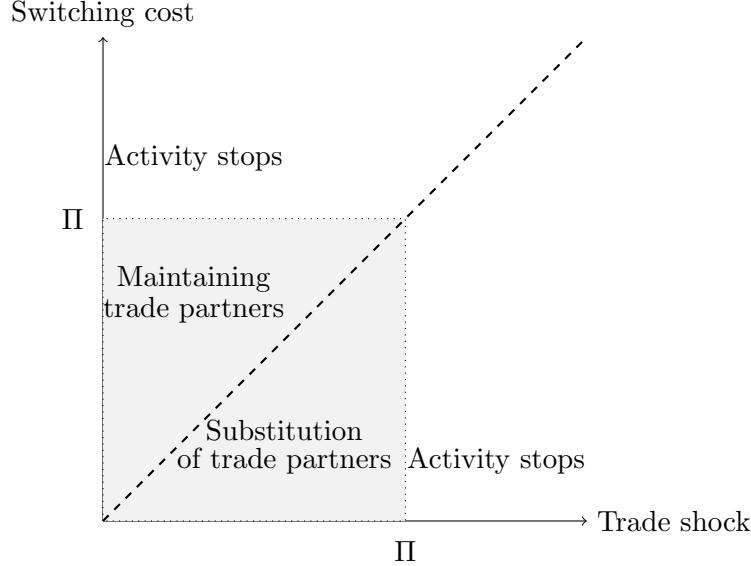
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<sup>13</sup>The integration of the annexed territories into Germany also presented technical challenges, at least in the short run. For example, French and German railway systems operated on different standards, complicating rail transport between Alsace-Moselle and the rest of Germany ([Forthoffer, 2018](#)).

<sup>14</sup>As an example, [Eiler \(1979\)](#) also documents the economic consequences for Bischwiller: the town's population dropped from 11,500 in 1869 to 5,000 by 1874, and the number of weaving looms fell from approximately 2,000 to 650.

then faces a choice: it can search for new trading partners at a cost  $SC$ , or it can cease operations if its profits fall below its outside option (normalized to zero).

**Figure 2:** Switching costs and trade cost



The firm seeks to maximize its profit. If both  $C$  and  $SC$  exceed  $\Pi$ , the firm will cease its activity. Conversely, if  $\min(SC, C) = SC \leq \Pi$ , the firm finds it profitable to switch to a new trading partner. If  $\min(SC, C) = C \leq \Pi$ , the firm maintains its existing trading relationship.

This framework highlights a simple yet important fact: if a military conflict raises trade costs between two countries - such as France and Germany - one should expect bilateral trade to decline. Indeed, at least for some firms, we could expect  $\min(C, SC) > \Pi$ . This is a classical result from the “trade and conflict” literature (see, for instance, [Martin et al., 2008](#); [Glick and Taylor, 2010](#); [Qureshi, 2013](#); [Schultz, 2015](#); [Kamin, 2022](#)).

However, we also know that trade disruptions were often relatively moderate during the nineteenth century ([Karlsson and Hedberg, 2021](#)). This observation suggests two potential explanations: (a) switching costs may have been low, allowing firms to substitute partners easily; or (b) switching

costs were high, but the trade shock itself remained moderate relative to expected profits. This interpretation is consistent with [Davis and Meunier \(2011\)](#), who argues that sunk costs in trade relationships can mute the effects of political tensions, even if their focus is on tensions rather than outright conflict.

We aim to apply this simple framework to assess the impact of the 1870 Franco-Prussian War on French international trade. Broadly speaking, the framework predicts a decline in trade: for at least some firms,  $\min(SC, C) > \Pi$ , making continued trade unprofitable. However, following [Karlsson and Hedberg \(2021\)](#), who find that military conflicts had limited effects on aggregate trade flows, we derive our first empirical hypothesis:

**Hypothesis 1:** *The 1870 war was associated with a negative but short-lived disruption of French international trade.*

This general prediction leaves open two mechanisms for the moderated trade effects observed:

(A) Firms were able to absorb the shock by switching partners (low switching costs), or (B) Firms were unable to switch, but the trade shock itself was relatively small compared to profits.

The annexation of Alsace and Moselle introduces a more complex case. Indeed, our simple framework does not immediately predict whether international trade would rise or fall for firms located in annexed territories: maintaining a trading partner could imply either outcome. If firms on the annexed territories were trading with Prussia, the annexation would cause a decrease in trade. To the contrary, if firms in the annexed territories were trading with French firms, the annexation could lead to an increase in trade.

Overall, the historical evidence described above could not help deciding whether trade with

Germany would decrease or remain relatively unaffected. As suggested, the tensions and the cultural resentment was high after the war. However, the annexed territories likely had incentives and abilities (at least in the short run) to maintain their trade relationship with France. We therefore consider both possibilities:

**Hypothesis 2a:** *Trade between France and Germany declined following the war.*

**Hypothesis 2b:** *Trade between France and Germany remained relatively unaffected.*

That said, if the effect on the overall level of trade might be unknown, at the *local level*, one could be more confident in the maintaining of sustained level of trades. The historical evidence suggests that Alsatian firms had incentives to remained connected with French markets. For firms located near the (new) German border, it also might have been costly to find new partners. Indeed, if they were decreasing, inland transportation costs were still important during the second half of the nineteenth century.<sup>15</sup> Consequently, we might expect that near the German border, trade flows did not decrease:

**Hypothesis 3:** *Imports of Alsatian products into France increased after the war; French firms trading with Alsatian partners may have expanded their exports.*

This third hypothesis echoes some of the findings in [Dedinger \(2012\)](#), who observes an increase in French imports from Alsace-Lorraine in the short term after the annexation. However, while

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<sup>15</sup>This fact was often acknowledged by political actors. The *député* Paul d'Estournelles for instance claimed in 1897 that: “it is already more difficult, more expensive, and often more time-consuming to get our goods across the territory of France than across the ocean.” (*Journal Officiel* December 10 1897, p.2810 - our translation).

Dedinger focuses on the broader restructuring of Franco-German trade relations over the mid- to long term, we concentrate on the persistence of cross-border trade ties immediately following the war.

## 4 Data

### 4.1 Trade data

We begin our analysis using trade data from the *TradHist* database (Fouquin and Hugot, 2016), which provides bilateral trade flows between countries.

Our primary data source, however, is the *Montesquieu* project (Becuwe et al., 2019), based on the *Tableau général du commerce de la France avec ses colonies étrangères* and, after 1896, the *Tableau général du commerce et de la navigation*. The *Montesquieu* project provides detailed information on the value of French exports and imports recorded at various customs centers. We rely on two versions of the data: an aggregated dataset at the customs center level (available annually) and a product-level dataset. We built from this raw database a new one in which each product is assigned its corresponding HS (Harmonized System) 4-digit-code. Similar to another approach assigning products to the SITC nomenclature (Becuwe et al., 2019), we refine the data using a contemporary coding system. This method not only enhances readability but also increases the accuracy of our study by allowing for a better isolation of specific products. Indeed, the original source provides imprecise product categories that do not allow for grouping goods following an analytically useful classification. Table A1 illustrates the differences in accuracy between the original categories and the final dataset's classes used in this article. We identify 403 traded products (4-digit codes) over the study period. These goods are further categorized into two

additional levels of disaggregation: 97 categories at the “chapter” level and 22 categories at the section level, which encompasses these chapters. However, 1,001 observations remain uncategorized, representing approximately 4 percent of the observations. Table A2 lists all chapter and section numbers and titles.

To the best of our knowledge, this is the only historical source that systematically reports the location through which trade flows transited, thus offering an essential geographical dimension to our analysis. Nevertheless, several limitations should be acknowledged.

First, the dataset includes only major customs centers -ranging between 19 and 25 centers per year - while smaller centers are aggregated into an “Other centers” category that represents 25.8 percent of total observations, reducing spatial granularity.

Second, and more importantly, the valuation of trade flows may be subject to biases. Customs authorities relied on the *Commission Permanente des Valeurs en Douane* to estimate the value of goods. Historical evidence suggests that valuations for certain products may have been politically motivated, particularly to mask or reduce the appearance of trade deficits (Bécuwe et al., 2023). As is often noted in the literature (e.g., Dedinger, 2012; Bécuwe et al., 2023), import data - because they were important for tariff revenues - are generally considered more reliable than export data.

Third, and crucially, trade flows are recorded at the location of the customs center, not necessarily at the actual border crossing (nor the place where goods were produced or consumed). This introduces ambiguity about the geographic origin of goods prior to customs declaration. The issue is particularly acute for Paris, which handled a significant proportion of French trade but where goods may have transited through multiple routes before declaration. For our purpose, German goods or French export to Germany might have been declared in Paris before crossing the border.

## 4.2 Other data

We complement these primary data sources with several additional datasets. First, we use GDP data from the Maddison Project database (Fouquin and Hugot, 2020). More importantly, we draw on the 1865 industrial census (Postel-Vinay et al., 2022) to identify the main economic activities within, or in proximity to, the annexed territories. We also make use of the 1906 that contains information on the population per sectors.<sup>16</sup>

In addition, we employ several historical shapefiles constructed by Gay (2020) and Schvitz et al. (2022), which allow us to map the administrative divisions of the French Third Republic. In particular, these shapefiles enable us to precisely identify the *arrondissements* that were partially or totally annexed following the 1870 war.

# 5 The impact of the 1870 war on French trade

## 5.1 Methods

In this section, we analyze the impact of the 1870 war on French trade at the aggregated level.

We rely on the *synthetic control* methodology developed by Abadie and co-authors (Abadie and Gardeazabal, 2003; Abadie et al., 2010; 2015), with a recent overview provided by Abadie (2021). This method has been applied to study the economic consequences of conflicts (Kešeljević, 2024) and the effects of the protectionist turn during the First Globalization (Potrafke et al., 2022).

Intuitively, the synthetic control method estimates the causal effect of the 1870 war on French trade by comparing the observed trade levels to the levels that would have prevailed in the absence of the war. The treatment effect is defined as  $\tau = Y_t^{\text{observed}} - Y_t^{\text{counterfactual}}$ . Since the counterfactual

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<sup>16</sup>Scanned versions of the census are available on Gallica.fr, the website of the *French National Library*.

outcome is not observed - France did, in fact, fight the war - it is reconstructed as a weighted average of the outcomes of other units:  $Y_t^{counterfactual} = \sum_{i \neq F} w_i Y_{it}$ . When studying French international trade, we thus use trade levels of other countries, or France's trade with other partners, to construct the synthetic control. We provide more details below on the *donor pools* (observations that could help us constructing the counterfactual) as its composition depends on the analysis.

When using synthetic control, inference typically relies on permutation tests. Under the null hypothesis of no treatment effect, one can imagine that all units are alternatively assigned the treatment (i.e., being at war with Germany in 1870). The distribution of estimated effects across these placebo tests provides a benchmark to assess the significance of the actual effect (see: [Abadie, 2021](#)).<sup>17</sup>

## 5.2 French trade - Aggregated results

First, we estimate the effect of the 1870 war on the aggregate level of French trade. This task is complicated by the fact that the war occurred shortly before the onset of the *Long Depression* (beginning in 1873). A key risk is therefore to wrongly attribute a potential decline in trade to the war, when it could instead reflect a broader economic slowdown.

To address this, we work at the national level and use the (log) trade levels of other countries - obtained from the *TradHist* database ([Fouquin and Hugot, 2016](#)) - to reconstruct the counterfactual path of French trade in the absence of the war. To improve comparability, we restrict the *donor pool* (i.e., the set of countries used to build the counterfactual) to those with complete series from 1861 to 1885.<sup>18</sup> We select 1861 as the starting point to avoid capturing the shock of the 1860

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<sup>17</sup>We implement the method in Stata using the package developed by [Galiani \(2017\)](#).

<sup>18</sup>Specifically: Argentina, Austria-Hungary, Belgium, Canada, Denmark, Spain, Finland, Great Britain, Greece, Italy, Netherlands, Norway, Portugal, Sweden, the United States, and Russia.

trade agreement. The choice of 1885 as the endpoint is more arbitrary, but results are qualitatively robust to alternative selections.

Our approach assumes that the war had little or no effect on the trade performance of other countries. While strong, this assumption is consistent with the findings of [Karlsson and Hedberg \(2021\)](#). They show that during the nineteenth century, neutral countries' trade levels were largely unaffected by wars.

Table A3 shows how the different countries contribute to the counterfactual and underlines the contribution of Great Britain. Then, table A4 provides year by year estimates of the effect of the war on French trade. Figure 3 summarizes our main results.

**Figure 3:** Synthetic control - National level results.



This graph summarizes the result of a *synthetic control* estimation using aggregated trade data from the TradHist database ([Fouquin and Hugot, 2016](#)). It displays the actual and the estimated level of trade before and after the 1870 war.

We find that the war is associated with lower-than-expected levels of both imports and exports. However, two important points must be noted: (i) for exports, the results are never statistically significant; and (ii) for imports, no statistically significant effects are observed after 1875. In other words, although the short-run impact on imports appears substantial - with estimated differences between observed and counterfactual values ranging from 8.3% to 28.2% between 1870 and 1875 - the 1870 war seems to have had no lasting effect on French trade beyond approximately five years. While expected, this forms a striking contrast with 20th century wars whose effects are observed for approximately 10 years (Glick and Taylor, 2010). This is especially noticeable as France was partially occupied until 1873.

We next turn to analyzing bilateral trade flows between France and other countries, with a particular focus on whether the war disrupted trade between France and Germany.<sup>19</sup> Here, the unit of observation is a bilateral flow (either log-imports or log-exports) between France and another country.<sup>20</sup> The treated unit consists of flows between France and Germany, while the *donor pool* includes France's flows with other countries, again restricted to those for which complete data from 1861 to 1885 are available.

Figure 4 summarizes the main findings. Two key insights emerge: (i) the war caused a short-term negative effect on trade flows with Germany, both economically large and statistically significant; (ii) beginning in 1872, estimated effects are generally positive, although rarely statistically significant.

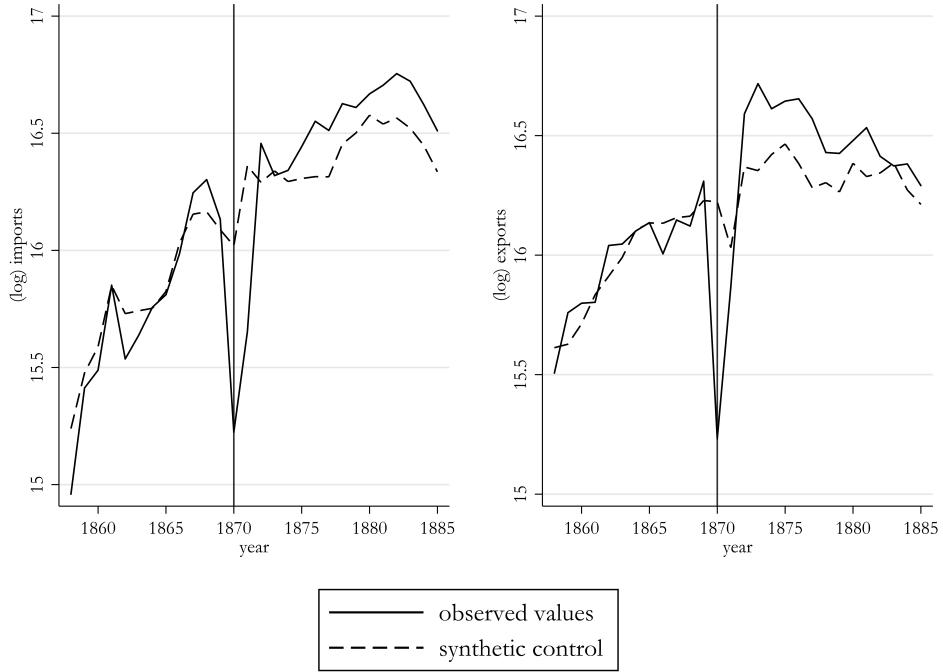
However, this does not imply that the war had no impact on trade between the two belligerents.

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<sup>19</sup>Before the war, we aggregated Zollverein, Mecklenburg, the Hanseatic League cities, and Hanover to form a single German unit, with most trade occurring with the Zollverein.

<sup>20</sup>Appendix Table A5 shows the weights assigned to each flow in constructing the synthetic control, and Table A6 provides the results. Some flows involving French territories (e.g., French Guiana, Réunion) were included in the donor pool, but excluding them does not strongly change the results. We also report results for total trade flows, which are very similar.

**Figure 4:** Synthetic control - National level results - flows with Germany



This graph summarizes the result of a *synthetic control* estimation using aggregated trade data from the TradHist database (Fouquin and Hugot, 2016). It displays the actual and the estimated level of trade before and after the 1870 war.

As emphasized by Dedinger (2012), the conflict may have affected the bilateral trade balance between France and Germany. Although our results are sensitive to the choice of dependent variable and the composition of the donor pool, Figure 5 suggests that the (log) trade balance became (i) lower than expected and (ii) negative for France following the war. Moreover, the effects are often statistically significant after 1876.<sup>21</sup>

### 5.3 Trade on the German border

Although the data at the customs center level do not permit a causal analysis, they can nonetheless complement the preceding results. In Figure 6, we aggregate the value of trade recorded at customs

<sup>21</sup>See Table A6 for further details.

**Figure 5:** Synthetic control - National level results - Balance of trade.



This graph summarizes the result of a *synthetic control* estimation using  $\ln(X/M)$  as dependent variable.

centers located along the Prussian/German border.<sup>22</sup> The figure reveals a strong upward trend in trade values before the war. Between 1872 and 1875, trade even reached historically high levels; a fact consistent with the observations of [Dedinger \(2012\)](#). Thus, the war does not appear to have interrupted the underlying trend. A sharp but brief decline is observed around 1875. By 1880, the level of exports declared at the German border had returned to prewar levels (although the trend was now downward). As for imports, they were higher in 1880 than in 1868.

To conclude this first analysis, our findings align with those of [Karlsson and Hedberg \(2021\)](#): the 1870 war appears to have had only a short-lived impact on French trade. Apart during the war

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<sup>22</sup>Specifically, we aggregate flows from Strasbourg, Mulhouse, and St-Louis before 1870, and from Pagny, Avricourt, and Belfort after 1871.

**Figure 6:** Imports and exports declared in custom centers located on the German border.



This graph shows the value of imports and exports (in millions francs) declared on customs centers located on the German border: Strasbourg, Saint-Louis and Mulhouse before 1870 and Metz, Avricourt and Belfort afterward. Data for 1869 and 1871 are missing.

and the very first post-war years, our estimates generally fail to reach statistical significance.<sup>23</sup>

Notably, our results suggest that Germany was not replaced as a trading partner after the conflict. This supports *Empirical Hypotheses 1 and 2b*. Our interpretation is that, despite geopolitical tensions between France and Germany, the costs associated with switching trading partners were too high for most firms. In the next section, we turn to product-level data to provide further evidence for this interpretation.

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<sup>23</sup>In the appendix, Figure A3 also presents results using (log) GDP per capita as the outcome variable. We find a negative effect of the war, although it is likewise not statistically significant.

## 6 Products and customs centers level results

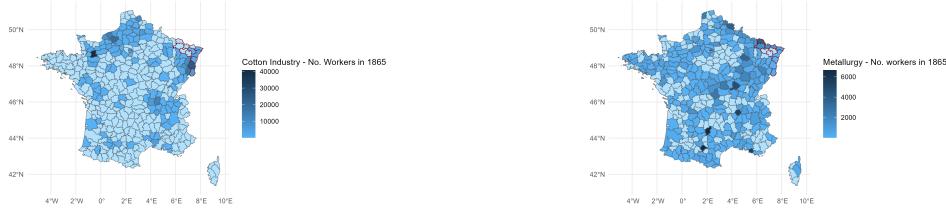
### 6.1 Graphical evidence: industries before and after the war

We begin this section by providing graphical evidence that the 1870 wars did not seem to have strongly impact some of the industries located near the German border.

First, we identify the *arrondissements* that were either annexed or located close to the newly established border.<sup>24</sup> Second, using the 1865 industrial census (Postel-Vinay et al., 2022), we identify the most important economic activities in these areas, based either on the number of workers or the value created.

Consistent with previous accounts (Asselain, 1984; Dormois, 2009), metallurgy and, more importantly, textiles (particularly cotton) were dominant industries in 1865.<sup>25</sup>.

**Figure 7:** Number of workers in cotton and metallurgy per arrondissement in 1865.



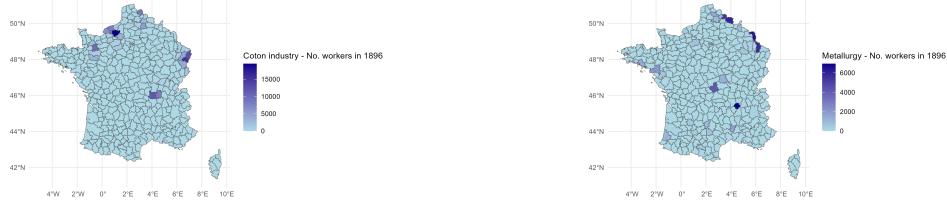
The map shows the number of workers in the cotton industry and in metallurgy in 1865 according to the 1870 industrial census. (*warning: differences in magnitude in cotton industry between the two censuses*)

We then use the 1896 industrial census in order to produce figure 8. It shows that - at least

<sup>24</sup> *Arrondissements* are subdivisions of *départements*, the latter corresponding to the NUTS3 level in France. We classify as annexed the arrondissements of Colmar, Mulhouse, Schlestadt, Strasbourg, Saverne, and Wissembourg. In addition, the arrondissements of Briey, Metz, Château-Salins, Sarrebourg, Nancy, Lunéville, Saint-Dié, Remiremont, and Belfort were partially annexed. Finally, Montbéliard, Lure, Épinal, Commercy, Verdun, Montmédy, Toul, and Mirecourt were contiguous to these partially annexed territories.

<sup>25</sup> For cotton, both weaving and spinning were significant activities. Lace production also appears relatively developed. Although metallurgy and cotton were not the only valuable sectors, they were the most prominent. Other activities (e.g., minting, flour milling) were either less clearly linked to export/import markets or more vaguely defined (e.g., machinery) in the census.

**Figure 8:** Number of workers in cotton and metallurgy per arrondissement in 1896.



The map shows the number of workers in the cotton industry and in metallurgy in 1896 according to the 1906 industrial census.

regarding the cotton industry - the German Border remained an active industrial center. We clearly observe an increase in the number of workers in the cotton industry in Belfort, Remiremont and Saint-Dié-des-Vosges *arrondissements* in 1896 compares to 1865. In the metallurgy sector, the Lorraine *arrondissements* of Sarreguemines, Saverne, and Metz were significant industrial centers by 1865, each employing around 2,000 workers on average. However, the annexation seems to have fueled the activity in neighboring French *arrondissements*, particularly Briey and Nancy<sup>26</sup>. This suggests that at least some of the activities that were important near the border remained present twenty-five years latter. Kuga (2016) similarly suggests that after the war, cities located near the new border experienced faster population growth than cities farther away.

Of course, this evidence remains limited: we cannot observe developments on the German side of the border. Moreover, alternative explanations - beyond sunk costs and the inherent difficulties of relocating certain industries - could account for the observed patterns. To further investigate the role of sunk costs, we now turn to analyzing how trade evolved for products associated with industries that were important prior to the war

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<sup>26</sup>Although contemporaries of Bismarck and Napoleon III were aware of the rich iron ores in Briey, they were also known for their high content in phosphorus. It was only after the invention of the Thomas-Gilchrist process in 1877 that it became possible to exploit such high-phosphorus pig iron effectively.(McKay, 1968)

## 6.2 Product level analysis

As discussed above, we hypothesize that it was too costly for firms to switch trading partners after the annexation, at least relative to the size of the “trade shock” caused by the war. This helps explain why firms did not relocate further from the frontier after the war and why the border region remained an industrial center. If this hypothesis is correct, we should also observe an increase in the trade of goods produced in the annexed territories. Firms located there would have found it more profitable to continue selling their products in France - thus increasing imports - rather than switching trading partners.

To explore this question, we use data at the product and regional levels. “Products” are grouped according to chapters in the Harmonized System (HS) customs classification (see [A2](#)). In our analysis, we consider 91 product chapters. By “region,” we refer to (a) the German border, (b) the North, (c) the English Channel, (d) the Atlantic coast, and (e) the Mediterranean coast. We aggregate the trade flows of all customs centers within each area to obtain regional trade data.

Then, we consider the regression:

$$\begin{aligned} \ln(Y_{prt}) = & \beta_1 \times \mathbb{1}(k = \text{Cotton}) \times \mathbb{1}(r = \text{German Border}) \times \mathbb{1}(t > 1870) \\ & + \beta_2 \times \mathbb{1}(k = \text{Metallurgy}) \times \mathbb{1}(r = \text{German Border}) \times \mathbb{1}(t > 1870) \\ & + \mu_{pr} + \mu_{pt} + \sum_j \delta_j \times \mathbb{1}(j = t) \times \mathbb{1}(r = \text{German Border}) + \epsilon_{prt} \end{aligned}$$

where  $p$ ,  $r$ , and  $t$  stand for product  $p$  in region  $r$  at year  $t$ , and  $Y$  denotes a trade flow, either imports or exports.  $\mathbb{1}()$  represents the indicator function. Thus,  $\beta_k$  captures the variation in trade for a product that was an industrial specialization of the German border prior to the war, specifically on the German border after the war. The parameters  $\beta_1$  and  $\beta_2$  are our primary coef-

ficients of interest; they aim to measure the extent to which the war affected the trade of products corresponding to the pre-war specializations of the territories most impacted by the conflict.

The terms  $\mu_{pr}$  and  $\mu_{pt}$  are product-region and product-time fixed effects, respectively. They control for the fact that each product may have had a different baseline level of trade across regions and may have evolved differently over time. The  $\delta_j$  coefficients capture specific shocks affecting the German border region. Finally,  $\epsilon_{prt}$  is the traditional error term, clustered at the product-region level.

Intuitively, our regression seeks to compare the evolution of trade for products that corresponded to the pre-war specialization of territories near the German border *on that border*, relative to the evolution of trade for *the same products* at *other borders*. This comparison accounts for regional differences in initial trade levels, product-specific time trends, and region-specific trade shocks that may have independently affected the German border.

It is important to note that the above equation corresponds to a traditional log-linear regression. However, because many products may not have been traded on a particular border,  $\ln(Y)$  may be undefined. Furthermore, due to heteroskedasticity, log-linearized regressions can yield biased estimates. To address these issues, we also estimate the model using the pseudo-Poisson maximum likelihood estimator (PPML) proposed by [Silva and Tenreyro \(2006\)](#).

### 6.3 Results

Table 1 provides the results of our main regressions, focusing on the main parameter.<sup>27</sup>

The main result from the table is that no coefficient is both negative and statistically significant. This implies that, for the two products we selected, the level of trade either remained stable or

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<sup>27</sup>In the appendix, in table A7 we display the result of the same regression but without the specific German Border time effects. In table and A8, we clustered the regression per product instead of product/region.

**Table 1:** Results - log-linear and ppml regressions

	(1) exports - log	(2) exports - ppml	(3) imports - log	(4) imports - ppml
<i>Main variables</i>				
Cotton - GB after 1870	-0.837 (0.586)	-0.372 (0.373)	3.012*** (0.784)	1.836*** (0.347)
Iron and steel - GB after 1870	1.866** (0.735)	2.112*** (0.330)	1.779*** (0.538)	2.995*** (0.328)
Observations	1430	2062	1380	1898
R2 or pseudo-R2	.	0.957	.	0.953

\* 0.1 \*\* 0.05 \*\*\* 0.01 - standard errors are clustered at the product/region levels

actually increased.

These results are consistent with the existence of sunk costs. Because firms were already present in this area, and because relocating or changing trading partners was expensive, firms maintained their trade relationships. Consequently, firms did not substitute partners during the war, and after the war, trade returned to previous levels.

In fact, the level of trade actually increased for some products, possibly as a direct consequence of the annexation. For instance, if cotton was produced on both sides of the border in 1865, but production was higher in the territories annexed after 1870, firms located there would have continued selling their production in France. If (a) firms previously sold their output in France and (b) faced high sunk costs, it is natural to observe increases in imports.<sup>28</sup>

## 7 Conclusion

This article investigates the effect of the 1870 Franco-Prussian war on the French level of trade.

Using synthetic control methodologies, we show that the French level of trade did not decline

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<sup>28</sup>For the same reason, exports may decrease. We do find negative estimates, although they are not statistically significant.

after the war. This finding is coherent with the results of Karlsson and Hedberg (2021), who show that, on average, military conflicts in the nineteenth century had only a moderate effect on trade.

We then test two competing explanations for this pattern: (a) substitution of trade partners, or (b) the existence of sunk costs. The first mechanism is emphasized by Karlsson and Hedberg (2021), who argue that the lack of product differentiation during the nineteenth century allowed firms to substitute one trading partner for another, thereby mitigating the effects of conflict. The second explanation relates to Davis and Meunier (2011), who suggest that trade relationships involve substantial sunk costs, making trade more resilient to geopolitical shocks.

We show that trade levels with Germany recovered extremely quickly after the war. Thus, French (or German) firms likely did not substitute their German (or French) trading partners.

Moreover, we suggest that the main industries located near the German border maintained (or even developed) their activities between 1865 and 1896. While already suggested by Kuga (2016), this result differs from findings in other studies analyzing the effects of conflicts associated with territorial losses (Redding and Sturm, 2008; Nakajima, 2008). Additionally, products emblematic of these territories (such as cotton, and to a lesser extent metallurgy) witnessed increases in trade after the war. We interpret these patterns as evidence in favor of the sunk costs explanation.

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## A Appendix

**Table A1:** Harmonized System (HS) Textile Classification - Sample

<b>HS Section</b>	<i>Montesquieu "Nature"</i>	<b>HS 2-digit</b>	<b>HS 4-digit</b>	<b>Description</b>
		50. Silk	5001	Silkworm eggs
			5007	Silk Fabrics
				Silk Ribbon
11. Textile	Fabrics	51. Wool	5101	Bulk wool
			5111	Cashmere Fabrics
				Alpaca Fabrics
		52. Cotton	5205	Woolen cotton
			5208	Cotton Fabrics

Note: The highest level of disaggregation - apart from the actual name of the product - in the *Montesquieu* database “*Nature 2*” doesn’t allow to separate silk fabrics from cotton and wool fabrics.

**Table A2:** HS Section and Chapter Titles

<b>Section No.</b>	<b>Section Title - Chapter No. and Title</b>
1	<b>Live animals; Animal Products</b> <ul style="list-style-type: none"> <li>1. Live animals</li> <li>2. Meat and edible meat offal</li> <li>3. Fish and crustaceans</li> <li>4. Dairy produce</li> <li>5. Products of animal origin</li> </ul>
2	<b>Vegetable Products</b> <ul style="list-style-type: none"> <li>6. Live trees and other plants</li> <li>7. Vegetables</li> <li>8. Fruits and nuts</li> <li>9. Coffee, tea, mate, and spices</li> <li>10. Cereals</li> <li>11. Products of the milling industry</li> <li>12. Oil seeds and oleaginous fruits</li> <li>13. Vegetable plaiting materials</li> </ul>

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<b>Section No.</b>	<b>Section Title - Chapter No. and Title</b>
3	<p>14. Other vegetable products</p> <p><b>Animal, vegetable or microbial fats and waxes</b></p> <p>15. Animal or vegetable fats and oils</p>
4	<p><b>Prepared foodstuffs; Beverages, spirits and vinegar; Tobacco</b></p> <p>16. Prepared meat, fish, or crustaceans</p> <p>17. Sugar and sugar confectionery</p> <p>18. Cocoa and cocoa preparations</p> <p>19. Preparations of cereals</p> <p>20. Preparations of vegetables</p> <p>21. Miscellaneous food preparations</p> <p>22. Beverages, spirits, and vinegar</p> <p>23. Residues and waste from the food industry</p> <p>24. Tobacco</p>
5	<p><b>Mineral products</b></p> <p>25. Salt, sulfur</p> <p>26. Ores, slag, and ash</p> <p>27. Mineral oils and fuels</p>
6	<p><b>Products of the chemical or allied industries</b></p> <p>28. Inorganic chemicals</p> <p>29. Organic chemicals</p> <p>30. Pharmaceutical products</p> <p>31. Fertilizers</p> <p>32. Tanning or dyeing extracts</p> <p>33. Essential oils and resinoids</p> <p>34. Soap, organic surface-active agents</p> <p>35. Albuminoidal substances</p> <p>36. Explosives</p> <p>37. Photographic and cinematographic goods</p> <p>38. Miscellaneous chemical products</p>
7	<p><b>Plastics; Rubber</b></p> <p>39. Plastics and articles thereof</p> <p>40. Rubber and articles thereof</p>
8	<p><b>Raw hides and skins, leather, furskins; Travel goods; Handbags</b></p> <p>41. Raw hides and skins</p> <p>42. Leather articles</p>

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<b>Section No.</b>	<b>Section Title - Chapter No. and Title</b>
9	43. Furskins and artificial fur <b>Wood and articles of wood; Cork; Basketware</b> 44. Wood and articles of wood; wood charcoal 45. Cork 46. Manufactures of straw
10	<b>Pulp, paper, and printed matter</b> 47. Pulp of wood 48. Paper and paperboard 49. Printed books, newspapers, etc.
11	<b>Textiles and textile articles</b> 50. Silk 51. Wool and hair 52. Cotton 53. Other vegetable fibers 54. Manmade filaments 55. Manmade staple fibers 56. Wadding 57. Special yarns 58. Special woven fabrics 59. Imitation fur 60. Knitted or crocheted fabrics 61. Apparel, knitted 62. Apparel, not knitted 63. Other textile articles
12	<b>Footwear, headgear, umbrellas, whips; Feathers; Flowers</b> 64. Footwear 65. Headgear 66. Umbrellas, walking sticks 67. Prepared feathers
13	<b>Stone, plaster, cement; Ceramics; Glass</b> 68. Stone articles 69. Ceramic products 70. Glass and glassware
14	<b>Precious stones, metals, coins</b> 71. Pearls, stones, coins

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<b>Section No.</b>	<b>Section Title - Chapter No. and Title</b>
15	<b>Base metals and articles thereof</b> <ul style="list-style-type: none"> <li>72. Iron and steel</li> <li>73. Articles of iron or steel</li> <li>74. Copper and articles thereof</li> <li>75. Nickel and articles thereof</li> <li>76. Aluminum and articles thereof</li> <li>78. Lead and articles thereof</li> <li>79. Zinc and articles thereof</li> <li>80. Tin and articles thereof</li> <li>81. Other base metals</li> <li>82. Tools, cutlery</li> <li>83. Misc. base metal articles</li> </ul>
16	<b>Machinery and electrical equipment</b> <ul style="list-style-type: none"> <li>84. Machinery and mechanical appliances</li> <li>85. Electrical machinery</li> </ul>
17	<b>Vehicles and transport equipment</b> <ul style="list-style-type: none"> <li>86. Rail locomotives</li> <li>87. Road vehicles</li> <li>88. Aircraft</li> <li>89. Ships and boats</li> </ul>
18	<b>Instruments, clocks, musical instruments</b> <ul style="list-style-type: none"> <li>90. Optical instruments</li> <li>91. Clocks and watches</li> <li>92. Musical instruments</li> </ul>
19	<b>Arms and ammunition</b> <ul style="list-style-type: none"> <li>93. Arms and ammunition</li> </ul>
20	<b>Miscellaneous manufactured articles</b> <ul style="list-style-type: none"> <li>94. Furniture</li> <li>95. Toys and sports equipment</li> <li>96. Miscellaneous manufactured articles</li> </ul>
21	<b>Works of art, collectors' pieces, antiques</b> <ul style="list-style-type: none"> <li>97. Art, collectibles, antiques</li> </ul>
22	<b>Others</b>

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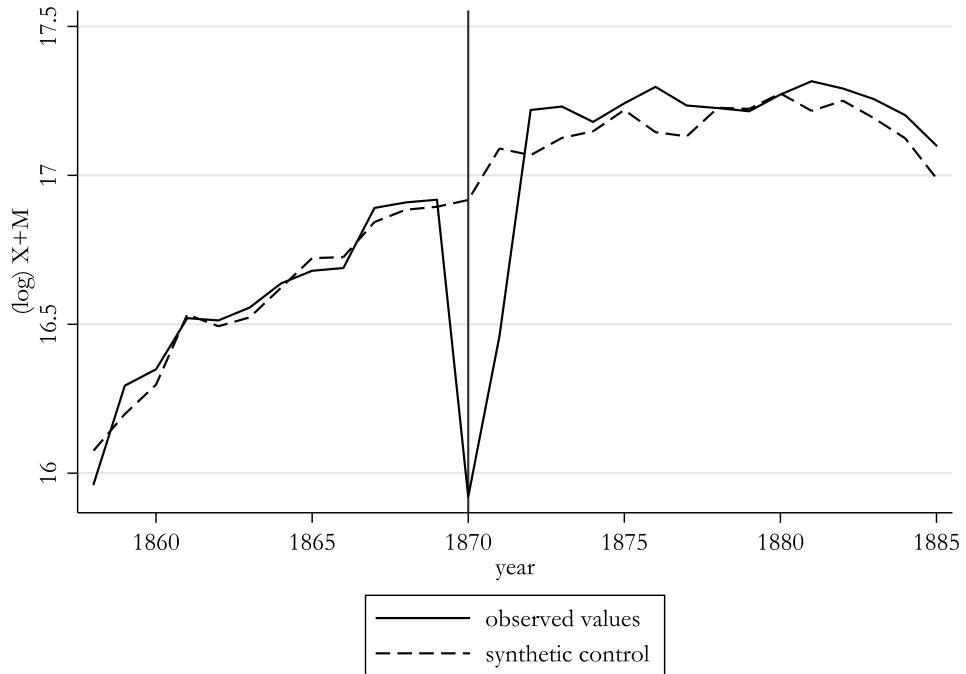
**Table A3:** Example of weights for (log) imports by country

Country	Weights for (log) imports	Weights for (log) imports
Austria-Hungary	0.067	0.08
Denmark	0.059	0
Great-Britain	0.664	0.784
Sweden	0.043	0
USA	0.049	0
Russia	0.118	0
Belgium	0	0.136

**Table A4:** Synthetic control estimates - National level - 1870 to 1885

Year	(log) Imports	Standardized p-values	(log) Exports	Standardized p-values
1870	-0.1641	0.0000	-0.1639	0.3750
1871	-0.0803	0.1250	-0.2875	0.1250
1872	-0.1812	0.0625	-0.1398	0.4375
1873	-0.2301	0.0625	-0.1493	0.5000
1874	-0.2485	0.1250	-0.1237	0.5625
1875	-0.2381	0.0625	-0.0292	0.8125
1876	-0.0950	0.3125	-0.0203	0.8750
1877	-0.1532	0.3125	-0.0608	0.8125
1878	-0.0281	0.7500	-0.1192	0.6250
1879	0.0842	0.2500	-0.1045	0.8125
1880	0.0355	0.6875	-0.1665	0.3750
1881	0.0396	0.7500	-0.1931	0.3125
1882	-0.0097	0.9375	-0.2181	0.3125
1883	-0.0431	0.3125	-0.2474	0.1875
1884	-0.0666	0.1875	-0.2805	0.1250
1885	-0.0492	0.5000	-0.2398	0.2500

**Figure A1:** Synthetic control - National level results - Total trade.



This graph summarizes the result of a *synthetic control* estimation using the log of  $X + M$  as dependent variable.

**Table A5:** Exports, Imports, and Trade Balance - Weights by Country for the synthetic control

Exports	Weight	Imports	Weight	Trade Balance	Weight
Belgium	0.146	Argentina	0.025	Belgium	0.261
Spain	0.198	Belgium	0.666	Danemark	0.027
Great Britain	0.469	Switzerland	0.121	GUF ?	0.309
Reunion	0.056	Russia	0.139	Reunion	0.241
Russia	0.131	Venezuela	0.500	Sweden	0.015
-	-	-	-	Russia	0.057
-	-	-	-	Venezuela	0.090

**Table A6:** Exports, Imports and Balance of Trade - France and Germany - 1870 to 1885

Year	Estimates	Std. p-values	Estimates	Std. p-values	Estimates	Std. p-values
1870	-0.9911	0.0000	-0.7957	0.0000	0.0303	0.8333
1871	-0.1629	0.3158	-0.7082	0.0263	0.2237	0.3333
1872	0.2223	0.1842	0.1662	0.4211	-0.3229	0.2500
1873	0.3639	0.0789	-0.0200	0.9737	-0.3684	0.2222
1874	0.1915	0.3421	0.0477	0.8684	-0.0697	0.7500
1875	0.1793	0.4474	0.1363	0.5789	-0.3962	0.2222
1876	0.2708	0.2368	0.2365	0.2895	-0.4739	0.0833
1877	0.2878	0.1579	0.1979	0.3421	-0.4185	0.1944
1878	0.1261	0.6842	0.1724	0.4474	-0.6363	0.0833
1879	0.1613	0.4211	0.1088	0.6053	-0.5810	0.0833
1880	0.0951	0.6579	0.0909	0.6316	-0.5339	0.1111
1881	0.2045	0.3947	0.1656	0.5526	-0.4660	0.1111
1882	0.0697	0.7368	0.1895	0.4474	-0.6216	0.0833
1883	-0.0121	0.9211	0.2002	0.5263	-0.7926	0.0278
1884	0.1088	0.6842	0.1745	0.6579	-0.4336	0.2778
1885	0.0785	0.8421	0.1750	0.6579	-0.4153	0.2222

**Table A7:** Results - without German border specific time shock

	(1) exports - log	(2) exports - ppml	(3) imports - log	(4) imports - ppml
<i>Main variables</i>				
Cotton - GB after 1870	-0.995* (0.537)	-0.445 (0.344)	3.423*** (0.716)	1.774*** (0.151)
Iron and steel - GB after 1870	1.697** (0.700)	1.927*** (0.297)	2.100*** (0.440)	3.195*** (0.194)
Observations	1430	2062	1380	1898
R2 or pseudo-R2	0.883	0.957	0.898	0.952

\* 0.1 \*\* 0.05 \*\*\* 0.01 - standard errors are clustered at the product/region levels

**Figure A2:** Synthetic control - National level results - Relative balance of trade.



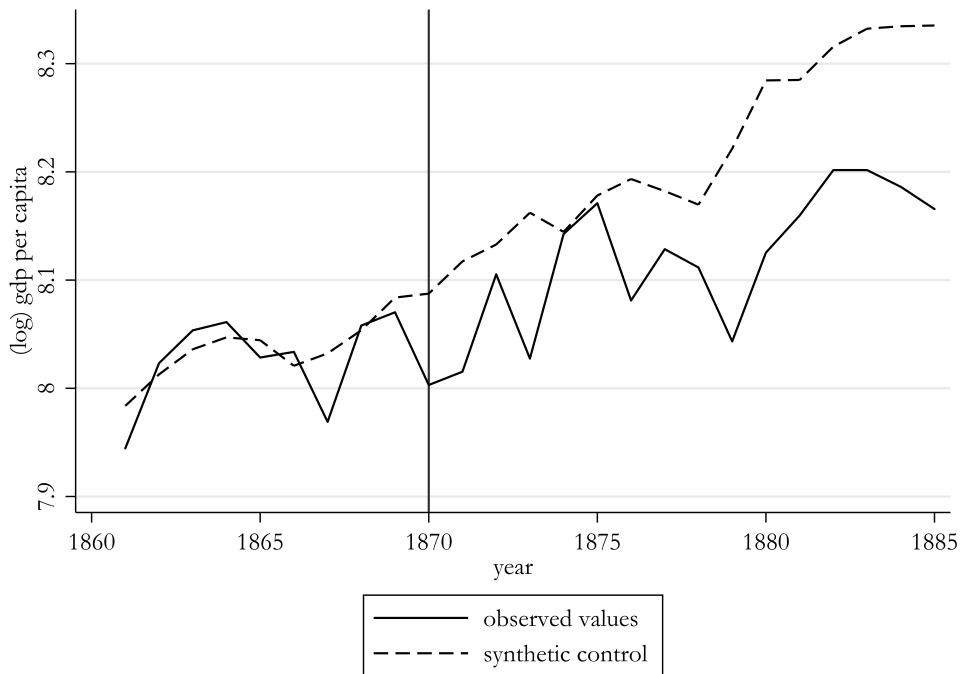
This graph summarizes the result of a *synthetic control* estimation using  $\frac{X-M}{X+M}$  as dependent variable.

**Table A8:** Results - log-linear and ppml regressions

	(1) exports - log	(2) exports - ppml	(3) imports - log	(4) imports - ppml
<i>Main variables</i>				
Cotton - GB after 1870	-0.837*** (0.238)	-0.372*** (0.139)	3.012*** (0.335)	1.836*** (0.186)
Iron and steel - GB after 1870	1.866*** (0.229)	2.112*** (0.164)	1.779*** (0.319)	2.995*** (0.187)
Observations	1430	2062	1380	1898
R2 or pseudo-R2	.	0.957	.	0.953

\* 0.1 \*\* 0.05 \*\*\* 0.01 - standard errors are clustered at the product/region levels

**Figure A3:** Synthetic control - National level results - GDP per capita.



This graph summarizes the result of a *synthetic control* estimation using GDP per capita data from the Maddison project database ([Fouquin and Hugot, 2020](#)). It displays the actual and the estimated level of trade before and after the 1870 war.