Quantifying Beggar-my-neighbour Effects
Evidence from Interwar France

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Abstract

Historians and contemporary economists have emphasised the role of retaliation as a cause for mounting bilateral trade barriers in the interwar period, which this article supports by the analysis of contemporary newspapers. Retaliation is a complement to many other explanations that might set the upward spiral of protectionism in motion. However, economists find it particularly hard to identify retaliation empirically because of the presence of endogeneity and - quite often - the absence of appropriate data. This case study on France is the first on interwar commercial policies to provide a remedy for both. Firstly, competitive devaluations provide a source of exogenous variation. Historical and qualitative accounts indicate that these were perceived as a protectionist measure but not influenced by French protectionism. Secondly, this research exploits an original dataset on French bilateral tariff revenues. Retaliation for the devaluations explains a great deal of the heterogeneity in tariff rates between France and her trading partners and even outperforms other causes of protectionism. Besides identifying retaliation empirically, this paper particularly highlights the downside of the 1930s devaluations in triggering a beggar-my-neighbour spiral.

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“The international trade of the world is caught in one of the most vicious of vicious circles”

(Roorbach, 1933, p. 224)

1. Introduction

In the light of the recent economic crisis, the great trade collapse of the 1930s has received a great deal of attention. In contrast to the current crisis, the 1930s witnessed an unprecedented protectionist response. Estimates attribute about 40% of the fall in world trade to protectionist measures (Madsen, 2001). Influenced by the empirical macro and the gold standard literature, Irwin (2012) advanced a form of the macroeconomic trilemma as the main explanans for the rise of protectionism. Through the lenses of this paradigm, countries can choose two out of three policy options: the gold standard parity, open trade, and independent monetary policy. Eichengreen and Irwin (2010) conclude that protectionism emerged, because some countries “having sacrificed one policy instrument (monetary autonomy) that might have been used to counter the Depression, policymakers in their desperation resorted to another (trade controls).” Conceptually, multilateral pressure and domestic macroeconomic constraints are pictured the main drivers of protectionism. Proponents of this view acknowledge the role of retaliation and trade wars for mounting trade barriers, but the relative magnitude of retaliation as a driver of protectionism remains underexplored. Focusing on France, this paper asks whether retaliation as a bilateral cause for mounting trade barriers mattered and if so to what extent.

Figure 1 illustrates that retaliation and tariff wars were on everyone’s lips. It shows the annual frequency of Manchester Guardian articles that contain words relating to the bilateral nature of protectionism. The spikes in the years 1930–1933 indicate that retaliation became an important subject. The increase in the count of the combination of “retaliation & tariff” coincides with the draft of the Smoot-Hawley legislation. The count of the combination “tariff war,” retaliatory in the nature of the wording, spikes in 1932 just after the devaluations. In this year, it was used more than 90 times or on average about every fourth day. A thorough analysis of the The Economist, the Financial Times, and the Manchester Guardian carried out in this paper suggests that retaliation actually mattered for commercial policy makers.

Not only newspapers provoke this paper’s research question on the impact of retaliation. Ironically, the commercial policies of the 1930s inspired contemporary economist Joan Robinson

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1This is not just apparent in recent academic research (e.g. Eichengreen and Irwin, 2010; Irwin, 2012) but also in the interest in policy blogs such voxeu.org, in which Eichengreen’s and O’Rourke’s contribution “A tale of two depressions: What do the new data tell us?” has been clicked more than 800,000 times.
Robinson was not the only economist to take this approach to the world surrounding her. A part of the literature review contrasts contemporary and recent research, emphasising the relevance of retaliation in the former. Finally, the political economy literature suggest a strong role for retaliation in tariff setting (Johnson, 1953a; Grossman and Helpman, 1995). Taking into account the number of historical and theoretical priors, why did retaliation as an explanans became of secondary importance in the latest wave of research?

Referring to the post-World War II research, Gawande (1997, p. 425) notes that attempts to measure retaliation are rare. The reason might lie in the difficulty of the empirical identification and scarcity of bilateral protection data. The extreme political circumstances of the 1930s provide us with an excellent opportunity to explore the retaliatory nature of protectionism, because it offers some exogenous variation to exploit. Qualitative accounts demonstrates that countries such as France perceived the currency deprecations of the 1930s as a protectionist measure (see Section 3). At the same time, it is unlikely that the trading partner’s tariff choices drove the exit from gold (see Wolf, 2008, for a number of possible determinants). Hence, devaluations provide us with an exogenous source of variation (see Wolf and Ritschl, 2011, for a similar line of reasoning regarding currency areas). This insight makes an empirical identification of retaliation possible. Of all non-devaluing countries, France’s status as the gold bloc’s center makes it the obvious choice.
for this case study. Moreover, French statisticians recorded average tariff rates on a bilateral level, which is vital to the identification of bilateral effects. A Difference in Differences approach allows us to test the predictive power of retaliation for the devaluations against the general increase in protectionism, be it for trilemma forces, a response to unemployment or lobbying efforts. In this particular setting, retaliation turns out to be the more important driver of protectionism.

This result has two implications. The historiographical implication is that France did not exercise protectionism uniformly across the board, but was retaliating specifically against individual countries through two main channels. The most direct form of this was a surtax on goods from countries with depreciated currencies. More indirectly, France raised tariffs on goods such as butter, which were almost exclusively imported from countries with depreciated currencies (in this case the Scandinavian countries). Besides giving an idea about the magnitude of the impact of retaliation in comparison to other forces at work, this result cast doubts about the benevolent assessment of the unilateral devaluations of the 1930s. If they triggered retaliatory responses and thus protectionism, their positive impact is in question. Whether or not the devaluations were beggar-my-neighbour policies per se (Eichengreen and Sachs, 1985) might be of secondary order. The discussion of qualitative evidence shows that the devaluations were perceived as such, and the protectionist response was carried out accordingly. As such retaliation is a complementary explanation for interwar protectionism, not contradicting others such as the trilemma framework. This paper illustrates that, once caught in the upward spiral of trade barriers for whatever reason, discriminatory commercial policies have an important impact. The second implication of this research has policy relevance for today. If retaliation matters, international policy cooperation and strong safeguards against protectionism are needed. This is of utmost importance in times of economic crises, in which withdrawals from currency unions are discussed. Once such a decision is discussed, the externality of potential tariff increases should be taken in account. However, in stark contrast to the 1930s, the treaty systems of the World Trade Organization and the European Union provide a much better safeguard against protectionism than the League of Nations in the 1930s.

The remainder of this paper is organised as follows. Section 2 reviews the relevant literature in three parts. Section 2.1 places the case study in its historical context. It presents new economic activity estimates to inform the reader about the beginning and duration of the French Depression, linking political and economic instability. With special emphasis on exchange rate policies, it reviews the international implications of French economic policy. While other countries had depicted France as the villain during the heyday of the gold standard for having returned below the pre-war parity, she felt victimised by foreign exchange rate policies from the end of 1931 onwards. Section 2.2 substantiates this French focused narrative with more general considerations on exchange rate policies and protectionism. Moreover, it contrasts the more recent and contemporary
literature on protectionism. The last part of the literature review (Section 2.3) briefly outlines the theoretical literature on the role of retaliations in trade relationships, substantiating the historical priors mentioned above. Section 3 provides a qualitative account of the relation between the competitive devaluations and discretion in French tariff setting. Section 4 demonstrates empirically that retaliation mattered. Section 5 concludes.

2. French Economic Policy, Devaluations, and the Economics of Retaliation


Interwar France was marked by a high degree of political and economic instability. This section combines the existing body of literature with a new economic activity estimate, which documents this instability. The return to gold in 1928 far below the pre-war parity provoked indignation abroad, although economic instability rather than a potential competitive advantage was the cause of this decision. While pictured as the villain of exchange rate policies abroad at the heyday of the gold standard, French policymakers felt victimised by the devaluation wave in late 1931. French tariff law equipped policymakers to take retaliatory action.

Figure 2: Economic Activity in Interwar France (seasonally adjusted)

Figure 2 tracks down French economic activity and real trade data for the period 1925–1936. The estimate is based on Principal Component Analysis and differs slightly from the official French production index, which suffers several problems such as the exclusion of unemployment
From 1925 until 1928 the French business cycle exhibits high volatility. After two years of rising inflation, French authorities managed to stabilise the currency under the presidency of Raymond Poincaré in the end of 1926 (Prati, 1991). Whether Poincaré’s politics were the reason for this stabilisation, remains debated. Sargent (1986) argues that Poincaré could stabilise the franc by returning to sound fiscal policies and thus provoking a shift of confidence in pro-capitalist policies. In contrast, Prati (1991) shows that the timing makes his argument unlikely to be true as France already ran a surplus in 1924. From his point of view, Poincaré brought inflation to halt by introducing a bill shifting the tax burden off the bondholders. The economic activity estimate indicates that Prati’s scepticism might be well justified albeit for another reason. The economic upswing was followed by the de facto stabilisation of the franc and not vice versa. Whatever the ultimate causes for the economic and monetary instability were, politicians had to carry the blame. Between 1924 and 1926, ten different governments had ceased to rule (Prati, 1991, p. 221).Ironically, the de facto stabilisation in 1926 did not cause immediate economic growth. Instead, the French economy entered a mild recession from the end of 1926 until about a year later.

France returned de jure to the gold standard in 1928 by establishing convertibility at one fifth of the pre-war parity (Mouré, 2002, p. 142–144). Poincaré actually favoured a further revaluation of the Franc. However, the governor of the Bank de France, Moreau insisted to immediately restore convertibility. Three major arguments drove the parity choice. First, Britain and Italy experienced severe difficulties when returning to their pre-war parities. Secondly, throughout the phase of instability the franc was already down to about 10 % of its pre-war parity and the de facto stabilisation at more than 20 % was considered as too difficult (Mouré, 2002, 142). The economic activity estimates substantiates Mouré’s observations. Having just recovered from a downturn, deflation and thus reduced economic activity might have not been a desirable option.

According to Sicsic (1992), French contemporaries did not consider the franc undervalued although in fact it was. In contrast, contemporaries abroad criticised the potential undervaluation of the Franc. In the beginning of 1928, *The Economist* estimated the misalignment to be 25 % against the pound in terms of purchasing power (see e.g. Hamilton, 1987, p. 146). Some authors link this undervaluation and France’s sterilisation of gold inflows to the global decrease in prices (Hamilton, 1987). Doubtlessly, the French accumulation of gold had deflationary effects abroad. However, to what degree French policy makers “caused the Great Depression” (Irwin, 2010) as opposed to the gold exchange standard system per se is still debated (see e.g. Mazumder and Wood, 2013). In the light of the volatility of the preceding years, however, it is not too much of a surprise that France did not return at the pre-war parity. Nonetheless, French monetary policy caused...
unpleasantness elsewhere, especially in Britain (Mouré, 2002, p. 183). It certainly contributed to the poisonous climate in the interwar policy arena.

As the depression continued and the first big wave of devaluations occurred in autumn 1931, the French trade balance worsened substantially (see Figure 2). One could think of this as the shift in the roles from the alleged “villain” to the “victim” of exchange rate policies. The degree of the devaluations were by no means negligible. In real terms the sterling devalued by as much as 60 % relative to the franc in the two following years (see Appendix B). French commercial law empowered the government to take “emergency measures to combat any action of foreign governments, which may hinder French trade” (Dietrich, 1933, p. 663). 3 This is of utmost importance for this paper’s argument. As we shall see later, French policymakers made extensive use of their freedom to discriminate against certain countries, not just by imposing quotas as Dietrich (1933) argues, but also by imposing tariffs.

There has been no extensive research about the discretion in French tariff setting and non-tariff responses. 4 In sum, the French interwar years were marked by political and economic turbulence. Having returned to a presumably undervalued parity in 1928, France might have played an important role in the disastrous decline of the world price level. This relationship was known by contemporaries. While France was pictured as the villain before 1931, she felt victimised herself after the devaluations. Commercial law allowed French policymakers to exercise retaliation, which is central to this paper.

2.2. Contemporary and Historiographical Perspectives on the Devaluations

The relationship between exchange rate and commercial policies is central to the empirical identification of retaliation proposed in this article. This section inquires into contemporary and recent literature on the question of why countries would retaliate for devaluations in the first place. Alternative explanations such as trilemma forces and lobbying are outlined. This literature review argues that in stark contrast to the contemporary literature, recent contributions on interwar protectionism understate the relative magnitude of the effect of retaliation in comparison to other factors such as trilemma forces, but emphasise the positive effects of currency devaluations in depreciating countries.

Inspired by the theoretical and empirical work by Eichengreen and Sachs (1985, 1986), there is a consensus on the positive consequences of a devaluation for the individual country (see e.g.

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3Dietrich argued that quotas were the most important measure as tariffs could not be lifted because of commercial treaties (ibidem). While intuitively plausible, this contradicts the quantitative evidence as we shall see later.

4The notable exception is the preferential treatment of her colonies (Eichengreen and Irwin, 1995, p. 4). France installed a colonial preference system in the fashion of the British Imperial Preference (see e.g. Gowa and Hicks, 2013, p. 452). The share of imports from colonies in terms of total imports rose from 12 % to 30 % and the initial share of exports to colonies of 15 % roughly doubled (see Appendix C).
Countries that had left the gold standard early, recovered faster. However, devaluations had externalities. It is worthwhile to conceptualise the consequences of unilateral devaluations in a payoff matrix (Figure 3) and to distinguish between unsterilised and sterilised devaluations. According to the Mundell-Fleming based model by Eichengreen and Sachs (1985, 1986), a devaluation would have a positive effect on the domestic economy by decreasing the domestic real wage and hence increasing aggregate supply. In their model aggregate demand depends on the countries’ price levels, the exchange and interest rates. As the devaluation implies a decrease in the price of gold in one country and a constant one in the other, the exchange rate changes. Hence demand decreases in the non-devaluing country, leading to less output. Hence, in any case the non-devaluing country would suffer from a reduction of its competitiveness on the world market. If the devaluation is not sterilised, it would, however, profit from increasing reserves and thus a monetary expansion. This could outweigh the demand shift and “thus, a devaluation under a gold standard may or may not be beggar-my-neighbour[...]” (Eichengreen and Sachs, 1986, p. 70).

Based on the assessment of the gold stocks across countries, Eichengreen and Sachs (1985, p. 943) reach the tentative conclusion that “currency depreciation, beneficial from the individual country’s point of view, was in fact beggar-my-neighbour” as it was sterilised, which precludes the possibility of a positive effect on non-devaluing countries. On the contrary, they summarise their theoretical paper as follows: “Its [the model’s] analysis reveals that devaluation under a gold standard need not be beggar-my-neighbour. Contrary to the thrust of the existing literature, competitive devaluations like those of the 1930s could have hastened recovery from the Great Depression.”

Figure 3: Devaluation Payoffs (Output)

See Eichengreen and Sachs (1985, p. 934) for the underlying model. Figure taken from Albers (2012, p. 4)

(i) Unsterilised Devaluation: \( b > d > c > a \)

(ii) Sterilised Devaluation: \( b > d = a > c \)

\[ \begin{array}{c|cc}
    & \text{Adhere} & \text{Devalue} \\
  \hline
  \text{Adhere} & a & b \\
  \text{Devalue} & c & d \\
\end{array} \]

Bernanke, 1995). In the case of the sterilised devaluation, the devaluing country keeps its gold reserve unchanged and hence - in a two country world - the gold stock of the non-devaluing country remains unchanged. Consequently, there is no positive impact on the money supply in the non-devaluing countries.
Depression” (Eichengreen and Sachs, 1986, p. 67). These seemingly contradictory statements have left a legacy in the succeeding literature. Some ignore the potential beggar-thy-neighbour consequences of the devaluations and emphasise the positive aspects of the devaluations (e.g., Bernanke, 1995). Others such as Campa (1990) stress only the theoretical result that their can be no presumption that devaluations were beggar-thy-neighbour. However, if these devaluations were in fact beggar-my-neighbour as Eichengreen and Sachs (1985) and caused retaliatory response, it is not clear how large, if any, the benefit to the world as whole was.

Irwin (2012) advances a related explanation for the “trade policy disaster.” He employs a slightly modified trilemma in the fashion of Obstfeld and Taylor (1997) to illustrate the constraints that interwar policy-makers faced. Countries could only choose two of the following three: a fixed exchange rate, open trade, and independent monetary policy. However, cutting complexity comes at a cost. Several countries chose only one option out of three (e.g., Britain and Germany), questioning the desirability of all three policy options. More importantly, employing the trilemma conceals the relevance of the externalities of policy choices. Decisions in the interwar policy arena were not independent from each other. The Sterling Bloc’s devaluation changed its relative competitive position and there is little evidence that increasing gold supply in non-devaluing countries could outweigh this effect. If the devaluations were beggar-my-neighbour (Case ii in Figure 3), we would expect a policy reaction from non-devaluing countries.

This line of reasoning resonates well with contemporary scholarship. Joan Robinson’s (1937, pp. 210–228) seminal contribution “Beggar-My-Neighbour Remedies for Unemployment” is usually seen as the work, which coined the beggar-my-neighbour term (Irwin, 2012, e.g., p. 125). It states that devaluations are one form of beggar-my-neighbour policies, similar but not equal to import quotas, tariffs and wage reductions. Robinson (1937, p. 210f) described what economists nowadays would call a non-cooperative game:

“In times of general unemployment a game of beggar-my-neighbour is played between the nations, each one endeavouering to throw a larger share of the burden upon the others. As soon as one succeeds in increasing its trade balance at the expense of the rest, others retaliate, and the total volume of international trade sinks continuously [...].”

Robinson’s stance was far from isolated. Other contemporary economists emphasised the bilateral consequences of the devaluations. Amongst other reasons for the rise of protectionism,

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6Most recently and surprisingly, Irwin (2012, p. 134) argued with reference to Eichengreen and Sachs that the “sterling bloc depreciation was unsterilised, and therefore it was probably not a beggar-my-neighbour policy.”
Liepmann (1938, p. 361–364) points to retaliation for exchange rate depreciation. In his free trade manifesto, Findlay (1934) points to the retaliation of twenty other nations after the devaluations. He emphasises the shift of some countries’ paradigms: “Holland, hitherto virtually a Free Trade nation, showed what she thought of our surrender by raising all her duties against British goods by 25 per cent” (Findlay, 1934, p. 31). Roorbach (1933, p. 89f) argued explicitly that the devaluation “resulted in a movement for still further restrictions of imports by the gold standard countries.” According to MacKintosh (1936, p. 1), economic nationalism is inherent, but the “protectionist plea is most likely to be heard when he is asking to be protected against a fresh threat.” He argues that the devaluations were such a threat and thus stimulated protectionism. This takes us from the simple observation of retaliation, particularly for the devaluations, to the question who would voice the protectionist’s plea. Williams (1932, p. 17) reports the rise of protectionism after the devaluation, referring to domestic producers’ request for protection in the non-devaluing countries. Hence, the government is the agent and the producers the principal. Grossman and Helpman (1995) formulated a formal model for this mechanism about 60 years later as the next section discusses. Nevertheless, also rising unemployment was identified as a source for retaliation as the statement above by Joan Robinson shows.

The emphasis on retaliation in the last paragraphs should not conceal that some authors were critical about the role played by retaliation relative to other reasons for the rise of protectionism. While acknowledging that the “fear of exchange dumping” increased trade barriers, Graham and Whittlesey (1934, p. 411) argued in line with Irwin’s (2012) trilemma that “it is at least equally probable that the attempt to maintain the nominal exchange value of a currency will lead to the erection of unscalable trade barriers.” Others such as Dietrich (1933) were worried about the actual mechanics of setting tariffs aiming at specific countries, pointing to a large number of goods, which were covered by trade treaties, some of them including the most-favoured-nation (MFN) principle. Is the latter a serious concern for identifying retaliation in tariff data?

In fact, the contemporary accounts also inform us how the MFN principle and other trade treaties were circumvented in practice. Beckett (1940) makes the case for the United States regarding reciprocal (or bilateral) preferential treatment established in trade treaties during the 1930s. Policymakers employed the so-called chief supplier principle. According to this principle, bilateral bargaining focuses only goods that are almost exclusively provided by the negotiating parties. In practice, trade officials reclassified items of the American tariff schedule or distinguished qualities of a specific good (Beckett, 1940, p. 203). Such definitions could take absurd shapes at times, but always had a clear goal. For instance, in order to bargain with Great Britain and protect

7Other reasons include stricter migration laws, infant industry protection (p. 360), self-sufficiency in agriculture and government revenues (p. 366).
domestic low-quality filter domestic paper producer at the the same time, the tariff code on filter paper was differentiated. Imports of such paper worth 75 cents per pound were subject to a 2.5 cent per pound and 7.5 % ad valorem duty. In contrast, cheaper paper was subject to 5 cent per pound plus 15 % ad valorem. This kept low quality filters from France and other countries out of the American market, while guaranteeing high quality filters from Great Britain preferential treatment (Beckett, 1940, p. 204).

In sum, numerous contemporary authors have stressed the importance of retaliation in the interwar policy arena, particularly with reference to the devaluations. Contemporary observers also identified other causes for protectionism rooted in the trilemma, unemployment and lobbying. Clearly, all these reasons for mounting trade barriers are rather complements than mutually exclusive. However, retaliation has become very much secondary to the trilemma as an explanans for interwar trade. Arguably, this is rooted in the difficulties to prove retaliation empirically. The empirical framework of this paper disentangles bilateral from general tariff increases and hence makes it possible to assess the relative importance of the forces at work. Moreover, if the devaluations helped the devaluing countries in recovering from the Great Depression, but only at the expense of triggering a beggar-my-neighbour spiral, then their positive assessment is in question.

2.3. The Economic Theory of Protectionism

Political economy research provides additional support for the ideas advanced in this paper. Retaliation plays a pivotal role in this literature, though not in combination with exchange rate policies. It lies beyond the scope of this paper to modify one of the models presented in the section. The retaliatory component in these is often channeled through the terms of trade. Exchange rate policies strongly affect the terms of trade. Hence the analysis on the effect of exchange depreciation within a theoretical framework seems feasible and desirable. As this paper has more of an historical and empirical than theoretical approach, the review of this literature is kept extremely brief and does not do justice to the existing body of theoretical literature. Instead, it illustrates different approaches to the role of retaliation and optimum tariffs in the political economy literature.

Scitovszky (1942, p. 89) introduces his article with the observation that “free trade can be shown to be beneficial to the universe as a whole but has never been proved to be the best policy also for a single country.” One cannot help but to notice implicit notion of a non-cooperative game in his words. Moreover, he argues that a safeguard such as a new League of Nations is needed to enforce the desired state of free trade (Scitovszky, 1942, p. 109). The theoretical evidence, he presents mainly rests on graphical analyses of trade, which are influenced by microeconomic theory. Johnson (1953b) revises Scitovszky’s approach and shows that countries can gain by setting tariffs even if retaliation occurs (see Riezman, 1982, for a comparison of the two).

This notion of a tariff game has influenced a large body of literature, which deals with the
merits and shortcomings of the GATT. For instance, Dixit (1988) analyses the economic rationale for countervailing tariffs and anti-dumping tariffs within the GATT framework. While he finds some rationale for the first, there is none for the latter. To this author’s knowledge, the “protection for sale” model by Grossman and Helpman (1994) and its international extension (Grossman and Helpman, 1995) are state-of-the-art models. The optimum tariff models discussed above assume welfare-maximising governments. In contrast, Grossmann and Helpman argue that the policymaker’s objective function consists of voters’ welfare and the contributions of lobby groups, most likely painting a picture closer to reality. Some interesting (and testable) predictions emerge. For instance, if the lobby of a certain industry is strong in one country and weak in the other, high tariffs would emerge. In the case of equally powerful lobbies, lower tariffs would emerge (Grossman and Helpman, 1995, p. 706).

In sum, there is a substantial body of theoretical literature that discusses the interdependence in tariff setting decisions. This literature indicates that countries might in fact retaliate and tariff wars can emerge. As opposed to earlier research focusing on welfare maximisation, recent contributions emphasise the role of lobby groups for the emergence of trade barriers. This seems to be another interesting route of research, but does not affect the results of this study. The scope of this paper is the identification of retaliation. The ultimate roots of the “protectionist plea,” be they unemployment or lobby groups, are only of secondary importance. Given the empirical and historical scope of this paper, the review of the theoretical literature is very short. Nevertheless, two interesting findings emerge. First, some theoretical models predict retaliation. Second, lobby groups’ contributions are a possible motivation for politicians to retaliate.

3. The Rhetoric of Retaliation - A Qualitative Account

This section presents a qualitative account of retaliation based on newspaper articles in the Manchester Guardian, the Financial Times and The Economist. Occasionally, archival government documents complement these. As a larger geographical coverage lies beyond the scope of this paper, it focuses on the Anglo-French relationship. The section’s structure follows the vein of this paper, centring the discussion around the devaluation wave. Section 3.1 presents the prelude to the devaluations. Protectionism and retaliatory sentiment were in place well before the devaluations. However, policy measures were more likely to meet leniency in Britain before 1931 and hopes for cooperation were still present. Section 3.2 documents the shift in sentiment towards more nationalistic and retaliatory rhetoric immediately following the devaluations, which culminated in the upward spiral of protectionism illustrated in Section 3.3.
3.1. Prelude

The move towards protectionism had already been visible in France before the devaluations. She fought a tariff war with Australia around 1930 (Manchester Guardian, 1931f) and, like other countries, France considered retaliation immediately after the Smoot-Hawley bill was passed in June 1930 (Manchester Guardian, 1931a). France urged for negotiations and called the American MFN treatment into question (Manchester Guardian, 1930). While this threat did not materialise, France discriminated against the United States, when she introduced more draconian quotas for American coal than for coal of other origins in July 1931. In the light of the 6 % reduction on British coal, the 89 % reduction of the American quota seems immodest (Manchester Guardian, 1931c). Maybe it was this comparison that provoked leniency in Britain. The Secretary of Mining, Shinwell, pointed out that the French quota did not aim to “embarrass” Great Britain, but was an effort by the French government to protect the coal workers. Instead of calls for retaliation, there were calls for cooperation of the mining industries across Europe (Manchester Guardian, 1931c). The Labour government refrained from taking any protectionist measures in the summer.

Tariff proposals in Britain remained of “revenue nature” before the end of 1931. In September the Chancellor of Exchequer Phillip Snowden proposed a revenue tariff on luxury goods (Manchester Guardian, 1931o). Due to her large luxury goods industry, this suggestion met “outstanding anxiety” in France (The Economist, 1931f, p. 517) and the rhetoric began to change. Criticising the proposed measures, Rollin, French Minister of Commerce, emphasised that duties should be allowed to retaliate against unfair competition such as dumping (Manchester Guardian, 1931i). A British commentator hoped that this tariff menace could lead to new negotiations about a tariff truce, which had been initiated two years earlier but failed (Manchester Guardian, 1931e). Such hopes did not materialise, especially after the September 20, 1931 when the British devaluation “fell like a bombshell on the [French] market” (French correspondent in The Economist, 1931b, p. 550). Economic nationalism and tariff war rhetoric soon replaced international sympathy and leniency. The spirit of cooperation became under strain.

3.2. Immediate Reactions to the Devaluations

The devaluation provoked “great surprise and consternation in French industrial and business circles” (Naudau, President of French Chamber of Commerce in London in the Financial Times, 1931b). The same was true for politics, but at least there was the hope that this would stop the British tariff plans. French Minister of Commerce Rollin commented “it goes without saying that if the British Government have been thinking of new tariff measures, now that the depreciation in sterling constitutes an important bounty for British exporters, they must have given up the idea” (Manchester Guardian, 1931h). In October, Foreign Secretary Lord Reading visited France to discuss the French tariff anxiety regarding the tariff question (Manchester Guardian, 1931d,n).
However, in the first weeks after the devaluation of the pound, the public did not perceive the float as a permanent situation. French newspapers speculated whether the pound will return at par or about 20 % (Manchester Guardian, 1931p). Neither this hope, nor the one concerning the tariffs materialised. In Britain, the tariff question was a dominant topic in the run-up to the general election, with Labour opposing and the conservatives favouring protection (Manchester Guardian, 1931s). The conservatives won the election by far (Manchester Guardian, 1931t), indicating that there was substantial public support for protectionist policies.

After the devaluations, small instances could trigger intense debates. When Britain announced the ban of French potatoes because of the Colorado Beetle, the Journée Industrielle considered this a protectionist measures and called for tariff reprisals (Manchester Guardian, 1931q). About a month later, the French Minister of Agriculture actually threatened to ban coal, tea, and whiskey from Britain if the embargo was not lifted (Manchester Guardian, 1931b). In the meantime, France herself had banned certain foodstuff from early October until the end of the year (Manchester Guardian, 1931g). In the case of butter and beef, this mainly hit two other depreciators, Denmark and Argentina (Manchester Guardian, 1931g).

In November, France reacted on a large scale to the devaluations. The surtax on goods from countries with depreciated currencies, which were specified explicitly, came into effect on November 14, 1931 (The Economist, 1932a). Certain goods such as grain and tea were exempted from this tariff. Moreover, the surtax in its initial form employed different rates across countries: 15 % for Great Britain, Australia, Denmark and Sweden, 10 % for Uruguay and Argentina, 8% for Norway, and 7 % on British India and the Native States (The Economist, 1931e, p. 956). The British Mining Association reported immediate effects materialising in the cancelation of orders, because British coal exporters had become relatively more expensive for French importers (Manchester Guardian, 1931j).

Because of this apparent level of discretion and the fact that no other large coal exporter went off the gold standard, the British industrialists suspected the surtax aimed particularly at British coal (Manchester Guardian, 1931k). The chamber of commerce argued that the surtax violated the most-favoured clause, which both countries had agreed on (Manchester Guardian, 1931l). To such criticism, the French Minister of Commerce Louis Rollin responded that the 15% would still not be enough to compensate for the competitive advantage gained by British manufactures through the devaluations (The Economist, 1931g, p. 1006). Moreover, a French correspondent argued that the new exchange rate resembled a 50 % ad valorem tariff. With regard to the new

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8"At the very moment that a tariff has become not only a superfluity but an absurdity we are to have a general election, it is generally believed, on that question alone" (Manchester Guardian, 1931s)
9A month later the surtax was fixed at 15 % for all countries.
10We shall later see, that the MFN treatment was actually more of an unspoken rule and no such contract existed.
proposed British tariff legislation, the correspondent stated: “The loss to France and to other
countries will be very heavy, and many people here do not hesitate to say that the action of the
British Parliament amounts to a declaration of economic war” (Manchester Guardian, 1931). Clearly, the French industrialists did not hesitate to fuel this war. They insisted that the Minister
of Commerce should not lose any time “in taking up the matter with the British government and,
if necessary, to start retaliatory measures” (Financial Times, 1931a).

In sum, the last bits of leniency vanished after the devaluations and agitation took over in press
and politics. The immediate reactions anticipated an upward spiral in protectionism, which is
documented in the following section.

3.3. The Upward Spiral of Retaliation

Complementary to the global downward spiral of trade, there was an upward spiral in retaliation.
Before the introduction of the General Tariff in early 1932, the British parliament passed
the Abnormal Importations Act on 17 November, 1931 (The Economist, 1932a). It empowered
the President of the Board of Trade, Runciman, to impose duties on wholly or mainly manufac-
tured goods of up to 100 % for a duration of 6 months (The Economist, 1931a). One argument
for the tariff was the French surtax of 15 %, while as we shall see later it was not enforced in
all cases to the same degree. With reference to France’s return to gold at one fifth of its prewar
parity, the commentator argued that Great Britain could have imposed a tariff of 400 % in 1928
(The Economist, 1931a, p. 944).

With the new tools at hand, retaliation was discussed quite openly in the House of Commons
(House of Commons, 1931-1932c):12

“Colonel Wedgwood asked the President of the Board of Trade whether his atten-
tion has been called to the action of the French Government in imposing additional
duties on British goods entering France; whether this is in conformity with the most-
favoured-nation treaty with France; and, if not, whether we are in a position to put
special duties on French wines, silks, perfumes, and dresses without infringing the
said treaty?

Major Colville: The answer to the first part of the question is in the affirmative.
Although United Kingdom goods have received most-favoured-nation treatment in
France, in the matter of duties under a French law, for some 50 years, there is no
treaty in force under which either country is bound to accord such treatment to the

11This is central to the analysis by Kitson and Solomou (1990).
12See also O’Connor’s comment on representation concerning the surtax: “Will not the best possible representation
[regarding the French surtax] be made when we have a tariff of our own?” (House of Commons, 1931-1932a).
goods of the other. The answer to the last part of the question is, accordingly, in the affirmative.”

Three decrees were issued under the Abnormal Importations Act. Those fixed mostly prohibitive duties of 50% on a variety of goods. While not aimed at specific countries per se, the tariff affected the United States, France, Germany and Holland the most as the details of the first (The Economist, 1931c, p. 994), second (The Economist, 1931i, p. 1061) and the third schedule (The Economist, 1931h, p. 1221) demonstrate. The Economist (1931h, p. 1220-1223) argued that the schedules were a small concession to protectionism in statistical terms but not in principal and concludes that Runciman was playing a “dangerous game.” After criticising the French surtax and discrimination, however, Runciman stated, “I would like to point out that there is no connection whatever between that decree and our orders, or the legislation which preceded them” (House of Commons, 1931, c. 1473). Taking into account the parliamentary debates and his own introduction of the speech, this statement does not appear overly credible.

French reactions to these emergency tariffs included the reduction of the quota on British coals less than eight days after the passage of the law (The Economist, 1932a), which was “designed to restrict entries of British and other foreign fuels” (The Economist, 1931d). However, until the British General Tariff was introduced in the end of February 1932, France also made some concessions. She lifted the surtax on coal (and on coal only) in order to obtain favourable treatment for some agricultural products (Manchester Guardian, 1932c). This bargaining failed, at least at a large scale. It did not affect the introduction of the general tariff (Imports Duty Act), which came into effect on February 29, 1932 (The Economist, 1932b).

Interestingly, the second section of the general tariff provided the Board of Trade “to impose supplementary duties in case of foreign discrimination” (House of Commons, 1931-1932b) on top of the general tariff of 10% ad valorem. While the final decision remained was made in the House of Commons, recommendations were made by the Import Duties Advisory Committee. Each recommendation includes a list with goods, on which additional tariffs should be charged. The Import Duties Advisory Committee made heavy use of its power to impose additional tariffs. This power was used extensively, indicated in Table 1, which evidences substantial discretion in tariff setting exercised by Britain.  

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13 The Economist (1931h) argues that the third schedule was probably not aiming at one specific country.
14 Demanding retaliation was not unique to the Anglo-French relationship as experiences in other countries illustrate (see e.g. Manchester Guardian, 1931m).
15 In fact, Capie (1981, p. 160) notes that “it appears that the House always accepted the recommendations of the Committee.”
16 Unfortunately, the official recommendations lack the basis on which the Committee decided. For a more detailed account of this part of the Act, see Capie (1981).
France responded to the general tariff with the introduction of new quotas in “rapid succession” (Manchester Guardian, 1932e). A particularly draconian example was the quota on British textile machinery, which reduced import allowances to less than 10% in 1931 terms (Manchester Guardian, 1932b). Among the new quotas was also a quota on cotton yarn and piece goods (Manchester Guardian, 1932d).

In the following two years, the above characterisation as a tit-for-tat game remains true for Anglo-French commercial relations. For instance, a new anti-dumping bill in December 1932 was introduced, which allowed to super-impose tariffs of up to 50% on all merchandise from countries that treat France less favourably than their other trading partners (The Economist, 1932c, p. 1081). In 1933, there were still British demands for retaliation for the surtax (Manchester Guardian, 1933b,c). This demand became even stronger, when France did not apply the surtax against the United States after the dollar devaluation. The Manchester Guardian (1933a) argued that France had “fear of annoying the U.S.” The surtax against Britain was only suppressed from January 1934 onwards (Manchester Guardian, 1934). However, the quotas remained in place.

This section has demonstrated the importance of retaliation in the interwar policy arena by focusing on the anglo-french relationship. The “potato instance” illustrates that small actions could provoke “intense” menaces. Moreover it shows, how discretion in protectionist measures gained usage in both countries. These actions and the increasing discretion sparked terms such as “economic war.” Nevertheless, analyses such as this one suffer a severe caveat. It could be that much of what had been written was just rhetoric. Moreover, we cannot assess the relative importance of retaliation compared to other drivers of protectionism. Domestic goals were an important argument for the introduction of both, tariffs and quotas. However, retaliation and domestic policy goals often go hand in hand, and clearly politicians have incentives to obscure the motives of protectionism in order to avoid international dispute.

Table 1: Recommendations by the Import Duties Advisory Committee 1932–1936

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1932</td>
<td>9</td>
</tr>
<tr>
<td>1933</td>
<td>23</td>
</tr>
<tr>
<td>1934</td>
<td>36</td>
</tr>
<tr>
<td>1935</td>
<td>35</td>
</tr>
<tr>
<td>1936</td>
<td>32</td>
</tr>
</tbody>
</table>

*Source:* Counted in the House of Commons Archive provided by ProQuest.

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17 Neither can we obtain a realistic picture to what extent lobby groups played a role. An interesting impression from the reading of contemporary newspapers is that the British Chamber of Commerce had a high media presence. While not central to this paper, British tariff policies in the interwar period would make an interesting case for “the protection for sale” model (Grossman and Helpman, 1994) given the high level of discretion in the hands of relatively few individuals.

18 Petsche’s statement on behalf of the French government illustrates this. The quota system “has been adopted for the sole means of preserving the home market for French producers, who had been driven from foreign markets by
ation was the sole driver of protectionism, but rather that it played a substantial role, especially after the devaluations. The newspaper analysis supports this notion as it shows that discretion in protectionist measures increased and the rhetoric of retaliation became prevalent. Moreover, the qualitative analysis informs the quantitative analysis on two issues. First, the introduction of the surtax suggests that we might find quantitative evidence. However, some goods (and countries) were exempted and the overall effect is not clear. Second, quotas became the commercial policy tool of choice soon after the devaluations, which renders post-1932 tariff rates as of secondary importance.

4. Retaliation - A quantitative Account

Having established qualitative evidence that retaliation mattered in the interwar period, we now turn to the quantitative evidence. The econometric framework enables us to distinguish retaliation for the devaluations from the general rise of protectionism due domestic pressures such as lobbying and unemployment. By employing a difference in differences estimator, the analysis indicates that retaliation is as important as the general upward trend in French protectionism between 1931 and 1932. Controlling for individual country fixed effects, this approach also precludes the possibility that results are due to certain economic structures of the trading partner or pre-existing tariff levels. As the qualitative analysis has outlined the importance of quotas, which are not captured by average protection rates, this analysis also employs a “counterfactual” measure of trade costs (Novy, 2013). This measure captures the difference between observed and hypothetical frictionless trade flows and thus embodies forms of protectionism other than tariffs. The results of all specifications point into the same direction and confirm the historical and theoretical priors advanced above.

4.1. Data & Summary Statistics

Table 2 summarises the data sources. The data on exports and import values and bilateral tariff revenues\(^\text{19}\) for France were manually transcribed from the *Tableau général du Commerce de la France*. To the best of this author’s knowledge, French statisticians were the only among the main economic powers to record tariff revenues by trading partner for this period. Except for in Dedinger (2012) for the Franco-Prussian pre-war trade relationship and in Hayakawa (2013) for

\(^{19}\)Unfortunately the *Tableaux* do not include any information on whether or not revenues from the surtax are included though a government memorandum from 1933 suggests so (Ministère des Finances, 1933, p. 140 & 427). If they were not included, this would make the results even stronger. The change in the average protection rate for a specific country would then be entirely due to changes in the tariff code aiming at it.
post-1990 data, these seem to have been rarely employed in empirical studies exactly for this reason. However, this data are vital to the identification of retaliation, which ultimately is a variation in tariff rates across trading partners.

Table 2: Data Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral Exports, Imports, Tariff Revenue</td>
<td>French franc</td>
<td>Tableau général du Commerce de la France</td>
<td>Issues 1926–1936, bilateral tariff revenue only available for 1926–1933</td>
</tr>
<tr>
<td>GDP</td>
<td>Current US $</td>
<td>Klasing and Milionis (2014)</td>
<td>Based on Maddison, but converted to current US $</td>
</tr>
<tr>
<td>Geographic Variables</td>
<td>km</td>
<td>Mayer and Zignago (2011)</td>
<td>Contigency dummy, distances</td>
</tr>
<tr>
<td>Exchange Rates (57 countries)</td>
<td>x/US$</td>
<td>Global Financial Database</td>
<td>Estimation of bilateral exchange rate via cross-calculation</td>
</tr>
</tbody>
</table>

For unknown reasons, the French statisticians stopped the recording of bilateral tariff revenues after 1933. This is not too much of a concern for this analysis. As the qualitative analysis showed, quotas became the commercial policy instrument of choice, especially from 1933 onwards. If we consider protectionism as a package, which consists of tariff barriers, quotas, and non-tariff barriers, a rising share of one of them would decrease the relative relevance of the other as a proxy for the overall protectionism. Hence, most of the econometric analysis focuses on the cross-sections of 1931 and 1932.

As an alternative measure of bilateral protectionism, I employ the trade costs measure suggested by Novy (2013). Unfortunately, this measure covers not only the barriers of trade erected by French politicians, but also those imposed by her particular trading partner, transport costs and all other possible frictions to trade between two countries. Derived from the state-of-the-art gravity equation by Anderson and Van Wincoop (2003), it calculates the hypothetical bilateral trade flows, given frictions were as low as in the trading parties’ domestic markets. The comparison with the actual trade flows and some rescaling yields the bilateral trade cost measure.20 Empirically, trade costs are calculated as follows (see e.g. Jacks, Meissner and Novy, 2010, p. 131):

\[ \tau_{i,j} = \left[ \frac{x_{ij}x_{ji}}{s_i(Y_i - x_i)s_j(Y_j - x_j)} \right]^{\frac{1}{2-1}} \]  

(4.1)

\[ \text{Appendix D shows the theoretical derivation.} \]

18
where \(i\) is France and \(j\) represents one of her \(N\) trading partners. \(s\) proxies the share of the tradable sector, \(Y\) is the GDP and \(x\) are either total exports or a bilateral trade flow, depending on the subscript. I employ the parameter assumptions for the elasticity of substitution \(\sigma = 8\) and the tradable sector \(s = 0.8\) following Jacks, Meissner and Novy (2011). These assumptions are critical. However, the transformation into log-differences (or growth rates) mitigates the problem of right parameter choices (Jacks, Meissner and Novy, 2011, Appendix C). Therefore all estimations relying on the trade cost measures are carried out with such a transformation. Notwithstanding these caveats, Figure 4 suggests that the trade cost measure provides a good approximation in terms of the direction and trend of changes, though not necessarily regarding the size of the effect.\(^{21}\) Moreover, lags occur frequently (e.g. for Belgium in Figure 4, which is plausible as importers would need time to adjust to higher tariffs. However, this is problematic for the econometric identification as we shall discuss later.

![Figure 4: Bilateral Tariff and Trade Cost Measures](image)

\(\tau\) denotes Novy’s trade cost measure and \(tr\) the bilateral average protection rate.

Source: see text.

Figure 4 also demonstrates large variation in the tariff increases. For example. The bilateral tariff against Great Britain increased by about 4\% ad valorem, about 18\% ad valorem against Sweden and remained stationary against Belgium between 1931 and 1932. This also suggests that the surtax was not implemented rigidly across the board as France and Sweden had both devalued in 1931. In ad valorem terms, the change of the bilateral tariff against Britain might seem small, but it implied double the rate of 1930.

Figure 5 illustrates the difference between this and previous studies. Panel (a) plots the mean tariff rate and its standard deviation (that is the cross-sectional variation for every year) for a balanced 73 country sample for the period 1926–1933. Most studies (e.g. Jacks, Meissner and

\(^{21}\)Appendix E provides a selection of plots comparing tariff rates and the trade cost measure. Simple correlations (not reported) confirm the results from the eyeballing exercise. However, the suggested interpretation as “a tariff equivalent” (Novy, 2013, p. 105) is probably not quite accurate.
Novy, 2010; Clemens and Williamson, 2004) focus on the solid line, the mean tariff, and neglect the variation around it. However, there is substantial variation in the bilateral tariff rates across trading partners. This observation is valuable as such. It raises some doubts, whether the log product of countries’ average protection rate mimics a good proxy for bilateral tariffs in gravity models and their variations such as in Jacks, Meissner and Novy (2010).

More interesting for this analysis is the change of the standard deviation over time. The dashed lines resemble a one standard deviation above and below the mean respectively. The average increases from around 5 % to 20 % ad valorem. At the same time, the standard deviation increased from 4 % to 22 % ad valorem. If France applied her tariffs symmetrically across countries (e.g. a 10 % general tariff), the standard deviation would not change (while the mean would increase by 10 %). This plot of summary statistics indicates that French tariff setting had asymmetric effects across trading partners.

The right Panel of Figure 5 tells the same story. It plots kernel densities, which are a form of smoothed histograms, for three different cross-sections. One can observe that the shape of the dis-

---

22 Conventionally, researchers define the average protection rate $T$ as the sum of tariff revenues $t$ of country $i$ from $n$ trading partners $j$ divided by the sum of $i$’s imports $M$ from $n$ trading partners $j$: $T_i = \sum_{j=1}^{n} t_{ij}/\sum_{j=1}^{n} M_j$. In contrast, the graph takes the (unweighted) average of the protection rate against all countries in the sample, which is $T_i = \sum_{j=1}^{n} T_{i,j}/n$. 

20
tribution becomes flatter over time, indicating increased discretion in tariff choices in comparison with 1926. Thinking in terms of general tariff example as opposed to discretionary tariff setting, we would expect the distribution simply to shift on the x-axis of the graph, while its shape should not change.

The increase in the standard deviation could have various reasons. It could stem from the protection of a certain economic sector such as agriculture or discrimination against certain countries. As these graphs analyse cross-sections of 73 trading partners at seven points of time, they imply that the heterogeneity does not only stem from the economic structure of the trading partner, which is time-invariant in the short run. A simple summary statistic provides some intuition for the later analysis. The average change of the tariff rate from 1931 to 1932 for countries “off gold” was about 9.5 % ad valorem (SD: 11.5), whereas the one for countries still on gold was 6.3 % ad valorem (SD: 6.3). However, those numbers should be taken with a grain of salt as they are just summary statistics. As the initial levels differ heavily and protectionism might be sector-specific, their relevance is somewhat doubtful. In contrast, the statistical analysis rules out such factors and shows that increasing heterogeneity in tariff levels is rooted in retaliation. Bilateral policy choices play an important role for the tariff setting.

For the construction of French bilateral exchange rates with its trading partners, I make use of the monthly US-dollar exchange rates provided by the Global Financial Database (2013). The cross-calculation of the annual averages of the US dollar exchange rates yields the bilateral exchange rates , i.e.:

\[ e_{fr,i} = \left[ \frac{e_{fr,us}}{e_{i,us}} \right]^{-1} \]  

\[ e_{fr,us} \] and \[ e_{i,us} \] are francs and \( i \)'s currency in US dollars. Hence \( e_{fr,i} \) are French Francs in terms of \( i \)'s currency. A appreciation of the franc would lower the exchange rate. For the sake of simplicity when interpreting regression results at a later stage, I re-base the bilateral exchange rate to 100 in 1929 and take logarithms to create a valuation measure:

\[ VAL_{fr,i,t} = \log(100 \cdot \frac{e_{fr,i,t}}{e_{fr,i,1929}}) \]  

Based on theory one could argue that increased tariffs against country \( j \) lead to less demand for \( j \)'s currency as the importing industries switch to substitute the input. In fact, one would expect a depreciation of the currency in this case. While this theoretical narrative would hold in a two country world, its relevance for this analysis is doubtful. Most likely, the bilateral exchange rate of France and country \( j \) is determined by more complex relationships. Moreover the creation of
an “off gold” indicator variable mitigates this problem. If the value of the currency in 1929 terms is smaller than 90%, this indicator variable takes the value one. Late 1931 depreciators are still counted as on gold, but for countries that had left the gold standard before autumn 1931 the “off gold” indicator takes the value of one already in 1931. It is very unlikely that French tariff choices had any effect on countries’ decision to leave the gold standard.

Finally, as most of my estimations are carried out in a panel, I test for the validity of a random effects model as opposed to a fixed effects model. I add standard controls such as distance, contingency and language and colonial status from the dataset by Mayer and Zignago (2011). It turns out that the Hausman test rejects the applicability of the random effects model.

4.2. Model

Qualitative evidence regarding the surtax suggests the existence of a relationship between the devaluations and the increasing discretion in tariff setting. However, as noted above French officials exempted certain goods and even countries from it and it was frequently modified by decrees. Furthermore, France increased its tariffs on certain goods to hit individual countries (see e.g. Northern Star, 1932, for French tariff increase on butter and wheat in response to Australian commercial policies). The econometric framework accounts for both these channels and measures the importance of retaliation relative to other (multilateral) tariff measures by the following model for the years 1931 and 1932:

\[ Y_{it} = VAL + c_i + t_i + \epsilon_{it} \] (4.4)

Depending on the regression, \( Y_{it} \) denotes either the French tariff rate against trading partner \( i \) in year \( t \) or the change in the respective bilateral trade costs. \( VAL \) represents either the change in the valuation of the currency or an “off gold” dummy. \( c_i \) controls for country specific characteristics. The time dummy \( t_i \) controls for the general rise in protectionism or formally, different means in the cross-section at different points of time. This specification resembles the difference in differences approach, if \( VAL \) is the “off gold” dummy and the dependent variable is in (log-) levels. The trading partner fixed effects \( c_i \) should account for time-invariant factors and the time dummy \( t_i \) for the general increase in protectionism.

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23The annual summary tables of the Journal Officiel (Tables du Journal Officiel) for the years 1931, 1932, 1933 list 18 decrees in total, often containing multiple orders.
24Naturally, this implies that I discard observations that were “off gold” in 1931 already because of perfect multicollinearity between the \( c_i \) and the “off gold” dummy. This makes my result even more robust and striking as observations are excluded, which are likely to make the results stronger.
The tariff rate is transformed into either logarithms for the OLS estimation, or implicitly so, by employing the Poisson Pseudo Maximum Likelihood estimator. The interpretation differs in so far as that the simple levels would account for the ad valorem percentage change, whereas log-levels indicate the percentage change of the ad valorem tariff. For instance, an increase of French tariffs against country \( i \) from 5% to 10% would simply imply a 5% change in a specification without the logarithmic transformation. In the log-specification, it would show up as a doubling of the tariff rate and imply a higher value than an increase from 30% to 59%. Rooted in the idea that a tariff is a mark-up on the price, researchers often employ the logarithm of \((1+\text{tariff rate})\) instead of the logarithm of the tariff rate only, which mitigates the above problem. However, as we focus on policy decision, this introduces a somewhat arbitrary scaling effect. Moreover, the untransformed and “\((1+\text{tariff rate})\)” specification cannot be estimated via OLS because of their distributional properties and the presence heteroscedasticity.

There are several reasons why heteroscedasticity occurs in this case. First, the degree of diversification of the French import basket varies across trading partners. The less diversified the basket is, the stronger is the effect of a particular tariff on the overall tariff level. Second, the reason might lie in different developments of French and foreign price indices. If all duties were ad valorem, prices would have no effect. If non-ad valorem duties are included and their proportion varies substantially across countries, a compositional effect might occur, depending on the proportion of ad valorem versus quantity duties. Finally, the most likely explanation lies in the nature of the distribution of the dependent variable (see Figure 5). It contains a lot of near-zero values and not so many high values (tariff rates). There are two ways to handle this problem.

A simple logarithmic transformation smoothes the distribution as argued by Sarel (1996, p. 203) for the case of inflation rates. Silva and Tenreyro (2006) suggest that the Poisson Pseudo Maximum Likelihood (PPML) estimator is the preferable strategy. This estimator, usually employed for count data, is particularly well-suited for dependent variables containing a lot of zeros or near-zero values. The kernel densities plotted in Figure 5 show that such a (Poisson) distribution is present. The interpretation using the PPML estimator is straightforward. The coefficient of the gold dummy indicates the change in the logarithm (or growth rate) of the dependent variable induced by being “off gold.” Hence it is analogous to the interpretation of the log-OLS specification. The results section reports log-OLS and the PPML results. They are very similar and I leave the ultimate decision which estimates to trust more to the reader.

In some specifications, I replace the tariff rate with Novy’s trade cost measure. It turns out, that heteroscedasticity is less of a concern. However, other problems emerge. The trade cost measure lags the imposition of tariffs, although it should pick them up straight away (see Appendix E for a comparison of the two). This makes an application of the classical difference in
differences approach somewhat impossible. Therefore, I pool the observations from 1930–1934 and add country and time fixed effects. The country fixed effects are able to remove distortions in the growth rates stemming from different base values, which are heavily influenced by non-protectionist characteristics such as distance.

In sum, I provide several different specifications to deal with the problem of heteroscedasticity. This problem has its root in the nature of the tariff rate data. It might stem from price developments, the diversification of the import basket or simply (and most likely) from the distribution of tariff choices across trading partners. Whatever, the ultimate cause of the problem is, the econometric techniques and transformations solve it. The problem does not occur when the trade cost measure is applied to proxy protectionism. Hence, the application of the trade cost measure meets the concerns of those who are sceptic about the above transformations and those who are sceptic about whether the average tariff rate is a good proxy for protectionism.

4.3. Results

This section presents the results of specifications described in the previous section. It provides quantitative evidence that discretion in French tariff policies was in fact driven by retaliation. Different specifications all point in the same direction: retaliation mattered.

Table 3 presents the results for the regressions including the “off gold dummy.” The first two columns rely on a sample of 46 countries. Countries that went off the gold standard before autumn 1931 are excluded as their country fixed effect would be collinear with the off gold dummy. The pooled regression in the third column relies on 33 countries for 5 years, totalling 165 observations. The size of the cross-section is smaller for these as GDP data availability is limited.

The first two columns confirm the results of the qualitative analysis. Retaliation, it seems, mattered. In the log-OLS specification the “off gold” dummy is statistically and economically significant. The treatment effect of the devaluation is $e^{0.39} \sim 1.48 = 48\%$. Hence France increased tariffs against devaluing countries by an additional 50%. Can we learn from this simple difference in differences setting anything about the relative importance of retaliation as opposed to other drivers of protectionism? Regardless of whether trading partners devalued or not, the latter would affect all her trading partners to a similar degree. This general increase in tariffs would be picked up by the time fixed effect for 1932. With $e^{0.253} \sim 1.29 = 29\%$, it is smaller than the identified retaliatory effect. The PPML estimates confirm these results. The magnitudes of the coefficients (51% for “off gold” and 36% for the time fixed effect) are very similar to those obtained by OLS and high $z$ values indicate that the impact is measured precisely.

In fact, restricting the sample to 1932 and 1933 yields plausible and significant results. However, the significance of the results is sensitive to the choice of the periods under consideration.
Table 3: Regression Results - “off gold” treatment, 1931–1932

<table>
<thead>
<tr>
<th>Difference in Differences</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1931–1932 (OLS)</td>
<td>1930–1934 (OLS)</td>
</tr>
<tr>
<td>LOG(TR)</td>
<td>TR Growth of Trade Costs</td>
</tr>
<tr>
<td>Off Gold</td>
<td>0.390**</td>
</tr>
<tr>
<td>(2.57)</td>
<td></td>
</tr>
<tr>
<td>Time 1932</td>
<td>0.253***</td>
</tr>
<tr>
<td>(3.29)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>92</td>
</tr>
<tr>
<td>R²</td>
<td>0.466</td>
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Significance levels: * p < 0.01, ** p < 0.05, *** p < 0.01

Hence, one could conclude that the French tariff decisions were slightly more driven by retaliation and thus bilateral considerations than by other forces, which are depicted as tariff increases across all trading partners by the time fixed effect. One might argue that an alternative channel for trilemma forces would be the following: France was forced to increase tariffs and hence lifted them up against those, who played beggar-my-neighbour. However, if France wanted to improve her trade balance because of the trilemma constraints, she could have passed a general tariff of 10% ad valorem instead of engaging in discriminatory policies, which are harder and more costly to enforce than a general tariff. Moreover, the newspaper analysis suggests that the observed effect is indeed due to retaliatory measures.

The third column provides the robustness check for non-tariff measures. As argued above a difference in differences approach is not applicable, but the results of the pooled regression with the growth rates of trade provide further evidence for retaliatory tariff setting. The growth in trade costs (as approximated by log differences) is on average 1.3 % higher for countries “off gold.” A set of time and country fixed effects is included in the regressions, but not reported. In contrast to the difference in differences estimates, the time fixed effects have no interesting implication for the discussion of retaliatory motivations for protectionism as opposed to other forces. The positive coefficient is robust in statistical significance and magnitude for either shrinking the period to 1930–1933 or extending it to 1930–1935.

In the difference in differences setting and even in the pooled regression with the gold dummy,
endogeneity is of little concern. As argued above, historical accounts do not suggest that French tariff setting played any role for other countries’ decisions for going off the gold standard, although theoretically possible. However, regressions presented in Table 4 estimate devaluation elasticities using exchange rates. In this case the exogeneity argument becomes weak. Currency markets are driven by supply and demand. A tariff would reduce the importers’ demand for the particular foreign currency and thus, ceteris paribus, the franc would appreciate. I have no solution to offer against such concerns but one important remark. Bilateral exchange rates are influenced by many different factors in a multilateral world. For instance, the relative position of the pound against the dollar might influence the pound-franc exchange and so do British (and French) general economic conditions. Nevertheless, I cannot preclude the possibility of an endogeneity bias in the following estimations.26

<table>
<thead>
<tr>
<th></th>
<th>1931–1932</th>
<th>1930–1934</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(OLS)</td>
<td>(PPML)</td>
</tr>
<tr>
<td><strong>LOG(TR)</strong></td>
<td>1.153**</td>
<td>1.200***</td>
</tr>
<tr>
<td><strong>TR</strong></td>
<td>(2.31)</td>
<td>(4.07)</td>
</tr>
<tr>
<td><strong>Time 1932</strong></td>
<td>0.225***</td>
<td>0.254***</td>
</tr>
<tr>
<td></td>
<td>(3.03)</td>
<td>(5.71)</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>102</td>
<td>102</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>0.520</td>
<td>0.779</td>
</tr>
</tbody>
</table>

\[ t/z \] statistics in parentheses. Robust standard errors applied. Fixed effects included of the fixed effects (OLS regressions). Significance levels: * \( p < 0.01 \), ** \( p < 0.05 \), *** \( p < 0.01 \)

These estimates include all countries, even if they have devalued pre-autumn 1931 as they contain valuable information and in the presence of a continuous regressor such as the change in the value of the currency \( \Delta VAL_{fr,t} \), multicollinearity is no issue anymore. The elasticities of tariffs on exchange rates are high and significant. OLS results and PPML results are very similar. A 10% change in the growth rate in overvaluation would lead to a tariff increase of about 15%.

26One way to deal with this concern is the GMM estimator such as in Rodrik (2008) who analyses the impact of undervaluation on growth. This estimator uses lags and differences to mitigate endogeneity issues. Given the relatively short time period under consideration, I doubt its applicability in this case though.
The result for the trade cost measure is less pronounced as it is not significant at the conventional 10% level ($p \sim 14\%$). For different time frames such as 1932–1934 results become significant. Most likely, the insignificance is due to the small amount of variation in the pre-1932 exchange rate. Some of the countries that were off gold before autumn 1931 in fact had never gone back on the gold standard such as China and Spain. Naturally, those exhibit less variation (or depreciation) than the countries depreciating in autumn 1931 as there was no such effect as “breaking the golden fetters” (Eichengreen, 1992).

In sum, the empirical results support the qualitative assessment. Retaliation played an important role for French tariff setting. The difference in differences estimates allow us to compare the strength of retaliation as opposed to other forces at work. The latter played a slightly less important role than retaliation in this case study. The effects are not only statistically significant, but also large enough to have an economic impact. Tariff-exchange rate elasticity estimates are presented and turn out to have significant values, both in magnitude and the statistical sense. However, endogeneity concerns forbid a strictly causal interpretation of those.

5. Conclusion

This analysis emphasises the role of retaliation in trade relationships. Qualitative accounts document a shift in the rhetoric from leniency towards retaliation. Historical and theoretical priors inform the econometric analysis, which finds that retaliation mattered. With regards to French tariff setting, retaliation appears to be an even more important driving force than the general protectionist tendency either stemming from other domestic or trilemma forces. There are lessons for the academic and policy debates.

The economic policy implication is that breakups of fixed exchange rate regimes are likely to result in protectionism in the absence of an adequate safeguard. Many researchers draw parallels between the gold standard break-up and a potential break-up of the Eurozone (see e.g. Wolf, 2010). Yet, an interesting difference between now and then is that the common market regulations of the European Union would counter protectionist measures at least within the EU. For instance, if Greece exits the Eurozone, this would put Spanish olive oil production in a worse competitive position. However, Spain would have no legal basis to retaliate against Greece as markets are free within the EU. This thought experiment illustrates that strong institutions might well have the capacity to prevent retaliatory spirals such as the one occurring in the interwar period.

The implication for the academic debate is that retaliation albeit often ignored can be a driver of protectionism, which is quantitatively as important as other forces. Data scarcity and identification difficulties are weak arguments for omitting an important variable. Generally, the omission of bilateral tariff levels in all empirical trade models that are estimated for pre-1990 data seems sur-
prising given the large variation of tariff levels across trading partners. In terms of economic history research, this paper sets an agenda. Is it possible to generalise the French results? Moreover, would the benevolent assessment of the 1930s devaluations hold, if we account for the externalities caused by them?

Finally, this research underlines the importance of historical case studies. Macroeconomic frameworks such as the trilemma are important contributions in the field of economic history. However, they tend to undermine political and historical circumstances resulting in explanations outside of the framework. This paper demonstrates that information can flow from economic history to economics and not only vice versa.

6. References

Primary Sources

To improve the readability of this bibliography, I omit the urls for the single newspapers articles within in the Gale Group online archive. However, those can easily be found given the name and the date or requested from the author.


Manchester Guardian. 1931m. “German Demand for Retaliation.” The Manchester Guardian (1901-1959), 12. Copyright - Copyright Guardian Newspapers Limited Dec 19, 1931; Last updated - 2010-07-03.


Secondary Sources


Northern Star. 1932. “France Retaliates.”


Appendix A. Economic Activity in France

As the official industrial production index does not include employment and stock prices and is based on relatively few series, I decided to estimate French economic activity in the fashion of Albers and Uebele (2013). All data are monthly and have been manually transcribed from the “Statistisches Handbuch der Weltwirtschaft” (Statistische Reichsamt, 1936, 1937). I calculate the weights for the economic activity index by running principal components analysis on the z-standardised growth rates of the 72 disaggregated series. I combine the weights with the seasonally adjusted and z-standardised data in levels. Figure B.7 illustrates the differences between the estimate and the official index. The weighting of the official index (based on 1906 employment data) and its base year of 1913 seem problematic. For instance, rubber-industry output quadrupled in comparison to 1913, whereas other series have not reached their previous level. Therefore, an industry with a rather small weight gains a higher weight in the official index. Moreover, employment data is strictly excluded from the official index although it supposedly carries important information. The Bulletin de la Statistique générale de la France, October 1924 describes the official index in more detail. The main differences between my estimates and the official index lie in the volatility until 1928 and the timing of the pre-Depression peak. In fact, my estimates do not show any growth from 1929 onwards. All indices, however, demonstrate that the crisis became severe from 1930 onwards and the French economy reached a trough in 1932.
TABLE A.5: WEIGHTS FRENCH INDEX

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Unit</th>
<th>Principal Component Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All Series</td>
</tr>
<tr>
<td>Mining</td>
<td>Index (1913)</td>
<td>0.15</td>
</tr>
<tr>
<td>Iron and steel works</td>
<td>Index (1913)</td>
<td>0.19</td>
</tr>
<tr>
<td>Engineering</td>
<td>Index (1913)</td>
<td>0.15</td>
</tr>
<tr>
<td>Cars</td>
<td>Index (1913)</td>
<td>0.16</td>
</tr>
<tr>
<td>Rubber</td>
<td>Index (1913)</td>
<td>0.11</td>
</tr>
<tr>
<td>Paper</td>
<td>Index (1913)</td>
<td>0.04</td>
</tr>
<tr>
<td>Leather</td>
<td>Index (1913)</td>
<td>0.09</td>
</tr>
<tr>
<td>Textiles (all)</td>
<td>Index (1913)</td>
<td>0.17</td>
</tr>
<tr>
<td>Cotton</td>
<td>Index (1913)</td>
<td>0.17</td>
</tr>
<tr>
<td>Woolen</td>
<td>Index (1913)</td>
<td>0.08</td>
</tr>
<tr>
<td>Silk</td>
<td>Index (1913)</td>
<td>0.16</td>
</tr>
<tr>
<td>Construction</td>
<td>Index (1913)</td>
<td>0.05</td>
</tr>
<tr>
<td>Coal and lignite</td>
<td>100t</td>
<td>0.19</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>100t</td>
<td>0.21</td>
</tr>
<tr>
<td>Potassium</td>
<td>100t</td>
<td>0.16</td>
</tr>
<tr>
<td>Pig iron</td>
<td>100t</td>
<td>0.23</td>
</tr>
<tr>
<td>Raw steel</td>
<td>100t</td>
<td>0.23</td>
</tr>
<tr>
<td>Cotton mills - spindle employed</td>
<td>1000s</td>
<td>0.15</td>
</tr>
<tr>
<td>Cotton mills - production per spindle</td>
<td>kg</td>
<td>0.18</td>
</tr>
<tr>
<td>Cotton mills - stocks per spindle</td>
<td>kg</td>
<td>-0.08</td>
</tr>
<tr>
<td>Weaving mills - looms employed</td>
<td>1000s</td>
<td>0.12</td>
</tr>
<tr>
<td>Weaving mills - production per loom</td>
<td>100m</td>
<td>0.19</td>
</tr>
<tr>
<td>Weaving mills - stocks per loom</td>
<td>100m</td>
<td>-0.10</td>
</tr>
<tr>
<td>Weaving mills - orders per loom</td>
<td>100m</td>
<td>0.06</td>
</tr>
<tr>
<td>Wool conditioning</td>
<td>1000t</td>
<td>0.09</td>
</tr>
<tr>
<td>Silk conditioning</td>
<td>1000t</td>
<td>0.14</td>
</tr>
<tr>
<td>Transportation - wagons (railway)</td>
<td>1000s</td>
<td>0.16</td>
</tr>
<tr>
<td>Transportation - shipped goods</td>
<td>1000t</td>
<td>0.07</td>
</tr>
<tr>
<td>Imports - total</td>
<td>m. Franc</td>
<td>0.19</td>
</tr>
<tr>
<td>Exports - total</td>
<td>m. Franc</td>
<td>0.15</td>
</tr>
<tr>
<td>Exports - foodstuff</td>
<td>m. Franc</td>
<td>0.11</td>
</tr>
<tr>
<td>Exports - raw materials</td>
<td>m. Franc</td>
<td>0.17</td>
</tr>
<tr>
<td>Exports - fully manufactured goods</td>
<td>m. Franc</td>
<td>0.14</td>
</tr>
<tr>
<td>Exports - foodstuff</td>
<td>m. Franc</td>
<td>0.07</td>
</tr>
<tr>
<td>Exports - raw materials</td>
<td>m. Franc</td>
<td>0.10</td>
</tr>
<tr>
<td>Exports - fully manufactured goods</td>
<td>m. Franc</td>
<td>0.14</td>
</tr>
<tr>
<td>Exports - raw cotton</td>
<td>1000t</td>
<td>0.09</td>
</tr>
<tr>
<td>Exports - raw woolen</td>
<td>1000t</td>
<td>0.06</td>
</tr>
<tr>
<td>Exports - coal &amp; coke</td>
<td>1000t</td>
<td>0.04</td>
</tr>
<tr>
<td>Exports - cooper</td>
<td>1000t</td>
<td>0.07</td>
</tr>
<tr>
<td>Exports - machines</td>
<td>m. Franc</td>
<td>0.10</td>
</tr>
<tr>
<td>Exports - iron goods</td>
<td>1000t</td>
<td>0.08</td>
</tr>
<tr>
<td>Exports - machines, vessels and electronics</td>
<td>m. Franc</td>
<td>0.06</td>
</tr>
<tr>
<td>Exports - cars (including partial manufactures)</td>
<td>m. Franc</td>
<td>0.05</td>
</tr>
<tr>
<td>Exports - non-precious metals</td>
<td>m. Franc</td>
<td>0.11</td>
</tr>
<tr>
<td>Exports - raw cotton</td>
<td>1000t</td>
<td>0.11</td>
</tr>
<tr>
<td>Exports - cotton</td>
<td>1000t</td>
<td>0.07</td>
</tr>
<tr>
<td>Exports - clothing</td>
<td>m. Franc</td>
<td>0.11</td>
</tr>
<tr>
<td>Exports - goods from the chemical industry</td>
<td>m. Franc</td>
<td>0.11</td>
</tr>
<tr>
<td>Wholesale prices</td>
<td>Index (July 1914)</td>
<td>0.13</td>
</tr>
<tr>
<td>Retail prices in Paris</td>
<td>Index (July 1914)</td>
<td>0.11</td>
</tr>
<tr>
<td>Unmatched job requests</td>
<td>1000s</td>
<td>-0.11</td>
</tr>
<tr>
<td>Unemployed on benefits</td>
<td>1000s</td>
<td>-0.11</td>
</tr>
</tbody>
</table>
Appendix B. Real Exchange Rate

The graph shows the Franc-pound real and nominal exchange rate. The notation is $\frac{\text{Franc}}{\text{pound}}$. The nominal exchange rate was calculated via cross-calculation with the dollar exchange rate, which are taken from the *Global Financial Database*. For the real adjustment wholesale prices from (Statistische Reichsamt, 1936, 1937) are taken. For both countries, indices have been linked via re-calibrating them to a common base year.

![Real and Nominal Exchange Rate (1929=100)](image)

**Figure B.7: Real and Nominal Exchange Rate (1929=100)**

Appendix C. French Imperial Preference

(a) Imports

![Imports](image)

(b) Exports

![Exports](image)

**Figure C.8: France’s increasing trade with the Colonies**

Source: Tableau général du Commerce de la France, issues: 1926–1933

Note: Balanced sample of 73 countries (14 Colonies, 59 Non-Colonies)
Appendix D. Measuring Trade Costs

Measuring protectionism is a very challenging task because protectionist measures can take various forms. This is especially relevant for the 1930s in which policymakers discovered quotas and exchange controls as commercial policy tools. Therefore, this paper uses two different proxies of trade costs. The classic measure, in this case on a bilateral basis, is tariff revenues divided by imports. Moreover, I calculate the trade cost measure by Jacks, Meissner and Novy (2008, 2011), which is micro-founded (following Anderson and Van Wincoop, 2003). The measure compares frictions of international trade and intranational trade. It is an indirect measure of trade costs and therefore less data intensive. This section summarises the theoretical derivation of this measure. Novy (2013, p. 104f) presents the theoretical background.\(^{27}\) The starting point is the micro-founded gravity equation by Anderson and Van Wincoop (2003):

\[
x_{ij} = \frac{y_i y_j}{Y^W} \left( \frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma}
\]

where \(x_{ij}\) denotes the exports trade from country \(i\) to \(j\), and \(y\) is the output of \(i, j,\) and the world \(W\). Thus exports from \(i\) to \(j\) are increasing in the share of the two countries output in world output. \(t_{ij}\) is the bilateral trade cost for the exports from \(i\) to \(j\) and not necessarily equal to \(t_{ji}\). \(\Pi_i\) is a price index reflecting outward multilateral resistance and \(P_j\) reflects inward multilateral resistance. They reflect average trade costs, because those prices include the trade costs with all other trading partners. Because the elasticity of substitution across goods is larger than one (\(\sigma > 1\)), bilateral trade costs (normalised by the average multilateral trade costs) decrease exports from \(i\) to \(j\).

Anderson and Van Wincoop (2003) assume trade costs to be:

\[
t_{ij} = b_{ij} d_{ij}^\kappa
\]

where \(b\) is a border dummy and \(d\) the distance with the respective distance elasticity \(\kappa\). They also assume symmetry that is \(t_{ij} = t_{ji}\), implying that inward and outward multilateral resistance are the same \(\Pi_i = \Pi_j\). Novy argues that three problems arise: (i) the cost function might be misspecified, (ii) bilateral trade costs might be asymmetric, and (iii) trade costs are time-variant and constant barriers are not a good way to measure trade cost changes over time.\(^{28}\)

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\(^{27}\)The following paragraphs summarise his work and do not rest on my own ideas unless stated otherwise.

\(^{28}\)In fact, point (iii) could be accounted for in an empirical model using time-varying country fixed effects.
The virtue of Novy’s approach is the provision of an analytical solution that does not require further assumptions. Instead it rests on the idea that international and intranational trade influence trade costs. For country $i$ the intranational trade would be:

$$x_{ii} = \frac{y_i^2}{y_i W} \left[ \frac{t_{ii}}{\Pi_i P_i} \right]^{1-\sigma}$$ (D.3)

and re-arranging for the multilateral resistance variables yields:

$$\Pi_i P_i = \left[ \frac{x_{ii}}{y_i} \right] \cdot \left[ \frac{y_i}{y_i W} \right] \left[ \left[ \frac{t_{ij} l_{ji}}{\Pi_i P_i \Pi_j P_j} \right] \right]^{1-\sigma}$$ (D.4)

$x_{ii}/y_i$ could be interpreted as a measure of “closeness” as opposed to openness, since it measures the domestic trade in terms of the output. With decreasing openness, multilateral resistance increases $\frac{\delta t(\Pi_i P_i)}{\delta x_{ii}/y_i} > 0$. Having this knowledge in mind, we can go back to Equation (D.1). Instead of looking only at one direction of the trade flow (from $i$ to $j$), we multiply the equation by the reverse trade flow.

$$x_{ij} x_{ji} = \left[ \frac{y_i y_j}{y_i W} \right]^2 \left[ \frac{t_{ij} l_{ji}}{\Pi_i P_i \Pi_j P_j} \right]^{1-\sigma}$$ (D.5)

We substitute $\Pi$ and $P$ for the right-hand term from Equation D.4 and rearrange for the trade cost measures:

$$\frac{t_{ij} l_{ji}}{t_{ii} l_{jj}} = \left[ \frac{x_{ii} x_{jj}}{x_{ij} x_{ji}} \right]^{\sigma-1}$$ (D.6)

Novy then takes the geometric mean of trade costs and subtracts one, which expresses the trade costs $\tau$ in a tariff equivalent.

$$\tau_{i,j} = \left[ \frac{t_{ij} l_{ji}}{t_{ii} l_{jj}} \right]^{\frac{1}{\sigma-1}} - 1 = \left[ \frac{x_{ii} x_{jj}}{x_{ij} x_{ji}} \right]^{\frac{1}{\sigma-1}} - 1$$ (D.7)

One can proxy $x_{ii}$ and $x_{jj}$ by the difference of GDP and total exports (Jacks, Meissner and Novy, 2011).29 From the empirical literature, we know that $\sigma = 8$ is a reasonable value for the

---

29Moreover, one could add the share of the tradable sector like in Eichengreen and Irwin (2010, p. 91). Unlike them, however, one should not assume the same share for every country as those are very likely to vary by country. In the proposed research, I could actually proxy those by using employment shares by sector from Statistische Reichsamt (1936, 1937) for each individual country.
elasticity of substitution. I can now generate bilateral trade cost measures. Jacks, Meissner and Novy (2011) demonstrate that for the analysis of the change in trade costs results are not sensitive to the choice of $\sigma$.

Appendix E. Comparison of Trade Cost Measure and Bilateral Tariff Rates

![Figure E.9: Trade Costs versus Tariff Rates](image)