

The Zollverein and the formation of a Customs Union

Florian Ploeckl *

School of Economics
University of Adelaide

February 5, 2014

Abstract

The Zollverein, a customs union, of 1834 was the outcome of sequential accession negotiations between Prussia and a series of other German states. This paper applies a bargaining model to analyze the choices of the negotiation structure and accession sequence. The existence of negative coalition externalities, the effect of a new coalition on non-participants, led the agenda setter, Prussia, to choose sequential over multilateral negotiations. The nature of the coalition externalities within the areas of trade patterns, trade policy and political economy also explains the observed accession sequence. Further the choice of a customs union as the institutional structure was maximizing Prussia's utility by allowing larger coalition externalities.

*E-mail: florian.ploeckl@adelaide.edu.au

This is a revised version of University of Oxford Discussion paper in Economic and Social History Nr.84. Some citations and correct references may be missing.

1 Introduction

The rise of nation states was associated with the rise of unified customs territories of unified political entities. The Zollverein, the 1834 customs union between German states, was the first international trade agreement that created a unified customs area between independent sovereign nations. This unification of trade institutions without concurrent political unification created the template for similar agreements and provides therefore a historically important example which reveals the mechanics and causes that shape the creation and structures of trade agreements (Viner, 1950). In this paper I use the historical example to analyse the creation of a customs union in light of the debate¹ about the role of regional trade agreements in the creation of multilateral agreements.

Traditionally the economic history literature has focused on the reasons underlying the existence of the Zollverein, proposed explanations range from political dominance within Germany (Treitschke, 1872; Murphy, 1991) to financial advantages due to administrative savings (Dumke, 1994*a*). These approaches may provide a reason for the existence of the Zollverein but do not explain the realized nature of the formation process including characteristics that help to draw lessons about the nature of trade agreements in general. In particular I will focus on the negotiation structure, institutional structure and sequence of accession observed in this case. This paper demonstrates in an analytic narrative that the logical conclusions derived from a game-theoretic analysis applied to the particular context of central Europe in the early 19th century explain the creation process of the Zollverein customs union. In particular I show that the analysis illuminates the underlying factors, notably geographic externalities, that explain the institutional structure, negotiation

¹This debate is often labeled as stepping stones versus stumbling blocs highlighting the potential of regional agreements to further as well as hinder global agreements (Aghion, Antras and Helpman, 2006)

structure and accession sequence and thereby more generally the nature of the formation process of trade agreements.

The institutional modernization process of German started by the Napoleonic wars also involved customs systems and tariff structures. In 1828 the first, customs union agreements were concluded, which then evolve in the following years leading to the establishment of the Zollverein on January 1st, 1834 as a customs union of seven German states². Over the next three decades a number of further states joined this customs union, which saw substantial structural changes after the 1866 war between Prussia and Austria and then become part of the political structure of the German Empire after its founding in 1871 (Henderson, 1984*a*; Hahn, 1982*a*). The Zollverein had no internal customs borders and common external tariff rates which, like any decision, had to be set unanimously by a congress of all member states that met approximately all three years. The actual border controls and customs administration was still in the purview of the national services. The net revenues, after the costs for border customs administration were compensated, were split according to population size. The necessary calculations were made by a small standing office in Berlin, which only had administrative functions. Due to their effect on trade the Zollverein treaties also contained restrictions on public monopolies and producer taxes within the individual states. The Zollverein further harmonized weights and measurements as well as standardized the acceptance of multiple currencies in use throughout its territory (Henderson, 1984*a*; Hahn, 1982*a*).

In the second half of the 19th century the beginning historiography about the creation focused on Prussia's hegemony. One particularly influential interpretation was given by Treitschke (1872), who saw the Zollverein as a first step towards German unification under the enlightened guidance of the Prus-

²This counts the group of officially independent Thuringian principalities as a single entity.

sian monarch. This nationalistic view interpreted the Zollverein as a move by Prussia to assert hegemony over Germany and diminish the influence of its rival, Austria. This view began to be challenged in the 20th century, where, for example, Taylor (1946) and Kitchen (1978) argue that Prussia's motives were initially of economic nature and only became political later on. Murphy (1991) provides a differing political interpretation, arguing that the Zollverein was intended as a political bulwark against France. The theory commonly accepted in the current economic history literature (Williamson, 2003; Alesina and Spolaore, 2003) was introduced by Dumke (1976; 1994*b*), and emphasizes huge fiscal savings due to economies of scale in customs administration. Financial gains, which resulted from these savings, were therefore the main incentive for the creation of, and participation in, the union. Although there are further works about the formation process (Henderson, 1984*a*; Hahn, 1982*b*), these are rather descriptive in their approach and do not provide an analysis explaining the observed structures of the formation.

The issues of the formation and sequencing of trade agreements do receive attention in the modern trade literature, especially with regard to the design of a global trade architecture and the role of regional trade agreements through which it can advance. One approach is the so-called "Domino Regionalism". Formalized by Baldwin (1999), an idiosyncratic event changes the internal political economy within one state, which then joins the trade agreement. The resulting trade creation and diversion effects lead to political economy changes in another country, causing it to join as well. Similarly, Philippe Aghion, Pol Antras and Elhanan Helpman (2006) develops a bargaining model based on an underlying cooperative game. The model, more general than Baldwin's approach, provides a theoretical framework for the role of regional trade agreements in building a global free trade agreement. Its general nature allows to adapt it to the historical circumstances, so I utilize this approach to interpret the formation of the Zollverein, shedding new

light on the development of this institution as well as providing a case study for the formation of a customs union.

The central argument of this paper is that the historical situation of trade relationships between the German states fits the setup of the theoretical model by Aghion et al very well; the logic of the model explains therefore the observed formation process, in particular bargaining structure, institutional choice and accession sequence. Section 2 describes the historical context, framed as a game-theoretic setup. This setup is then used to demonstrate the theoretical framework and its logical conclusions for the shape of the formation process in section 3. The section additionally introduces the main drivers for the model predictions, namely coalition externalities, the impact of one state's trade agreement membership on non non-member states. Their impact is demonstrated in the next two sections, which explore how they explain the observed bargaining structure and institutional choice. Section 6 analyzes the accession of each state individually, exploring the reasons and coalition externalities behind the admission into the Zollverein. The analysis ends with a conclusion in the final section.

2 Setup

The basic setup of any game theoretic analysis is the set of players and the set of actions they can execute. The next section discusses the set of states involved as players as well as the identity and role of a specific player, namely the agenda setter. This is followed by a discussion of the set of actions, split into a discussion of the relevant policy domain as well as the potential range of institutional arrangements.

2.1 Set of Players

The set of players contains a number of states that were members of the *Deutsche Bund*, the common political governance institution for German States created by the Congress of Vienna in 1815. The discussion first clarifies which of the members states are considered to be relevant players, and then addresses why no other, non-German, states were involved.

The institutional structures of the *Deutsche Bund* had three different categories of member states, first Austria and Prussia as part of the great European powers that served as guarantors for the acts of the Congress of Vienna and then the constitution of the *Deutsche Bund*; second, a number of mid-sized powers, for example Bavaria and Hannover, with full voting rights in the Diet; and third, smaller principalities and free cities as part of shared voting arrangements (Angelow, 2003a).

The role of Prussia and Austria is discussed in the later section that looks at the role and identity of the agenda setter. The main set of players are the mid-sized states, which had full voting rights in their own right.³ This group contains Baden, Bavaria, Hannover, Hesse-Cassel, Hesse-Darmstadt, Saxony and Wuerttemberg. Most of these states had begun to institutionally modernize following the French or Prussian examples. One important reform in a number of states was the institution of a new customs system, in particular the move to external border systems and abolishment of internal tariff borders. Related to the modernization of tariff systems, a number of these states started to negotiate in varying constellations with each other about trade agreements. These negotiations however failed to result in more than short-lived and narrow agreements (Henderson, 1984a; Müller, 1984) The third group are small, though independent, states that did not have

³The cases of Luxemburg and Holstein-Lauenberg, whose voting rights were granted to their respective foreign owners, the Netherlands and Denmark, are discussed in the section on foreign neighbours.

their own voting rights. The constitution of the German Federation specified groups of states with a common vote, the actual voting arrangement was up to the group members. I split the group of Braunschweig and Nassau, the two largest states under this arrangement, and take them as individual players. This is because of their size and respective geographical position, the two states did not border each other. Similarly I do the same for Oldenburg, as well as the group of free cities, in particular Frankfurt, Hamburg and Bremen. The main alternative is to include a group of such states as a single player. This is appropriate for the Thuringian principalities, which had a shared voting group and end up with a shared membership in the Zollverein as well. This leaves a number of small geographically dispersed principalities, which were combined in a number of voting groups. In contrast to their Thuringian counterparts, they had no clear dynastic, geographic or other connection. Some of them, for example the Anhalt principalities, were enclaves within the territories of other states, in their case Prussia. This led to a treatment of these small principalities similar to that of enclaves of other, larger states. These areas were not treated as separate customs territories but absorbed into the tariff systems of the surrounding state.⁴ The actual sovereigns of these enclaves were usually compensated financially for the loss of tariff revenues, usually loosely based on the number of enclave inhabitants. Since these small principalities surrendered their tariff policy rights to the larger neighbours, they did not participate in trade negotiations and are therefore not considered as a players in these circumstances.

Denmark, the Netherlands and Switzerland are the neighbor states that

⁴This usually meant that the small state would be treated as a territory of the larger state with regard to customs and trade issues. Furthermore customs officials from the larger state might have the right to enter the smaller states territory in official capacity. For example Schwarzburg-Sondershausen allowed Prussian officials to enter the territory for investigatory purposes, but arrests and related police functions were still the purview of local authorities (VBDZ 35).

might have potentially been interested in participating in the Zollverein. The Swiss had received a guarantee of their absolute neutrality in the Congress of Vienna and saw any sharing of sovereignty through the involvement in a customs union as unacceptable for them. Denmark owned the German principality of Holstein-Lauenburg, an official member of the Deutsche Bund, but the Danish King preferred consistency of economic policy within his dominion over a possible membership in the Zollverein. Similar to Denmark, the Netherlands owned a principality, Luxembourg, which was considered to be German, i.e. a member of the Deutsche Bund. Luxembourg joined the Zollverein in 1842 as part of the Prussia tariff system due to political pressure. One of the fortresses of the Deutsche Bund was located there, which led German states in the Zollverein to secure the adhesion of Luxembourg, once France had floated plans about a possible customs union (Henderson, 1984*b*). The Netherlands itself had a trade policy which tried to extract as much as possible from its favorable geographic position, controlling the Rhine's mouth into the North Sea. This position would have made an accession into the Zollverein too costly for Prussia, and led it and the Zollverein to cooperate closer with Belgium, which was seceding from the Netherlands at the time.⁵ An important part of this cooperation was the creation of the "Iron Rhine", a rail connection between Antwerp and Cologne, which connected the Rhine to the North Sea by avoiding the Netherlands (Zanden and Riel, 2004). A final neighbour that had the potential to get strongly involved into German trade agreements was France. In contrast to the afore discussed foreign states, France had the size, economic strength and historical political relations to become a leader than just a follower state in such negotiations. It is therefore discussed in the following section that deals with the role and identity of the

⁵Belgium seceded from the Netherlands in 1830. The treaty of London in 1839, in which the Netherlands recognized Belgian independence, contained a clause allowing Belgium the construction of the rail link between the Rhine and the North Sea (Zanden and Riel, 2004).

agenda setter.

2.1.1 Agenda setter

As alluded in the previous section, after the Napoleonic wars there was a small group of major powers that guaranteed stability in Europe. The two leading German nations, Prussia and Austria, as well as neighbour France were part of this group. This strategic importance, which was also based on economic characteristics, implies that these nations had a superior position within trade negotiations with other German states. Formulated in the framework of a game they can be seen as a distinct class of players that have a special set of actions to which follower states react to in their actions. These are called agenda setters.

Prussia was the only one of the three that got actively involved into the negotiations and was therefore the only state that took on the role of an agenda setter. It actively assumed this role in 1828 when it opened negotiations with Hesse-Darmstadt (Hahn, 1982a), but two prior decisions already foreshadowed this decision. The first was Prussian refusal to follow up on the mandate for closer economic cooperation given to the *Deutsche Bund*, which is discussed later on in the context of the negotiation structure. The second is its enclave policy, in particular its domineering behaviour. Although the inclusion of enclave territories within the trade area of the surrounding nation was nothing extraordinarily new⁶, Prussia's unilateral imposition of this policy in 1818 on a number of independent enclaves was. The inability of the affected principalities to reverse or even even change the terms of

⁶Prussia's negotiations with independent enclaves in 1818 contain calculations, which demonstrate that the inclusion of (non-independent) territories of other German states within Prussia's tariff line was a common occurrence. The tariff territory of Prussia's eastern provinces contained about 166000 foreign subjects, while about 205000 Prussian subjects were included in the tariff areas of other German states.(VBDZ 31)

this imposition shows the ability of Prussia to dictate the structures of trade negotiations.

Similarly, both France and Austria had the potential, due to their size and geographical location, to become agenda setters for trade policy between German states. Neither grasped the opportunity, mostly due to their decision for strong protection over possible gains from trade. France and Austria had also a strong preference against differential tariffs (VBDZ 772) and the geographical situation did not present as much opportunity for administrative savings as it did for Prussia. This implies that the possible pay-off from trade agreements with German states for both France and Austria were considerably lower than for Prussia. As a consequence Austria took a passive stance towards the first rounds of negotiations conducted by German states and a policy of accommodation towards Prussia (Branchart, 1930). The French government was acting in a similar way to its Austrian counterpart. Despite receiving repeated letters from its Bavarian and German representatives, detailing the possibility of gaining influence over German states through trade policy, the French government did not deviate from its high tariff policy, angering possible allies in Germany. Furthermore, this stance did not change much through the July revolution in 1830 (Krauss, 1987).

Once Prussia assumed the role of the agenda setter in 1828 through its involvement in negotiations, neither France nor Austria contested it. Both states however did not see a Prussian success at forming a customs union with other German states as beneficial for them either. This didn't cause them to become active players, but it allowed other German states to use their backing and weight in negotiations with Prussia, which is explained in more detail in the discussion of coalition externalities.

2.2 Set of Actions

The role of the agenda setter during the formation process is formally stylized into two main characteristics. First, the agenda setter has the right to decide when and with whom negotiations are opened. This implies further that Prussia had to choose between opening multilateral negotiations, i.e. simultaneous negotiations with all follower states, or bilateral ones, which additionally require a decision about the sequence in which these would be conducted. Second, the agenda setter proposes the membership terms for each state it opened negotiations with. As a consequence follower states have only to act in a single instance, namely they can accept the proposed terms and join the agreement or reject the offer and stay outside.

While the decisions to open negotiations and to accept or reject a membership offers are clear, the proposal of membership had two main dimension, first the policies areas covered in the agreement and second its institutional structure.

As introduced above, all states were members of the Deutsche Bund. This implies that there existed a political institution which already affected and coordinated a number of policy areas between these states. In particular security related topics were already covered, most notably a institutionalized military cooperation between the member states. The existence of these structures implied that these issues were the topic of separate negotiations between German states and therefore excluded from the discussions about the Zollverein. Article 19 of the Bundesakte, the constitution underlying the Deutsche Bund, contained the intention, and thereby an authorization, to coordinate trade and customs policy, the Bund however did not follow up on that and left these issues to the individual member states⁷. This implies that the range of topics potentially considered in the negotiations of the

⁷This is further discussed in the section on the bargaining structure, since it provided the possibility of an institutional framework for multilateral negotiations.

Zollverein contains predominantly economic policies. In particular a range of tariff and non-tariff barriers. Next to customs, this concerned internal issues like tax structures, monopolies and privileges, currencies, legal structures and regulatory issues. Another possible area for negotiations were the trade relationships with foreign nations.

One major trade related issue that was already covered was the regulation of shipping on the Rhine and Elbe, the two main navigable rivers. The Congress of Vienna explicitly called for a cooperation of the concerned states. Based on international agreements two official commissions were established that put the regulation principles postulated by the Congress of Vienna into practice (Angelow, 2003*b*). As with the linkage to other policies, the separate treatment through the Congress of Vienna resulted in a removal of the issue from the set of topics covered by the Zollverein.

The negotiations were therefore restricted to economic issues, but this didn't limit the potential institutional form of the outcome. The players, the states, were free to choose any institutional agreements short of a political unification. This allowed for bilateral as well as multilateral arrangements, either free standing or in case of the latter potentially embedded into the Deutsche Bund structure. Furthermore, the players' negotiations also covered the length of the agreement, possibilities ranging from one time actions to permanent agreements.

3 A formation framework

This setup, a group of states negotiating a trade agreement without strong restrictions on the agreement structure, resembles closely a cooperative game theory setup with transferable utility between the players. Cooperative game theory models games in which a number of players decide on cooperative actions through forming coalitions to do so. Such an approach however focuses

only on the resulting coalitions of states that form the agreement while neglecting the bargaining and formation process. The cooperative game is therefore complemented by a bargaining structure which determines the specific characteristics of the formation process and resulting outcome. Philippe Aghion, Pol Antras and Elhanan Helpman (2006) provide exactly such a framework, including a specific application to free trade agreements, and is therefore used as the theoretical approach guiding the analysis. This model is framed as a non-cooperative game, but the payoff structure follows the logic of the underlying cooperative approach.

Its main analysis uses the three-country case⁸ but it can easily be generalized to more players. The outcome of the bargaining game is a coalition structure represented as a partition Γ of $\{a, b, c\}$. If the partition contains a coalition, which is a set with more than one player, the involved players are interpreted as members of a trade agreement. The pay-off – the gross of lump-sum transfers – for each coalition C in the resulting partition Γ is given by the value function $v(C, \Gamma)$. This value function stems from the underlying cooperative game and depends on the objective function of the involved actors.⁹

The first stage of the bargaining game is the decision of the agenda setter about the negotiation structure. It can choose either a multilateral approach, making simultaneous offers to all other players, or a sequential approach, starting with an offer to only one or at most a subset of countries. Under multilateral negotiations, states weigh their received offers individually and simultaneously respond with a "yes" or "no" decision. If at least one state

⁸The three countries are labeled a, b, and c, with c designated the leader and therefore agenda setter.

⁹Aghion et al. use mainly aggregate welfare as the objective. Since the value function is connected to the issue of coalition externalities, the later section on these externalities will specify a more appropriate factor for the value function based on historical circumstances at the time of the Zollverein.

refuses to accept, the negotiations fail and no agreement is reached. The resulting outcome is therefore either a global agreement, $\Gamma = \langle \{abc\} \rangle$, or no agreement, $\Gamma = \langle \{a\}\{b\}\{c\} \rangle$. Under the sequential approach the agenda setter makes offers to the individual states sequentially. If one state decides to reject the offer, the negotiations stop and the result is an agreement with all the countries which had received and accepted their offers prior to this first rejection. If, for example, c approaches a first, which accepts, and then receives a rejection from b , the result is a coalition between c and a , $\Gamma = \langle \{ca\}\{b\} \rangle$. Under both negotiation structures the membership offer has an associated pay-off, which may contain lump sum transfers between states and is unaffected by other states joining the agreement later on. The extensive form of the bargaining game is depicted in the appendix. To ease notation, let $W(j)$ be country j 's pay-off if there is no agreement at all. $W_{kl}(j)$ is the pay-off for country j if countries k and l form an agreement, $W(kl)$ is the joint pay-off of countries k and l , which formed a coalition, and $W(GC)$ is the joint pay-off of the grand coalition, when all states join in the trade agreement. This leads Aghion et al. to define the following concept:

Definition: Coalition externalities

There are positive coalition externalities in country j when $W_F(j) > W(j)$, negative coalition externalities when $W_F(j) < W(j)$ and no coalition externalities when $W_F(j) = W(j)$, where F is a coalition of countries which does not include j .

Positive coalition externalities imply that one country profits from an agreement between other countries. Negative coalition externalities imply that the country loses due to an agreement between other states.

3.1 Coalition externalities

These coalition externalities drive certain outcomes such as the decision between multilateral and sequential negotiations and the optimal accession sequence. Aghion et al. justify this modeling choice by demonstrating their existence in trade creation and diversion effects due to the formation of trade agreements.¹⁰ Nevertheless, this choice assumes that the utility function of the relevant actor, in modern settings usually a democratic government, is predominantly concerned with general welfare. This is not reasonable for early 19th century German states, where political power rested in some cases still with individual sovereigns. As demonstrated above, the relevant negotiation areas mostly concern trade policies and in particular tariff setting. This implies that that the motives behind policy choices in these areas reveal the consequences, and therefore the relevant externalities, for the involved states at the time. I base therefore the actor's utility functions, which are connected to the value function of the underlying cooperative game, on historically important goals for trade policies.

Following the of world tariff setting between 1789 and 1938 by Williamson (2003) I distinguish three different central motives: a revenue motive, a strategic tariff motive and a Stolper-Samuelson factor compensation motive. The first is rather self-explanatory – governments set tariffs with the idea of raising revenues to satisfy their budgetary needs. The second is based on the theory revolving around strategic tariff setting. At the time of the Zollverein, this concept focused predominantly on reciprocal market access. This implies that states change their tariffs to either elicit reciprocal responses by other countries or as a reciprocal reaction to other states. The third motive concerns the internal political economy of countries. This approach rests on a connection between trade and politics shown by the Stolper-Samuelson

¹⁰Rieder (2006) shows the existence of these trade diversion and creation effect externalities empirically for the case of the European Union.

theorem, which has been described by Rogowski (1990). Tariff rates affect relative prices between sectors, for example agriculture and manufacturing, and therefore their relative income. Sectors therefore have an incentive to influence tariff setting, and relative tariff rates may reflect the relative political strength of individual sectors.

These three motives reveal the main externalities that influenced governments decisions about trade policy and membership in a formal trade agreement. The first motive is the effect on tariff revenues. A new coalition can affect the revenue of a third state in two major ways. One is the change in trade volume. A coalition can cause trade to be diverted or even prevented, which triggers the trade volume of the outside country to sink. This obviously lowers the revenues from tariffs. A coalition can also affect revenues through the diversion of trade routes. Major trade routes bolster revenues through transit tariffs and through demand for services along the route. Affected services are, for example, logistics, transportation, housing, food, or access to markets such as fairs. Governments are able to levy taxes and fees on these and derive in this way revenues from trade. Traffic patterns change when tariff barriers change, free traffic within a coalition entices merchants to use routes in customs union territory, and outside countries lose revenues.

The second area is international trade politics. Given geographical positions, a coalition might be able to obtain control over all relevant trade routes leading into a country not within the customs union. The coalition obtains in this way a certain degree of control over the tariff system of the country in question, since traders cannot evade transit tariffs on trade conducted with the state. High transit tariffs therefore have a similar effect to that of a high tariff rate of the country itself. This poses problems for a state which has the intention to secure market access through reciprocal preferential treatment and therefore wants to implement a low tariff system. The state is no longer

able to offer low trade barriers to another state, and consequently cannot offer the necessary reciprocation. In the extreme, the coalition can go as far as treating all goods destined for such an outside state as regular imports into the customs union. For practical purposes, the state loses control over its customs system. The power to determine one's own tariff system is a question of political sovereignty; losing that power threatens the political situation of the sovereign. This was a real fear for the sovereigns of smaller German states in light of the mediatization process of independent states, started through the Reichsdeputationshauptschluss of 1803, where stronger states absorbed small, formally independent, territories under their reign. The rulers of the remaining small principalities only had guarantees by the Congress of Vienna to secure their dynastic rights and therefore had the fear that a loss of control over trade policy would be the first step of being absorbed by larger neighbors, in their case, especially, by Prussia.

The last issue is internal political economy. Rogowski's framework stresses the effect of tariffs on factor compensation and therefore on the relative political power of different sectors. Prussia's tariff system of 1818 is an example of this – its moderate tariffs were a compromise between the demands of agriculture, located predominantly in Prussia's east, and the industrial and commercial interests in the western parts of its territory. The Zollverein essentially took over Prussia's moderate rates, which were neither prohibitive nor free trade-oriented.¹¹ The adoption of these tariff rates by new member states had only minor effects on the relative strength of different sectors due to this moderation. The effect of neighbor states joining the Zollverein had less of a differential impact on sectors than it had on different regions. Regional interests played an important part in tariff choices, as Prussia demon-

¹¹Prussia targeted a tariff rate of 10% at the institution of the tariff in 1818. The tariff was, however, based on weight and not value, and subsequent price decreases raised tariff levels considerably over the target rate.

strates. Its customs system not only balanced commercial and agricultural interests, but also represented a compromise between the eastern and western territorial parts of Prussia (Ohnishi, 1973). The geographical structure of a number of German states, with the most prominent example of Prussia, was a combination of sometimes completely unconnected territories. This had strongly differing regional interests as a consequence. An accession of neighboring states into the Zollverein changed the relative strength of regions, shifting political power and interest. This change in the internal political economy of a state can influence its government to look more favorably on the Zollverein and thereby reduce the necessary pay-off required to convince the state to join.

Since coalition externalities reduce their pay-off, states obviously have the incentive to prevent or reduce them before they receive a membership offer. Governments had a number of options to do so. To counter effects caused through a coalition's control over roads, states had to find ways to secure access to unimpeded trade routes. Some of the possibilities were building or improving roads going through their own territory as well as coordination agreements with other states. To counter the potential international effects, states had to use reciprocal power before they were cut off. This implies that they preferred to conclude formal diplomatic agreements with foreign nations, locking in preferential treatment with regard to market access. In addition, a state might commit itself by treaty not to join the coalition, which serves as a signal to foreign states and raises the, predominantly political, cost that the agenda setter has to pay to overcome the necessary breakup of an official treaty. To counteract effects on the internal political economy, governments have limited options. Since these effects cause shifts in relative power and demands, governments would need to make concessions to specific regions and sectors. These concessions, for example tax relief, are costly from a government viewpoint; therefore, it might be more profitable to accept the

externalities than to the attempt to mitigate them.

4 Bargaining structure

Let S_i be the coalition which has formed after i states have accepted the offers of the agenda setter, which is following the sequence S to make its offers. So S_i is simply the coalition of the agenda setter and the first i states in the sequence S . Let $i(S)$ denote the i^{th} state in the sequence S and let Ω denote the set of all possible sequences S . There is a sequence which provides the largest payoff to the agenda setter, formally

$$S^* = \operatorname{argmax}_{S \in \Omega} W(S) - \sum_{i=1}^{|S|} W_{S_{i-1}}(i(S))$$

To decide whether to opt for multilateral or for sequential bargaining, the agenda setter compares the pay-off resulting from multilateral negotiations¹² with its pay-off from the optimal sequence. Formally, the agenda setter will choose sequential bargaining if

$$W(S^*) - \sum_{i=1}^{|S^*|} W_{S_{i-1}^*}(i(S^*)) > W(C_G) - \sum_1^M W(i)$$

. The agenda setter will choose multilateral negotiations if the reverse inequality sign holds. This is conditional on the relevant pay-off being positive; the agenda setter will obviously not start negotiations if it doesn't profit from them.

The existence of negative coalition externalities in at least one country is a necessary and sufficient condition for the choice of sequential negotiation

¹²Formally, the pay-off in the multilateral setting is the core allocation where follower states receive their lower bound pay-off and the agenda setter its upper bound pay-off.

in a setting with three countries. In a setting of more than three countries it is no longer sufficient¹³, but still a necessary condition for the choice of sequential negotiations.

The bargaining structure imposed by Aghion et al. has a number of implications. If one state rejects the membership offer coming from the agenda setter, the negotiations end. While for sequential negotiations this results in a coalition of all states which had accepted an offer prior to the rejection, for multilateral negotiations this results in a complete breakdown of negotiations without any trade agreement. Aghion et al. justify this modeling choice with references to current voting procedures within the WTO and EU, I do so in light of Prussia's decision against multilateral negotiations.

Although the institutional framework of the Deutsche Bund offered Prussia the opportunity for multilateral negotiations at any point, there are two particular moments when its government explicitly rejected such an approach. The first was the attempt by a number of states to follow up on the mandate of closer commercial integration articulated in article 19 of the Bundesakte, the constitution of the Deutsche Bund. The full plenum, in particular due to Prussia's influence, never followed up on this mandate in any serious way and nothing came out of the initial impetus. The existence of this article, including the fact years later some states again petitioned for multilateral negotiations based on this article, demonstrate that there was an institutional framework which made multilateral negotiations between German states possible, that Prussia rejected such an approach and that the breakdown of multilateral negotiations did not lead to smaller groups of states forming an agreement based on the existing consensus between them.

The second moment was Prussia's reaction to the *Mitteldeutscher Handelsverein*, an association of a number of German states which will be dis-

¹³The existence of negative coalition externalities is still sufficient if no positive externalities exist.

cussed in more detail later on. Prussia's insisted to negotiate only with individual member states, thereby rejecting any calls for negotiations with all of the *Handelsverein's* members combined (VDBZ 609) (Haferkorn, 1933). Similarly, a second moment that shows that failed multilateral negotiations did not result in smaller coalitions were negotiations between smaller German states during the 1820's.¹⁴

Prussia's decision for bilateral rather than multilateral negotiations has implications for the existence of coalition externalities. As shown above, this implies that the agenda setter's pay-off from a sequential approach was higher than the pay-off from a multilateral approach, which indicates the presence of negative coalition externalities in the formation of trade agreements between German states in the first half of the 19th century.

5 Institutional Choice

Following Viner's (1950) definition, a customs union has three central characteristics: no tariff barriers between its members, a uniform external tariff and a predetermined revenue distribution scheme. Aghion et al. do not derive their model explicitly for such a union. They do note, however, that it is applicable to those cases as well. The model can cover the case of customs unions in general, since such unions are free trade agreements with the special provision of common tariff rates in all states. Additionally, the revenue distribution scheme of a customs union usually involves some form of monetary transfer between member states. This corresponds well with the model, which incorporates the possibility of transferring utility between coalition partners in the transferable utility game underlying the pay-offs. Although the Zollverein's institutional structure fits well with the model, the

¹⁴Bavaria and Wuerttemberg participated in these discussions before they formed their own union; however, their agreement was the result of separate negotiations.

important question is what explains this choice by Prussia.

The theoretical model has the agenda setter determining the offers it makes to other states, which implicitly leaves the choice of the institutional structure to the agenda setter. Prussia had therefore the opportunity to choose the institutional form that maximized its payoff. Since the existence of negative externalities and the sequential bargaining structure showed that the agenda setter was able to capture significant parts of the membership gains of the other states, the selected institutional form was chosen to maximize the payoff of the complete agreement. Dumke (1994*a*)'s thesis about economies of scale in customs administration relies on the existence of administrative savings, which are only feasible under a customs union. This reduction in administrative costs is the major advantage over regular free trade agreements, both lead to a fall in revenues due to free trade over certain borders but only a full customs union allows to significantly reduce or even abolish customs controls on these borders. Dumke's evidence also demonstrates that the administration costs of German states were not negligible compared to customs revenues. For some of the smaller states the costs were so prohibitive that they hadn't reduced a full external border tariff system but relied to tolls and tariffs along roads through their territory.

This advantage of a customs union exists because of the necessary enforcement of rules of origin regulations in free trade agreements. Member states of a free trade area can only uphold differences in tariff rates against third country producers if the enforcement of the rules of origin regulations at their borders is sufficiently strong. The relatively small size and complex, interwoven geographical positions of German states allowed for relatively cheap detours, so the savings through entering in the lower tariff rate FTA member state, forging the origin of the goods and then freely exporting into the higher tariff member state, easily outweighed the higher transport costs. This can be demonstrated using the preferential trade agreement between

Hesse-Darmstadt and Baden in 1824. Hesse, which had strong budgetary problems, was running high tariffs for revenue purposes, while Baden, as a trading-oriented nation, had relatively low tariffs. This created two possibilities for foreign producers, for example a trader in Bavaria, who wanted to sell in Hesse-Darmstadt. He could travel directly to Hesse-Darmstadt from Bavaria, paying high tariffs on his goods. Or he could travel from Bavaria to Baden, paying low tariffs but only slightly higher travel costs, and then enter Hesse-Darmstadt without further payments by masking the origin of his goods as Baden. One year later, Hesse-Darmstadt canceled the treaty due to complaints about such smuggling and the inaction of Baden in this matter (Müller, 1984).

The importance of rules of origin regulations is strongly linked to the ability of individual free trade agreement member states to uphold different tariff rates against non-member states. This ability to set different rates than other member states, essentially the retention of a state's right to set its own tariff rates, has economic implications and can affect a state's general welfare. The agenda setter will select a free trade agreement if its payoff from capturing the welfare effects of other member states' deviations from the alternative customs union tariff rate outweighs the payoff from capturing the cost reductions of the potential customs union.

A customs union was selected as the institutional form of the Zollverein, since the cost reductions, based on the substantial length of internal borders, outweighed the welfare gains from tariff deviations. These deviations would have been rather minor, since the Zollverein tariff was fairly moderate compromise between the interest of industrializing as well as agricultural dominated regions.

5.1 Optimal Sequence

The sequence of accessions depends on the nature and extent of coalition externalities. The agenda setter optimizes its pay-off through the choice of a particular sequence, in case it has opted to follow sequential rather than multilateral negotiations. The choice of sequence influences the total pay-off through maximizing negative coalition externalities or minimizing positive coalition externalities on states which haven't yet joined the coalition. If there are no coalition externalities, all sequences resulting in the same final coalition give the agenda setter the identical pay-off – it is therefore indifferent about them.

These externalities arise during the formation process if the agenda setter has decided to choose sequential rather than multilateral negotiations. The actual sequence of accessions is also a choice of the agenda setter, which can optimize its payoff through the selection of a particular sequence. This selection influences the agenda setter's pay-off through maximizing negative coalition externalities or minimizing positive coalition externalities on states further down the sequence. If there are no coalition externalities, all sequences resulting in the same final coalition give the agenda setter the identical pay-off – it is therefore indifferent about them.

This optimal sequence has the following property:

For any two consecutive elements of the optimal sequence, it has to hold that the externality of the accession of the first on the second is at least as negative (or at most as positive) than the externality of the second on the first.

If this property does not hold, the sequence is obviously not optimal and could be improved by switching the two elements.

The optimal sequence will therefore show the following regularity:

A state which has a stronger negative impact on many other states than they have on it is likely to be an early element of the sequence.

And a special case is the situation where two states only impact each other through their accession.

If two states have only an impact on each other, the agenda setter will pick that state first, which has the stronger negative impact on the other.

The appendix contains two numerical illustrating examples.¹⁵

These regularities will be used to analyze the actual sequence of accessions into the Zollverein. I will show how the actual sequence followed the described characteristics of the optimal sequence; in particular, I will demonstrate the existence and nature of the externalities which determined the sequence, their strategic use, as well as the mitigation attempts by affected states.

6 The formation of the Zollverein

Prussia was clearly the agenda setter for the formation of the Zollverein. The first step towards this role was its customs system reform in 1818, which lifted internal tariff lines and established a border customs system. In the wake of this reform its government also decided to treat enclaves of other states within its territory as Prussian territory with regard to customs pur-

¹⁵The two numerical examples in the appendix illustrate both regularities. The first results in the formation of the grand coalition. The second example sees a single change in externalities which causes the grand coalition to fail and a smaller coalition to form. Both examples use only negative externalities and the agenda setter is indifferent between multilateral negotiations and no negotiations at all

poses. As compensation, the states were offered direct financial revenues.¹⁶ Some states complied with Prussia's wishes,¹⁷ but some resisted for years.¹⁸ During the next few years Prussia remained on the outside during negotiations between other German states. It assumed the agenda setter role by convincing Hesse-Darmstadt to join its customs system, a move which jolted other German states. Once it had taken up this role, Prussia filled it by leading the negotiations, which resulted in the formation of the Zollverein, the accession of further states, as well as official trade relationships with foreign nations such as France, England and Russia (Eisenhart Rothe and Ritthaler, 1934; Henderson, 1984b). Given this role as the leading nation of the Zollverein, Prussia's motivations during the negotiations reflect the reasons for the creation and formation process of this customs union. This is evident in a note (VBDZ 747) the Prussian Finance Minister, Motz, sent to his colleague Eichhorn about negotiations with Bavaria and Wuerttemberg: *In the report to his Majesty about a customs and trade treaty with Bavaria and Wuerttemberg the following conditions should be considered:*

1. *Political importance concerning our position in Germany*
2. *Impact on the Mitteldeutschen Verein and elimination of all its negative effects on Prussia.*
3. *Financial and economic advantage for Prussia*

I will further comment on 3. The following principles should be applied:

- a. *Free trade in the goods and manufacturing sector of the combined states is conditional on the required security through certificates of origin, at most with the modification that full import and export tariffs are removed only af-*

¹⁶Prussia initially offered compensation based on per-capita tariff revenues, but the actual amount was then fixed sum, rounded for practical purposes.(VBDZ 33-35)

¹⁷The treaty with Schwarzburg-Sondershausen was completed in October 1819 (VBDZ 35)

¹⁸The agreement with Anhalt-Dessau and Anhalt-Koethen was successfully concluded on July 17th, 1828, more than ten years after the dispute arose.(VBDZ 155)

ter two to three years, for now reduced by half, but on the explicitly affirmed principle of complete free trade. The advantages are an increased market for larger domestic industries and especially for our far superior manufacturing, increased trade and, in this regard, especially a better utilization of the Elbe through Magdeburg.

b. Through a possible accession of Rheinbayern to the Hessian and Prussian Zollverein besides the advantages of lower administrative costs through enlargement and better borders along the customs line.

His first item demonstrates that Prussia's aims for the Zollverein – and customs policy in general – were more than just economic or fiscal; political calculus entered the negotiations. The statement indicates that Prussia was concerned about its influence on other German states, so the Zollverein was helping to prevent the rise of a third power in Germany besides Prussia and Austria. Additionally, Prussia was motivated by the desire to obtain a common German reaction against potential threats from France. The Zollverein was not explicitly aimed at pushing Austria out of Germany, but the economic unification without Austria allowed Prussia to do so later on (Murphy, 1991). The explicit political gain for Prussia explains why the government was willing to accept the financial losses it sustained. As will be shown below, Prussia essentially transferred significant amounts of money to most of the other member states of the Zollverein.

The importance of coalition externalities and the choice for sequential negotiations are illustrated in his second item. It shows that the *Mitteldeutscher Handelsverein*, which will be explored in more detail later, was an attempt by other German states to mitigate externalities caused by the accession of Hesse-Darmstadt into the Prussian tariff system. Furthermore, the Prussian government realized that multilateral negotiations with members of the *Mit-*

teldeutscher Handelsverein would have a negative impact on Prussia's payoff. The item demonstrates that states recognized the existence of coalition externalities and incorporated them in their strategic actions.

The third item illustrates the influence of fiscal and economic motives on tariff policy. His comments highlight the expected positive effects of an increase in market size, the positive effect through an increase in transit traffic and fiscal savings through economies of scale in customs administration. The reference to the utilization of the river Elbe implies that tariff rates influenced the routes taken by merchants, and it demonstrates that governments cared about, and likely profited fiscally from, these routes. The item also demonstrates a disadvantage of a free trade agreement versus a customs union, namely its need for certifications of origin. This point played a role in determining the institutional structure of the Zollverein as discussed above.

Once Prussia had assumed the role as agenda setter and had made the decision for sequential negotiations, the next step was to select the actual sequence. The deterministic nature of the sequence implies that the first element represents the major decision from which all other elements follow logically. So why did Prussia select Hesse-Darmstadt as the first state to create a customs union with ?

The Grand Duchy of Hesse and by the Rhine, usually referred to as Hesse-Darmstadt, was one of the middle powers in Germany, numbering slightly less than a million inhabitants. Shaped by the Congress of Vienna it had two, disjoint territories located to the north and south of the independent city of Frankfurt. Both territories bordered Prussia's main western province¹⁹, though the length of these borders was fairly short and the number of relevant trade routes crossing was small. Economically its main products were agricultural, including wine, though it had some textile production and trading activity in Mainz, which was located on the Rhine. Its fiscal position was still

¹⁹The northern part additionally bordered the Prussian enclave of Wetzlar.

shaky from the aftermath of the Napoleonic wars and the subsequent reforms (Hahn, 1982*b*) Due to dynastic relations the state had strong connections with the neighbouring Hessian states, in particular Nassau and Hesse-Cassel.

Although the state was actively involved in the discussions about trade agreements with the southern German states during the 1820's it opened trade negotiations with Prussia in 1827. Its government had two main motives to agree to negotiations with Prussia, first the potential financial revenues outweighed those from an agreement with the southern states and second the political climate within the state changed from focusing on the demands of certain industries and regions which looked towards the markets in southern Germany to those of the northern regions and certain agricultural and textile branches which saw northern markets, especially Prussia, as much more enticing.

The financial dimension of the agreement between Hesse-Darmstadt and Prussia was substantial. The smaller partner profited considerably with regard to customs revenues, alleviating its considerable financial troubles. In 1830 the Hesse-Darmstadt government officially calculated the increased net revenue at 280000 fl per year (Hahn, 1982*b*), which was in line with their expectations during the negotiations, which were around 200000-270000 fl (VBDZ 368).

These financial advantages for Hesse-Darmstadt were mirrored by corresponding financial losses for Prussia, since the savings in customs administration expenses was fairly low due to the short border between the two states. Next to the financial downside the agreement had another major negative consequence for Prussia, namely the necessary involvement of a foreign government in tariff setting for a major part of its customs system. Furthermore the agreement had no immediate, apparent upside, it did not create a tariff-free connection between the two major Prussian territories, nor did Prussia attain control over another major trade route (VBDZ 363). As seen at the

time, the agreement appears without any direct, obvious benefit for Prussia (VBDZ 373).

So if the union with Hesse-Darmstadt is not profitable on its own terms, why did Prussia make this choice rather than forging an agreement with one of the other neighbouring states, for example Hesse-Cassel, Saxony or the Thuringian principalities. The reason behind this strategic choice is the above described characteristic of the optimal accession sequence, a state with a corresponding, relative higher negative externalities on another state should be earlier in the sequence.

There are a number of neighbours, predominantly Saxony and the Thuringian principalities, that would have had no direct, first-order externalities on Hesse-Darmstadt, and similarly its accession did not have direct, immediate consequences. This was mostly due to the missing geographic proximity between these states. However Hesse-Darmstadt had relative stronger negative externalities down the sequence once the impact of this accession on the remaining states is taken into account. The first impact is the obstacle this agreement put in place for the expansion of the union between Bavaria and Wuerttemberg. The major externality however was the pressure this move put on the other Hessian states, in particular Hesse-Cassel. The treaty explicitly stated that Hesse-Darmstadt should seek the accession of the neighboring Hessian sovereignties (VBDZ 379); Prussia, especially, focused attention on Hesse-Cassel (VBDZ 370) due to its position between the two major Prussian territories. If this were achieved then the Prussian tariff area would control all trade routes between the south of Germany and the North Sea ports which represented the gateways to many important international markets. The externalities on the subsequently affected states would therefore be financial, higher transit tariffs would reduce trade and therefore tax revenues, and a reduction in market access, since Prussia's control would harm the ability of these states to conclude reciprocal trade agreements with foreign nations.

The discussion about the nature of coalition externalities argued that states will attempt to mitigate them and take measures to raise their own reservation threshold. The new coalition between Prussia and Hesse-Darmstadt caused exactly such a reaction. On September 24th, 1828 a large group of affected German states established the *Mitteldeutscher Handelsverein*, a formal trade agreement (VBDZ 532). Geographically, the territories of its members covered north and central Germany, containing the major trade fairs of Frankfurt and Leipzig as well as the trade roads between these two and the major North Sea ports, the port city of Bremen was even an official member state (VBDZ 532). It also covered all roads between the two main Prussian territories. The three southern states – Bavaria, Wuerttemberg, which had formed its own union, and Baden – were not involved. Baden did not border geographically with any of the *Mitteldeutscher Handelsverein* member states, and the agreement was also a reaction against externalities caused by the Bavarian-Wuerttemberg customs union, which was actively looking for further members (VBDZ 351-353).

The nature of the agreement reveals that it was designed to mitigate externalities; it was neither a customs union nor did it create a free trade area between its member states. Its content was focused on preserving the trade route access of member states and hinder the enlargement of the two newly created customs unions in Germany. The treaty had therefore two central elements – first, it intended to safeguard and improve control over trade routes by agreements to retain low transit tariffs and to instigate an intensive road improvement program.²⁰ Second, it contained the explicit legal commitment of its member states not to join any other customs union during the lifetime of the treaty. These two elements were proffered in order to prevent further coalition externalities in a threefold way. They fostered traffic on the roads

²⁰This program never really started in any serious way due to coordination problems, disagreement about route prioritization and a lack of the necessary funds (Thimme, 1931).

under the control of the *Mitteldeutscher Handelsverein*, guaranteeing reliable access from and to foreign markets and therefore allowing for reciprocal trade policy, and it attempted to prevent additional coalition externalities by forcing Prussia to switch to multilateral negotiations.²¹ Most of the expected effects of further accessions to the Prussian system were negative; therefore, the *Mitteldeutscher Handelsverein* member states would have achieved a higher pay-off if multilateral negotiations about a merger with the Prussian union had been successfully concluded at this stage (Haferkorn, 1933). Nevertheless, Prussia refused collective negotiations and actively pursued policies to break this agreement up, which it did successfully by inciting Hesse-Cassel to defect three years later.

This defection of another Hessian state into the existing union between Prussia and Hesse-Darmstadt broke the *Mitteldeutscher Handelsverein* due to the state's central geographic location. Wedged between the two Prussian territories it controlled not only a direct transport link between these two but also the traditional German north-south trade routes as well as the important east-west connection between the major trade fairs in Frankfurt and Leipzig. This literally split the *Mitteldeutscher Handelsverein* into a group of northern states around Hannover and the central-south bloc of Saxony, Frankfurt and the Thuringian principalities. The loose and neutral nature of the *Mitteldeutscher Handelsverein*, the intended road improvement program of which was also designed to foster Hesse-Cassel's transit revenues, had made membership the natural choice of the ruling duke who strongly resisted any treaty perceived to be threatening his sovereignty (Hahn, 1982*b*).

The union between Prussia and Hesse-Darmstadt, though, had had strong negative externalities on the state. The higher tariff border of its direct

²¹The official conference protocol states an agreement between the member states about negotiations with all other German states on the basis of the principles of the *Mitteldeutscher Handelsverein* (VBDZ 531).

neighbor Hesse-Darmstadt was a central factor, leading to civil unrest in the southern part of Hesse-Cassel in 1830 – the regional population blamed Hesse-Cassel’s tariff policy for its miserable economic situation. Additionally, Prussia continued its road building program, which led Hesse-Cassel to fear losing transit traffic to alternative trade routes, especially the Rhine (Thimme, 1931). Although the duke did not receive the diplomatic overtures through his relations in Darmstadt very well, the political establishment was more open to an improvement of the dormant political relationship with Prussia. These factors convinced the government, though not the ruling duke, of Hesse-Cassel to defect from the *Mitteldeutscher Handelsverein* and accept Prussia’s offer of membership in 1831. Although the duke resisted as long as possible, his internal political position became untenable and he was forced to abdicate in the fall of 1831. His son and successor signed the ratification documents within a few weeks of assuming power (Hahn, 1982*b*).

As indicated above, the accession of Hesse-Cassel into the Prussian custom system caused considerable negative coalition externalities on a whole range of states. This defection was a decisive blow to the *Mitteldeutscher Handelsverein*. The enlarged Prussian customs union area now split its area into two unconnected geographical blocks. It countered any attempts of the *Mitteldeutscher Handelsverein* members, as well as the Bavarian-Wuerttemberg union, to secure unimpeded trade routes between southern Germany and major trading ports in the north. Again, the accession sequence followed a pattern with admitting a state whose accession caused considerable negative externalities on others, but was, due to its geographical position, relatively immune to possible externalities through the accession of other states.

Prussia’s successful work against the *Mitteldeutscher Handelsverein* included cooperation with the next element of the sequence, namely the union of Bavaria and Wuerttemberg. This union decided to cooperate with Prussia, rather than the *Mitteldeutscher Handelsverein*. This was due to the south-

ern union neither being able to make financial contributions large enough to convince these German states, nor having enough power over them. The externalities of the southern union were fairly small and did not lower the reservation price thresholds of the states, which formed the *Mitteldeutscher Handelsverein*, low enough.

The cooperation was formalized with an extensive trade agreement in 1829, which was accompanied by a road-building program, enhancing the connections of southern Germany to the north (VDBZ 766). Since the territory of the *Mitteldeutscher Handelsverein* covered all possible routes, Prussia convinced two small Thuringian principalities, both members of the *Mitteldeutscher Handelsverein*, to allow them to create a route through their territory.²² (Thimme, 1931) Additionally, Prussia and Bavaria pursued a closer cooperation between their respective postal services, which led to tensions with the Thurn and Taxis family, that held the postal monopoly for the Thuringian principalities and some of the other states of the *Mitteldeutscher Handelsverein*.²³ (Helbig, 1991)s. The following accession of Hesse-Cassel into the Prussian customs system in 1831 shifted the trade routes available to the southern union from the control of the *Mitteldeutscher Handelsverein* to the Prussian union. This exerted negative externalities on Bavaria and Wuerttemberg, which were affected particularly by increased transit tariffs through Hesse-Cassel (VBDZ 655). This led to continued negotiations between the two customs unions, which were concluded in March 1833 (Eisenhart Rothe and Ritthaler, 1934). The resulting union became the institution commonly identified as the Zollverein, since this was the central treaty that determined the institutional details for the customs union covering large parts

²²The two principalities, Meiningen and Coburg, were bought off with direct monetary compensation as well as improvements to local infrastructure.

²³The Thurn and Taxis family was a strong ally of Austria, the resistance against the Prussian-Bavarian plans, which rested on the interpretation of monopoly rights and legal treaties, had therefore the implicit backing by Austria.(Helbig, 1991)

of Germany. Bavaria and Wuerttemberg received a strong financial pay-off through the use of the population-based revenue distribution scheme Alber (1919). They also received political concessions through the right to negotiate trade agreements with foreign powers and present them to the whole Zollverein for approval. The Zollverein, the newly enlarged coalition, exerted externalities on Saxony and the Thuringian principalities, which faced being surrounded by one custom system once the Zollverein came into force on January 1st, 1834. Baden was affected similarly, since all its German neighbor states were now part of one common customs area. These new coalition externalities, together with the point that no other state would have had a significant impact on Bavaria and Wuerttemberg, show that this particular accession again followed the outlined characteristics of the optimal sequence.

Cooperation and potential unification between the two customs unions led to the fear of complete isolation in Saxony²⁴ and some of the Thuringian principalities. The fear was already evident during the early stages of the cooperation when, in 1829, Saxony and the Thuringian principality of Saxony-Weimar insisted on an exit clause in a second treaty of the *Mitteldeutscher Handelsverein*. This article allowed them to end their membership in the *Mitteldeutscher Handelsverein* early in case the two customs unions merged (VBDZ614). Since Prussia was aware of this clause (VBDZ 624), the negotiations and their successful conclusion with Bavaria and Wuerttemberg exerted negative coalition externalities on Saxony by giving them legal cover to leave the *Mitteldeutscher Handelsverein* (VBDZ 862). Saxony therefore joined the Zollverein on virtually identical terms to Bavaria and Wuerttemberg, although it had a considerably stronger economic situation. As one of the most developed and industrial regions in Germany, this state was also a center for international trade, especially through its trade fair in Leipzig

²⁴The fear of being isolated from major trade routes showed up again when other German States, especially Prussia, started to build railroads (Kiesewetter, 1988).

(Kiesewetter, 1988). This implied that Saxony's share of Zollverein imports, and therefore customs revenues, was substantially higher than its population share. The acceptance of the standard revenue distribution scheme showed that Prussia was able to use coalition externalities to extract financial concessions from Saxony. Given the geographic position, as well as economic importance, of the states which had not yet joined the Zollverein, Saxony would have only been affected by the accession of Thuringian principalities into the Zollverein. Nonetheless, given the smaller size of Thuringia and the issue that all international trade routes were now running through Zollverein territory, the potential impact was very low.

Together with Saxony, the Thuringian principalities started to become isolated with the accession of Hesse-Cassel and the treaty with Bavaria and Wuerttemberg.²⁵ It became complete for Thuringia when Saxony signed its treaty to join the Zollverein in late March 1833. As this agreement created even more negative coalition externalities on the principalities, Prussia was therefore able to extract significant concessions with regard to political power and membership rights. The small principalities were no longer able to insist on full individual membership, but agreed to pool together in a common institution, which reduced the possible number of veto players in internal Zollverein negotiations and prevented the value of the veto being diluted any further (Henderson, 1984*b*). Furthermore the states had to Prussia concluded the negotiations with Saxony prior to those with the Thuringian principalities, since the impact of Saxony on Thuringia was greater than the potential reverse impact, allowing Prussia to extract more political concessions.

Baden was a mid-sized state in the south west of Germany and shared

²⁵The negotiations in December 1832 show that the Thuringian states already expected the coming agreement between the Prussian and the Bavaria-Wuerttemberg unions. They tried unsuccessfully to convince Prussia to come to an agreement before the conclusion of the negotiations with Bavaria and Wuerttemberg (VDBZ 847).

a long border with France as well as Switzerland. This geographic position led it to be the major gateway for trade between France, Switzerland and the rest of the German states. Consequently, this position and role made it less dependent on trade routes to the north. This was reinforced through its access to the Rhine, which formed Baden's borders with France and Switzerland and allowed access to a number of important German and international markets. The accession of the Hessian states had therefore no major impact on Baden, as already noted by the contemporary Prussian official Bernstorff (VBDZ 382). The accession of Wuerttemberg and Bavaria in 1834, however, isolated Baden from most German markets. The fear of complete isolation and its possible effect on trade, as well as the large market of the Zollverein, led to negotiations and its eventual accession into the Zollverein (Müller, 1984). Due to its position as a trading center, Baden had a very strong free trade orientation. Its tariffs were fairly low before the accession, so it had to concede the introduction of the substantially higher Zollverein tariffs as part of its membership. The comparatively larger importance of Wuerttemberg and Bavaria for Baden, rather than vice versa, explains the later accession of Baden.

After the accession of Hesse-Darmstadt, two important Hessian states, Nassau and the free city of Frankfurt, remained outside the Zollverein. Nassau was running a mildly successful tariff system, especially due to certain tolls on the Rhine. (Hahn, 1982*b*) This implied it had a fairly high reservation price, and so for a long time its politics towards Prussia was relatively hostile. The accessions of the southern German states, however, led to the fear of complete isolation, despite ready access to the Rhine. The government attempted to compensate the loss of other German markets through a trade treaty with France in 1835, which also represented a legal obstacle to Zollverein membership. The limited nature of the treaty and the distance to France meant that this trade agreement did not have much of an impact

on the economic situation of the country. Coalition externalities, namely the swelling anger of local farmers who were shut out from neighboring markets in other German states through the new trade barriers around the Zollverein, however, led to a change in Nassau's position. It used a formal technicality to nullify the treaty with France and ratified an accession treaty with the Zollverein in December 1835. Additionally, it gave a number of concessions with regard to shipping on the Rhine. (Hahn, 1982*b*).

Nassau's access to the Rhine was the only direct connection Frankfurt had to it, once its other Hessian neighbors joined Prussia and the Zollverein. Since it was an important trading hub with international connections, such a connection was important (VBDZ 765). The city already suffered through the Zollverein, since its trade fairs, the central institution for its status as a major trading city, were undermined by the fair in the neighboring city of Offenbach. This fair was located in Zollverein territory and drew business away from Frankfurt, since it saved the merchants the costs of leaving and re-entering the Zollverein. As a consequence, Nassau's accession caused considerable externalities on Frankfurt, while the loss of Frankfurt as a market would have represented the only major externality on Nassau. Nassau's accession meant that Frankfurt lost its last unimpeded access to the Rhine and was completely isolated, which led to the speedy conclusion of its own negotiations with Prussia and its formalized membership in January 1836. Frankfurt had concluded a trade agreement with the United Kingdom on May 13th, 1832, with reciprocal preferential treatment.²⁶ Such an agreement obviously provided an obstacle to membership, however the British government agreed to a request from Frankfurt to be released from the treaty obligations. Frankfurt's terms of membership in the Zollverein had two major specifica-

²⁶British diplomats realized that such a treaty was likely not able to prevent Frankfurt from joining the Prussian tariff system eventually, a possible delay however would be costly to Prussia (VBDZ 824).

tions – first, it had to share full membership rights with Nassau and second, it did not participate in the population-based revenue system, but received a fixed sum. These two items reflect Frankfurt’s nature as a city state, since its small size meant it had to give political concessions but on the other hand it had a considerably higher per capita trade incidence, making membership in the population-based revenue distribution scheme inappropriate (Henderson, 1984*b*; Hahn, 1982*b*).

The accession of Baden, Frankfurt and Nassau filled geographic gaps within Zollverein territory, which had now a fairly round, convex shape. This had the consequence that the northern German states, in contrast to their southern German counterparts, did not face the threat of being isolated geographically (VBDZ 646). Their access to major ports, and therefore international markets, had the implications that the related absence of strong coalition externalities meant that Prussia found the required reservation price too high and did not secure their accession. The nature of coalition externalities, and their dependence on geography, therefore determined the set of states which formed the initial members of the Zollverein.

Brunswick and Hannover concluded, as a reaction to the Zollverein, their own customs union, the *Steuerverein*, in 1834, which Oldenburg joined in 1836. The almost completed negotiations about the renewal of the *Steuerverein* in 1841 fell apart due to differences between Hannover and Brunswick about the route of a new road, which would have caused traffic through Brunswick to decrease significantly. To avoid isolation, Brunswick turned to Prussia and joined the Zollverein in 1842 (Wittenberg, 1930). Hannover finally joined in 1854, but by then the Zollverein had turned into an arena for the political struggle between Prussia, Austria and the other German states. The treaty with Hannover gave Prussia another direct connection between its two territories and diminished the bargaining power of the other German states considerably. Hannover was compensated for this with a premium on its

regular share of customs revenues (Arning, 1930; Henderson, 1984*b*). Facing the defection of its last remaining partner within the *Steuerverein*, and therefore isolation, Oldenburg followed Hannover into the Zollverein in 1854 (Henderson, 1984*b*). The remaining independent states were either annexed by Prussia after the war in 1866, leading to an accession of their territories into the Zollverein, or in case of the major port cities Hamburg and Bremen joined after major political pressure through the empire in the late 1880's.

7 Conclusion

As shown above, the predominant hypothesis in the economic history literature for the creation of the Zollverein has severe shortcomings. I demonstrate that, by using a recently developed bargaining model, it is possible to resolve these problems and explain the formation process of the Zollverein in a consistent way. The idea of economies of scale in customs administration is still a considerable factor; however, it is necessary to include further ideas for a consistent result. This improvement is achieved through the introduction of the concept of coalition externalities.

The concept of coalition externalities allows us to widen the scope of relevant factors from purely financial administrative savings to the inclusion of important geographical, political and trade policy factors. This demonstrates the importance of these factors for the creation of the Zollverein and allows for a consistent explanation of the formation process. Externalities drive the decision between a multilateral and sequential bargaining approach and they are the main determinants of the optimal sequence if the agenda setter chooses the sequential approach.

The Zollverein was a successful customs union, whose example allows us to draw conclusions for modern trade policy. It provides an example where an agenda setter uses a sequential approach to form a coalition and illustrates

the importance of externalities, the effect a coalition has on non-participating states. It shows that regional agreements can be building blocks, but that for the successful conclusion of a global free trade agreement the agenda setter needs to have sufficient possibilities to exert negative coalition externalities during the formation process.

References

- Aghion, Philippe, Pol Antras, and Elhanan Helpman.** 2006. "Negotiating Free Trade." *NBER Working Paper*, , (10721).
- Alber, Georg.** 1919. *Zollverwaltung und Zollerträgnisse in Bayern seit dem Jahre 1819*. München:Limmer. 8vo.
- Alesina, Alberto, and Enrico Spolaore.** 2003. *The size of nations*. Cambridge, Mass.:MIT Press. Alberto Alesina and Enrico Spolaore. ill. ; 24 cm.
- Angelow, Jürgen.** 2003a. *Der Deutsche Bund*. Darmstadt:Wissenschaftliche Buchgesellschaft.
- Angelow, Jürgen.** 2003b. *Der Deutsche Bund*. Darmstadt:Wissenschaftliche Buchgesellschaft. Jürgen Angelow. 24 cm. Geschichte kompakt. Neuzeit.
- Arning, Hilde.** 1930. *Hannovers Stellung zum Zollverein*. Hannover:Culemann.
- Baldwin, Richard.** 1999. "A Domino Theory of Regionalism." In *Trading blocs : alternative approaches to analyzing preferential trade agreements*. , ed. Jagdish Bhagwati, 479–502. Cambridge, Mass:MIT Press.
- Branchart, Albert.** 1930. *Österreich und die Anfänge des preußisch-deutschen Zollvereins*. Marburg,.

- Dumke, Rolf H.** 1976. "The political economy of German economic unification : tariffs, trade, and politics of the Zollverein era." PhD diss. University of Wisconsin, Economics Department.
- Dumke, Rolf H.** 1994a. *German economic unification in the 19th century : the political economy of the Zollverein.* München:Institut für Volkswirtschaftslehre, Universität der Bundeswehr München. ill., maps ; 29 cm. Diskussionsbeiträge ; Nr. 4/94.
- Dumke, Rolf H.** 1994b. *German economic unification in the 19th century : the political economy of the Zollverein.* München:Institut für Volkswirtschaftslehre, Universität der Bundeswehr München.
- Eisenhart Rothe, Wilfried von, and Anton Ritthaler.** 1934. *Vorgesichte und Begründung des Deutschen Zollvereins 1815-1834 Akten der Staaten des Deutschen Bundes und der Europäischen Mächte.* Vol. 2, Berlin:Friedrich List Gesellschaft Reimar Hobbing.
- Haferkorn, Hans.** 1933. "Bernhard August Von Lindenau, Die Zollfrage und der Mitteldeutsche Handelsverein." PhD diss. Leipzig.
- Hahn, Hans-Werner.** 1982a. *Wirtschaftliche Integration im 19. Jahrhundert : die hessischen Staaten und der Deutsche Zollverein. Kritische Studien zur Geschichtswissenschaft ; Bd. 52,* Göttingen:Vandenhoeck and Ruprecht.
- Hahn, Hans-Werner.** 1982b. *Wirtschaftliche Integration im 19. Jahrhundert : die hessischen Staaten und der Deutsche Zollverein.* Göttingen:Vandenhoeck & Ruprecht.
- Helbig, Joachim.** 1991. *Bayrische Postgeschichte 1806-1870 : Grundlagen zur Interpretation altdeutscher Briefe.* Munich:Verlag Elise Helbig.

- Henderson, W. O.** 1984a. *The Zollverein*. . 3rd ed., London, Eng. ; Totowa, N.J.:F. Cass. by W.O. Henderson. maps ; 23 cm. "First published in the series Cambridge studies in economic history."–T.-p. verso.
- Henderson, W.O.** 1984b. *The Zollverein*. Vol. 3rd, London, Eng. ; Totowa, N.J.:F. Cass.
- Kiesewetter, Hubert.** 1988. *Industrialisierung und Landwirtschaft : Sachsens Stellung im regionalen Industrialisierungsprozeß Deutschlands im 19. Jahrhundert. Mitteldeutsche Forschungen, Bd. 94*, Köln:Böhlau.
- Kitchen, Martin.** 1978. *The Political Economy of Germany 1815-1914*. London.
- Krauss, Sylvia.** 1987. *Die politischen Beziehungen zwischen Bayern und Frankreich, 1814/15-1840*. München:Beck'sche Verlagsbuchhandlung. von Sylvia Krauss. 25 cm. Schriftenreihe zur bayerischen Landesgeschichte ; Bd. 85 [i.e.87] Source material in German and French. Includes index.
- Müller, H.P.** 1984. *Das Großherzogtum Baden und die deutsche Zollvereinigung : 1819 - 1835/36*. Frankfurt am Main:Lang.
- Murphy, David T.** 1991. "Prussian Aims for the Zollverein, 1828-1833." *Historian*, 53(2): p285ff.
- Ohnishi, Takeo.** 1973. *Zolltarifpolitik Preußens bis zur Gründung des Deutschen Zollvereins : ein Beitrag zur Finanz- und Außenhandelspolitik Preußens*. Göttingen:Schwartz.
- Rieder, Roland.** 2006. "Playing Dominoes in Europe: An Empirical Analysis of the Domino Theory for the EU, 1962-2004." *HEI Working Paper*, , (11-2006).

- Rogowski, Ronald.** 1990. *Commerce and Coalitions : how trade affects domestic political alignments*. Princeton, NJ:Princeton University Press.
- Taylor, A.J.P.** 1946. *The Course of Germany History*. New York.
- Thimme, Paul.** 1931. *Straßenbau und Straßenpolitik in Deutschland zur Zeit der Gründung des Zollvereins 1825-1835*. Stuttgart:W. Kohlhammer.
- Treitschke, Heinrich von.** 1872. “Die Anfänge des deutschen Zollvereins.” *Preußischen Jahrbücher*, 30.
- Viner, Jacob.** 1950. *The Customs Union Issue*. New York:Carnegie Endowment for International Peace.
- Williamson, Jeffrey.** 2003. “Stolper-Samuelson, Strategic tariffs and Revenue Needs: World Tariffs 1789-1938.”
- Wittenberg, Richard.** 1930. *Braunschweigs Zollpolitik von 1828 bis zum Anschluß an den Deutschen Zollverein*. Braunschweig:Gemeinnützige Schreibstube.
- Zanden, J. L. van, and Arthur van Riel.** 2004. *The strictures of inheritance : the Dutch economy in the nineteenth century*. Princeton, N.J. ; Oxford:Princeton University Press. Jan Luiten van Zanden and Arthur van Riel ; translated by Ian Cressie. ill. ; 24 cm. The Princeton economic history of the Western world.

Appendix

Effects of coalition externalities:

Example 1

Country A is the agenda setter and the columns represent the formed coalitions

tion, the joint pay-off of this coalition, as well as the pay-offs for the individual countries:

Coalition	Pay-off	A	B	C	D
A	10	10	8	8	8
AB	20	12	8	5	6
AC	20	12	7	8	7
AD	20	12	7	7	8
ABC	30	17	8	5	2
ACB	30	15	7	8	2
ABD	30	16	8	4	6
ADB	30	15	7	4	8
ACD	30	15	6	8	7
ADC	30	15	6	7	8
ABCD	34	19	8	5	2
ABDC	34	16	8	4	6
ACBD	34	17	7	8	2
ACDB	34	13	6	8	7
ADBC	34	15	7	4	8
ADCB	34	13	6	7	8

The optimal sequence for the agenda setter is BCD.

B is the first country in the sequence, since it has the stronger negative effect (-3/-2) on the other states than C or D (both have -1/-1). This illustrates the regularity with which states that have a stronger impact on others appear early in the sequence.

The agenda setter chooses C over D, because C has an effect of -4 on D, while D only has an effect of -1 on C. This illustrates the special case, where only two states with an impact on each other are to be selected.

Example 2

Coalition	Payoff	A	B	C	D
A	10	10	8	8	8
AB	20	12	8	5	6
AC	20	12	7	8	7
AD	20	12	7	7	8
ABC	30	17	8	5	5
ACB	30	15	7	8	5
ABD	30	16	8	4	6
ADB	30	15	7	4	8
ACD	30	15	6	8	7
ADC	30	15	6	7	8
ABCD	34	16	8	5	5
ABDC	34	16	8	4	6
ACBD	34	14	7	8	5
ACDB	34	13	6	8	7
ADBC	34	15	7	4	8
ADCB	34	13	6	7	8

The coalition pay-offs and externalities in this example are identical to the first, but with one exception – the highlighted pay-off for D under a coalition of A with B and C is now 5 instead of 2. This change results in a new optimal sequence, namely BC, which illustrates that the grand coalition is no longer the optimal outcome.

Both examples make use of negative coalition externalities only. The joint pay-off of the grand coalition is such that the agenda setter is indifferent between multilateral negotiations and no negotiations at all; the agenda setter receives in both cases a pay-off of 10. The existence of negative coalition externalities is therefore sufficient enough in both cases for the decision to negotiate as well as the choice of a sequential structure.

Tables

Table 1: Summary Statistics about Zollverein members

State	Treaty Signature	Size	Border/Area	Population 1834
Prussia		5108.9	0.22	13690653
Hesse-Darmstadt	02/14/1828	152.7	1.06	758748
Hesse-Cassel	08/25/1831	166.2	1.13	640674
Bavaria	03/22/1833	1387.5	0.25/0.27*	4251118
Wuerttemberg	03/22/1833	354.3	0.48	1632781
Saxony	03/30/1833	271.9	0.59	1595668
Thuringia	05/10/1833	265.5	908478	
Baden	05/12/1835	278.4	0.75	1228024
Nassau	12/20/1835	85.5	0.67	373601
Frankfurt	01/02/1836	1.8	8	60000
Brunswick	10/19/1841	67.7	2.23	
Hannover	09/07/1851	698.7	0.58	
Oldenburg	03/01/1852	107.3	0.82	
*without/with Rheinpfalz				
<i>Thuringia</i> (territories as of 1858)				
Sachsen-Weimar		65.9	1.8	
Sachsen-Coburg-Gotha		36.5	2.52	
Sachsen-Meiningen		46.3	2.3	
Sachsen-Altenburg		23.2	2.68	
Reuss-Greiz		6.3	5.3	
Reuss-Juengere linie		52.3	3.46	
Schwarzburg-Rudolstadt		17.4	3.26	
Schwarzburg-Sondershausen		17.6	2.7	

Data taken from:

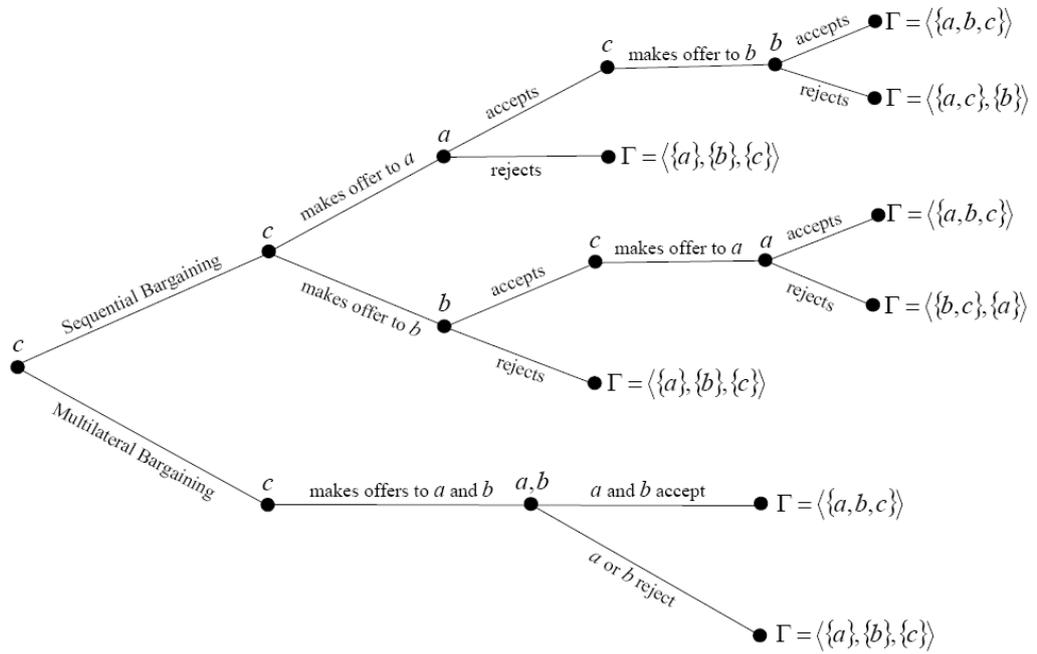
Dumke R., *German Unification in the 19th Century: the political economy of the Zollverein*, 1994

Henderson W.O., *The Zollverein*, 1984

Figures

The extensive form of the bargaining model for the three-country case is as follows:

Figure 1: Extensive form of the bargaining model



This is Figure 1, taken from Aghion, Antras and Helpman, 2008

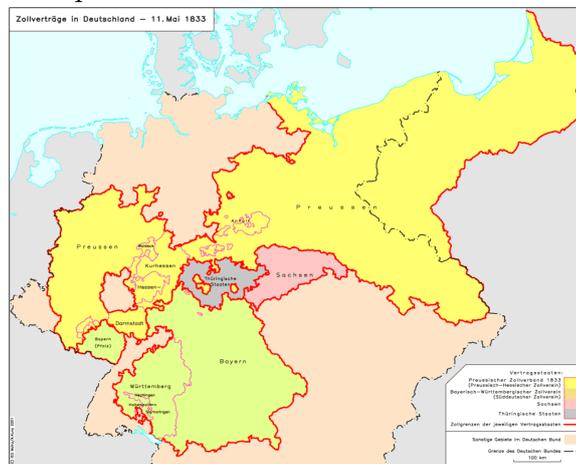
Figure 2: Map of Customs Unions in Germany in 1828 (Map 1)



The map depicts the two customs unions that formed in Germany in 1828, namely between Prussia and Hesse-Darmstadt (yellow) as well as between Bavaria and Württemberg (green). Additionally, the *Mitteldeutscher Handelsverein*, the trade agreement of a number of remaining German states, is illustrated (orange).

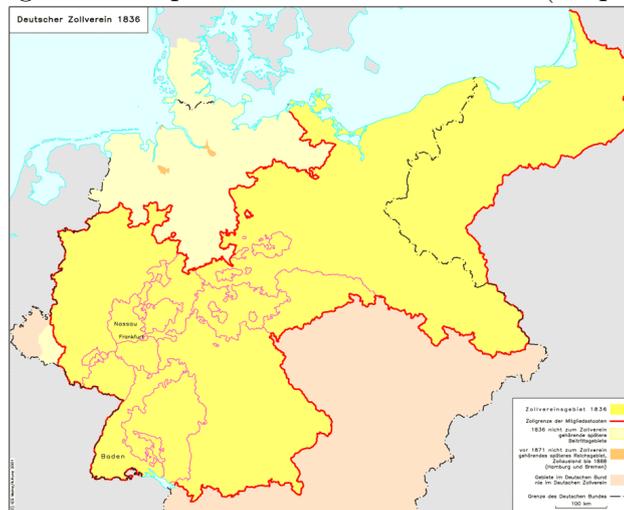
Source: HGIS Germany

Figure 3: Map of the Zollverein formation in 1833 (Map 2)



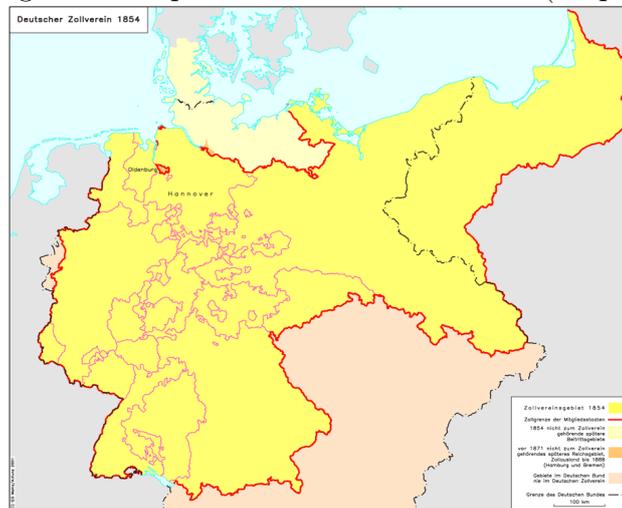
The map depicts the formation of the Zollverein during 1833. The sequence starts with the Prussian-Hessian union (yellow), then Bavaria and Wuerttemberg (green), Saxony (light purple) and Thuringia (gray).
Source: HGIS Germany

Figure 4: Map of the Zollverein in 1836 (Map 3)



The map depicts the extent of the Zollverein in 1836.
Source: HGIS Germany

Figure 5: Map of the Zollverein in 1854 (Map 4)



The map depicts the extent of the Zollverein in 1854.
Source: HGIS Germany