Borders, Policies and Illusions:
Essays on the Political Economy of Federalism and Trade

M.A. Martin Hoffstadt
geboren am 26.04.1989 in Bergisch Gladbach

2022

Supervisor:

Prof. Dr. Martin Gassebner

Co-Supervisor:

Prof. Dr. Christian Lessmann

Defense:

28th July, 2022

To Those Who Wonder Why?

Abstract

This PhD thesis studies the implications of local governance, decentralisation and regional autonomy under federalism. Furthermore, it contributes to the trade literature by bringing together the largely separated research on cartel behaviour and anti-dumping policy. More explicitly, this thesis identifies empirically that the implementation of communal mergers, regional autonomy and anti-dumping policy leads to unexpected outcomes. Chapter 2 and Chapter 3 use the Socialist Federal Republic of Yugoslavia between 1945-1991 as a case to study the local implications of communal mergers and of the decentralisation of government functions. Chapter 4 combines the largest databases on anti-dumping and antitrust cases to study the relationship of global cartels and anti-dumping laws. In response to policy-makers, this thesis argues that it is an illusion to expect that communal mergers only improve governance efficiency, that it is an illusion to expect federalism to more accurately reflect preferences of local populations, and that it is an illusion to expect that anti-dumping policy only protects competitive markets.

Keywords: *Political Economy, Federalism, Decentralisation, Border reforms, Communal Mergers, Yugoslavia, Trade, Trade Policy, Anti-Dumping, Antitrust, Cartels*

Acknowledgements

This dissertation is the product of endless years of asking – Why? When I was a teenager, assisting my father in his work as a carpenter, I kept on asking why it was impossible for us to win a public tender. In fact, this raised my interest in welfare economics.

As an undergraduate student at the Justus-Liebig University of Giessen I was wondering why I became only the first student in 2010 to go on an exchange term at the St. Kliment Ohridski University of Sofia (Bulgaria). At Sofia's Studentski Grad (Students Town), I kept wondering why other exchange students moved to more comfortable apartments in Sofia's city centre. In fact, Studentski Grad was the place where one could observe how Bulgarian students lived and what questions were puzzling them. The consequence of my stay in Studentski Grad was that I went on numerous trips in the Bulgarian countryside. Hours of train rides kept me wondering why the former communist regime had build heavy industrial plants in areas that lacked road, river and aerial access. Could the children that are born today in such remote areas have a future *at home*?

All these questions led me to visit Bulgaria's neighbouring countries, most notably Romania, Macedonia and Serbia. The contrasts in culture couldn't have been any greater, in particular between the countries that used to belong to the Warsaw pact (Bulgaria, Romania) and those that were once part of Yugoslavia (Macedonia, Serbia). To give an example, in Bulgaria and Romania I experienced railway conductors who tried to charge me extra money – probably because they saw the chance to collect a tip. On my first visit to Serbia I happened to fall asleep on a bus trip, which brought me to a small town named Babušnica. Back then I did not know the language, I had little clue where I was, and I felt the history of Nazi-Germany and the Nato campaign of 1999 did not favour me as a German citizen. I will never forget what the locals did to me back then – they invited me into their houses and celebrated the happening of a Serbian-German meeting.

These experiences brought me to the tragedy that occurred in the former Yugoslavia since 1990. Back in school I have had class mates originating from Bosnia-Herzegovina, without understanding what their families had just escaped from in the summer of 1995. In fact, to this day I do not claim to fully understand the events that began with the unilateral secession of Slovenia and Croatia in 1991. Nonetheless, I dedicate Chapter 2 and Chapter 3 of this thesis to those who wonder why Yugoslavia could fall apart in such an intensive war. Moreover, I consider my research on the *peaceful* time in socialist

Yugoslavia not only as a contribution to the understanding of the Yugoslav wars, but also as a continuation of research on a country that has received considerable attention from international social scientists between 1945 and 1991. Aware that I will probably forget to mention further important contributions, I want to mention some of the inspiring work that I have read. Most notably, I am grateful to the work of Benjamin Ward (1957, 1965, 1968), who researched the implications of Yugoslavia's self-management system. I am grateful to Branko Horvat (1971) for detailed descriptions of the Yugoslav economy, published in the American Economic Review. Beyond the school of economics, I am particularly grateful to the anthropological field work conducted by William Lockwood (1973, 1975), who has studied the social relations and the economic activity of a Muslim village in the centre of Bosnia-Herzegovina between 1966 and 1968. Reading the work of Lockwood (1973, 1975), Simić (1973, 1974) and Halpern (1956, 1963, 1965, 1975) has felt like a time ride into socialist Yugoslavia.

In early 2016, my journey of asking *Why?* led me to the Institute of Macroeconomics at the Leibniz University of Hanover. I was invited to present the content of my Master's thesis, which focused on the relation between ethnic diversity and public goods provision in the Republic of Serbia in 2011. The quality of the research environment in Hanover became clear to me from this day. In fact, a fully fledged group of scholars of the institute visited my presentation and engaged in the discussion of how and *why* my work could have a potential for a scientific career. At this point I want to thank all these scholars who happened to become my colleagues and friends, in particular for continually asking critical questions, and for always being available to talk *on* and *off* work. In particular I am grateful to Arevik Gnutzmann-Mkrtchyan, who not only became my co-author, but also for the endless time she had for me in reviewing my early Stata scripts, developing our common research agenda on the relation of antitrust and anti-dumping policy, and for always being available to review my presentations and writings. To Richard Bluhm I am grateful for his teachings in 'R' with the focus on geodata. Moreover, I would like to thank all my fellow PhD students Paul Schaudt, Melvin Wong, Tobias Korn, Andrea Cinque, Julian Wichert, Stefanie Hock and Camila Haux for all the endless time spent together at the Institute of Macroeconomics. A special endorsement goes to Paul Schaudt for introducing me to the world of QGIS, which only made it possible for me to digitise all the historic maps that I collected. I also benefited form my common office with Melvin Wong, who was not only always ready to review my work, but also to take a break and start a jam session with our guitars. All this fun has helped me to stay on the ground throughout all these years.

Outside the Institute of Macroeconomics I want to thank my family for supporting me on my path to science. Being the first to attend a university, discussions with my parents, siblings, uncles, aunts, – and my nephew Pascal – have always made me explain my work in simple words. My best friends Alex and Bene deserve credit not only for listening to my work, but also for joining me on trips to Bulgaria and Serbia.

Furthermore, I want to thank all my professors and co-students that have made my development possible. An important mentor and friend has been Henrik Egbert, who took endless time in reading and discussing my work. Together with Henrik I visited some of the former administrative centres that are part of the data used in Chapter 2, which has helped developing an understand of the local relations. I took these trips as an encouragement to visit further places in what is nowadays Serbia, Croatia, Bosnia-Herzegovina, Slovenia and Montenegro. In Montenegro, I am particularly grateful to the librarian of the statistical office, Žarko, who connected me with Danilo, a pensioner of the former Federal Statistical Office of the Socialist Federal Republic of Yugoslavia. Without Žarko and Danilo I would not have been able to make contacts with the institutes in Sarajevo and Belgrade. In Bosnia-Herzegovina I am more than grateful to Marko, who has not only helped me getting access to historic gazettes of the People's Republic of Bosnia-Herzegovina, but also travelled with me through a country where contrasts couldn't be any larger on a kilometre basis.

The length of this letter of acknowledgements demonstrates that there is a wide number of individuals and institutions that have made this dissertation possible. To all those that I don't mention explicitly I want to say thank you, too. More explicitly, I want to dedicate the last paragraph to my supervisors Martin Gassebner and Christian Lessmann.

From the first day of knowing each other I have felt that Martin trusted in my research, without which this dissertation would have been impossible. I did not only benefit from the seminars and courses that Martin made me aware of, but I also learned a great deal in econometrics through developing exercises for his lecture on the Economics of Terrorism. I also want to thank Martin for all the funding that he provided for conferences, data collection trips, student assistants. At this place I want to add big thanks to my assistants Jelena Rakić, Petar Jeremić and Jonas Altmann for helping me to collect and digitise historic census books and maps of Yugoslavia. Nonetheless, the greatest credit goes to Martin who has always supported me on my path. Key to my research was also that Martin introduced me to his network of fellow scholars, all of whom have continually pushed me in asking *Why?* At this point I want to thank Christian Lessmann who has great credit in helping me to develop my single authored work in Chapter 3. Without Christian's feedback I would not have had the farsightedness to develop the methodology that helped to identify a causal relationship between borders and market access. Therefore my deepest *THANK YOU* goes to Martin Gassebner and Christian Lessmann.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

This PhD thesis studies the implications of local governance, decentralisation and regional autonomy under federalism. Furthermore, it contributes to the trade literature by bringing together the largely separated research on cartel behaviour and anti-dumping policy. More explicitly, this thesis identifies empirically that the implementation of communal mergers, regional autonomy and anti-dumping policy leads to unexpected outcomes. In response to policy-makers, this thesis argues that it is an illusion to expect that communal mergers only improve governance efficiency, that it is an illusion to expect federalism to more accurately reflect preferences of local populations, and that it is an illusion to expect that anti-dumping policy only protects competitive markets.

The key argument in favour of federalism builds on the seminal work of Musgrave (1959, 1971) and Oates (1972, 1999), who argue that local governments are closer to the people, which makes them more responsive to the preferences within local jurisdictions. A second important argument in favour of federalism is that the costs for the provision of public goods differ by location. For example, road construction is likely to be less expensive on flat rather than on mountainous terrain. Letting local politicians decide on the public goods bundle, it is argued, should improve overall social welfare as decentralised governance can account for the varying conditions in a country (Oates 1999, p. 1122).

Connected to this hypothesis is the question of the optimal size of local jurisdictions. An important theoretical foundation to this question was laid by Tiebout (1956), who argues that a large number of communes increases the chance for mobile-consumer voters to locate in a commune that matches their preferences. Ostrom (1972) further discusses this question by contrasting the arguments of urban planners and political economists. Accordingly, urban planners argue that small jurisdictions are unable to collect the funds necessary to develop costly infrastructure. This tendency was also noted by Buchanan (1950), who observed ever-expanding tasks and responsibilities of local governments. Consequently, urban planners usually support communal mergers as they expect enlarged communes to improve the efficiency of service provision and to achieve a more equal distribution of costs to beneficiaries (Ostrom 1972, p. 479). In contrast, the political economy literature is less enthusiastic about communal mergers,

as it argues that each public good has a distinct optimal scale (Ostrom 1972, p. 486). In the words of Stigler (1957, p. 218), a missing persons bureau is more efficient if it operates worldwide, while locally organised police may more efficiently control local traffic. Nonetheless, at least since World War II it appears that policy-makers follow the advice of urban planers, which is to merge local jurisdictions to improve governance efficiency (Blom-Hansen et al. 2016, p. 814). Of little surprise to political economists, empirical assessments of these mergers have produced contradicting results (Reingewertz 2012, Allers & Geertsema 2016).

Chapter 2 contributes to the literature on the optimal size of local jurisdictions by analysing the local implications of communal merger reforms that were implemented in the Socialist Federal Republic of Yugoslavia between 1957 and 1969. While the lack of disaggregated data constrained previous literature to study only the aggregate effects of post-merger communes, the case of Yugoslavia allows to assess the impact of the reforms separately for each merging partner. Thus Chapter 2 not only emphasises that communal mergers create territorial *winners* and *losers*, but it also asks whether the *winners* bailed out the *losers* following the reforms. Whereas there is no consensus in the literature whether communal mergers indeed improve efficiency, the empirical results of Chapter 2 identify that former administrative centres reduce the number of administrative staff due to the reforms. Moreover, the specific context of Yugoslavia allows to split-up the effect by ethnicity. As a key result, Chapter 2 identifies that losing administrative status to the same ethnic group leads to a reallocation on local labour markets, where workers move from administration into industry. In contrast, losing administrative status to another ethnic group only leads to unemployment. Therefore I argue that it is an illusion that communal mergers only just improve governance efficiency. Instead, the evidence shows that communal mergers fostered inter-ethnic disparities 20 years before the Yugoslav wars.

The case of Yugoslavia is relevant to the federalism literature beyond the relationship between the size of local governmental units and efficiency. In fact, Cederman et al. (2015) find empirical evidence that supports the devolution of powers in multi-ethnic states. Precisely, Cederman et al. (2015, p. 368) conclude that in times of peace a combination of allowing regional autonomy and including all groups in the central government reduces the propensity for conflict. Given this hypothesis, the case of Yugoslavia is particularly relevant. Chapter 3 summarises the historical circumstances that led Yugoslavia's communist regime to decentralise all forms of government in times of peace. Under the constitution of 1974, *self-management communities of interest* were formed to implement direct democracy in education, culture and health institutions (Milenkovitch 1977, p. 57). These institutions elected delegates to communal, provincial, republican and federal assemblies (Lampe 2000, p. 313). Furthermore, the regime ensured that all federal organs reflected the ethnicity shares of the country more closely than any other government at the time, and a nine-member collective State Presidency represented all eight federal units plus Tito (Bertsch 1977, p. 95-97). After Tito's death,

the head of the presidency rotated on a yearly basis among the federal units (Lampe 2000, p. 326).

The flip side of decentralisation was that Yugoslavia's federal government gradually lost its competencies to the initially subordinate republics and provinces (Milenkovitch 1977, Bertsch 1977). What followed after 1965 was a fragmentation of Yugoslavia's economic and political system, which Lampe (2000, p. 305) describes as a confederation of eight one-party regimes after 1974. This was felt particularly in agriculture, where farmers required permits to sell outside their region (Cochrane 1990, p. 10).

Given this context, Chapter 3 analyses whether the hardening of Yugoslavia's federal borders after 1965 had an impact on the population growth of border settlements. This research question connects to the new economic geography (Krugman 1991, Davis & Weinstein 2002, Redding & Sturm 2008) and the persistence literature (Grosfeld & Zhuravskaya 2015, Becker et al. 2020). To the new economic geography literature, Chapter 3 contributes by developing a methodology to measure market access based on geospatial data. Concisely, Chapter 3 uses spatial elevation, river and road data to identify for each of 26,149 settlements the nearest of 468 towns, which translates into commuting spheres around each of these towns. As some of the commuting spheres overlap Yugoslavia's federal borders, the methodology identifies that federal borders cut certain settlements off their nearest town once these borders hardened. I term these to be *affected* border settlements. Using a panel of settlement-level population data (1948-1991), Chapter 3 identifies that affected settlements experienced strong declines in their annual population growth after 1965, which suggests the emergence of a border effect. As Pinkovskiy (2017, p. 183) documents the existence of border effects at the borders of Yugoslavia's successor states today, the evidence of Chapter 3 provides a causal explanation for the origin of these effects. To the federalism literature, Chapter 3 responds that the devolution of powers in times of peace could not prevent civil war in Yugoslavia. In the words of Cederman et al. (2015), it might have been too late to implement decentralisation reforms in the historically conflict-ridden Balkans. Nonetheless, the methodology developed in Chapter 3 highlights that the geography of subnational borders does not necessarily reflect actual local relations. Hence, I argue that it is an illusion to expect the devolution of powers to act as a conflict-reducing device in multi-ethnic states. Instead, the case of Yugoslavia documents that local politicians may use their competencies to exclude outsiders, which only decentralises the conflict. Yet worse, under decentralisation tensions may not just arise at the centre of autonomous regions, but also at more remote subnational border areas.

Chapter 4 turns to the behaviour of global cartels in the context of anti-dumping policy. In the antitrust literature it is well documented that private firms aim to establish and maintain cartels in order to gain the profits of successful collusion (Ivaldi et al. 2003, Harrington Jr 2017). Globally, cartel agreements range from market division to market sharing under collusive terms. As documented by Levenstein et al. (2015), it is well

possible *not to* observe changes in bilateral trade flows between countries that both have a firm involved in an international cartel. Nevertheless, it is natural to expect periods of collusion to be associated with lower quantities and higher prices.

Given the nature of cartels, it is surprising that anti-dumping duties are also levied on products that are subject to antitrust investigations at the same time (Messerlin 1990). In fact, anti-dumping laws are intended to prevent that foreign firms *dump* their products to gain a share in *competitive* domestic markets, implying that periods of dumping are associated with declines in prices or increases in quantities. At first glance, it thus appears to counter the intuition that anti-dumping duties can be levied in cartel industries. To shed light on this phenomenon, Chapter 4 combines the existing literature on global cartels and anti-dumping policy. Moreover, Chapter 4 develops a methodology to link the two most comprehensive but independent databases of anti-dumping and antitrust investigations. As a result, Chapter 4 identifies that 43 out of 61 global cartels are matched to at least one anti-dumping investigation. Empirically, Chapter 4 finds that legally proven periods of global cartels are associated with statistically significant increases in world import prices. Moreover, the empirical results suggest that anti-dumping investigations in cartel industries *during* the cartel period are at least correlated with significant increases in world import prices, which come on top of the general cartel effect. Finally, the key result of Chapter 4 supports Prusa (1992), who argues that cartel firms have an incentive to file anti-dumping petitions to threaten foreign competitors into cartel agreements. Accordingly, anti-dumping petitions are withdrawn once the firms reach an out-of-court agreement. As Chapter 4 shows that the period after withdrawn anti-dumping cases is correlated with price increases in cartel industries, I conclude that it is an illusion that anti-dumping policy is used only to protect *competitive* markets. Instead, there is reason to assume that global cartels abuse anti-dumping laws to preserve *cartelised* markets.

Chapter 5 concludes the dissertation. It puts the key results of each chapter into the broader context and highlights the lessons learned. Based on this discussion, Chapter 5 identifies important open avenues for future research.

Chapter 2

Communal Mergers and Efficiency[1]

2.1   Introduction

Countries that wish to decentralise governance inevitably run into a trade-off concerning the optimal size of local governments (Tiebout 1956, Oates 1972). On the one hand, many tiny administrative units allow proximity to local preferences, but limit the ability to develop costly infrastructure. On the other hand, fewer but larger local governments risk losing touch to local preferences, but ensure sufficient scales to develop costly infrastructure. Often this trade-off is amplified by increasing expectations towards public goods and services (Buchanan 1950).

Throughout the last 70 years numerous countries have turned to the hands-on solution of merging neighbouring communes (Blom-Hansen et al. 2016). But since reformers neglect that neighbours do *not* necessarily share the same preferences, it remains an open question whether communal mergers indeed have the potential to harvest economies of scale. Importantly, whether local disparities emerge due to communal mergers is yet to be addressed by the empirical literature.

Ostrom (1972) derives testable hypotheses concerning communal reforms based on two competing schools of thought. First, urban planners expect communal mergers to lead to higher output per capita, more efficient provision of services, more equal distribution of costs to beneficiaries, increased responsibility of local officials and increased participation by citizens (Ostrom 1972, p. 479). Second, political economists are less enthusiastic about communal mergers as they view local governments as multi-service providers, where each service has a distinct optimal scale (Ostrom 1972, p. 486).[2] In this line of thought the reform outcome depends on the initial size and future tasks of local governments.

In this light, mixed results in the empirical literature on communal mergers are of little surprise. For instance, Reingewertz (2012) reports that mergers between Jewish communes in Israel reduce expenditures by 9%, while there is no statistically significant effect for mergers between Arab communes in Israel. For Germany, Blesse & Baskaran

---

[1]This chapter is based on joined work with Martin Gassebner.
[2]Consequently, Stigler (1957) suggests that each governmental activity is assigned to the smallest governmental unit that can efficiently perform the task.

(2016) report significant reductions in administrative expenditures only where communal mergers were *compulsory*. For the Netherlands (Allers & Geertsema 2016) and Denmark (Blom-Hansen et al. 2016) there is no evidence of changes in expenditures or service provision.

Yet most empirical studies on communal mergers share two weaknesses. First, given the interest in the causal effect of mergers on economic performance, one requires that economic performance prior to the reform does not affect the decision to merge, which is typically not the case. Second, one would ideally observe all communes before and after the merger. Unfortunately, statistical institutes typically only provide data for communes that exist in a given year t. Thus most studies use the aggregated post-merger commune as the unit of observation, which constrains the analysis to assess only the *net effect* of the reforms. A promising alternative is developed by Egger et al. (2021), who document that nightlight intensity decreases in the former and increases in the new communal administrative centres after communal mergers in Germany. Similarly, Bluhm et al. (2020) demonstrate for a global set of cities that gaining capital status of first level administrative units increases city growth.

A gap remains in the literature with regard to local statistical data. Given the expectation that merged communes reduce joint expenditure, it remains open how these expenditure cuts are distributed locally and what the corresponding economic effects are. At the same time the lack of empirical studies on these questions is surprising since qualitative studies point to the emergence of local resistance just before communal mergers in Canada (Stott 2000) and Finland (Zimmerbauer & Paasi 2013). This resistance is particularly pronounced for populations in losing administrative centres (Zimmerbauer et al. 2017). Moreover, Alesina et al. (2004) have shown that racial hetereogeneity was associated with the preference not to amalgamate school districts in the United States. This finding implies that ethnic groups may resist to form common administrative units with rival ethnic groups.

This chapter uses settlement-level census data to study the local implications of communal merger reforms implemented between 1957 and 1969 in the Socialist Federal Republic of Yugoslavia (SFRY). Precisely, we focus on *1,358* settlements that functioned as administrative centres to the communes of Yugoslavia in 1955.[3] We group these settlements into three categories. First, *893* settlements are *reformed* so that they *lose* their administrative status through communal mergers. Second, *333* settlements are *reformed* so that they *win* over other administrative centres, implying that they gain administrative importance and responsibility. Third, *132* administrative centres remain *unreformed*. Throughout this chapter we term these groups as *losers*, *winners*, and *unreformed*, respectively.

Our focus on communal mergers in Yugoslavia has multiple advantages. First, the institutional setting of socialist Yugoslavia provides that local governments were

---

[3]Yugoslavaia had 1,479 communes in 1955. We exclude suburban communes (e.g. Zagreb-Maksimir).

responsible for a wide range of tasks including town planning, social services and public utilities (Horvat 1971). In addition, communal governments were in charge of all economic activities on their territory, including the founding and closing of enterprises (Milenkovitch 1977). This particular setting provides that the *winners* of the communal merger reforms became exclusively responsible for the future development of the *losers.* Moreover, since Yugoslavia was a multi-ethnic state, the setting provides instances of mergers *within* and *across* ethnic boundaries. Due to the ethnic dimension in the violent dissolution of Yugoslavia after 1990, it is particularly relevant whether communal mergers induced disparities between winners and losers, and whether the outcomes for *inter-ethnic* and *intra-ethnic* mergers differed.

To address these questions we collected and digitised settlement-level employment and ethnicity counts from Yugoslavia's censuses in 1953, 1961 and 1971. For each of the *1,358* administrative centres, our data set contains time-varying counts of individuals employed in different sectors, such as administration and industry. Since we observe losers, winners, and unreformed administrative centres before and after the reform, we can test empirically whether the communal mergers led to a reduction in the number of workers in administration, and whether the outcomes differed for losers and winners. Moreover, we test the role of ethnicity.

We find that the loss of administrative status is associated with a significant reduction of administrative staff. While this result confirms the intuition that the job of at least one mayor becomes redundant, it is yet surprising that the reduction of administrative staff occurs exclusively in the losing administrative centre. As there is no evidence of changes in administrative staff in the winning administrative centre, we conclude that the communal mergers in Yugoslavia indeed achieved net reductions in administrative staff. However, the key result of this chapter concerns the role of ethnicity. While ethnic proximity of the merging partners is irrelevant for administrative staff, we find significant differences in the industrial sector. Only when the merging partners are of the same ethnicity, we observe an increase in the industrial workforce that offsets the reduction in administrative staff. Concisely, this result suggests that winners do only integrate losers when they are co-ethnics, which highlights a channel behind emerging disparities.

The chapter is structured as follows. Section II describes the historical setting. Section III introduces the data sources and Section IV presents our empirical strategy. Section V presents the empirical results. Section VI concludes.

2.2   The Communal System of Yugoslavia

Communist Yugoslavia was closely aligned with the Soviet Union until 1948. Yet different to other Eastern European communists, Yugoslavia's World War II Partisan leader Josip Broz Tito confidently opposed Stalin's influence as his movement had liberated much of Yugoslavia's territory before the arrival of the Soviet Red Army (Neal, 1958, p. 2;

Table 2.1: Evolution of Administrative Tiers in Yugoslavia.

Administrative Tiers in Yugoslavia		1947**	1953	1955	1961	1969	1991
(Serbo-Croatian)	(English Translation)						
Republike i Pokrajine*	Republics and Provinces*	8	8	8	8	8	8
Srezovi	Districts	338	327	107	75	-	-
Gradovi	Cities	85	25	-	-	-	-
Mesni narodni odbori	Local people's committees	7,866	-	-	-	-	-
Gradske opštine	City communes	-	239	-	-	-	-
Opštine	Communes	-	3,904	1,479	782	500	517

Source: Statistical Yearbooks of Yugoslavia (Novak, 1955, p. 29; Grupković, 1991, p. 625).
*There were 6 Republics (Bosnia-Herzegovina, Montenegro, Croatia, Macedonia, Slovenia, and Serbia).
Serbia had two provinces (Vojvodina and Kosovo-Metohija).
**Only until 1949, Croatia was divided into two *regions* (Novak 1955, p. 29).

Rusinow, 1978, p. 10-13). Moreover, the leading ideologists among the Yugoslav Partisans, Milovan Djilas and Edvard Kardelj, disagreed with Stalin's hierarchical and centralised vision of communism (Djilas 1957). Instead, Djilas and Kardelj were inspired by the Paris commune of 1871 (Engels 1894, Marx 1900), which suggested a decentralised self-management system (Kardelj 1955*a*). In 1948, this tension led to Yugoslavia's expulsion from the communist bloc, which created the necessity to trade with Western market economies (Holt & Stapleton, 1971; Horvat, 1971, p. 120).

In response to the circumstances the regime set on a unique path to develop a system between capitalism and state socialism, which became known as *worker's self-management* (Horvat 1971, Milenkovitch 1977). At the core of this system stood the directive that the central state was redundant and should *wither away* in a classless communist society (Jović 2009). Instead of central administration, the new system required workers' councils to elect enterprise managers, and neighbourhood communities to elect local officials (Ward 1957, 1965, 1968). Consequently, communal governments gained responsibilities in town planning, social services and public utilities (Horvat, 1971, p. 155; Kasoff, 1976).

Due to the strong ideological preference for independent communes (Pusić 1975), the regime turned to territorial reforms with two explicit hopes: First, it was assumed that enlarged communes would benefit from *sufficient economic strength* (Fisher 1966), which should make it possible for communes *to meet their elementary needs using their own economic resources* (Kardelj 1955*b*). Second, it was assumed that mergers of urban and rural communes would relocate industry outside cities, and foster the integration of urban and rural areas (Petković, 1955; Hamilton, 1968).

Table 2.1 illustrates the evolution of administration in Yugoslavia. Until 1991, the first administrative tier consisted of six republics: Bosnia-Herzegovina, Montenegro, Croatia, Macedonia, Slovenia, and Serbia. Additionally, Serbia was divided into Serbia proper and two provinces: Vojvodina and Kosovo-Metohija.

In 1947, there were *338* districts, *85* cities and *7,866* local people's committees. Due to the centralist-directive system of the time, the large number of local units demonstrates the central government's bureaucratic apparatus to enforce and execute policies (Fisher

1964). By 1953, the central government cut this apparatus to 327 districts, 25 cities and 3,904 *local people's committes*, renamed to *communes* (Pusić 1975). By 1955, *107* districts and *1,479* communes remained, all depending on central government grants (Pusić 1975).

In 1955, the *General Law on the Organisation of Communes and Districts* (Kardelj 1955*b*) marked a turning point in Yugoslavia's state organisation. Most importantly, this law removed the preceding hierarchies between communes and districts (Djordjevic 1959). In Article 2 (Kardelj 1955*b*, p. 28), the commune was defined as *the basic political-territorial organisation of self-government* and *the basic social-economic community of the inhabitants on its territory.* Article 12 left only coordination tasks to districts, which disappeared altogether by 1966 (Pusić 1975). In this spirit, Yugoslavia's state organisation after 1955 is known as the *communal system* (Djordjevic 1959, Fisher 1964).

Since 1955 communes were in charge of their borders, with incentives to merge with neighbours. First, as communal governments received a share of enterprise income produced on their territory, urban communes tended to construct new factories on narrow city space (Petković 1955). In contrast, rural communes lacked the funds to construct new facilities, but provided space, manpower and housing. As many rural communes lacked secondary schools, their students either had to commute or to quit attending school (Petković 1955).

All of the resulting communal mergers had to be proposed to and ratified by higher level assemblies (Horvat 1971, p. 154). At the same time, no existing unit of local government could lose its legal status without its consent, which is evident in the refusal of Opatija to join Rijeka (Neal 1958, p. 181). Where communes merged, the redundant administrative centres were to be transformed into *subordinate* branch offices of the new communal administration (Petković, 1955, p. 99; Pusić, 1975, p. 137). Nonetheless, for the merger between the communes of Krk and Rijeka, Petković (1955, p. 101-102) expected that at least one third of the administrative staff could become superfluous.

The outcome were strong communal governments. In 1966, Yugoslavia's communal shares in total expenditure (*35%*) ranked among the highest in the world, ahead of West Germany (*30%*) and Switzerland (*25%*) (Horvat 1971, p. 157). This figure is even more impressive since Yugoslavia's communes lost some of their economic functions in 1964 to the republics and provinces (Hamilton 1968, p. 337). Until 1989, Yugoslavia's communes were intensively studied by urban planners due to their strong communal autonomy (Kasoff 1976, Simmie 1989).

2.3 Data

We faced a challenge in collecting data for a state that ceased to exist in 1992. In fact, access to historical local statistical data and maps remains a sensitive issue in former Yugoslavia.[4]

---

[4]Nonetheless, when we visited the statistical and geodetic institutes of Yugoslavia's successor states, we were well received and provided with contemporary geodata. At the libraries in Belgrade, Zagreb, Sarajevo, Banja Luka, Podgorica,

Digitising Historical Communal Borders Based on Contemporary Cadastral Communes

Example: The Commune of Bjelovar, Croatia, in 1958

Overlay: Cadastral Communes (2018)   **Overlay:** Digitised Commune (1958)
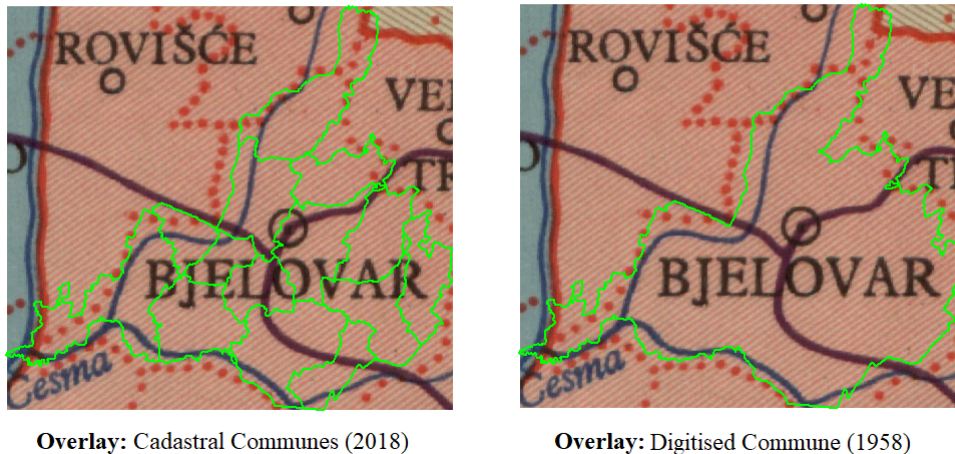
Figure 2.1: Digitising example for the commune of Bjelovar, Croatia, in 1958.

Our collections contain a series of statistical sketch maps of Yugoslavia's communes (1955-1971). We also obtained a map that shows the 1,193 communes of 1958 at a resolution of 1:500,000. To digitise these maps we used more precise contemporary cadastral and settlement borders, provided by the geodetic institutes of Yugoslavia's successor states. Since these borders typically follow natural features it is likely that there are few changes over time. Where available[5], we aggregated cadastral communes (Croatia, Serbia) or settlement borders (Slovenia, Bosnia-Herzegovina[6]) to reconstruct as closely as possible the communal borders visible in historic maps. An example of our approach is illustrated in Figure 2.1.

Despite our efforts to reconstruct precise historic communal borders, we cannot exclude the possibility that changes in settlement borders after 1971 distort the precision of our maps. However, since we aggregate cadastral and settlement borders to communal borders, changes in cadastral and settlement borders after 1971 only become a problem near the borders of the communes. It is precisely for this reason that we focus here exclusively on those settlements that functioned as administrative centres, which are typically located centrally within communes.

The next challenge in the construction of our data set concerns the identification of the location of administrative centres. As a starting point, names of the districts and corresponding communes of 1955 are listed in the Statistical Yearbook of Yugoslavia in

---

Ljubljana, and Kiel, we were also well assisted in our collection of historic maps, literature, law texts, and census books. We are particularly grateful to Mr. Danilo, a pensioner and former employee at the demographics department of the Federal Statistical Office of Yugoslavia, who has helped us making contact with the statistical institutes of Yugoslavia's successor states.

[5]Only for Montenegro and Macedonia we could not obtain official geodata. For Macedonia we used the Local Administrative Units (LAU2) borders available at Eurostat. For Montenegro we digitised the communes only based on historic maps.

[6]The Geodetic Institute of the Federation of Bosnia and Herzegovina kindly provided a precise map (1:200,000) of the communes in Bosnia-Herzegovina, dated 1985. This map, together with census data of 1991 and 2013, enabled us to reconstruct pre-war settlement boundaries in Bosnia-Herzegovina. We use pre-war settlements of Bosnia-Herzegovina to reconstruct the communes of 1955, 1958, 1961 and 1971.

1955 (Novak 1955, p. 390-392). Comparison with historical official gazettes, which we obtained for Bosnia-Herzegovina, Montenegro, Macedonia and Slovenia, confirms that the communes usually carried the name of their administrative centre. For instance, the National Assembly of the People's Republic of Bosnia and Herzegovina (1955, p. 202) published in its official gazette a list of all communes existing in Bosnia-Herzegovina in 1955.[7]

We supplied the list of commune names, together with the contemporary country name (i.e., Bosnia-Herzegovina instead of Yugoslavia) to several geocoding engines. Since we had previously digitised the historic maps, we could then test whether the coordinates found matched to the communes on our map. With little surprise, this procedure only produced roughly one half of the correct coordinates. In fact, searching for *Zagreb, Croatia* is a simple task for most geocoders today. However, searching for *Duvno, Bosnia-Herzegovina* is more complex, as the city is nowadays called *Tomislavgrad.* As a consequence, we had to individually investigate most of the communes of 1955.

Since the Federal Statistical Office of Yugoslavia published census data at the settlement level, we identified these publications as a useful resource to track the development of settlements that *lost* their administrative status due to communal merger reforms. However, as census books are sorted according to the administrative division of the census year, one requires knowledge on changes in the administrative divisions in order to find the same settlement in different censuses. We obtain this information by intersecting the coordinates of the administrative centres of 1955 with the communal maps of 1961 and 1971. Hence, searching and finding our administrative settlements in different census books turned into the ultimate robustness check to our methodology.

For instance, the *commune of Bronzani Majdan* existed in the 1953 and 1961 census as an independent commune. As described earlier, the *settlement of Bronzani Majdan* was the administrative centre of the commune. Hence, it is not difficult to find the *settlement of Bronzani Majdan* in the 1953 and 1961 census, as it is always listed under the header of the *Bronzani Majdan commune.* However, between 1961 and 1969 the *commune of Bronzani Majdan* was abolished, and according to the intersection of our communal maps, it was merged with the *Banja Luka commune.* Since we find *Bronzani Majdan* listed as a settlement within the *Banja Luka commune* in the 1971 census book, we are certain that the intersection of our communal maps correctly predicts that Bronzani Majdan lost its administrative status to Banja Luka.

Whenever we initially could not locate a settlement in a later census, we went back to review our digitised maps and verified that we found the correct coordinates. However, our maps lack the precision to track changes in the suburban communes of the capital

---

[7]As an example, the commune *Bronzani Majdan* contains 12 settlements: *Bistrica, Borkovići, Bronzani Majdan, Goleši, Kmečani, Melina, Obrovac, Pervan Donji, Pervan Gornji, Slavićka, Stratinska* and *Subotica.* In an additional column, the settlement of *Bronzani Majdan* is specified as the "*Sjedište narodnog odbora opštine,*" which translates into *the seat of the people's committee of the commune.*

(Belgrade) and republican capitals (Zagreb, Sarajevo, Skopje, Ljubljana, Titograd, Priština and Novi Sad). We exclude these cities from our estimation sample as we are not certain whether to assign them to the *unreformed* or to the *winner* group. In few instances (54 out of 1,358 settlements) we discovered mergers and splits of *settlements.* For instance, the settlement Bedekovčina appears in the 1971 census as a single settlement, whereas both the 1953 and 1961 census list *Donja Bedekovčina* and *Gornja Bedekovčina*, which translates to *Lower Bedekovčina* and *Upper Bedekovčina*. In cases like Bedekovčina, we collect census data both for *Donja Bedekovčina* and *Gornja Bedekovčina* and aggregate them to *Bedekovčina*, which assures a constant unit of observation.
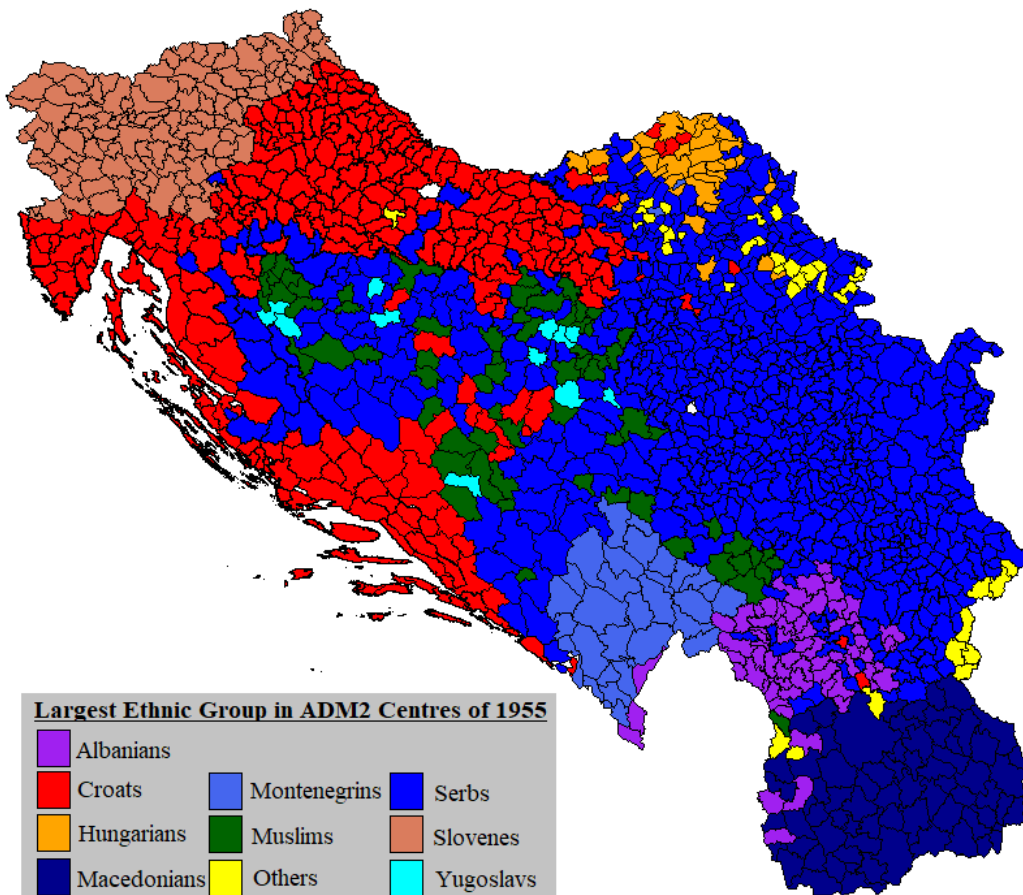
Figure 2.2: Yugoslavia's communal borders of 1955, plotted according to the largest ethnic group in the administrative centres (Census 1961).

Our final sample contains 1,358 (or 92%) out of the total 1,479 administrative centres in 1955 (Table 2.1). For each administrative centre we collected the following variables from the 1953, 1961, and 1971 census: total population, number of employees in administration, industry, transportation, and agriculture, respectively.[8]

---

[8]See Tables 2.11 - 2.14 for details. As the definition of the reported census variables varies, we aggregated the categories according to job descriptions, which ensures that we compare the same jobs over time. Table 2.10 shows the raw variables in each census.

Finally, we collected the counts of each ethnic group from the 1961 and 1971 census.[9] In 1961, Yugoslavia counted 18.5m inhabitants, containing the following shares: Serbs (*42%*), Croats (*23%*), Slovenes (*9%*), Macedonians (*6%*), Muslims (*5%*), Albanians (*5%*), Montenegrins (*3%*), Hungarians (*3%*), Others (*3%*), Yugoslavs (*2%*) and Roma (*less than 1%*). Figure 2.2 uses the communal borders of 1955 to illustrate the largest ethnic group of each administrative centre in 1961.

2.4 Descriptive Analysis

As we lack the data to study distinct public goods, we turn to the set of popular hypotheses that Nobel laureate Elinor Ostrom (1972, p. 479) attributes to the school of urban planners: "*Increasing the size of urban governmental units will be associated with higher output per capita, more efficient provision of services, more equal distribution of costs to beneficiaries, increased responsibility of local officials and increased participation by citizens.*"

As these hypotheses are still vague, we single out the question of *efficiency*. Precisely, we expect that communal mergers should reduce administrative staff as at least one mayor becomes redundant. Moreover, in the absence of data on public goods and services we formulate the positive assumption that the mergers do *not* lead to a reduction of public goods. To speak of *economic efficiency*, we then still require that the reduction of administrative staff does not lead to unemployment. Instead, only if employment can be accommodated in other sectors (i.e., industry), we could conclude that the merger enhanced *economic efficiency*. Importantly, in the absence of a measure for social cost, such as commuting time to another administrative centre, we *cannot* evaluate the relationship between communal mergers and *overall efficiency* (Ostrom 1972).

As our data set contains time-varying information for each of Yugoslavia's communal administrative centres of 1955, we are able to evaluate our hypotheses both for the *winners* and *losers* of the communal reforms. In fact, if communal mergers allow a reduction of administrative staff, then we would like to test whether this outcome is achieved by equally cutting jobs in the *winning* and *losing* administrative centre. If the number of workers in industry increases, then we would like to test whether this increase occurs similarly in the *winning* and *losing* administrative centre. Finally, as Petković (1955) explicitly formulated the hope that enlarged communes would offer additional bus services to bring in students from more remote areas, we expect that the overall number of workers in transportation should increase for at least one of the merging partners.

Finally, our data allow to extent these questions to the dimension of ethnicity: *Does it make a difference whether a commune is merged with a commune that is dominated by the same or another ethnic group?*

---

[9]Unfortunately, earlier censuses (1948, 1953) only report ethnicity data at more aggregated levels.

2.4.1 Difference-in-Differences

Our empirical strategy begins with a standard difference-in-differences approach that compares *reformed* to *unreformed* communes (Blom-Hansen et al. 2016). Similar to Egger et al. (2021), our setting allows to use the *pre-merger administrative centre* as the unit of observation. To structure the discussion, we split our data set into two samples. First, we include only *losers* and *unreformed* administrative centres. Second, we include only *winners* and *unreformed* administrative centres.

$$lnEmp_{it} = \alpha + \beta Loser_i \times PostReform_{it} + \gamma lnPop_{it} + \omega_i + \delta_t + \epsilon_{it} \qquad (2.1)$$

$$lnEmp_{it} = \alpha + \beta Winner_i \times PostReform_{it} + \gamma lnPop_{it} + \omega_i + \delta_t + \epsilon_{it} \qquad (2.2)$$

Equations (1) and (2) illustrate our baseline specification for each sample. $lnEmp_{it}$ is the log number of workers in a specific sector residing in administrative centre i at time t.[10] $Loser_i$ is a dummy indicating that administrative centre i loses its administrative status due to a communal merger between 1957 and 1969. Likewise, $Winner_i$ is a dummy indicating that administrative centre i absorbs at least one other administrative centre between 1957 and 1969. $PostReform_{it}$ is a dummy that turns to 1 at time t when administrative centre i has participated in a reform. For instance, for an administrative centre that loses its administrative status between 1961 and 1969, this dummy is *0* in 1953 and 1961, and turns to *1* in 1971.[11] Hence, the interaction of $Loser_i$ ($Winner_i$) and $PostReform_{it}$ yields the difference-in-differences estimator that captures the effect for *losing* (*winning*) administrative status relative to administrative centres that are never reformed.

To control for changes in population size we include $lnPop_{it}$, which is the log of the population residing in administrative centre i at time t. ω_i are administrative centre fixed effects that control for all time-invariant characteristics, such as historic legacies and geographic distances. δ_t are census fixed effects that control for census specific characteristics, such as methodology.

Next, we modify our specification to test for the role of ethnicity. For this purpose we use settlement-level ethnicity data of 1961 to identify for each administrative centre the largest ethnic group and its share in the local population.

$$lnEmp_{it} = \alpha + \beta_1 LostToFriend_i \times PostReform_{it}$$
$$+\beta_2 LostToNonFriend_i \times PostReform_{it} \qquad (2.3)$$
$$+\gamma lnPop_{it} + \omega_i + \delta_t + \epsilon_{it}$$

---

[10]Our different sectors are: $lnAdm_{it}$ is the log number of workers in administration, $lnTra_{it}$ is the log number of workers in transportation, $lnInd_{it}$ is the log number of workers in mining and industry, and $lnTot_{it}$ is the log number of the total number of workers.

[11]We also estimate the samples separately where we include next to the unreformed administrative centres only either winners (losers) of the first round of reforms (1957-1961), or only winners (losers) of the second round (1961-1969). In these cases $PostReform_{it}$ simplifies to $PostReform_t$.

$$lnEmp_{it} = \alpha + \beta_1 \, WonOverFriend_i \times PostReform_{it}$$
$$+\beta_2 \, WonOverNonFriend_i \times PostReform_{it} \qquad (2.4)$$
$$+\gamma lnPop_{it} + \omega_i + \delta_t + \epsilon_{it}$$

In Equations (3) and (4), we use our ethnicity data and replace $Loser_i$ by $LostToFriend_i$ and $LostToNonFriend_i$ (Equation 3). $Winner_i$ is replaced by $WonOverFriend_i$ and $WonOverNonFriend_i$ (Equation 4).[12]

We define these dummies as follows: $LostToFriend_i$ identifies entities that were absorbed by an administrative centre of the same ethnic group (which must also constitute more than 50% of the local population). Whenever this condition is not fulfilled, we classify a $Loser_i$ as $LostToNonFriend_i$.

Accordingly, $WonOverFriend_i$ identifies a $Winner_i$ whose merging partners are all home to the same largest ethnic group, which must also constitute more than *50%* of the local population. In contrast, if $Winner_i$ absorbed at least one administrative centre with a *different* largest ethnic group, or if the largest ethnic group of any merging partner constitutes less than *50%* of the local population, then we classify $Winner_i$ as $WonOverNonFriend_i$.

Communal Mergers in the later Nova Gradiška Commune, SR Croatia
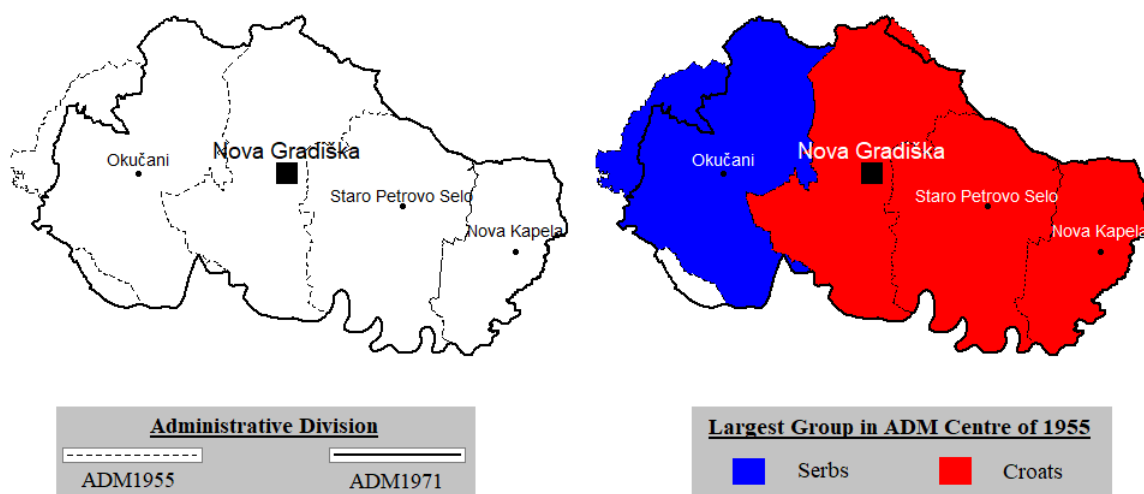
Figure 2.3: Communal Mergers in the later Nova Gradiška Commune, SR Croatia.

Figure 2.3 illustrates our setting for the commune of Nova Gradiška (Croatia), which was created through the merger of pre-reform Nova Gradiška, Okučani, Staro Petrovo Selo and Nova Kapela (all between 1961-1969). As the administrative centres of Nova Gradiška, Staro Petrovo Selo and Nova Kapela were all largely inhabited by Croats in 1961, we classify Staro Petrovo Selo and Nova Kapela as $LostToFriend_i$. In contrast, in 1961 the administrative centre of Okučani was largely inhabited by Serbs. Thus the

---

[12]Purposefully we choose the wording *NonFriend* as we do not want to suggest rivalry between all ethnic groups in Yugoslavia. We simply assume that mergers between co-ethnics are different from mergers across ethnic boundaries.

merger of Okučani and Nova Gradiška leads us to define Okučani as *LostToNonFriend_i*. Despite the fact that Nova Gradiška also absorbed ethnic friends (Staro Petrovo Selo, Nova Kapela), we classify Nova Gradiška as *WonOverNonFriend_i* due to the merger with Okučani.

Figure 2.4: Yugoslavia's Communal Reforms between 1957-1969, by Ethnicity.

Figure 2.4 demonstrates that we find both losers and winners all across the territory of Yugoslavia. In line with the spatial distribution of Yugoslavia's ethnic groups (Figure 2.2), we find friendly mergers (shades of green) in particular in the North-West (Slovenia, Croatia) and South-East (Central Serbia, Macedonia). In contrast, non-friendly mergers (red, purple) are most prevalent at Yugoslavia's core (Bosnia-Herzegovina, Croatia), but also ocurred in the North-East (Vojvodina) and South-East (Central Serbia, Kosovo, Macedonia).

2.4.2 Identifying Assumptions

Ultimately we are interested in the causal relationship of *losing* and *winning* administrative status on employment. Therefore we need to test two key assumptions. First, for a causal interpretation we require that prior to the communal mergers the

Table 2.2: Balancing Tests Comparing *Unreformed* to *Losers* in 1953.

		Sample: All Unreformed and Losers of 1961-1971 (Excluding Temporary Winners)							
		Panel A				**Panel B**			
		Census 1953				**Census 1953**			
		Full Sample				**With Sample Restriction**			
		All	**Unref.**	**Loser**	**Diff.**	**All**	**Unref.**	**Loser**	**Diff.**
Observations		323	132	191		107	24	83	
Population	**Mean**	1962	2626	1503	1124***	1646	1977	1551	426
	Std. Err.	(123)	(260)	(93)	(243)	(135)	(468)	(110)	(323)
Pop.Literate (older than 10)	**Mean**	1313	1796	979	818***	1026	1205	975	230
	Std. Err.	(94)	(203)	(66)	(187)	(96)	(348)	(73)	(230)
Empl.Total	**Mean**	782	962	658	304***	673	736	655	80
	Std. Err.	(48)	(100)	(42)	(97)	(55)	(189)	(46)	(133)
Empl.Agri	**Mean**	482	402	537	-135*	528	553	521	32
	Std. Err.	(35)	(63)	(38)	(70)	(48)	(166)	(40)	(115)
Empl.Admin.	**Mean**	127	235	52	183***	57	87	48	39***
	Std. Err.	(11)	(22)	(4)	(19)	(4)	(14)	(3)	(9)
Empl.Indust.	**Mean**	119	231	41	191***	48	54	46	8
	Std. Err.	(19)	(44)	(7)	(38)	(7)	(13)	(8)	(16)
Empl.Transp.	**Mean**	25	41	14	27***	19	19	19	-1
	Std. Err.	(2)	(5)	(1)	(4)	(2)	(5)	(3)	(6)
Empl.Constr.	**Mean**	31	53	15	38***	21	23	21	2
	Std. Err.	(6)	(13)	(2)	(11)	(4)	(6)	(4)	(9)

Sample Restriction:	1. Exclude all administrative centres of the former districts (1938-1955)
	2. Require in 1953 Population >=500
	3. Require in 1953 EmpShare in Agri* 50-90%
	*Agri includes Agriculture, Forestry and Crafts (incl. food process.)

Note: Results of two-sample t-tests with equal variances. Results for subsamples are similar (Table 2.15).

administrative centres in the *loser* and *winner* group were similar to the administrative centres in the *unreformed* group. In other words, we need to test whether the assignment of the treatment status occurred as good as randomly. Second, to attribute any potential treatment estimate to the communal reforms, we require that settlements in the treatment and control group followed similar trends prior to the reforms. As the earliest available census data come from the 1953 census, we can only test the parallel trends assumption for settlements that were *exclusively* reformed between 1961 and 1969. Consequently, we exclude settlements that were reformed already between 1957 and 1961.

Table 2.2 reports the results of balancing tests for the sample of losers and unreformed administrative centres on data of the 1953 census. Panel A of Table 2.2 compares all *132* unreformed administrative centres to all *191 losers* that lost their administrative status between 1961 and 1969. Here it is evident that unreformed administrative centres are significantly different in terms of population size, the number of literates and total employment. Moreover, when we split employment into sectors, we find differences on all categories. Thus similar to previous studies, our data confirm that administrative reforms do not occur randomly. As a result, we interpret estimates on the full sample only as correlations.

As we are interested in the causal impact of the reforms, we attempt to improve the matching of control and treatment groups on three sets of characteristics. First, we

exclude settlements that ever functioned as a *district administrative centre* between 1938 and 1955. This step is motivated by the fact that prior to 1955 the districts were the most important local government unit, which was de-facto abolished with the *General Law on the Organisation of Communes and Districts* (Kardelj 1955*b*). Second, to avoid bias from very small settlements we require all administrative centres to have at least *500* inhabitants in 1953. Third, as we observe that agriculture is by far the most important sector in the losing administrative centres, we require all administrative centres in our sample to have a share of employees in agriculture between *50-90%* by the end of the central planning episode (1953). This restriction can be understood as a removal of two extremes – pure agriculture and pure industrialisation. The latter is arguably related to political proximity to the communist leadership. Panel B of Table 2.2 reports the results of the balancing test on this restricted sample. Here we compare *24* unreformed administrative centres to *83* losers. The only difference remaining is in administration, which suggests that unreformed administrative centres had on average *39* administrative workers more prior to the reforms.
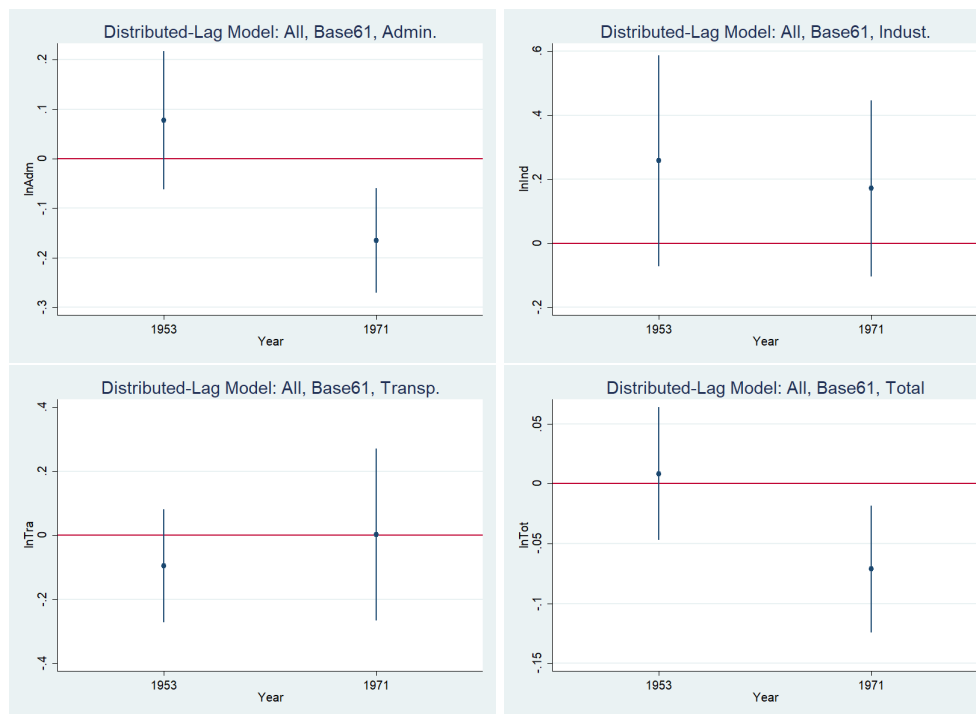
Figure 2.5: Results of distributed-lag regressions on Panel B in Table 2.2.
Note: All regressions include administrative centre fixed effects and census-period fixed effects, and *lnPop*. Standard errors are clustered at the communes of 1971. The zero-line refers to the 1961 census.

To test for the parallel trends assumption we follow Schmidheiny & Siegloch (2020) and estimate distributed-lag regressions on Panel B of Table 2.2. Relative to 1961 (indicated by the red horizontal line), we find that in 1953 employment in administration, industry, transportation and total employment did not differ significantly between losers and unreformed administrative centres. The same is true for friendly losers (Figure 2.8) and non-friendly losers (Figure 2.9).

Table 2.3: Balancing Tests Comparing *Unreformed* to *Winners* in 1953.

		Sample: All Unreformed and Winners of 1961-1971 (Excluding Temporary Winners)							
		Panel A				Panel B			
		Census 1953				Census 1953			
		Full Sample				With Sample Restriction			
		All	Unref.	Winner	Diff.	All	Unref.	Winner	Diff.
Observations		202	132	70		26	24	2	
Population	Mean	4767	2626	8805	-6179***	1922	1977	1258	720
	Std. Err.	(620)	(260)	(1620)	(1231)	(433)	(468)	(147)	(1653)
Pop.Literate (older than 10)	Mean	3248	1796	5987	-4191***	1190	1205	1007	198
	Std. Err.	(443)	(203)	(1156)	(886)	(320)	(348)	(109)	(1227)
Empl.Total	Mean	1676	962	3023	-2060***	715	736	468	268
	Std. Err.	(216)	(100)	(561)	(430)	(175)	(189)	(98)	(668)
Empl.Agri	Mean	656	402	1136	-734***	530	553	252	301
	Std. Err.	(80)	(63)	(184)	(159)	(154)	(166)	(54)	(585)
Empl.Admin.	Mean	494	235	984	-748***	87	87	85	3
	Std. Err.	(71)	(22)	(189)	(141)	(13)	(14)	(19)	(48)
Empl.Indust.	Mean	341	231	548	-317***	54	55	42	14
	Std. Err.	(62)	(44)	(155)	(128)	(7)	(8)	(4)	(28)
Empl.Transp.	Mean	86	41	173	-132***	19	19	17	2
	Std. Err.	(17)	(5)	(45)	(34)	(4)	(5)	(1)	(17)
Empl.Constr.	Mean	98	53	182	-129***	21	23	4	19
	Std. Err.	(18)	(13)	(46)	(38)	(6)	(6)	(1)	(23)

Sample Restriction:	1. Exclude all administrative centres of the former districts (1938-1955)
	2. Require in 1953 Population >=500
	3. Require in 1953 EmpShare in Agri* 50-90%
	*Agri includes Agriculture, Forestry and Crafts (incl. food process.)

Note: Results of two-sample t-tests with equal variances.

We conclude that unreformed administrative centres and losers followed parallel trends prior to the reforms. However, due to the difference in administrative staff prior to the reforms (Table 2.2), we cannot exclude that this difference is responsible for the treatment effect. Still, as we control for fixed effects at the administrative centre level and for each census period, and since the parallel trends assumption holds, it is likely that our setting estimates the average treatment effect. To ensure causal interpretation, we revisit this matter using the synthetic control method of Abadie & Gardeazabal (2003) in Section 2.5.

Table 2.3 compares unreformed administrative centres and winners in 1953. Here we find similar biases in the full sample (Panel A). For the restricted sample in Panel B we are left with only *2* winners, which prevents a meaningful difference-in-differences estimation. As an alternative, we address the causal relationship between winners of communal mergers and employment using a synthetic control method in Section 2.5.

2.4.3   DID Estimates: Losers

Table 2.4 reports the results of our baseline estimation on the sample of losers and unreformed administrative centres. Table 2.4 follows a systematic pattern: Initially we estimate our baseline equation on the full sample to obtain a correlation between the loss of administrative status and employment in administration (Column 1), industry (Column 3), transportation (Column 5), and total employment (Column 7). Next, we

Table 2.4: DID Estimates for *Losers* vs *Unreformed*.

	(1) lnAdm	(2) lnAdm	(3) lnInd	(4) lnInd	(5) lnTra	(6) lnTra	(7) lnTot	(8) lnTot
Loser × PostReform	-0.129***	-0.182**	-0.0481	0.265	-0.0571	-0.123	-0.0474***	-0.0598*
	(0.0276)	(0.0808)	(0.0558)	(0.180)	(0.0347)	(0.166)	(0.0113)	(0.0354)
lnPopulation	0.751***	0.780***	0.682***	1.666***	0.472***	0.368	0.908***	0.979***
	(0.0473)	(0.139)	(0.0880)	(0.431)	(0.0672)	(0.235)	(0.0217)	(0.0554)
Sample	Full	Restrict.	Full	Restrict.	Full	Restrict.	Full	Restrict.
Losers	All	61-71	All	61-71	All	61-71	All	61-71
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ADMTowns	977	107	977	107	977	107	977	107
Clusters	466	80	466	80	466	80	466	80
Observations	2,931	321	2,931	321	2,931	321	2,931	321
R-Square	0.9556	0.9348	0.9153	0.8668	0.9253	0.8884	0.9882	0.9768

* p <0.10, ** p <0.05, *** p <0.01
Standard errors in parentheses, clustered at the 1971-Communes.
Full sample contains all towns with ADM status in 1955 that lost subsequently (excluding temporary winners).
Restr. sample drops former district centres, requires pop >500 in 1953, and Agriculture >50% & <90% of total Emp.
The control group contains only towns that were never reformed between 1955-1971.
lnAdm is the log of the count of administrative employees residing in town *i*.
lnInd is the log of the count of mining and industry employees residing in town *i*.
lnTra is the log of the count of transportation employees residing in town *i*.
lnTot is the log of the count of total employees residing in town *i*.

repeat the estimation of our baseline equation on the resticted sample of Panel B in Table 2.2. The even columns report the causal estimates corresponding to the preceding odd column.

Table 2.4 leads to three conclusions. First, across Table 2.4 it is noteworthy that the estimates for the full sample are virtually identical to our causal estimates. Second, we find that losers reduce administrative staff by *18%* following the communal mergers compared to unreformed communes (Column 2). This estimate is meaningful as former administrative centres became subordinate branch offices of the new communal administration following the reforms (Petković, 1955; Pusić, 1975).

Third, with respect to employment in industry and transportation we find no significant effects (Column 3-6). Instead, the decline in administrative staff translates into a *6%* decline of the total workforce in former administrative centres compared to unreformed ones (Column 8). Thus despite the reduction in administrative staff we *cannot* conclude that the communal mergers enhanced *economic efficiency* for former administrative centres (*losers*).

Next we turn to the role of ethnicity. Table 2.5 reports the results obtained for the estimation of Equation 2.3 on the restricted sample, shown in the odd columns.[13] As a robustness check, the even columns require that each administrative centre must have *at least one non-friendly* administrative centre of 1955 within a radius of 25km. This restriction is motivated by the spatial distribution of friendly and non-friendly mergers (Figure 2.4) and ensures that all losers had at least a theoretical chance to be merged with another ethnicity.

The results read as follows. Confirming our baseline results we find that both friendly

---

[13]We provide the balancing test for the sub-samples of friendly and non-friendly losers in Table 2.15.

Table 2.5: DID Estimates for *Friendly (Non-Friendly) Losers* vs. *Unreformed.*

	(1) lnAdm	(2) lnAdm	(3) lnInd	(4) lnInd	(5) lnTra	(6) lnTra	(7) lnTot	(8) lnTot
LostToFriend × PostReform (β_1)	-0.175*	-0.363***	0.434**	0.983***	-0.0732	0.190	-0.0334	-0.0114
	(0.0936)	(0.102)	(0.205)	(0.335)	(0.171)	(0.217)	(0.0353)	(0.0543)
LostToNonFriend × PostReform (β_2)	-0.193**	-0.255***	-0.0196	0.205	-0.207	0.00436	-0.104**	-0.0984*
	(0.0802)	(0.0814)	(0.212)	(0.217)	(0.193)	(0.213)	(0.0455)	(0.0499)
lnPopulation	0.784***	0.700***	1.757***	2.500***	0.394*	0.446	0.993***	1.008***
	(0.142)	(0.168)	(0.412)	(0.462)	(0.236)	(0.287)	(0.0547)	(0.0724)
Sample	Restrict.	Restrict.	Restrict.	Restrict.	Restrict.	Restrict.	Restrict.	Restrict.
Loser	61-71	61-71	61-71	61-71	61-71	61-71	61-71	61-71
NonFriendly AdmTown55 within 25km		Yes		Yes		Yes		Yes
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ADMTowns	107	64	107	64	107	64	107	64
Clusters	80	53	80	53	80	53	80	53
Observations	321	192	321	192	321	192	321	192
Wald Test, $\beta_1=\beta_2$, (p-value)	0.8139	0.2490	0.0376	0.0221	0.3396	0.2848	0.0783	0.0997
R-Square	0.9348	0.9514	0.8700	0.8865	0.8890	0.9075	0.9773	0.9780

* p <0.10, ** p <0.05, *** p <0.01
Standard errors in parentheses, clustered at the 1971-Communes.
Restr. sample drops former district centres, requires pop >500 in 1953, and Agriculture >50% & <90% of total Emp.
The control group contains only towns that were never reformed between 1955-1971.
LostToFriend=1 if more than 50% of local pop of both merging partners is of same ethnic group.
LostToNonFriend=1 if the largest ethnic group of both merging partners is of another ethnic group.
lnAdm is the log of the count of administrative employees residing in town i.
lnInd is the log of the count of mining and industry employees residing in town i.
lnTra is the log of the count of transportation employees residing in town i.
lnTot is the log of the count of total employees residing in town i.

and non-friendly losers cut 17-19% of administrative staff following the reforms relative to unreformed communes (Column 1). A Wald test confirms that the coefficients are not statistically different, which is also true for the robustness check in Column 2, and for the estimation of the full sample without restrictions, reported in Table 2.16. Strikingly, the results for our robustness check in Column 2 are well in line with Petković (1955), who expected prior to the reforms that the communal mergers would make one third of administrative staff redundant.

A key difference emerges once we look at the estimates for employment in industry. Whereas we find that friendly losers experience an increase in industrial employment by *43%* (Column 3), we find non-friendly losers to be non-distinguishable from unreformed communes. The Wald test confirms that these coefficients are statistically different at the 5%-level. For our robustness check (Column 4) the estimate for friendly losers doubles and increases in statistical significance. If we run the regression on the unrestricted sample (Table 2.16), we still observe a significant difference between friendly and non-friendly losers.

Concerning employment in transportation (Columns 5 and 6) we do not find statistically significant results. Therefore it is assuring that Columns 7 and 8 indicate a *10%* decline of the total workforce for non-friendly losers, while the estimate for friendly losers is insignificant.

Taken together, we conclude that the communal mergers led to a significant decline of the administrative workforce of both friendly and non-friendly losers. However, *only*

for friendly losers we observe an increase in the number of industrial workers following the communal mergers. Importantly, the size of the coefficients suggests that friendly losers were able to offset the decline in administrative staff by an increase in industrial workers. However, as there is no change in the transportation sector, we are left in the dark whether the increase in industrial workers is due to regular operation of inter-city bus services with the original workforce, or whether the merging partner (i.e., the winner) organised transportation to town. Theoretically this effect could of course also be driven by new factories in the losing commune.

Importantly, friendly losers do not experience changes in their total workforce. Therefore we cannot reject the possibility that the communal mergers enhanced the *economic efficiency* of friendly losers. In contrast, for non-friendly losers it is evident that communal mergers only led to a reduction of the total workforce. In a nutshell, the case of Yugoslavia suggests that winners compensated losers for the loss of administrative jobs – but only if they shared the same ethnicity.

2.4.4 DID Estimates: Winners

As discussed in Section 2.4.2, we face the problem that our restricted sample only contains two winners, which limits the statistical power and causal interpretation. Yet to be complete, we report the estimates from the estimation of Equation 2.4 in Table 2.6, all of which we interpret as correlations. Similar to Table 2.4, the odd columns of Table 2.6 present the results for the full sample without restrictions. The even columns report the estimates for the restricted sample.

The estimates in Table 2.6 suggest that winners did not experience significant improvements due to the communal reforms. The only significant estimates come from the full sample, which imply that administrative staff is reduced by 9 to 13% (Column 1), and that only in the case of non-friendly winners transportation staff is reduced by 13% (Column 5). Most importantly, we do neither observe changes in industrial employment nor in total employment, which suggests that the reductions in administrative staff in the losing administrative centres (Table 2.4, Table 2.5) did not translate into an increase of workers in the winning town. Nonetheless, we take this interpretation with a grain of salt as our restricted sample only contains two (friendly) winners.

Table 2.6: DID Estimates for *Friendly (Non-Friendly) Winners* vs. *Unreformed.*

	(1) lnAdm	(2) lnAdm	(3) lnInd	(4) lnInd	(5) lnTra	(6) lnTra	(7) lnTot	(8) lnTot
WonOverFriend × PostReform (β_1)	-0.138*** (0.0374)	-0.0454 (0.141)	0.124 (0.0809)	-0.894 (0.636)	0.0279 (0.0468)	-0.114 (0.404)	0.0134 (0.0138)	-0.0296 (0.0535)
WonOverNonFriend × PostReform (β_2)	-0.0969** (0.0442)	- (-)	-0.0458 (0.0866)	- (-)	- 0.130** (0.0562)	- (-)	-0.0141 (0.0230)	- (-)
lnPopulation	0.653*** (0.0626)	0.342* (0.177)	1.138*** (0.137)	2.632*** (0.591)	0.748*** (0.0813)	0.433 (0.502)	1.034*** (0.0245)	1.130*** (0.0729)
Sample	Full	Restrict.	Full	Restrict.	Full	Restrict.	Full	Restrict.
Winner	All	61-71	All	61-71	All	61-71	All	61-71
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ADMTowns	465	26	465	26	465	26	465	26
Clusters	465	26	465	26	465	26	465	26
Observations	1,395	78	1,395	78	1,395	78	1,395	78
Wald Test, $\beta_1=\beta_2$, (p-value)	0.2836		0.0709		0.0067		0.1557	
R-Square	0.9597	0.9478	0.9317	0.8941	0.9569	0.8881	0.9890	0.9850

* p <0.10, ** p <0.05, *** p <0.01
Standard errors in parentheses, clustered at the 1971-Communes.
Full sample contains all towns with ADM status in 1955 that absorbed at least one other town subsequently (excl. temp. winners).
Restr. sample drops former district centres, requires pop >500 in 1953, and Agriculture >50% & <90% of total Emp.
The control group contains only towns that were never reformed between 1955-1971.
WonOverFriend=1 if more than 50% of local pop of both merging partners is of same ethnic group.
WonOverNonFriend=1 if the town merged with at least one town where another ethnic group makes at least 50%.
lnAdm is the log of the count of administrative employees residing in town i.
lnInd is the log of the count of mining and industry employees residing in town i.
lnTra is the log of the count of transportation employees residing in town i.
lnTot is the log of the count of total employees residing in town i.

2.5   Synthetic Control

The difference-in-differences estimation in Section 2.4 suggests that the communal mergers in Yugoslavia reduced administrative staff regardless of ethnicity. However, only for friendly losers we find that the reduction of administrative staff is offset by a similar increase in other sectors. In this section we turn to the synthetic control method (Abadie & Gardeazabal 2003, Abadie et al. 2010, Abadie 2021) to test the robustness of this result.

2.5.1   Case study: Friendly and Non-Friendly Losers in Nova Gradiška

An ideal case to test for the robustness of our results requires a commune that experienced both a friendly and a non-friendly merger. Visible in Figure 2.3, the 1971-commune of Nova Gradiška (Croatia) provides such an example due to the mergers of pre-reform Nova Gradiška, Staro Petrovo Selo, Nova Kapela and Okučani between 1961 and 1969. While Nova Gradiška, Staro Petrovo Selo and Nova Kapela all had a Croat majority in 1961, Okučani had a Serb majority.

Table 2.7: Summary Statistics for the 1971-Commune of Nova Gradiška.

Nova Gradiška	Pop	EmpAdm	% EmpAdm	EmpTot	% EmpTot
Census 1953	7,548	777	10.3%	2,570	34.0%
Census 1971	11,580	1499	12.9%	4,481	38.7%
Diff (1971-1953)	*4,032*	*722*	*2.7%*	*1,911*	*4.6%*

Staro Petrovo Selo	Pop	EmpAdm	% EmpAdm	EmpTot	% EmpTot
Census 1953	2,382	42	1.8%	1,006	42.2%
Census 1971	2,280	113	5.0%	1,109	48.6%
Diff (1971-1953)	*-102*	*71*	*3.2%*	*103*	*6.4%*

Nova Kapela	Pop	EmpAdm	% EmpAdm	EmpTot	% EmpTot
Census 1953	998	45	4.5%	416	41.7%
Census 1971	922	62	6.7%	403	43.7%
Diff (1971-1953)	*-76*	*17*	*2.2%*	*-13*	*2.0%*

Okučani	Pop	EmpAdm	% EmpAdm	EmpTot	% EmpTot
Census 1953	1,021	59	5.8%	375	36.7%
Census 1971	1,762	135	7.7%	596	33.8%
Diff (1971-1953)	*741*	*76*	*1.9%*	*221*	*-2.9%*

Note: The 1971-Commune of Nova Gradiška (Croatia) was created between 1961 and 1969 through the merger of the 1955-communes of Nova Gradiška, Staro Petrovo Selo, Nova Kapela and Okučani.

Table 2.7 reports summary statistics from the censuses of 1953 and 1971 for each of the administrative centres, leading to three key observations. First, the winner of the reform – the administrative centre of Nova Gradiška – experienced a strong increase of its population from 7,548 to 11,580 inhabitants between 1953 and 1971. Moreover, while friendly losers (Staro Petrovo Selo, Nova Kapela) experienced declines of their population, the non-friendly loser (Okučani) experienced a strong increase of its

population from 1,021 to 1,762 between 1953 and 1971. Second, although all administrative centres increased their share of administrative staff, the increase appears stronger in Nova Gradiška (winner) and Staro Petrovo Selo, which has considerably more inhabitants compared to Nova Kapela and Okučani.[14] Third, concerning the total employment shares it appears that friendly losers (Staro Petrovo Selo, Nova Kapela) experienced increases, while the non-friendly loser (Okučani) experienced decline. Thus the pattern observed in Table 2.7 is in line with the results of Section 2.4.

Due to their similar population size in 1953, the cases of Okučani and Nova Kapela appear ideal to apply the synthetic control method as a test of causality. In our setting, the synthetic control method compares a single *treated* administrative centre to a weighted average of *unreformed* administrative centres, termed *synthetic control*. Thus we define J as the number of available control administrative centres (24 unreformed administrative centres, Panel B of Table 2.2) and $W = (w_1, ..., w_J)'$ as a ($J \times 1$) vector of nonnegative weights that sum to one. The scalar $w_j(j = 1, ..., J)$ represents the weight of an unreformed administrative centre j in the synthetic control. As each different value for W produces a different synthetic control, the choice of a valid subset of control administrative centres is embedded in the choice of the weights W.

X_1 is a ($K \times 1$) vector of pre-reform values of K predictors of employment in the treated administrative centre, and X_0 is a ($K \times J$) matrix that contains the values of the same variables for the J possible control administrative centres. V is a diagonal matrix with nonnegative components, where the values of the diagonal elements reflect the relative importance of each predictor. Then, the vector of optimal weights W^* minimises $(X_1 - X_0 W)' V (X_1 - X_0 W)$ subject to $w_j \geq 0 (j = 1, ..., J)$ and $w_1 + ... + w_j = 1$. Consequently, W^* defines the combination of unreformed administrative centres that best resemble the treated administrative centre in question prior to the reform.

To construct synthetic controls we use the following predictors. First, we use the average pre-reform population shares of total and administrative employment. Second, to ensure that the synthetic controls are constructed from culturally similar administrative centres we use the 1961 census to add population shares of catholics[15] and orthodox[16] inhabitants. Third, to ensure geographic similarity we use the distance to Yugoslavia's two outstanding economic and political centres, Belgrade and Zagreb, and distance to the Adria coast. We follow (Abadie 2021) and scale the employment variables by population in order to correct for differences in the size of the communes. Table 2.8 shows the results for administrative employment. As expected, the synthetic versions of Okučani and Nova Kapela are much closer to their real-world counterparts than the sample mean.

Figure 2.6 reports the 1953-1971 comparisons of Okučani and synthetic Okučani (Panel A, Panel C), and of Nova Kapela and synthetic Nova Kapela (Panel B, Panel D).

---

[14]This might seem at odds with our results, but those are to be interpreted compared to unreformed communes. Our DiD estimate just means that unreformed communes increased their administrative employees more compared to losers.

[15]This includes ethnic Croats, Slovenes and Hungarians.

[16]This includes ethnic Serbs, Montenegrins and Macedonians.

Table 2.8: Okučani, Nova Kapela and their Synthetic Controls

	Okučani	Synthetic Okučani	Sample (Mean)
% EmpTotal (1953-1961)	37%	37%	36%
% EmpAdmin (1953-1961)	8%	8%	7%
% Catholics (1961)	30%	23%	43%
% Orthodox (1961)	67%	65%	36%
Distance Belgrade	261 km	252 km	266 km
Distance Zagreb	113 km	222 km	273 km
Distance Adria Coast	173 km	154 km	136 km

	Nova Kapela	Synthetic Nova Kapela	Sample (Mean)
% EmpTotal (1953-1961)	40%	40%	36%
% EmpAdmin (1953-1961)	6%	6%	7%
% Catholics (1961)	92%	59%	43%
% Orthodox (1961)	7%	27%	36%
Distance Belgrade	225 km	264 km	266 km
Distance Zagreb	147 km	247 km	273 km
Distance Adria Coast	198 km	123 km	137 km

Note: Okučani and Nova Kapela were both absorbed by Nova Gradiška (1961-1969). In 1961, the largest ethnic group in the town of Nova Gradiška were Croats. Since Okučani had a Serb majority it lost to an ethnic non-friend (or rival). Since Nova Kapela had a Croat majority it lost to an ethnic friend.
Synthetic Okučani is the weighted average of the following unreformed administrative centres: Laktaši (43%), Han Pijesak (11%), Zaprešić (3%), Lenart (3%), Vinica (3%), Šipovo (3%), Plav (3%), Mozirje (3%), Temerin (3%) and others (all less than 2%).
Synthetic Nova Kapela is the weighted average of the following unreformed administrative centres: Grude (19%), Zaprešić (11%), Temerin (8%), Ugljevik (7%), Čitluk (7%) and others (all less than 7%).

The figure leads to three conclusions. First, in all panels the synthetic control closely matches the trend of the treated administrative centre prior to the reform (1961). Second, in Panel A and Panel B it is evident that following the loss of administrative status (1971) both Okučani and Nova Kapela reduced administrative staff relative to their synthetic controls. Therefore the synthetic control method confirms that our difference-in-differences estimation indeed captures a causal relationship between the loss of administrative status and the number of administrative staff, which is *not* affected by ethnicity.

Finally, concerning total employment, the results of the synthetic control method confirm that the non-friendly loser (Okučani) experiences a decline after the loss of administrative status (Panel C), while the friendly loser (Nova Kapela) experiences an increase in its share of total employment following the reforms (Panel D). Thus we take the results from the case studies of Okučani and Nova Kapela as further evidence that the winners of Yugoslavia's communal reforms compensated the losers for the loss of administrative jobs – but only if they shared the same ethnicity.
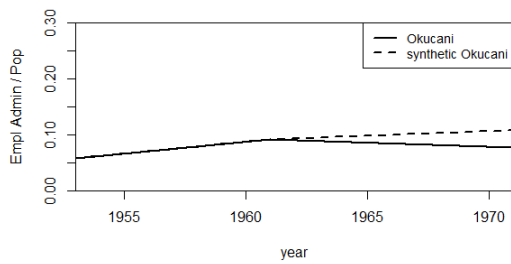
(a) Okučani: Admin.
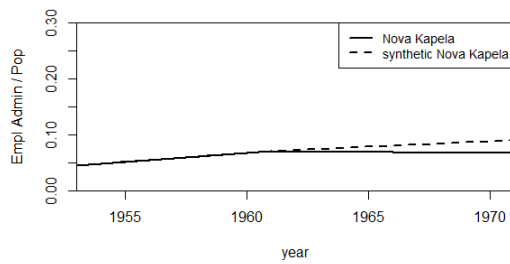
(b) Nova Kapela: Admin.
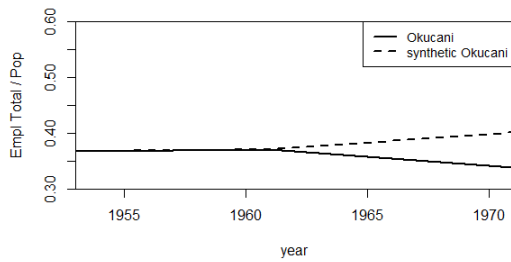
(c) Okučani: Total Empl.
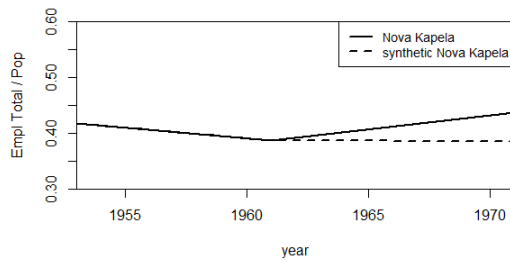
(d) Nova Kapela: Total Empl.

Figure 2.6: Results for the synthetic control of Okučani and Nova Kapela.
Note: Both Okučani and Nova Kapela lost their administrative status between 1961-1969 to Nova Gradiška (SR Croatia, SFR Yugoslavia). In 1961, the largest ethnic group in Okučani were Serbs and the largest ethnic group in both Nova Kapela and Nova Gradiška were Croats.

2.5.2 Case study: Winners - Cerknica and Ivanić Grad

In Section 2.4 we faced the problem that our restricted sample only contains two winners. Since Abadie & Gardeazabal (2003) developed the synthetic control method for a single treated unit, the method appears ideal to test for the causal relationship between winning in administrative status and employment in our context. Consequently, we apply the model introduced in Section 2.5.1 to the two winners in our sample (Cerknica and Ivanić Grad). Cerknica had a Slovene majority and absorbed one fellow Slovenian administrative centre (Loška Dolina), while Ivanić Grad had a Croat majority and absorbed one fellow Croatian administrative centre (Križ). Thus both are friendly winners.

Table 2.9 reports the results from the synthetic control method for Cerknica and Ivanić Grad. In Table 2.9 it appears that the synthetic communes provide a better match to the original Cerknica and Ivanić Grad than the sample mean. Nonetheless, when we compare the evolution of Cerknica and Ivanić Grad to their synthetic controls over time, then it appears that the method does not converge for total employment (Panel C and Panel D in Figure 2.7). At the same time, Panel A and Panel B of Figure 2.7 show that the share of administrative employment declines following the reforms (1971) in both Cerknica and Ivanić Grad, which confirms the correlations obtained from the difference-in-differences estimation on the full sample in Table 2.6. As we do not observe increases in employment on other variables, we conclude that the winners in our sample did not necessarily create new opportunities and jobs following the reforms.

Table 2.9: Cerknica, Ivanić Grad and their Synthetic Controls

	Cerknica	Synthetic Cerknica	Sample (Mean)
% EmpTotal (1953-1961)	44%	43%	36%
% EmpAdmin (1953-1961)	7%	8%	7%
% Catholics (1961)	99%	96%	43%
% Orthodox (1961)	1%	2%	36%
Distance Belgrade	490 km	397 km	266 km
Distance Zagreb	126 km	44 km	273 km
Distance Adria Coast	49 km	114 km	136 km

	Ivanić Grad	Synthetic Ivanić Grad	Sample (Mean)
% EmpTotal (1953-1961)	38%	38%	36%
% EmpAdmin (1953-1961)	11%	11%	7%
% Catholics (1961)	96%	83%	43%
% Orthodox (1961)	3%	9%	36%
Distance Belgrade	334 km	369 km	266 km
Distance Zagreb	34 km	153 km	273 km
Distance Adria Coast	138 km	136 km	137 km

Note: Cerknica absorbed Loška Dolina (1961-1969) and both administrative centres had an ethnic Slovene majority in 1961. Similarly, Ivanić Grad absorbed Križ (1961-1969) and both administrative centres had an ethnic Croat majority in 1961. Therefore both Cerknica and Ivanić Grad won over an ethnic friend. Synthetic Cerknica is the weighted average of the following unreformed administrative centres: Zaprešić (74%), Mozirje (11%) and Ulcinj (1%) and others (all less than 1%).
Synthetic Ivanić Grad is the weighted average of the following unreformed administrative centres: Lenart (32%), Mozirje (31%), Posušje (3%), Kreševo (3%), Vrgorac (3%), Zaprešić (3%), Temerin (3%) and others (all less than 3%).
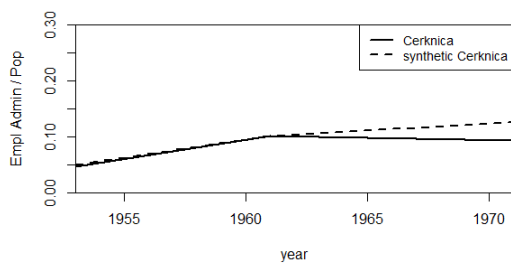
(a) Cerknica: Admin.
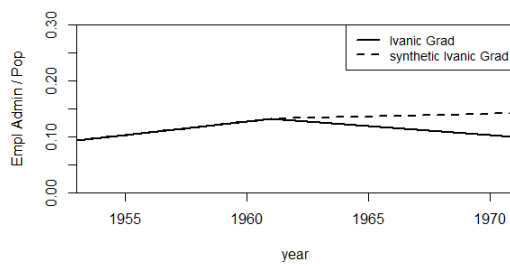
(b) Ivanić Grad: Admin.
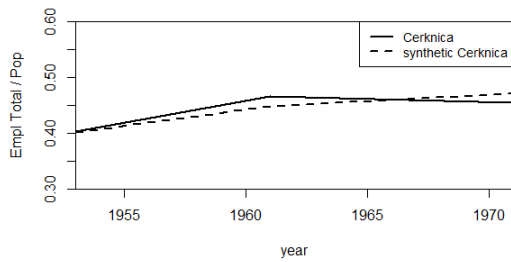
(c) Cerknica: Total Empl.
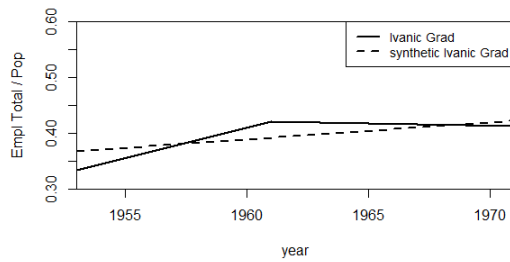
(d) Ivanić Grad: Total Empl.

Figure 2.7: Results for the synthetic control of Cerknica and Ivanić Grad.
Note: Between 1961 and 1969, Cerknica absorbed Loška Dolina (both Slovenia), and Ivanić Grad absorbed Križ (both Croatia). Both Cerknica and Loška Dolina had an ethnic Slovene majority in 1961, and both Ivanić Grad and Križ had an ethnic Croat majority in 1961. Therefore both Cerknica and Ivanić Grad are friendly winners in our methodology.

Conclusions

In this chapter we have addressed the question whether the merger of communes in the former Yugoslavia led to an improvement in government efficiency. This hypothesis received substantial theoretical motivation from the works of Buchanan (1950), Tiebout (1956), Stigler (1957), Ostrom (1972) and Oates (1972). Given the theoretical foundation, it is surprising that the large number of empirical studies has produced little consensus (Hinnerich 2009, Jordahl & Liang 2010, Reingewertz 2012, Blesse & Baskaran 2016, Blom-Hansen et al. 2016, Hirota & Yunoue 2017). While data limitations have prevented previous empirical studies to go beyond the basic question whether merger reforms improve efficiency, this chapter targets this gap by the use of more detailed statistical data. In contrast to the standard in the current literature that has aggregated pre-merger communes to post-merger communes in order to study the net-effect of merger reforms, our dataset consists of all administrative centres of communes. We observe these administrative centres both before and after the reforms, which allows us to estimate the local effect of communal mergers. This way, we have assessed winners and losers of the reforms separately. The context of socialist Yugoslavia allowed us to add the dimension of ethnicity to the question of communal mergers. This is of particular relevance in the light of the Yugoslav wars in the 1990s. There the factors that motivated the intensity of local fighting remain unclear (Weidmann 2011). In this context our approach to assess the effect of communal reforms at the level of winners and losers and their ethnic proximity provides a yet unidentified methodology to identify the sources of local tensions.

Our empirical results can be summarised as follows. First, we find that losing the status as a communal administrative centre is associated with a decline in the administrative workforce of 17-36%, relative to unreformed administrative centres. In the case of Yugoslavia, this result is meaningful since former administrative centres were transformed into subordinate branch offices of the new communal administration. To the best of our knowledge, our result is the first estimate concerning changes in *former administrative centres*. Second, the context of Yugoslavia allowed us to consider mergers between the same and different ethnic groups. The empirical evidence demonstrates that the reduction of administrative staff is compensated for by a similar increase in the industrial workforce – but only if the merging partners share the same ethnicity. In case of inter-ethnic mergers, our results suggest that the reduction of administrative staff translated into a reduction of the total workforce, implying an increase in unemployment. This result is not just relevant in the context of Yugoslavia, but provides an important contrast to the policy recommendations drawn from the previous literature. Importantly, Blesse & Baskaran (2016) find that *only compulsory mergers* led to cost savings for communal mergers in Germany. Consequently, one might derive that

policy-makers should force communes to merge. If we interpret mergers between different ethnic groups as compulsory mergers, then we agree that these mergers reduce administrative staff. However, our case demonstrates that these alleged cost savings create local disparities, which casts doubts on the overall efficiency. Thus we endorse the conclusion of Ostrom (1972, p. 487), who states that communal mergers might produce more harm than good.

2.6   Appendix
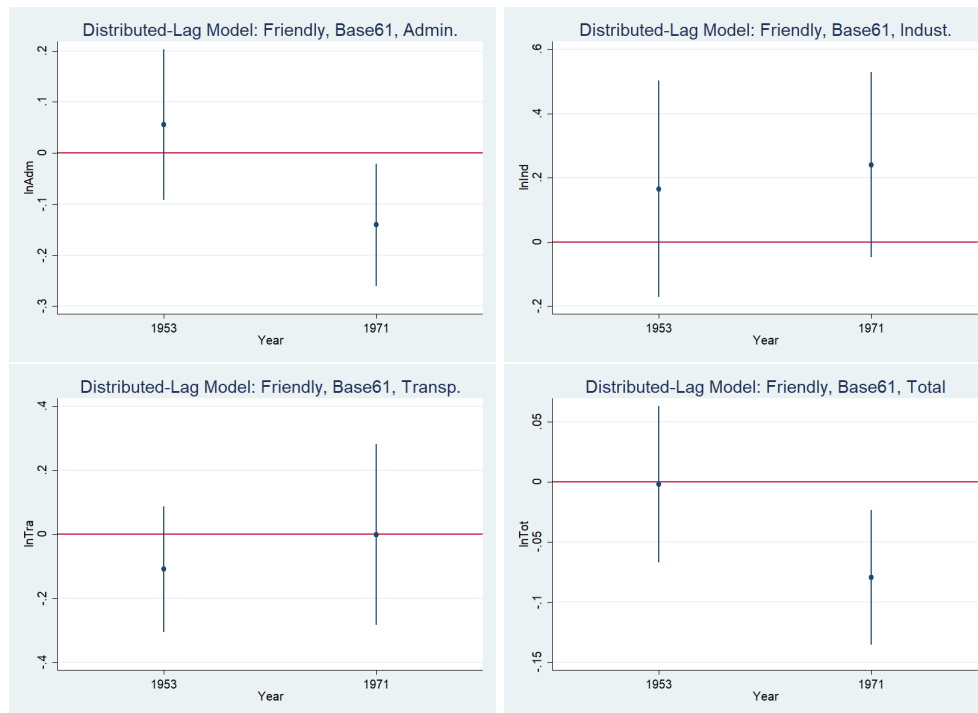
Figure 2.8: Results of distributed-lag regressions on the sample of Panel A in Table 2.15. All regressions include town fixed effects and census-period fixed effects, and *lnPop*. The zero-line refers to the 1961 census.
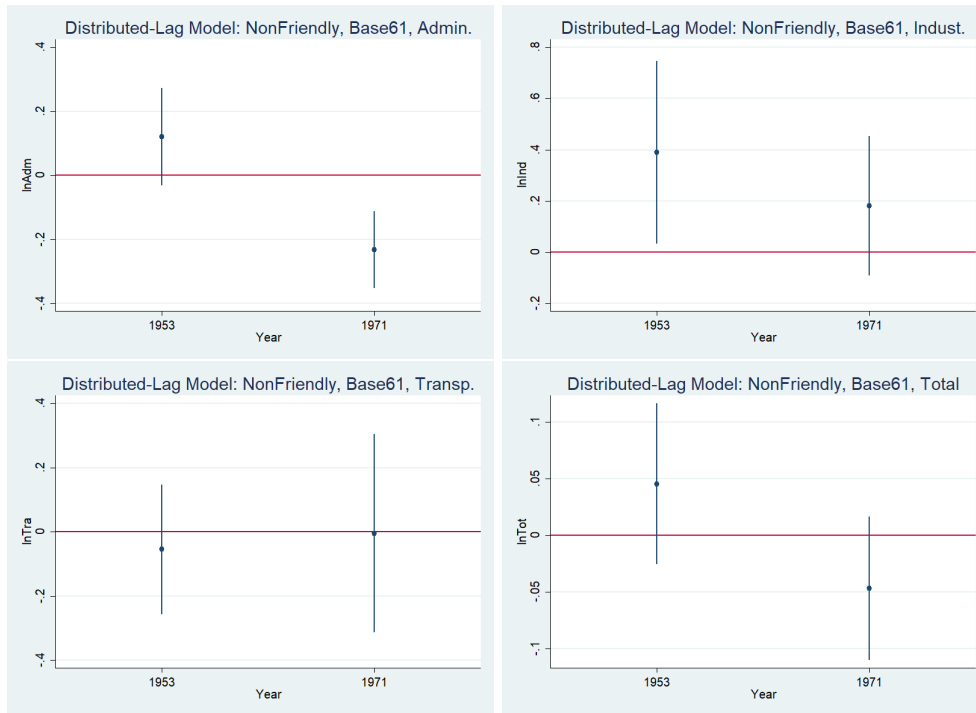
Figure 2.9: Results of distributed-lag regressions on the sample of Panel B in Table 2.15. All regressions include town fixed effects and census-period fixed effects, and *lnPop*. The zero-line refers to the 1961 census.

Category	Variable	Census 1953	Census 1961	Census 1971
Agriculture	Agr	Agriculture	Agriculture	Agriculture and Fishing
Agriculture	Agr	Forestry	Forestry	Forestry
Agriculture	Agr	Crafts	Crafts	Crafts
Agriculture	Agr	Services	Personal Services	
NonAgriculture	Ind	Mining	Mining	Industry and Mining
NonAgriculture	Ind	Industry	Industry	
NonAgriculture	Con	Construction	Construction	Construction
NonAgriculture	Tra	Transportation	Transportation	Transportation
NonAgriculture	Adm	Trade	Trade and Catering	Trade and Catering
NonAgriculture	Adm	Administration	Communal Activities	Housing and Communal Activities
NonAgriculture	Adm		Public Administration and Judiciary	Cultural and Social Activities
NonAgriculture	Adm		Cultural, Educational and Scientific Activities	Activities of Social and State Services
NonAgriculture	Adm		Health and Social Activities	Other Activities
NonAgriculture	Adm		Other Activities	

Table 2.10: Employment Variables listed in the 1953, 1961 and 1971 censuses.

Variable	Census 1953	Census 1961	Census 1971
Adm	Warehouses	Retail	Retail
Adm	Retail, Shops and Markets	Wholesale	Wholesale
Adm	Catering, Hospitality	Foreign Trade	Foreign Trade
Adm	Banking	Trade Services	Trade Services
Adm	Insurance	Catering, Hospitality	Business Associations
Adm	State Administration	Tourism	Catering, Hospitality
Adm	Cultural, Educational and Scientific Activities	Building Management	Tourism
Adm	Entertainment and Leisure Activities	Communal Economy	Housing
Adm	Health Services	Federal Authorities	Communal Utilities
Adm	Social Protection Services	Republican and Provincial Authorities	Schooling
Adm	Housing and Communal Utility Services	District Authorities	Science
Adm	Planning and Related Activities	Communal Authorities	Cultural and Educational Activity
Adm	Other Public Services	Judiciary	Art and Entertainment Activity
Adm	Mass Organizations, Business Associations	Education	Health
Adm	Free Professions	Science	Social Protection
Adm	Religious Organizations	Culture and Arts	Physical Culture
Adm		Social Protection	Social Organisations
Adm		Social Insurances	Activities of Chambers of Commerce, etc.
Adm		Health	Finance and Insurance
Adm		Sports and Physical Education	Social Insurance Institute
Adm		Economic Associations	Administrative Bodies
Adm		Other Activities	Other Social Services

Table 2.11: Job descriptions classified as Administration.

Variable	Census 1953	Census 1961	Census 1971
Ind	Coal Mines	Coal Production	Production, Transmission and Distribution of Electricity
Ind	Extraction of Oil and Natural Gas	Oil and Natural Gas Production	Coal Production and Processing
Ind	Iron Ore Mines	Iron Ore Mines	Oil Production and Refining
Ind	Mine of Other Metal Ores	Production of Non-Ferrous Metal Ores	Ferrous Metallurgy
Ind	Mines of Non-Metallic Minerals	Non-Metallic Ore Mines	Non-Ferrous Metallurgy
Ind	Quaries	Quarries and Pits of Sand and Gravel	Production, Refining and Processing of Non-Metallic Minerals
Ind	Production, Transmission and Distribution of Electricity	Electricity Generation and Transmission	Metal Industry
Ind	Gas and Coke	Coal Processing	Shipbuilding
Ind	Oil Refinery and Natural Gas Processing	Oil Refining	Electrical Industry
Ind	Ferrous Metallurgy	Ferrous Metallurgy	Chemical Industry
Ind	Non-Ferrous Metallurgy	Non-Ferrous Metallurgy	Construction Material Industry
Ind	Non-Metal Processing	Non-Metal Processing	Wood Industry
Ind	Mechanical Engineering	Mechanical Engineering	Paper Industry
Ind	Metal Processing Industry	Metal Processing Industry	Textile Industry
Ind	Shipbuilding	Shipbuilding	Leather and Footwear Industry
Ind	Production of Electrical Machinery	Manufacture of Electrical Machinery	Rubber Industry
Ind	Electrical Industry	Other Electrical Industry	Food Industry
Ind	Chemical Industry	Chemical Industry	Graphic industry, Newspapers and Publishing
Ind	Construction Material Industry	Construction Material Industry	Tobacco Industry
Ind	Lumber Industry	Wood Industry	Film Industry
Ind	Wood Pulp and Paper Industry	Paper Production	Geological and Mining Research
Ind	Textile Industry	Textile Production	Other Industries
Ind	Leather and Footwear Industry	Leather and Footwear Industry	
Ind	Tire Industry	Rubber Industry	
Ind	Food Industry	Food Industry	
Ind	Graphics and Printing Industry	Graphics Industry	
Ind	Tobacco Industry	Tobacco Industry	
Ind	Film Industry	Film Industry	
Ind		Production of Paper Products	
Ind		Production of Plastic Articles	
Ind		Production of Sports Equipment	
Ind		Other Diverse Industries	

Table 2.12: Job descriptions classified as Industry.

Variable	Census 1953	Census 1961	Census 1971
Tra	Railway Traffic	Railway	Railway Traffic
Tra	Sea Traffic	Sea	Sea Traffic
Tra	River Traffic	River and Lake	River and Lake Traffic
Tra	Air Traffic	Air	Air Traffic
Tra	Local Road Traffic	Road	Road Traffic
Tra	Inter-City Road Traffic	City	City Traffic
Tra	Postal Traffic	Transshipment	Transshipment
Tra		Postal Services	Postal Services

Table 2.13: Job descriptions classified as Transportation.

Variable	Census 1953	Census 1961	Census 1971
Agr	Agriculture	Agriculture	Agriculture
Agr	Fishing	Fishing	Fishing
Agr	Cultivation, Care and Protection of Forests	Water Management	Water Management
Agr	Hunting	Cultivation, Care and Protection of Forests	Forest Management
Agr	Forest Exploitation	Hunting	Hunting
Agr	Metalworking Crafts	Forest Exploitation	Non-Metal Processing
Agr	Shipbuilding Crafts	Metal Processing and Production Crafts	Metal-Processing
Agr	Electrical Engineering	Metal Processing and Construction Crafts	Construction and Repair of Small Vessels
Agr	Chemical Crafts	Electrical Engineering	Manufacture of Electrical Appliances and Accessories
Agr	Pre-Processing Crafts for Non-Metal Materials	Electrical Engineering and Construction Crafts	Manufacture of Chemical Products
Agr	Construction Crafts	Chemical Crafts	Production of Construction Materials
Agr	Woodworking Crafts	Crafts for Processing of Non-Metal Materials	Wood Processing
Agr	Crafts for the Production of Paper Products	Construction Crafts for Processing of Non-Metal Materials	Paper Processing
Agr	Crafts for the Production of Textile Products	Construction Crafts	Manufacture of Textiles
Agr	Crafts for the Production of Leather Products	Woodworking Crafts	Leather Processing
Agr	Crafts for the Production of Food Products	Woodworking Construction Crafts	Manufacture of Rubber Products
Agr	Graphic Crafts	Crafts for the Production of Paper Products	Manufacture of Food Products
Agr	Mixed Crafts Activities	Crafts for the Production of Textile Products	Printing and Bookbinding
Agr	Homemade Handicrafts	Crafts for the Production of Leather Products	Manufacture and Repair of Other goods
Agr	Service Crafts	Food crafts	Construction Crafts
Agr	Other Services	Butchers, Bakers and Confectioners	Personal and Other Craft Services
Agr		Other Handicrafts	
Agr		Personal Services	

Table 2.14: Job descriptions classified as Agriculture.

Sample: All Unreformed and Losers of 1961-1971 (Excluding Temporary Winners)								
		Panel A				**Panel B**		
		Census 1953				Census 1953		
		Full Sample				With Sample Restriction		
		All	**Unref.**	**Friendly Loser**	**Diff.**	**All**	**Unref.**	**NonFriendly Loser**	**Diff.**
Observations		81	24	57		50	24	26	
Population	Mean	1613	1977	1459	518	1860	1977	1752	225
	Std. Err.	(163)	(468)	(120)	(354)	(253)	(468)	(233)	(511)
Pop.Literate (older than 10)	Mean	1051	1205	987	218	1071	1205	948	257
	Std. Err.	(118)	(348)	(85)	(259)	(182)	(348)	(144)	(366)
Empl.Total	Mean	658	736	626	110	728	736	721	15
	Std. Err.	(65)	(189)	(49)	(143)	(104)	(189)	(103)	(211)
Empl.Agri	Mean	508	553	488	64	573	553	592	-39
	Std. Err.	(56)	(166)	(41)	(124)	(91)	(166)	(90)	(185)
Empl.Admin.	Mean	61	87	50	37***	65	87	44	43***
	Std. Err.	(5)	(14)	(4)	(11)	(8)	(14)	(6)	(14)
Empl.Indust.	Mean	49	54	47	7	48	54	43	11
	Std. Err.	(8)	(13)	(11)	(18)	(8)	(13)	(11)	(16)
Empl.Transp.	Mean	17	19	16	3	23	19	27	-8
	Std. Err.	(2)	(5)	(2)	(5)	(4)	(5)	(7)	(9)
Empl.Constr.	Mean	24	23	24	-1	19	23	14	9
	Std. Err.	(5)	(6)	(6)	(11)	(4)	(6)	(3)	(7)

Sample Restriction:	1. Exclude all administrative centres of the former districts (1938-1955)
	2. Require in 1953 Population >=500
	3. Require in 1953 EmpShare in Agri* 50-90%
	*Agri includes Agriculture, Forestry and Crafts (incl. food process.)

Table 2.15: Balancing test comparing *Unreformed* to *Friendly Losers* (Panel A), and *Unreformed* to *NonFriendly Losers* (Panel A), prior to the communal mergers (1953). Results of two-sample t-tests with equal variances.

	(1) lnAdm	(2) lnAdm	(3) lnInd	(4) lnInd	(5) lnTra	(6) lnTra	(7) lnTot	(8) lnTot
LostToFriend × PostReform (β_1)	-0.131***	-0.141***	0.0466	-0.0667	-0.0167	-0.00303	-0.0280**	-0.0393**
	(0.0295)	(0.0421)	(0.0589)	(0.0848)	(0.0380)	(0.0530)	(0.0120)	(0.0171)
LostToNonFriend × PostReform (β_2)	-0.121***	-0.118***	-0.291***	-0.325***	-0.161***	-0.136**	-0.0969***	-0.0797***
	(0.0351)	(0.0620)	(0.0871)	(0.0876)	(0.0542)	(0.0595)	(0.0142)	(0.0179)
lnPopulation	0.750***	0.723***	0.723***	0.574***	0.490***	0.514***	0.916***	0.904***
	(0.0470)	(0.0620)	(0.0871)	(0.112)	(0.0668)	(0.0870)	(0.0210)	(0.0280)
Sample	Full	Full	Full	Full	Full	Full	Full	Full
Loser	All	All	All	All	All	All	All	All
NonFriendly AdmTown55 within 25km		Yes		Yes		Yes		Yes
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ADMTowns	977	585	977	585	977	585	977	585
Clusters	466	294	466	294	466	294	466	294
Observations	2,931	1,755	2,931	1,755	2,931	1,755	2,931	1,755
Wald Test, $\beta_1=\beta_2$, (p-value)	0.7521	0.4944	0.0000	0.0045	0.0098	0.0355	0.0000	0.0042
R-Square	0.9556	0.9578	0.9165	0.9168	0.9257	0.9279	0.9884	0.9887

* p <0.10, ** p <0.05, *** p <0.01

Standard errors in parentheses, clustered at the 1971-Communes.

Full sample contains all towns with ADM status in 1955 that lost subsequently (excluding temporary winners).

The control group contains only towns that were never reformed between 1955-1971.

LostToFriend=1 if more than 50% of local pop of both merging partners is of same ethnic group.

LostToNonFriend=1 if the largest ethnic group of both merging partners is of another ethnic group.

lnAdm is the log of the count of administrative employees residing in town i.

lnInd is the log of the count of mining and industry employees residing in town i.

lnTra is the log of the count of transportation employees residing in town i.

lnTot is the log of the count of total employees residing in town i.

Table 2.16: DID estimates for the whole sample of *Friendly* (*Non-Friendly Losers*) vs. *Unreformed*.

Chapter 3

Borders and Commuting Spheres

3.1 Introduction

Pinkovskiy (2017) documents the existence of sharp discontinuities in economic growth at country borders across the globe. Pinkovskiy (2017) shows that these discontinuities are neither due to geography, climate or public goods provision, but rather due to differences in institutions between countries. While this explanation might apply to long-existing borders, it *cannot* explain discontinuities at rather recently created borders, such as those in the Balkans (Pinkovskiy 2017, p. 183).

In fact, the causal direction between *borders* and *border effects* is less clear. On the one hand, it is well known that formal barriers such as tariffs, quotas and currencies cause reductions in trade (Frankel et al. 1995, McCallum 1995, Anderson & Van Wincoop 2004). On the other hand, discontinuities in economic activity often remain after the removal of formal barriers. In line with Acemoglu et al. (2002), Michalopoulos & Papaioannou (2014) demonstrate that differences in economic activity persist across ethnic homelands in Africa. Similar persistence of historic borders within contemporary countries has been documented for Europe (Grosfeld & Zhuravskaya 2015, Becker et al. 2016) and the United States (Wolf 2000, Felbermayr & Gröschl 2014).

To the best of my knowledge, Redding & Sturm (2008) is the only paper applying a difference-in-differences methodology to identify that the partition of Germany (1945-1989) caused the decline of towns *near* the iron curtain. Nitsch & Wolf (2013, p. 177) argue that the effect persists today as local social and business networks did not yet (re-)integrate. Still, the forces that hinder integration remain unknown as part of the German border effect already existed prior to World War II (Wolf 2009, Becker et al. 2020).

Different to Redding & Sturm (2008), I assume that *proximity to a border* is not equivalent to *integration across a border*. Therefore the key contribution of this chapter is in the identification of spatial markets that are *affected* by the implementation of border regimes. To identify spatial markets, I apply the algorithm of Dijkstra et al. (1959) to derive geospatial commuting spheres based on elevation, rivers and roads. This approach not only identifies areas where geography hinders integration, but it also highlights that

two sides of the same border are affected differently. On one side, some settlements are *cut off* their nearest town if that town is on the other side of the border. On the other side, some settlements are *not cut off* the same town and thus the hardening of the border does not affect daily activities, such as the commuting to the nearest market place.

The second difference to the previous literature is the focus on the implementation of federalism in a previously unitary state. Whereas subnational borders are of little relevance in a unitary state, a more decentralised state organisation implies the creation of local clubs that can set independent policies and exclude outsiders (Buchanan 1965, Casella & Frey 1992). Based on the new economic geography literature (Krugman 1991, Davis & Weinstein 2002, Alix-Garcia & Sellars 2020), I reason that federalism enables local politicians to create barriers and protect their jurisdiction from outsiders, which implies a negative shock to the market access of settlements that are cut off their nearest town by federal borders. Following Tiebout (1956), I assume that individuals *vote with their feet*, which leads to the depopulation of *affected* areas.

As a rare but important example for such a scenario, this chapter focuses on the Socialist Federal Republic of Yugoslavia (SFRY) between 1945 and 1991. Whereas Yugoslavia was a de-facto unitary state under centralised communist rule after World War II (Frankel 1955, p. 428), the country decentralised its entire administration, economy and political system in a series of reforms between 1966 and 1976 (Milanović 1987, p. 2-7). As most of Yugoslavia's federal borders turned into international borders after 1991, the 1945-1991 period provides a rare opportunity to assess whether border effects emerged long before border police, different currencies, and –most importantly– *prior to the wars of the 1990s.*

With the constitution of 1974, Yugoslavia's republican and provincial governments gained the competencies to regulate the sale of products on their territories (Lydall, 1989, p. 89-90; Bookman, 1990, p. 104). Enterprises were protected from competition of enterprises from other federal units, while the flow of capital across ADM1 borders[1] effectively ceased (Milenkovitch, 1977, p. 56; Lydall, 1989, p. 81-82). Due to the few powers left to the federal government, Lampe (2000, p. 305) describes Yugoslavia after 1974 as a confederation of eight one-party regimes. Moreover, historians discuss whether the reforms of 1966-1976 marked the start of Yugoslavia's disintegration (Ramet 1992, Jakir 2005, Jović 2009, Kežić 2017).

Using panel data (1948-1991), this chapter tests empirically whether Yugoslav federalism after 1965 affected the population growth of settlements that were previously integrated across Yugoslavia's ADM1 borders. As all citizens retained the rights to reside, work, and attend school and health institutions all across the country (Štiks 2015), I attribute declines in population growth after 1965 to the out-migration of farmers who could no longer sell across ADM1 borders (Burkett & Škegro, 1988, p. 143; Miller et al., 1989, p. 509; Cochrane, 1990, p. 10).

---

[1]In this chapter Yugoslavia's "republican and provincial borders" are referred to as "ADM1 borders". These borders delineated the first level administrative units of Yugoslavia between 1945 and 1992.

My empirical work builds on substantial data collection and digitisation, as well as on GIS data obtained from the authorities of Yugoslavia's successor states. Based on geospatial elevation and river data, and the road network of 1965, I use the algorithm of Dijkstra et al. (1959) to compute travel paths between 26,149 settlements and all 468 towns. From these paths I derive geospatial commuting spheres around each of Yugoslavia's towns in 1965. In line with the expectation that commuting spheres do not necessarily correspond to the geography of administrative borders, this methodology identifies areas that were integrated across Yugoslavia's ADM1 borders *prior to* the hardening of these borders.

The key result of this chapter is that the implementation of federalism negatively affected the population growth of settlements that *were cut off* their nearest town by Yugoslavia's ADM1 borders. Heterogeneity in the border effect suggests that the loss of a town with at least 5,000 inhabitants (in 1961) is the key driver behind the decline. This result holds for Serbian settlements that were cut off Serbian towns, Croatian settlements that were cut off Croatian towns, and Croatian settlements that were cut off Slovenian towns. Moreover, the effect also appears on ADM1 border sections *within* and *between* territories that were once part of the Ottoman Empire or Austria-Hungary, and cannot be explained by increased urbanisation. Instead, the evidence suggests that affected settlements declined in the absence of a nearby alternative town in the same federal unit.

The chapter proceeds as follows. Section 3.2 discusses the historical background and previous anthropological fieldwork conducted by international scholars within the Socialist Federal Republic of Yugoslavia between 1956 and 1976. Section 3.3 describes the data sources and the methodology. Section 3.4 introduces the estimation framework, while Section 3.5 discusses the empirical results. Section 3.6 concludes the chapter.

3.2 Historical Background

This section summarises Yugoslavia's history to address two key questions. First, is it reasonable to assume that local commuting across Yugoslavia's ADM1 borders existed prior to 1965? Second, why did the regime of Josip Broz Tito implement reforms that empowered the regions at the cost of *his* federal centre?

3.2.1 Socialist Yugoslavia: From Stalinism to Worker's Self-Management

Acting as a multiethnic guerillia group, the communist "Partisans" of Josip Broz Tito liberated much of Yugoslavia before the arrival of the Soviet Red Army in late 1944 (Neal 1958, p. 2). This achievement broadly united[2] the Yugoslav society behind Tito, who opposed Soviet influence (Rusinow 1978, p. 10-13). Nonetheless, the Federal

---

[2]To be complete: Tito's regime ran concentration camps to align or execute its opponents, in particular those related to the fascist Ustasha, the German occupiers and the royal Chetniks (Dulić 2004). Due to the common struggle against these forces during World War II, the Partisan movement was a strong integrating force across all of Yugoslavia's ethnic groups (Simić, 1973, p. 43 ; Lampe, 2000, p. 236-240).

People's Republic of Yugoslavia, proclaimed in November 1945, initially resembled the Soviet model (Lapenna 1972, p. 215).
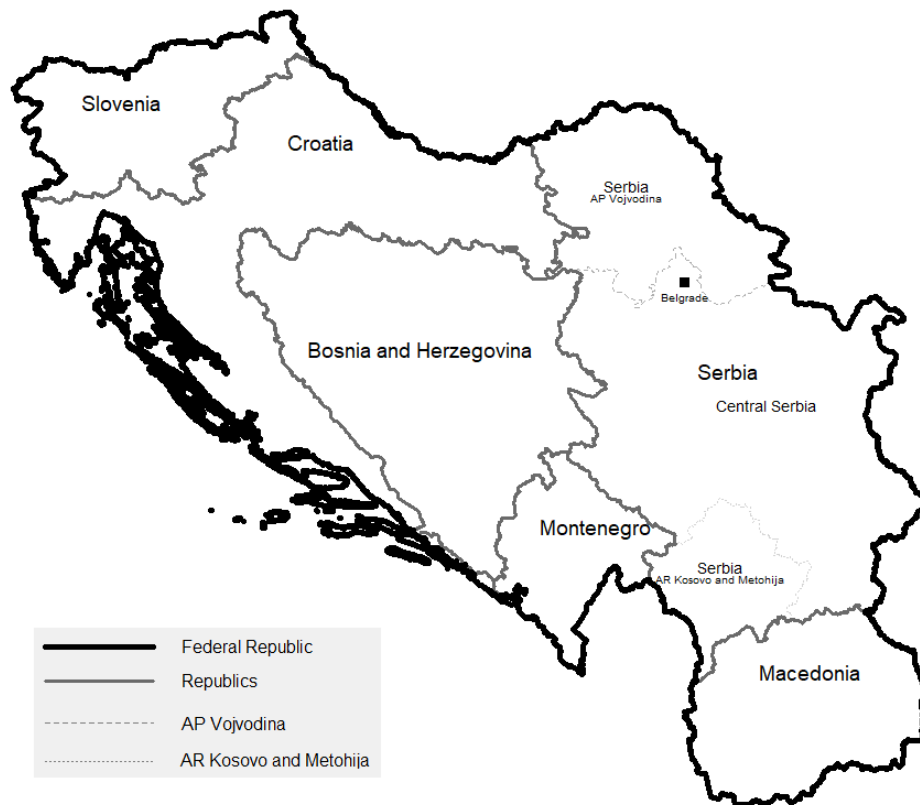
Figure 3.1: The Federal People's Republic of Yugoslavia in 1945.

The 1946 constitution defined the state as a federation of six republics, one autonomous province and one autonomous region (see Figure 3.1). In reality, however, power was concentrated on Tito in the federal capital Belgrade, leaving only cultural autonomy to subordinate units (Jović 2009, p. 58). The geography of federal borders was determined by the regime without formal legal procedure or documentation (Radan 1999, p. 142), but at least partially followed historical borders. In 1945, Tito explained that administrative boundaries were drawn to unite rather than separate the society (Radan 1999, p. 145).

Between 1945 and 1965 the federal government acted as a strong integrating force to the Yugoslav economy (Hamilton 1968, p. 116). Federal investment policy followed two major principles: First, investment was concentrated close to natural resources and where rentability was high (Hamilton 1968, p. 241). Therefore large commuting areas developed along and across Yugoslavia's largest rivers, such as the Sava and Drina, which separate Croatia, Bosnia-Herzegovina and Serbia (Hamilton 1968, p. 134-137). Second, less developed regions received special funds to equalise socio-economic conditions (Hamilton 1968, p. 137-146).

When Stalin expelled Yugoslavia from the communist bloc in 1948, the country faced the necessity to trade with Western market economies (Holt & Stapleton, 1971; Horvat, 1971, p. 120). Still driven by communist ideas, the regime set on a unique path to develop

a system between capitalism and state socialism, known as "Worker's Self-Management". At its core, Yugoslav communists agreed with Engels (1894, p. 262) that the state was redundant and should "wither away" in a classless society (Neal 1958, p. 18-20).[3]

Inefficiencies in central planning were answered by local self-management. In the new system workers controlled factories via workers councils (Ward 1957, 1965), while enterprises could go bankrupt and formal unemployment became possible (Horvat, 1971, p. 78; Woodward, 1995).[4] Economic policy making was decentralised *from the federation to the communes*, which created communal competition and particularism (Fisher, 1966, p. 25; Ward, 1968, p. 572; Kežić, 2017, p. 54-64).[5] However, hit by an economic crisis in the early 1960s, parts of the communal autonomy were transferred *to the republics and provinces*, but *not to the federation*.[6] This led to particularism and competition between republics and provinces, whose borders hardened after 1964 (Hamilton 1968, p. 337).

Between 1966 and 1976, the federal government gradually lost its competencies to the republics and provinces (Milenkovitch, 1977, p. 59; Bertsch, 1977, p. 92). Although the 1974 constitution[7] made the federation responsible to protect the unified market, intra-regional trade declined (Uvalić 1983, p. 15). This was felt particularly in agriculture, where farmers required permits to sell outside their region (Cochrane 1990, p. 10). To enforce protectionism, local governments used police powers against farmers, private buyers and official procurement agents (Burkett & Škegro, 1988, p. 143 ; Miller et al., 1989, p. 509).

3.2.2 Federalism in the Peasant Economy of Yugoslavia

Before World War II, Yugoslavia was an agricultural country with 77% of the population occupied by agriculture and 40% illiterate (Horvat 1971, p. 71). The inheritance rule led farmers to divide their land by the number of sons, which gradually intensified the fragmentation of agricultural land (Lockwood 1975, p. 93). Yugoslavia's agricultural landscape was therefore characterised by dwarf farms with an average per capita size of less than 1 hectare (Neal 1958, p. 187).

The communist takeover did not improve the prospects of peasant agriculture. In 1945, the regime expropriated 1.57 million hectare of agricultural land, which was partially assigned to landless families and otherwise collectivised into state farms (Hamilton 1968, p. 172). Although forced collectivisation ended already in 1953, the government restricted

---

[3] A thorough historical discussion on Yugoslav communist ideology is provided by Jović (2009). The key critic of Stalinism was published by the dissident Milovan Djilas (1957), who describes that Stalinism created the contradiction of a new bureaucratic class, which produced new class differences.

[4] Tito formed close relations with the West to develop tourism at the Adriatic, while guestworker programmes sent Yugoslavia's surplus workforce to Western Europe (Lampe 2000, p. 294).

[5] Fisher (1966, p. 176) mentions a commune that banned the sale of cigarettes produced elsewhere.

[6] Tito's close circle discussed alternatives (Jović 2009, p. 62-68). Edvard Kardelj proposed further decentralisation of state institutions, while Aleksandar Ranković favoured a stronger federal centre. Ultimately, Tito supported Kardelj and removed Ranković from power in 1966 (Jović 2009, p. 64-65).

[7] The 1974 constitution introduced a complex system of delegations and voters meetings (Jović 2009, p. 74), which transformed all organs of state, economy and society into Basic Organisations of Associated Labour (BOAL). Each BOAL organised referendums and elected delegates to higher-level assemblies (Milenkovitch 1977, Broekmeyer 1977). Due to the strong republican and provincial governments, Lampe (2000, p. 305) describes the country after 1974 as a confederation of one-party regimes.

cultivated land to 10 hectares per private farm (Hamilton 1968, p. 173).[8] Until 1955, access to machinery, fertilizer and credits remained prohibited to private farms (Neal 1958, p. 199).[9] While these constraints pushed peasants out of agriculture, communist economic policy created alternative opportunities through investment in heavy industries and urban infrastructure. In this light the number of workers in mining and industry increased from 238,115 to 1,362,000 between 1938 and 1964 (Hamilton 1968, p. 219).

The consequence of this development was a process of rural-to-urban migration and an expansion of urban commuting spheres.[10] Between 1948 and 1961, the number of people living in a city with at least 20,000 inhabitants increased from 12.5% to 19.5% (Simić 1973, p. 216). The number of cities with at least 100,000 inhabitants increased from two in 1948 (Belgrade, Zagreb) to seven in 1961. At the same time, however, urban infrastructure did not grow sufficiently. This was one reason why 1.4 million peasant-workers[11] still lived on their farm and commuted to work in factories by 1970 (Halpern 1975, p. 87).[12]

By 1969, half of Yugoslavia's 12 million rural inhabitants lived in a household with at least one peasant-worker employed in full time outside of agriculture (Lockwood 1973, p. 284-285). This worker-peasantry consisted of daily commuters and those who commuted weekly, monthly or seasonally to work places all across Yugoslavia and Western Europe (Lockwood 1973, p. 286). Depending on geography, the means of transportation were: walking by foot, horseback, bicycles, busses and trains (Lockwood, 1973, p. 287; Halpern, 1975, p. 87). As for daily commuters, Halpern (1963, p.164) notes that one-way travel distances could easily reach 15 miles (24.14km). If a bus service was available, then it was not uncommon to walk one or two hours to reach the bus stop. On another occassion, Halpern (1975, p. 88) cites a Croatian peasant-worker who leaves his village at 6:30am, works in a factory in Zagreb during the day, and returns to work in his fields at 3pm. Lockwood (1973, p. 287) resided in a settlement of 250 inhabitants in Bosnia-Herzegovina, who travelled 3-4 hours by foot or horseback to their nearest market town.[13] From this settlement, 9 full-time lumberjacks commuted weekly to their work site, where they could reside in barracks.

Detailed descriptions of the market place in the town of Bugojno (Bosnia-Herzegovina) are available thanks to the field work conducted between 1966 and 1968 by Lockwood (1973, 1975). In January 1967, the formal regulation of the market place was in the hands of Bugojno's farmer's cooperative (Lockwood 1975, p. 138-139). Local market regulators controlled the compliance with market rules and collected taxes for the trade of different products. For instance, farmers required a certificate of ownership for the livestock that they wished to sell outside their commune of origin. Importantly, the tax rates of vendors

---

[8]In mountainous terrain the limit was 15 hectares. However, given that the average land per farm was only 3.8 hectares, the 1953-law did little to relieve the situation (Neal 1958, p. 198).

[9]Credits became available to private agriculture in 1955 (Neal 1958, p. 201-203). However, peasants barely used this new opportunity in the absense of specified institutions (Neal 1958, p. 206).

[10]Detailed anthropological accounts of this process and Yugoslavia's peasant economy are available thanks to the field works of Halpern (1956, 1965, 1975), Simić (1973, 1974) and Lockwood (1973, 1975).

[11]Peasant-workers farmed their land besides a full-time industrial job (Lockwood 1973, p. 281).

[12]In addition, peasants kept their land as a security against economic crises (Lockwood 1973, p. 285).

[13]Lockwood (1975) studied a settlement named Planinica, near Bugojno (Bosnia-Herzegovina).

depended on their origin: Inhabitants from the neighbouring communes of Donji Vakuf and Gornji Vakuf had to pay the same tax rates as Bugojno's inhabitants, while outsiders from more distant places had to pay higher tax rates (Lockwood 1975, p. 140). Hence, at least in the Bugojno region during 1967, communal borders did not prevent peasants to sell in neighbouring market towns within Bosnia-Herzegovina (Lockwood 1975, p. 142).

At the market place, Lockwood (1975, p. 141-185) noted five different types of market participants: local peasants and farmers, outside farmers, buyers of the communal purchasing agency[14], and *smugglers*[15]. The most numerous group were local peasants, who originated from settlements *neither too close nor too distant from the town*. Lockwood (1975, p. 142) explains this by the fact that inhabitants of settlements just outside the town were rather involved in full time industrial work, while more distant villages lacked the means of transportation to regularly visit the market place.

3.3 Data

3.3.1 Population Data and Settlement Boundaries

All data used in this chapter were collected in visits to Yugoslavia's successor states. As a first step, geospatial files of the contemporary administrative divisions, including settlement boundaries, were obtained from the Agency for Statistics of Bosnia and Herzegovina[16], the State Geodetic Office of the Republic of Croatia, the Statistical Office of the Republic of Slovenia and the State Geodetic Office of the Republic of Serbia[17]. Eurostat provided lower level boundaries (LAU2) for Northern Macedonia. Only the settlement borders of Montenegro are missing.

Historic census books (1948-1991) were collected from the Statistical Office of the Republic of Serbia. Each census contains harmonised population counts of all previous censuses, which allows comparison of settlement-level population counts over time. Unfortunately, there is no joint publication of the 1991 census. Thus the harmonised population counts of 1948-1991 were requested from each of Yugoslavia's successors, but were only received for Bosnia-Herzegovina, Croatia and Serbia (without Kosovo). These entities constituted Yugoslavia's geographic core, which is most relevant to this chapter.

For Croatia and Serbia the obtained population data contain all settlements in all censuses, harmonised to contemporary settlement boundaries. In contrast, substantial effort was required to reconstruct and harmonise the data for Bosnia-Herzegovina.[18] The

---

[14]Communal purchasing agencies were tasked to buy at the request of local institutions, such as hospitals. Joint purchasing was to prevent that local institutions bought products from professional traders (Lockwood 1975, p.184-185); see smugglers.

[15]Professional trading was illegal in socialist Yugoslavia (Lockwood 1975, p. 140). Buying in one commune only to sell in another was considered smuggling, which was legally prosecuted.

[16]Since the Dayton Agreement there are three statistical offices in Bosnia-Herzegovina. Statistics for the Federation of Bosnia and Herzegovina are provided by the Statistical Office of the Federation of Bosnia and Herzegovina. Statistics for the Republika Srpska are provided by the Statistical Office of the Republika Srpska. In addition, there is the Agency for Statistics of Bosnia and Herzegovina, which provides few statistics for the entire Republic of Bosnia and Herzegovina.

[17]For Kosovo there are only cadastral municipalities available, which are similar in size to settlements.

[18]The inter-entity border, created during the Bosnian war (1992-1995) and institutionalised by the Dayton Agreement, partitions a substantial number of settlements in Bosnia-Herzegovina. Since the 1991 and 2013 censuses were published both for the settlement boundaries of 1991 and 2013, the available contemporary settlement borders could be used to reconstruct

---

final population data set contains harmonised settlement level population counts of all censuses between 1948 and 1991 for all settlements in Bosnia-Herzegovina, Croatia and Serbia (without Kosovo). Altogether these are 16,592 settlements out of the total 26,149 settlements.[19] In addition the data set contains ethnicity counts of 1981 for all settlements in Serbia (excluding Kosovo) and for a large number of settlements in Croatia[20]. For Bosnia-Herzegovina, the ethnicity counts come from the 1991 census. In addition, I have added the ethnicity data of the 1961 census for all 468 towns.

3.3.2 Topography, Roads and Commuting Spheres

Historic road and communal maps were collected from the National Library of Serbia and from the State Geodetic Office of the Federation of Bosnia and Herzegovina. From this collection, a 1:800,000 resolution road map published in 1965 by the Auto-Moto-Union in Ljubljana was digitised into a geospatial vector format. The map captures all local, regional and main roads existing in Yugoslavia in 1965. The EU's Environmental Agency provided a digital elevation model and geodata of all European river segments. Based on elevation, river and road data, the algorithm of Dijkstra et al. (1959) can compute travel paths that account for underlying topography and infrastructure.[21] For this purpose, Yugoslavia was categorised into 1x1 km^2 cells. Then, a transition matrix was created to define the speed with which an individual can travel between adjacent cells.[22]

The resulting travel paths are best understood at an example. As the anthropologist William G. Lockwood resided between 1966 and 1968 in a settlement named Planinica (Bosnia-Herzegovina), I test the algorithm for this settlement. Both the left and right image of Figure 3.2 illustrate the computed shortest travel paths (red) from Planinica to the towns of Kupres, Bugojno, Donji Vakuf, Gornji Vakuf and Prozor. Each of these towns functioned as communal administrative centres (ADM2) throughout 1945-1991. The left image of Figure 3.2 plots the travel paths on top of the digital elevation model and the only river (Vrbas) in this region. The right image of Figure 3.2 plots the same travel paths on top of the road map of 1965. By comparison of both images it is evident that the algorithm searches the shortest downhill path from Planinica to the nearest road (here: Bugojno-Gornji Vakuf), from which the journey continues on the road network.[23] Strikingly, this pattern fits the descriptions of Lockwood (1975, p. 41-42).

---

the settlement borders of 1991 through comparison of population counts in both administrative divisions. The census data obtained for Bosnia-Herzegovina lists the population counts of each census (1948-1991) in its respective administrative division, but with additional information of splits and mergers between settlements prior to 1991. This allowed to aggregate the data to the smallest unit that did not change over time.

[19] The difference is due to missing population data for settlements in Slovenia, Macedonia and Kosovo.

[20] Missing data on Croatia's settlement reforms after 1991 complicate the match with pre-1991 censuses.

[21] Ferries and railways are excluded due to the lack of available data. When rivers separate towns and settlements, a nearby road connection (bridge) is required to consider the town to be the nearest town.

[22] For the elevation model, the hiking function of Tobler (1993) is used to approximate the speed value. The hiking function assumes that individuals prefer to walk downhill or on flat terrain. For rivers, the transition matrix is set so that it is 100 times faster to cross through non-river cells. For the road network, the transition matrix obtains a speed value of 60km/h. Finally, the individual transition matrices are added up, resulting in a final transition matrix that accounts for elevation, rivers and roads. In a nutshell, the final transition matrix assumes that an individual will move downhill or on flat terrain, avoiding rivers, to find the nearest road, from where the journey continues on the road network.

[23] Deviations from the road, as between Bugojno and Kupres, are due to the 1x1 km^2 resolution.
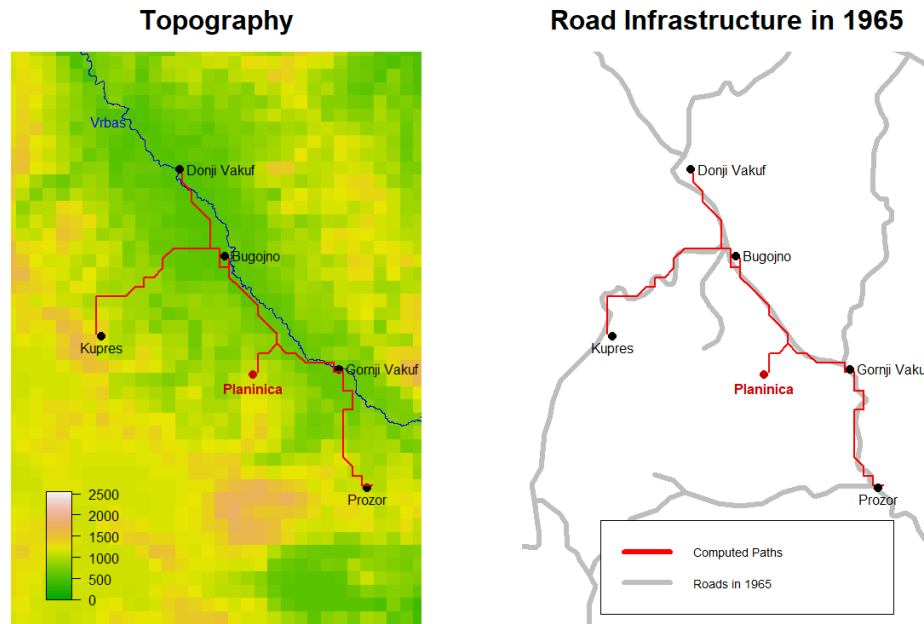
Figure 3.2: Shortest travel paths to towns from the settlement of Planinica (Bosnia-Herzegovina).

The shortest travel paths are computed for each of the 26,149 settlements, and for several sets of target towns in the entire Yugoslavia.[24] First, the administrative divisions of Yugoslavia are examined to identify all settlements that were the seat of a communal administration (*opština*) in all years between 1945 and 1991, resulting in a sample of 468 administrative towns (ADM2).[25] Besides the provision of basic administrative services, each of these towns permanently operated at least one open air peasant market. Second, the sample of administrative towns is split into subsamples of towns that had at least 5,000, at least 10,000, at least 20,000 and at least 50,000 urban inhabitants in the 1961 census. Summary statistics for these samples are provided in Table 3.1.

Table 3.1: Summary Statistics of Yugoslavia's Towns in 1961.

Town Samples	Census 1961				
	Number	Mean Pop	Median Pop	Min Pop	Max Pop
ADM2-Towns (1945-1991)	468	11,610	3,792	216	585,234
5,000 Urban Inhabitants	194	24,704	11,754	5,003	585,234
10,000 Urban Inhabitants	107	39,380	20,778	10,132	585,234
20,000 Urban Inhabitants	59	59,755	30,352	20,060	585,234
50,000 Urban Inhabitants	14	158,873	103,560	50,650	585,234

Note: All towns were in all years between 1945 and 1991 the administrative centre of a commune (*opština*). Population data refer to the corresponding urban settlements listed in the 1961 census.

For each dimension, the nearest town of a settlement is obtained by choosing the town with the shortest travel path distance out of the five nearest towns (by aerial distance).

---

[24] Although panel data for Slovenia, Montenegro, Kosovo and Macedonia are missing, I have manually searched and added the population data of 1961 for the towns in these territories. This step is important to identify settlements in Croatia, Bosnia-Herzegovina and Serbia that are cut off towns in Slovenia, Montenegro, Kosovo and Montenegro, respectively.

[25] The centres of suburban communes, existing only within Yugoslavia's larger cities such as Belgrade and Zagreb, are excluded from this sample as suburban communes did not exist in all years. Examples of suburban communes are Zagreb-Maksimir or Belgrade-Voždovac.

This procedure also records the shortest travel path distance to the 2nd, 3rd, 4th and 5th nearest town. In Section 3.5.3 these paths are used to identify settlements with and without nearby alternative towns in the same federal unit.[26]

Figure 3.3 visualises the resulting spheres of administrative towns (left image) and towns with at least 20,000 inhabitants (right image) at the example region around Planinica. Visual inspection shows that commuting spheres are neither constrained by communal (ADM2) nor by republican (ADM1) borders. Instead the commuting spheres follow the intuition that people do not commute according to administrative borders, but according to economic needs. Consequently, there are areas that are integrated across ADM2 and ADM1 borders.[27] In the right image of Figure 3.3 this is well visible for the town of Mostar (Bosnia-Herzegovina), where the commuting sphere overlaps in the south into neighbouring Croatia.
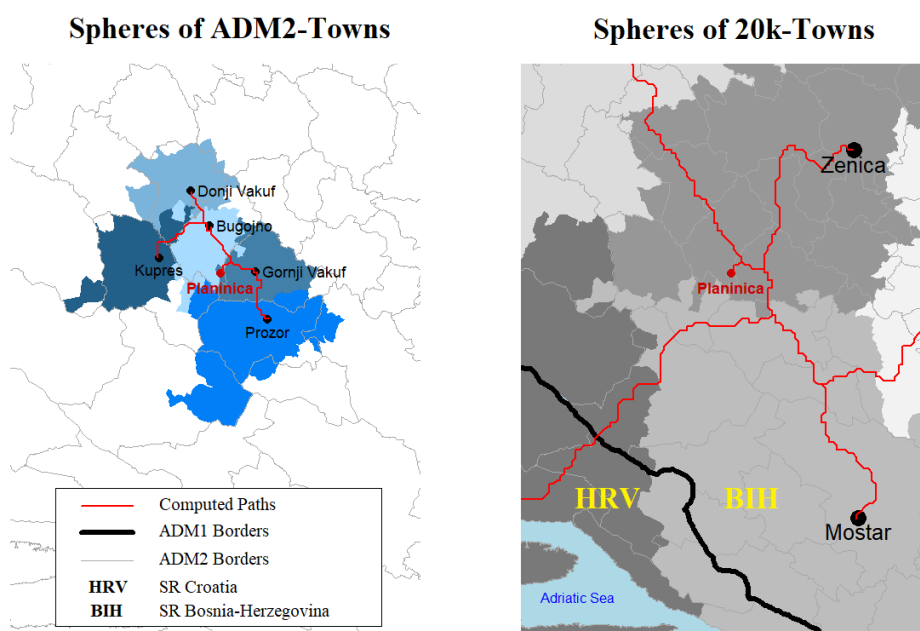
Figure 3.3: Travel paths of Planinica (Bosnia-Herzegovina).
Note: The left image shows in shades of blue the commuting spheres of administrative towns (Kupres, Bugojno, Donji Vakuf, Gornji Vakuf and Prozor). The right image shows in shades of grey the commuting spheres of towns with at least 20,000 inhabitants in 1961 (Zenica, Mostar). The red lines show the shortest travel paths from Planinica (Bosnia-Herzegovina) to each of these towns.

3.4 Empirical Strategy

Cochrane (1990, p. 10) explains that farmers required permits to sell across Yugoslavia's ADM1 borders, while Burkett & Škegro (1988, p. 143) and Miller et al. (1989, p. 509) describe that local governments used police powers to protect their markets from vendors

---

[26]Median travel distances between settlements and towns are provided by Table 3.9.

[27]For instance, Planinica belongs administratively to the commune of Bugojno, but is geographically closer to the town of Gornji Vakuf. The nearest town with at least 20,000 inhabitants in 1961 is Zenica. The illustrations of commuting spheres for towns with at least 20,000 (Figure 3.10) and at least 50,000 (Figure 3.11) urban inhabitants in 1961 confirm that commuting spheres are larger for larger towns, and that the travel pattern observed around Planinica is typical for Yugoslavia in general.

and buyers of other federal units. As Yugoslavia's ADM1 governments only received the competencies to implement such policies after 1965, I interpret the federalisation reforms of 1966-1976 as a persistent shock to the market access of farmers that were previously attending markets in other federal units.

To test this hypothesis I study the dynamics in annual population growth, where the difference-in-differences framework of Redding & Sturm (2008, p. 1774) provides a natural starting point. Importantly, the framework assumes that borders have a stronger impact on border areas compared to more distant areas. Applying this methodology to the case of Yugoslavia, I define settlements less than 20km from Yugoslavia's ADM1 borders as treated, and settlements within 20-40km as the control group.[28]

Figure 3.4: Test for parallel trends based on Redding & Sturm (2008).
Note: Coefficients with confidence bands from a distributed-lag regression of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). The specification includes settlement fixed effects and census-period fixed effects, standard errors are clustered at the commune level. Following Redding & Sturm (2008, p. 1776), I use the great-circle-distance to the nearest point of a (federal) border to define treatment (0-20km) and control group (20-40km). Towns and islands are excluded.

To identify a causal relationship between the hardening of Yugoslavia's ADM1 borders and the population growth of border settlements two assumptions need to hold. First, to ensure that the treatment was assigned as good as randomly, there must be no significant difference between treatment and control group prior to the reforms. Second, to associate any treatment effect with the reforms, I require parallel trends prior to 1965. The balancing test in Table 3.10 shows no significant difference between treatment and control group prior to the reforms. To test the parallel trends assumption, I follow

---

[28] Redding & Sturm (2008) calculate a population weighted distance matrix for Germany before and after the partition, suggesting a 75km threshold for the treatment group. In the absence of population data for all of Yugoslavia it is not possible to replicate this approach. Applied to Yugoslavia, the 75km threshold includes some federal units are almost entirely. The 20km vs 20-40km definition is supported by balancing tests (Table 3.10). Alternating the thresholds does not change the results.

Schmidheiny & Siegloch (2020) and estimate a distributed-lag model, which tests whether treatment and control group are statistically different relative to a base period. The result in Figure 3.4 supports the parallel trends assumption. However, as Figure 3.4 does not indicate a change after 1961-1971, it casts doubts on the empirical strategy:

In applying the empirical strategy of Redding & Sturm (2008), one presumes the integration of markets across Yugoslavia's federal borders prior to the reforms. However, instead of presuming integration, one should empirically identify the existence of markets across Yugoslavia's federal borders prior to the reforms.

As an alternative I therefore return to the commuting spheres of Section 3.3.2. This allows to include in the treatment group only settlements whose travel paths were interrupted by an ADM1 border. The control group initially includes all other settlements in Yugoslavia. Equation 3.1 formalises this estimation strategy.

$$PopGrowth_{it} = \alpha + \beta AffectedBorder_i \times Federalism_t + \omega_i + \delta_t + \epsilon_{it} \qquad (3.1)$$

The dependent variable is the annualised population growth rate of settlement i for the inter-census periods t.[29] The periods are: *1948-1953, 1953-1961, 1961-1971, 1971-1981* and *1981-1991. AffectedBorder_i* is a dummy that indicates if settlement i was cut off its nearest town by an ADM1 border. In the baseline setting this includes any settlement that is cut off its nearest town on at least one dimension. The dimensions are: towns with communal administrative status (ADM2) and subsets of ADM2-towns with at least 5,000, 10,000, 20,000 or 50,000 inhabitants in 1961. Later these spheres are also estimated separately. *Federalism_t* is a dummy that switches to *1* beginning in *1961-1971*, as Yugoslavia's ADM1 borders *hardened* after 1964 (Hamilton 1968, p. 337). Location-specific effects, such as altitude, are absorbed by settlement fixed effects ω_i. Time specific effects, such as census methodology, are absorbed by period fixed effects δ_t.

(a) Full Sample   (b) Reduced Control
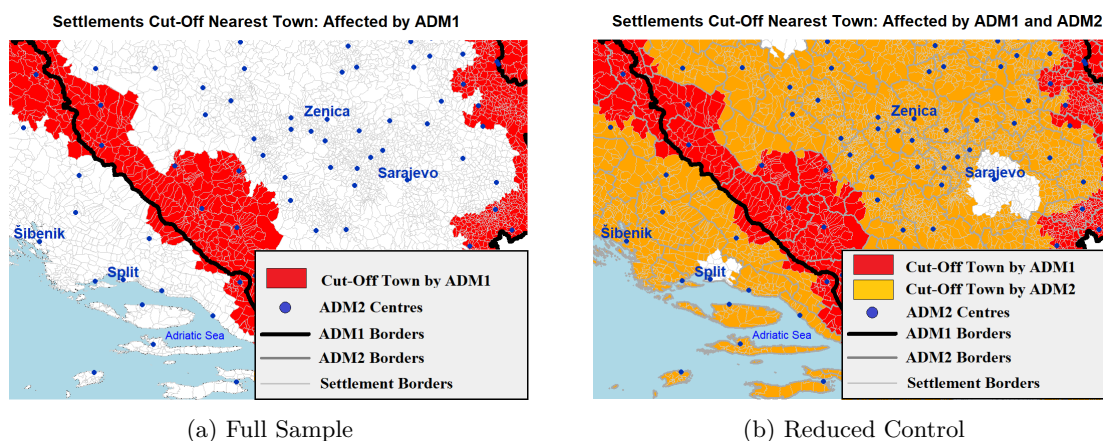
Figure 3.5: The estimation framework illustrated at the border between Bosnia-Herzegovina and Croatia.

Panel A of Figure 3.5 visualises Equation 3.1 at the border between Bosnia-Herzegovina

---

[29]Annualised population growth rates are calculated with the logarithmic growth formula: $PopGrowth = \frac{1}{censusperiod} \times ln(\frac{Pop_1}{Pop_0}) \times 100$, where *censusperiod* is the time between two censuses.

and Croatia, where all settlements that are *affected* by an ADM1 border are coloured in red. The distributed lag regression (Panel A of Figure 3.6) confirms that the parallel trends assumption holds. Yet different to the specification of Redding & Sturm (2008), Equation 3.1 identifies that *affected* settlements experienced decline after *1961-1971*.
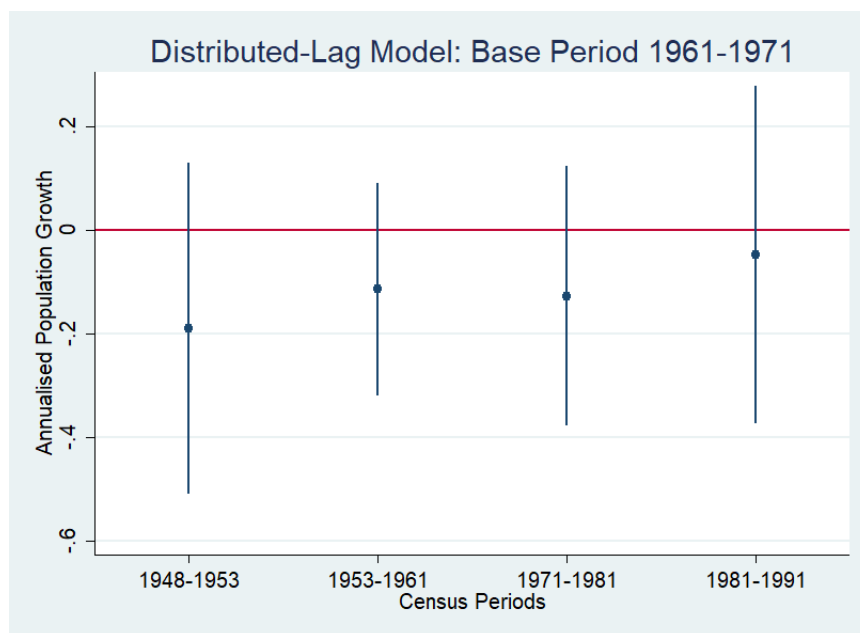

(a) Full Sample   (b) Reduced Control
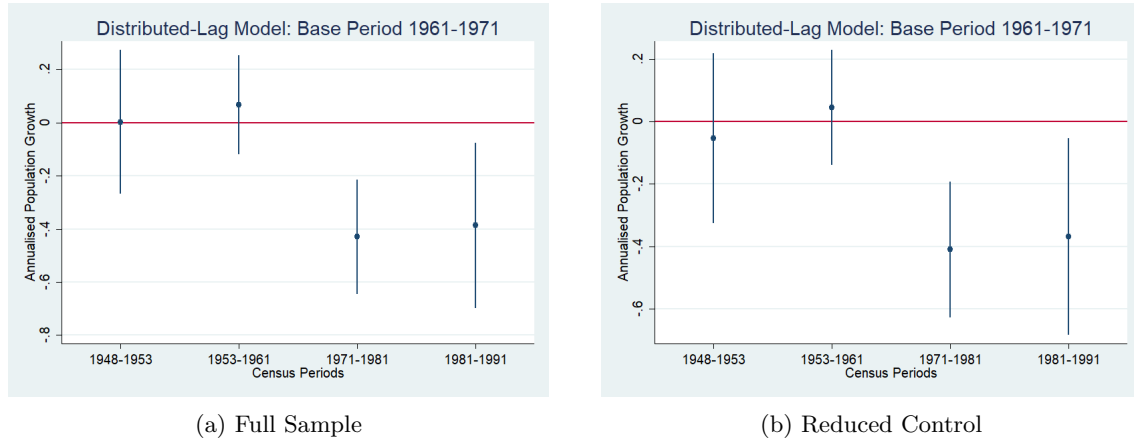
Figure 3.6: Test for parallel trends of Equation 3.1.
Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects, standard errors are clustered at the nearest administrative town (ADM2) sphere. The treatment dummy is defined according to Equation 3.1. Panel A uses the full sample, Panel B drops settlements that are *not cut off* their nearest town by an ADM2 border. Additionally, towns and islands are excluded.

If the hardening of Yugoslavia's ADM1 borders led to migration out of affected settlements, then there is concern that migration to the control group could overestimate the treatment effect. The following considerations address this concern.

First, as towns were the natural destination for internal migrants (Section 3.2.2), it appears wise to exclude all towns from the sample.[30] Second, similar to other countries Yugoslavia delineated its communal borders (ADM2) *exclusively within* republican and provincial (ADM1) borders, which implies that ADM1 borders were also ADM2 borders. Consequently, one can focus on settlements that were on at least one dimension cut off their nearest town by an ADM2 border (see Panel B of Figure 3.5).[31] Then, the federalisation reforms concern the subset of ADM2 borders that were also ADM1 borders.

This modification is supported by parallel pre-trends (Panel B of Figure 3.6) and by balancing tests (Table C of Table 3.2). As a result, the preferred estimation strategy compares 4,682 treated to 10,894 control settlements. If the reforms of 1966-1976 affected the population growth of border areas, then the causal effect should be captured by comparison of these groups before and after 1965.

---

[30]In addition, islands are dropped in the absence of information on ferry routes before 1965.
[31]Between 1955-1969 the number of communes was reduced to 500 (Novak 1955, Grupković 1991). I use the 1969 borders to drop the largest administrative extent of each town. Initially this modification only drops settlements within communes of towns with +50,000 inhabitants (see Panel B of Figure 3.5).

Table 3.2: Results of two-sample t-tests with equal variance for Equation 3.1.

Panel A:		Full Sample			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	16,596	11,911	4,685	
Population (1961)	**Mean**	847	939	612	327***
	(Std. Error)	(36)	(48)	(34)	(79)
Ann. PopGrowth (1948-1961)	**Mean**	0.39%	0.40%	0.38%	0.02%
	(Std. Error)	(0.02)	(0.02)	(0.03)	(0.04)

Panel B:		Towns and islands dropped			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	16,055	11,373	4,682	
Population (1961)	**Mean**	644	657	612	46
	(Std. Error)	(14)	(14)	(34)	(31)
Ann. PopGrowth (1948-1961)	**Mean**	0.37%	0.36%	0.38%	-0.01%
	(Std. Error)	(0.02)	(0.02)	(0.03)	(0.04)

Panel C:		Towns, islands and settlements not cut by ADM2 dropped			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	15,576	10,894	4,682	
Population (1961)	**Mean**	610	610	612	-2
	(Std. Error)	(11)	(7)	(34)	(25)
Ann. PopGrowth (1948-1961)	**Mean**	0.35%	0.34%	0.38%	-0.04%
	(Std. Error)	(0.02)	(0.02)	(0.03)	(0.04)

* p<0.10, ** p<0.05, *** p<0.01

3.5 Results

3.5.1 Baseline Result

Table 3.3: Baseline regression results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Annualised Population Growth					
Border20km × Federalism	0.0888	0.0932						
	(0.141)	(0.162)						
AffectedBorder × Federalism			-0.308**	-0.259*	-0.391**	-0.306**	-0.255*	-0.385**
			(0.151)	(0.152)	(0.182)	(0.149)	(0.150)	(0.180)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]
Restriction1[R1]	No	Yes	No	Yes	Yes	No	Yes	Yes
Restriction2[R2]	No	No	No	No	No	Yes	Yes	Yes
Restriction3[R3]	No	Yes	No	No	No	Yes	Yes	Yes
Census Period 1961-1971	Included	Included	Included	Included	Dropped	Included	Included	Dropped
Clusters	363	269	363	360	360	362	359	359
Settlements	16,596	10,600	16,596	16,055	16,055	16,107	15,576	15,576
Observations	82,980	53,000	82,980	80,275	64,220	80,535	77,880	62,304
R-Square	0.4183	0.3985	0.4188	0.4112	0.4369	0.4204	0.4128	0.4388

Standard errors in parentheses, clustered at the nearest ADM2-town sphere.
F: Includes all of Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements on at least one dimension off their nearest town.
R3: Control settlements are within 20-40km of Yugoslavia's ADM1 borders.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.3 reports the baseline regression results. Column 1-2 report the results for the specification based on Redding & Sturm (2008), whereby Column 1 uses the full sample and Column 2 includes sample restrictions. Column 3-8 report the results from the estimation of Equation 3.1. Column 3 uses the full sample, and Column 4-8 introduce the restrictions discussed in Section 3.4.

The results are as follows. First, the DiD estimate based on the specification of Redding & Sturm (2008) does not lead to a statistically significant estimate. Balancing tests (Table 3.10) and parallel pre-trends (Figure 3.4) support causal interpretation of Column 2. Hence, I conclude that Yugoslavia's federalisation reforms did *not* lead to genuine out-migration from settlements that are located within 20km of Yugoslavia's ADM1 borders. Nonetheless, the lesson learned from this specification is limited as it cannot identify that all settlements within 20km of Yugoslavia's ADM1 borders were in fact integrated across these borders prior to the reforms.

The estimation of Equation 3.1 tests whether *affected* settlements experienced changes in their population growth. That is, *AffectedBorder* only includes settlements that were on at least one dimension cut off their nearest town by Yugoslavia's ADM1 borders. Column 3 suggests that Yugoslavia's federalisation reforms are at least correlated with a decline

in the annual population growth of settlements that were (on at least one dimension) cut off their nearest town by an ADM1 border, relative to all other settlements. As expected, the estimate becomes smaller when likely migration destinations (i.e. towns) are excluded (-0.308% in Column 3 and -0.259% in Column 4). Moreover, the estimation is robust to Column 6 and Column 7, which include in the control group only settlements that were (on at least one dimension) cut off their nearest town by an ADM2 border. Furthermore, the estimation is robust to Column 5 and Column 8, both of which drop the 1961-1971 period that could be partially assigned to the pre-treatment period.

Supported by balancing tests (Figure 3.2) and parallel pre-trends (Figure 3.6), I conclude that the average reduction in annual population growth caused by the reforms is between 0.25% and 0.38% (Column 7, Column 8). Given an average annual population growth of 0.34% between 1948-1961 (Panel C in Table 3.2), this implies that the annual population growth turned to 0 due to the reforms.

3.5.2 Does Size Matter?

If the result in Section 3.5.1 in indeed caused by the loss off access to nearby market towns, then the size of the these town should matter (Krugman 1991). Based on the anthropological field work in Section 3.2.2 it seems reasonable to assume that farmers could travel up to 25km.[32] Given the median travel distances in Table 3.9, this implies that most farmers only visited the nearest administrative town (13.1km) and the nearest town with at least 5,000 inhabitants (23.8km). Table 3.4 therefore repeats the estimation separately for settlements that were cut off their nearest administrative (ADM2) town (Column 1-4), and settlements that were cut off their nearest town with at least 5,000 inhabitants (Column 5-8). First, the full sample is used for the estimation (Column 1, Column 5). Second, towns, islands and settlements that are not cut off their nearest town by an ADM2 border are dropped (Column 2, Column 6). Third, the sample is reduced to settlements within 20km of the nearest ADM1 border crossing road (Column 3, Column 7). Fourth, the sample is further reduced to settlements within 5km of the nearest ADM1 border crossing road (Column 4, Column 8).

Interpretation of Table 3.4 leads to two conclusions. First, the loss of a purely administrative town does not lead to decline in annual population growth. Causal interpretation is supported for the estimate in Column 2 by balancing tests (Table 3.11) and parallel pre-trends (Figure 3.12). Second, the loss of a town with at least 5,000 inhabitants leads to strong and statistically significant decline in annual population growth. Within 20km of the nearest ADM1 border crossing road, the annual population growth of affected settlements declined by 0.818% (Column 7). The estimate increases to -1.156% if I include only settlements within 5km of an ADM1 border crossing road

---

[32] Halpern (1963, p. 164) notes that one-way travel distances could easily reach 15 miles (24.14km). Planinica, the village studied by Lockwood (1973, 1975) is 15km travel distance from the nearest town with 5,000 inhabitants (Bugojno). According to Lockwood (1975, p. 142), the villagers of Planinica lacked the transportation technology to regularly sell their produce at the Bugojno market.

Table 3.4: Regression results testing for town size.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Annualised Population Growth				
CutOffADM2Town × Federalism	-0.123	0.0167	-0.391	-0.201				
	(0.211)	(0.226)	(0.298)	(0.357)				
CutOff5kTown × Federalism					-0.506	-0.458	-0.818**	-1.156**
					(0.313)	(0.333)	(0.402)	(0.436)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full^F	Full^F	Full^F	Full^F	Full^F	Full^F	Full^F	Full^F
Restriction1^{R1}	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Restriction2^{R2}	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Dist-To-ADM1 Border Road	175km^M	175km^M	20km	5km	175km^M	175km^M	20km	5km
Clusters	363	339	154	37	157	146	75	43
Settlements	16,596	4,513	1,756	399	16,596	9,521	3,702	642
Observations	82,980	22,565	8,870	1,995	82,980	47,605	18,510	3,210
R-Square	0.4183	0.4133	0.3804	0.3384	0.4189	0.4105	0.3832	0.3580

Standard errors in parentheses.
For Column 1-Column 4, standard errors are clustered at nearest ADM2-town sphere.
For Column 5-Column 8, standard errors are clustered at nearest 5k-town sphere.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements off their near. ADM2 town (Column 2-4) or near. 5k-town (Column 5-8).
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
* p<0.10, ** p<0.05, *** p<0.01

(Column 8). Both for Column 7 and Column 8 causal interpretation is supported by balancing tests (Table 3.12) and parallel pre-trends (Figure 3.13).

Taken together, the border effect appears where ADM1 borders cut access to *towns of significant size* (here: at least 5,000 inhabitants in 1961). Table 3.13 shows that the loss of a town with at least 10,000 and at least 20,000 inhabitants is correlated with decline, while the estimate for settlements that are cut off their nearest town with at least 50,000 inhabitants is not statistically significant. Thus I conclude that the border effect appears due to the loss of nearby significant towns rather than the loss of more distant towns.

3.5.3 Alternative Towns

The results of the previous section are best understood at an example. For this purpose Figure 3.7 zooms to an ADM1 border section between Bosnia-Herzegovina and Serbia, near the towns of Zvornik (Bosnia-Herzegovina), Mali Zvornik and Loznica (both Serbia). All of these towns functioned as communal administrative centres throughout the existence of socialist Yugoslavia and beyond. However, Loznica (10,411) and Zvornik (8,110) both counted more than 5,000 inhabitants in 1961, while Mali Zvornik only counted 1,303 inhabitants.

In Figure 3.7 the settlements of Donja Borina and Donja Trešnjica are illustrative examples as both were cut off their nearest town with at least 5,000 inhabitants. Column
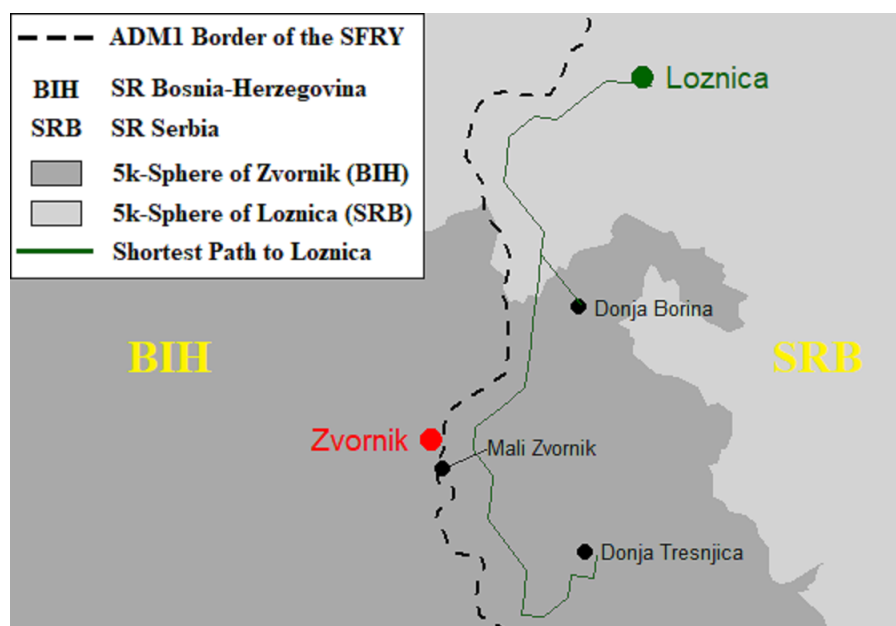
Figure 3.7: The 5k-Spheres of Zvornik and Loznica.

Note: Shortest travel paths from Donja Borina and Donja Trešnjica to their nearest alternative 5k-town in the same federal unit (Loznica, Serbia). However, the nearest 5k-town is Zvornik (Bosnia-Herzegovina).

Table 3.5: Descriptive statistics for the 5k-sphere of Zvornik (BIH).

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Zvornik-Sphere	Zvornik-Commune in BIH		Zvornik-Sphere in SRB		
	Total	N.Town=Zvornik	N.Town=Bijeljina	N.Town=Zvornik		
Settlements	294	39	3	30	Donja Borina	Donja Trešnjica
Dist. 1st 5k-Town	36km	15km	28km	32km	13km	16km
Dist. 2nd 5k-Town	55km	31km	30km	45km	16km	37km
Population (1948)	281	564	1,147	849	1,187	886
Population (1961)	375	742	1,351	901	1,395	1,044
Population (1991)	475	1,121	1,272	661	1,707	730
A. PopGrowth (48-61)	2.23%	2.10%	1.26%	0.46%	1.24%	1.26%
A. PopGrowth (61-91)	0.78%	1.38%	-0.20%	-1.03%	0.67%	-1.19%
Diff. (61-91 – 48-61)	*-1.44*	*-0.72*	*-1.46*	*-1.49*	*-0.57*	*-2.45*

Note: Mean distance and population values of settlements with Zvornik (BIH) as the nearest town with at least 5,000 inhabitants. 294 settlements are in Zvornik's sphere (Column 1), out of which 39 are located in the Zvornik commune (Column 2). Column 4 adds the 3 settlements in the Zvornik commune that are closer to Bijeljina (BIH), but cut off Bijeljina by an ADM2 (communal) border. Annualised population growth rates (1948-1961, 1961-1991) are calculated using the logarithmic growth formula.

6 and Column 7 of Table 3.5 show that both settlements were similar in size and population growth until 1961, and both experienced significant decline between 1961 and 1991.[33]

Nonetheless there is an important difference between Donja Borina and Donja Trešnjica. Both settlements are nearest to the *inaccessible* Zvornik, and for both the *nearest accessible alternative town* within Serbia is Loznica. Still, once we assume that farmers attend the nearest significant market, it becomes obvious that the hardening of the ADM1 border provided less of an obstacle to Donja Borina, where the additional travel distance to Loznica (16km) instead of Zvornik (13km) is just 3km. In contrast, Donja Trešnjica faced an additional 21km (Figure 3.7). In line with this interpretation, Donja Trešnjica (Column 7) experienced a much stronger decline than Donja Borina (Column 6) and the sphere average (Column 1).

Following the examples of Donja Borina and Donja Trešnjica, I expect that the estimates in Section 3.5.1 and Section 3.5.2 are driven by settlements that lacked a nearby alternative town in the same federal unit. To test this hypothesis, I split the variable *CutOff5kTown* into two groups. *CutOff5kTownDistAlt* is the subset where the nearest alternative town in the same federal unit is rather distant, and *CutOff5kTownNearAlt* is the subset where the nearest alternative town in the same federal unit is rather near. To identify whether the alternative town is distant or near, I examine for each settlement the *additional travel distance* incurred due to travelling to the nearest alternative town *within the same federal unit*. Then, comparison to the median (19.9km) identifies whether the alternative town is rather distant or rather near.

Table 3.6 reports the regression results. Column 1 uses the full sample, restrictions are introduced in Column 2-4. In Column 5 the sample includes only settlements in Bosnia-Herzegovina, in Column 6 only settlements in Croatia, in Column 7 only settlements in Central Serbia, and in Column 8 only settlements in Vojvodina.

Table 3.6 leads to only one conclusion. As expected, settlements with a relatively near alternative town in the same federal unit *do not* drive the border effect. Instead, it appears that settlements with a relatively distant alternative town *do* experience strong and statistically significant declines in their annual population growth following the federalisation reforms. The estimate in Column 4 suggests that affected settlements with a distant alternative experienced an average decline in their annualised population growth rate by 1.487%. Causal interpretation of this estimate is supported by balancing tests (Table 3.14) and parallel pre-trends (Figure 3.14). Moreover, the Wald test in Column 4 supports the conclusion that settlements experience decline when their inhabitants cannot reshuffle their economic activities to nearby alternative markets. This estimate is also confirmed when the sample is restricted to the individual federal units (Column 5-7). Only for the Vojvodina sample (Column 8) there is no statistically

---

[33]The entire Zvornik sphere declined between 1961 and 1991 (Column 1). Donja Borina and Donja Trešnjica are two out of the 30 treated settlements averaged in Column 5. When the average annualised population growth rates of all treated settlements (Column 5) are compared to settlements within the Zvornik commune that are nearest to Zvornik (Column 3), then the difference is much larger as when compared to settlements within the Zvornik commune that are cut by an ADM2 border (Column 4). This supports the preferred estimation strategy, which compares Column 5-7 to Column 4.

significant effect, which might be due to its small territory and the proximity to Belgrade.

Table 3.6: Regression results testing for the role of alternative towns.

	Annualised Population Growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CutOff5kTownDistAlt $\times$ Federalism (β_1)	-0.878***	-0.834***	-1.235***	-1.487***	-0.746**	-0.719*	-1.676***	-0.292
	(0.270)	(0.287)	(0.361)	(0.512)	(0.309)	(0.390)	(0.504)	(0.409)
CutOff5kTownNearAlt $\times$ Federalism (β_2)	-0.142	-0.0870	-0.366	-0.715*	-0.380	-0.246	-1.131	-0.777
	(0.352)	(0.372)	(0.426)	(0.407)	(0.452)	(0.395)	(0.795)	(1.126)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full[F]	Full[F]	Full[F]	Full[F]	BIH[FB]	HRV[FH]	SRB[S]	VOJ[FV]
Restriction1[R1]	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Restriction2[R2]	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Dist-To-ADM1 Border Road	175km[M]	175km[M]	20km	5km	99km[MB]	117km[MC]	175km[MS]	117km[MV]
Clusters	157	146	75	43	45	51	48	30
Settlements	16,596	9,521	3,702	642	3,409	3,620	2,328	164
Observations	82,980	47,605	18,510	3,210	17,045	18,100	11,640	820
Wald Test ($\beta_1 = \beta_2$), p-value	0.0060	0.0053	0.0016	0.0654				
R-Square	0.4192	0.4111	0.3851	0.3600	0.4398	0.3399	0.5127	0.3840

Standard errors in parentheses, clustered at nearest 5k-town sphere.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
FB: Includes all settlements in Bosnia-Herzegovina.
FH: Includes all settlements in Croatia.
FS: Includes all settlements in Central Serbia.
FV: Includes all settlements in Vojvodina.
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
MB: In Bosnia-Herzegovina, the maximum distance to an ADM1 Border Crossing Road is 99km.
MC: In Croatia, the maximum distance to an ADM1 Border Crossing Road is 117km.
MS: In Central Serbia, the maximum distance to an ADM1 Border Crossing Road is 175km.
MV: In Vojvodina, the maximum distance to an ADM1 Border Crossing Road is 117km.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements off their nearest 5k-town.
* p<0.10, ** p<0.05, *** p<0.01

Note: The definition of the variables is described in the text above. Figure 3.5 illustrates one settlement with a distant alternative (Donja Trešnjica) and one settlement with a near alternative (Donja Borina).

3.5.4   Border Sections and Ethnicity

If the border effect is due to federalism, then it should appear on all subsections of Yugoslavia's ADM1 borders.[34] More specifically, two aspects are relevant.

First, declining population growth should appear both on border sections *within* and *between* former Ottoman and Austro-Hungarian territories (Figure 3.8). To address this hypothesis I turn to the border between Bosnia-Herzegovina and Serbia (both former Ottoman Empire), to the border between Croatia and Slovenia (both former Austria-Hungary) and to the border between Croatia and Bosnia-Herzegovina (former border between the Ottoman Empire and Austria-Hungary).

---

[34]With the available data I can study 9 out of the total 12 ADM1 border sections. The border sections are: Slovenia-Croatia, Croatia-Bosnia-Herzegovina, Croatia-Montenegro, Croatia-Vojvodina, Vojvodina-Central-Serbia, Central-Serbia-Bosnia-Herzegovina, Central-Serbia-Montenegro, Central-Serbia-Kosovo, Central-Serbia-Macedonia, Kosovo-Macedonia, Kosovo-Montenegro and Bosnia-Herzegovina-Montenegro. In the absence of population data for Kosovo, Macedonia and Montenegro I have to exclude the following border sections: Kosovo-Macedonia and Kosovo-Montenegro. Due to few border crossing roads in 1965 I have to exclude the borders between Central-Serbia and Macedonia and between Croatia and Montenegro. Table 3.15 reports correlations for all available border sections.

Second, the spatial distribution of Yugoslavia's ethnic groups allows to focus on border sections that separate the same and different ethnic groups (Figure 3.9). As multi-ethnic Bosnia-Herzegovina contains numerous settlements with an ethnic Serbian (Croatian) majority, I can test whether the population growth declined in Serbian (Croatian) settlements that were cut off Serbian (Croatian) majority towns in neighbouring Serbia[35] (Croatia[36]). To obtain the ethnic majority of towns I have digitised the ethnicity census of 1961. However, for the more than 15,000 settlements I could only obtain the ethnicity censuses of 1981 and 1991. As a consequence, I restrain myself from causal interpretation.[37]

Table 3.7 is organised as follows. Column 1 and Column 2 include only settlements within 20km of the border between Bosnia-Herzegovina and Serbia. Column 1 includes only settlements with at least 50% Serbs, and Column 2 includes only settlements with at least 95% Serbs. In both specifications *CutOff5kTown* only turns 1 if a settlement is cut off a town that had a Serbian majority in 1961. Focusing on Croats, Column 5-6 apply the same estimation principle to the border between Bosnia-Herzegovina and Croatia, and Column 3-4 focus on the border between Croatia and Slovenia. Each column is supported by parallel pre-trends (Figure 3.15, Figure 3.17, Figure 3.16).

Both Column 1 and Column 2 suggest that Serbian majority settlements cut off Serbian majority towns experienced declining population growth following the reforms. As Column 5 and Column 6 show similar estimates for Croatian majority settlements cut off Croatian majority towns, I conclude that the border effect appeared on ADM1 borders that separated the *same* ethnic group.

Column 3 and Column 4 focus on the border between Croatia and Slovenia. As all towns in Slovenia had a Slovenian majority in 1961, both Column 3 and Column 4 suggest that Croatian majority settlements cut off Slovenian majority towns experienced decline following the reforms. Hence, I conclude that the border effect also appeared when ADM1 borders separated *different* ethnic groups.

As the effect appears on the border between Bosnia-Herzegovina and Serbia (Column 1-2), I conclude that it *cannot* be due to legacies of the Ottoman Empire. As the effect appears on the border between Croatia and Slovenia (Column 3-4), I conclude that it *cannot* be due to legacies of Austria-Hungary. Finally, as the effect also appears on the border between Bosnia-Herzegovina and Croatia (Column 5-6), I conclude that it *cannot* be due to the former partition between the Ottoman Empire and Austria-Hungary.

---

[35]The towns in question in Serbia are Bogatić, Loznica, Priboj, Titovo Užice, Valjevo and Šabac.

[36]The towns in question in Croatia are Dubrovnik, Gospić, Karlovac, Kutina, Nova Gradiška, Petrinja, Slavonska Požega, Slavonski Brod, Split, Đakovo and Županja.

[37]The available ethnicity data for settlements in Croatia and Serbia come from the 1981 census. The available ethnicity data for settlements in Bosnia-Herzegovina come from the 1991 census. Therefore, a settlement with +50% Serbs (Croats) could have had +50% of another ethnic group before the reforms (1961). As a robustness check I re-run the regression for samples with +95% Serbs (Croats). Nonetheless, in the absence of ethnicity data from 1961 I restrain myself from causal conclusions.

Table 3.7: Regression results for specific border sections and ethnic groups.

	Annualised Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
CutOff5kTown × Federalism	-0.939**	-0.992***	-0.765***	-0.469***	-1.133**	-0.920*
	(0.275)	(0.241)	(0.145)	(0.157)	(0.479)	(0.483)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]
Ethnicity Settlement[ES]	+50% Serbs	+95% Serbs	+50% Croats	+95% Croats	+50% Croats	+95% Croats
Ethnicity Cut Off Town[ET]	+50% Serbs	+50% Serbs	+50% Slovenes	+50% Slovenes	+50% Croats	+50% Croats
5k Town is in	SRB	SRB	SLO	SLO	HRV	HRV
Restriction1[R1]	Yes	Yes	Yes	Yes	Yes	Yes
Restriction2[R2]	Yes	Yes	Yes	Yes	Yes	Yes
20km-To-Border Section	SRB-BIH	SRB-BIH	HRV-SLO	HRV-SLO	HRV-BIH	HRV-BIH
Dist-To-ADM1 Border Road	20km	20km	20km	20km	20km	20km
Settlements	203	168	1,253	926	179	131
Observations	1,015	840	6,265	4,630	895	655
R-Square	0.3485	0.4895	0.3066	0.3011	0.4041	0.4116

Standard errors in parentheses, clustered at settlement level.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
ES: Ethnicity data for settlements come from 1981 (Croatia, Serbia) and 1991 (Bosnia-Herzegovina).
ET: Ethnicity data for all towns come from 1961.
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements off their nearest 5k-town.
* p<0.10, ** p<0.05, *** p<0.01

3.5.5 Towns and Urbanisation

As a final robustness check I turn to the sample of towns. In fact, an alternative explanation for the declining population growth rates of cut off border settlements could be in increased urbanisation of the corresponding towns.

In Column 1 of Table 3.8 I keep only the available 339 towns.[38] To identify *affected* towns, I calculate for each town with at least 5,000 inhabitants the share of settlements that is cut off by an ADM1 border. In Column 1, Column 3, Column 5 and Column 7 a town requires at least 1% of the settlements within its sphere to be cut by an ADM1 border. In Column 2, Column 4, Column 6 and Column 8 a town requires at least 50% of the settlements within its sphere to be cut by an ADM1 border. Moreover, the sample is restricted to towns within 40km of an ADM1 border crossing road. Column 3-4 only use towns within 40km of the border between Serbia and Bosnia-Herzegovina, Column 5-6 only use towns within 40km of the border between Croatia and Slovenia, and Column 7-8 only use towns within 40km of the border between Bosnia-Herzegovina and Croatia.

Across all specifications in Table 3.8 I do not obtain statistically significant estimates. For Column 1 and Column 2 causal interpretation is supported by balancing tests (Table 3.16) and parallel pre-trends (Figure 3.18). Hence, I conclude that the declining

[38]The total number of towns is 468. However, this number includes towns in Slovenia, Montenegro, Macedonia and Kosovo. The lack of available population data for all towns constrain the data set to all 339 towns that are located in Croatia, Bosnia-Herzegovina and Serbia (without Kosovo).

Table 3.8: Regression results for 5k-towns with +1% (+50%) of their sphere cut.

				Annualised Population Growth				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
5kTownLostSettlements × Federalism	0.391	0.258	0.574	0.359	-0.962	-0.0683	0.177	-0.149
	(0.251)	(0.458)	(0.959)	(1.198)	(0.618)	(0.862)	(0.450)	(0.576)
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]	Full[F]
Share of 5k-Sphere Cut	+1%	+50%	+1%	+50%	+1%	+50%	+1%	+50%
Restriction1[R1]	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dist-To-ADM1 Border Road	175km[M]	40km	175km[M]	40km	175km[M]	40km	175km[M]	40km
40km-To-Border-Section			SRB-BIH	SRB-BIH	HRV-SLO	HRV-SLO	HRV-BIH	HRV-BIH
Towns	339	121	40	30	28	14	84	60
Observations	1,695	605	200	150	140	70	420	300
R-Square	0.4352	0.3403	0.3151	0.2570	0.2184	0.1989	0.3767	0.3633

Standard errors in parentheses, clustered at the town level.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
R1: Islands dropped.
* p<0.10, ** p<0.05, *** p<0.01

population growth rates in cut off settlements *cannot* be driven be increased urbanisation of towns that had some of their sphere cut by an ADM1 border.

3.6 Conclusion

The case of the Socialist Federal Republic of Yugoslavia (1945-1991) provides evidence for negative externalities emerging from federalism. Between 1966 and 1976, Yugoslavia's republican and provincial governments (ADM1) gained the competencies to regulate the sale of products on their territories. Moreover, historians discuss whether these reforms marked the start of Yugoslavia's disintegration (Ramet 1992, Jakir 2005, Kežić 2017).

This chapter demonstrates that the hardening of Yugoslavia's ADM1 borders after 1965 led to the decline of settlements that were previously integrated across these borders. The key methodological contribution of this chapter is therefore in the identification of *affected* border areas. Different to previous literature, the algorithm of Dijkstra et al. (1959) is applied to obtain travel paths based on elevation, rivers and roads. The resulting commuting spheres demonstrate that two sides of the same border were affected differently by the federalisation. On the one side, there are settlements *cut off* their nearest town if that town is on the other side of the border. On the other side, there are settlements that are *not cut off* the same town and thus the hardening of the border does not necessarily affect daily activities, such as the commuting to the nearest market place.

The empirical results show that borders cause reductions in market access. Precisely, the evidence leads to two important conclusions. First, whether a border settlement depopulates depends on whether its nearest *significant* town is on the same or on the other side of the border. For Yugoslavia in the 1960s, *significant* towns had at least

5,000 inhabitants. Importantly, mere geographic proximity to an ADM1 border is not sufficient to experience decline. In response to the persistence literature, the evidence of this chapter demonstrates that there is no compelling reason to associate *border effects* with *borders* when there is no interaction feasible due to topography, infrastructure and regional integration.

Second, the empirical evidence shows that the loss of access to the nearest town only leads to decline when the nearest alternative town on the same side of the border is rather distant. Therefore I conclude that individuals migrate away from borders when they cannot reshuffle their activities, which highlights the importance of market access. Concerning the unresolved status of the Serbia-Kosovo border, the evidence underlines that the *hardening* of the border harms locals on both sides of the border (Figure 3.19).

3.7 Appendix

3.7.1 Maps

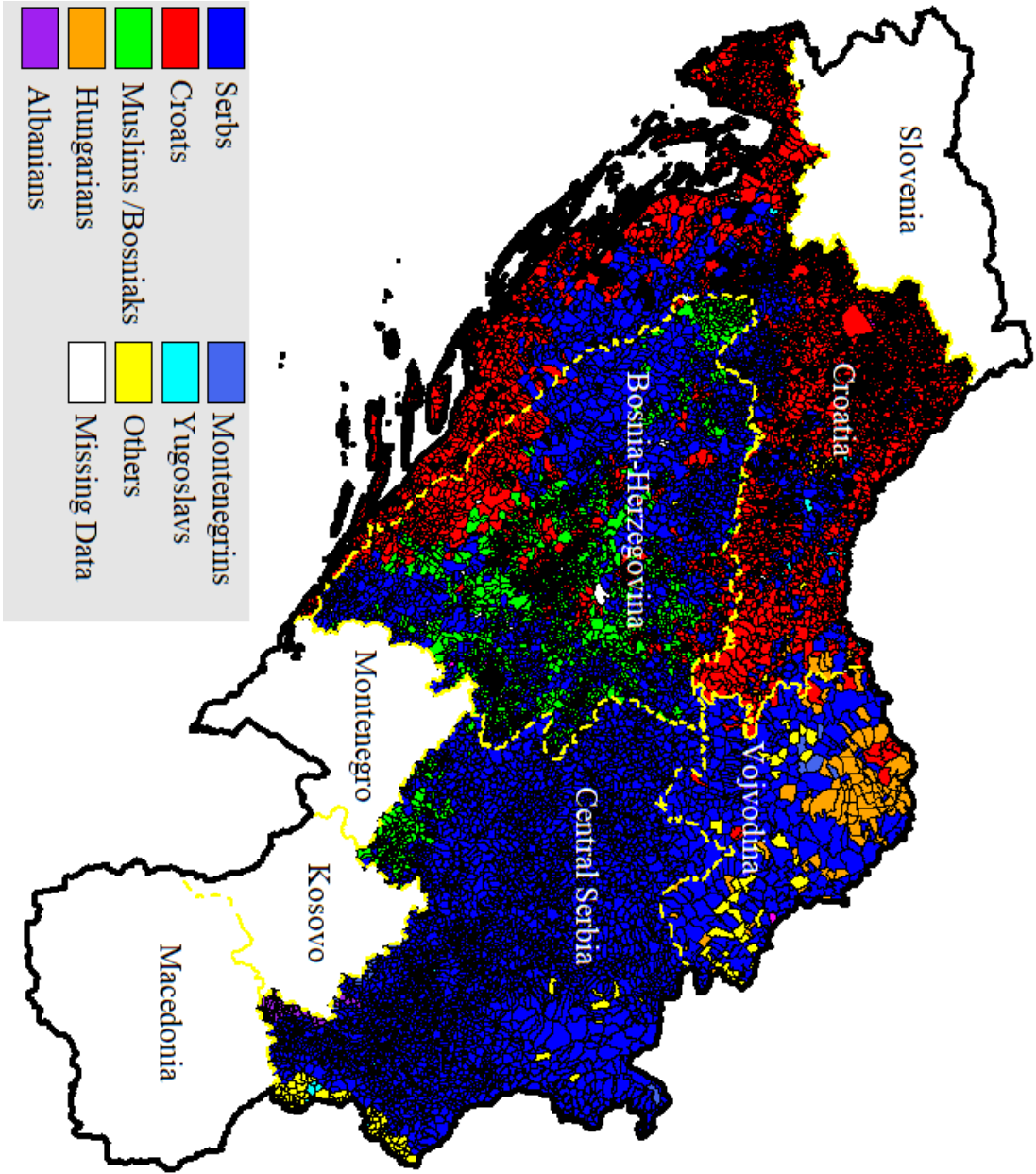Figure 3.8: The Balkans before World War I, based on Hamilton (1968, p. 16).

Figure 3.9: Largest ethnic groups in Croatia, Central Serbia and Vojvodina (all Census 1981), and Bosnia-Herzegovina (Census 1991).

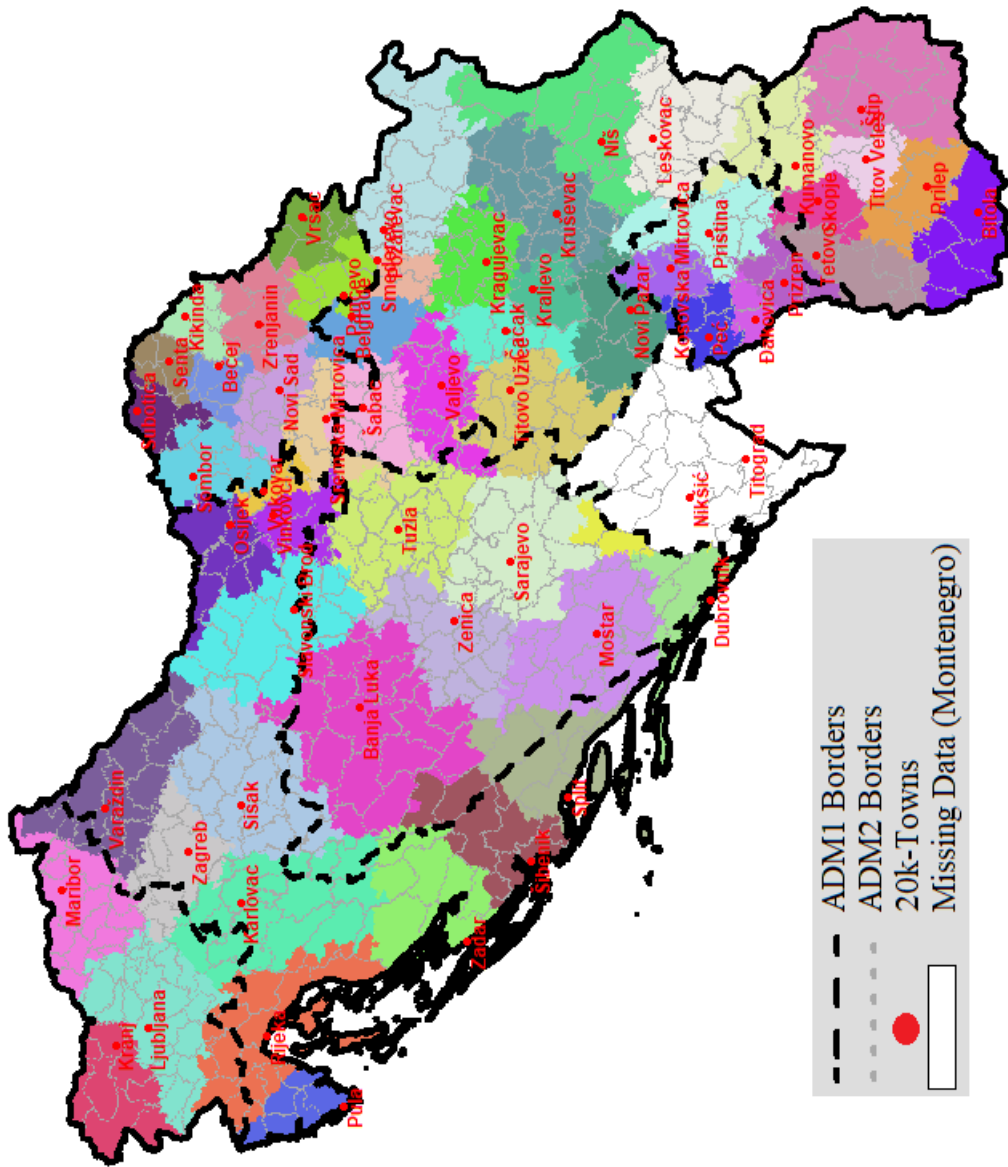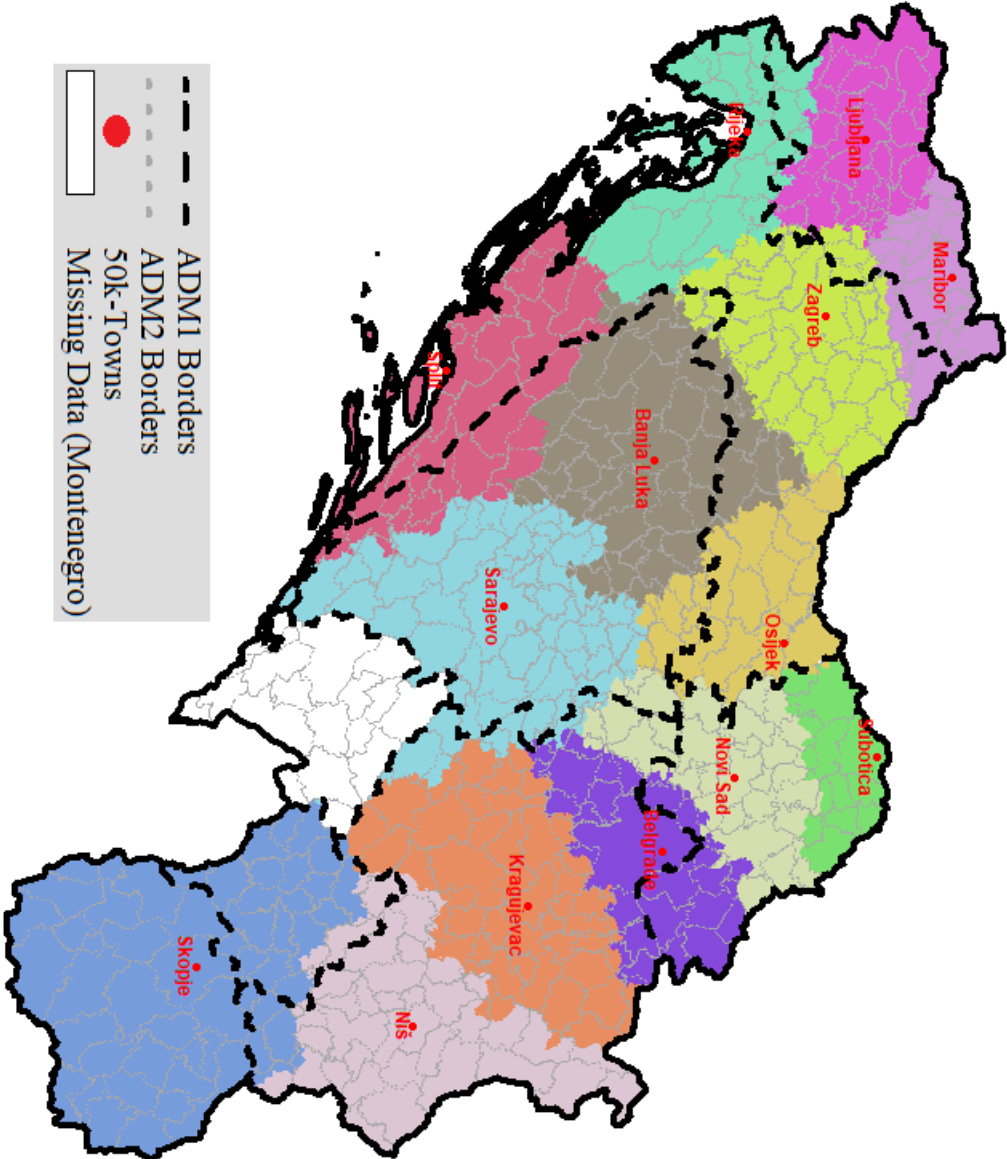Figure 3.10: Commuting spheres of towns with +20,000 inhabitants (in 1961).

Figure 3.11: Commuting spheres of towns with +50,000 inhabitants (in 1961).

3.7.2 Travel Distances

Table 3.9: Median travel distances between 26,149 settlements and 468 towns.

Nearest Rank	Distance to Nearest Town				
	ADM2 Towns	5k Towns	10k Towns	20k Towns	50k Towns
First	13.1km	23.8km	34.7km	44.7km	74.4km
Second	24.2km	41.3km	59.8km	75.6km	141.9km
Third	32.4km	53.6km	77km	101.7km	190.5km
Fourth	39.7km	64.7km	92.6km	123.7km	235.5km
Fifth	49.9km	76.9km	110.1km	147km	293.9km

Note: All towns had the status as a communal administrative centre (ADM2) between 1945 and 1991. This set of towns is broken down into towns with at least 5,000 inhabitants, towns with at least 10,000 inhabitants, towns with at least 20,000 inhabitants and towns with at least 50,000 inhabitants (all based on the 1961 census). For each layer the median travel distances are reported for the nearest, second nearest, third nearest, fourth nearest and fifth nearest town.

3.7.3 Methodology of Redding & Sturm (2008) Applied

Table 3.10: Results of two-sample t-tests with equal variance for the strategy of Redding & Sturm (2008).

Treatment = 0-20km to ADM1 Border; Control = All Other Settlements				
Panel A:		Full Sample		
		All	**Control**	**Treatment**	**Difference**
	Observations	16,596	9,821	6,775	
Population (1961)	**Mean**	846.74	833.08	866.55	-33.47
	(Std. Error)	(35.74)	(27.86)	(77.68)	(72.71)
Ann. PopGrowth (1948-1961)	**Mean**	0.39%	0.49%	0.26%	0.23%***
	(Std. Error)	(0.02)	(0.02)	(0.03)	(0.03)

Panel B:		Towns and islands dropped		
		All	**Control**	**Treatment**	**Difference**
	Observations	16,055	9,403	6,652	
Population (1961)	**Mean**	644.10	647.10	639.87	7.23
	(Std. Error)	(14.20)	(10.42)	(30.96)	(28.84)
Ann. PopGrowth (1948-1961)	**Mean**	0.37%	0.48%	0.21%	0.26%***
	(Std. Error)	(0.02)	(0.02)	(0.03)	(0.03)

Panel C:		Panel B + Control restricted to 20-40km		
		All	**Control**	**Treatment**	**Difference**
	Observations	10,600	3,948	6,652	
Population (1961)	**Mean**	635.69	628.66	639.87	-11.21
	(Std. Error)	(20.03)	(13.10)	(30.96)	(41.43)
Ann. PopGrowth (1948-1961)	**Mean**	0.23%	0.26%	0.21%	0.04%
	(Std. Error)	(0.02)	(0.03)	(0.03)	(0.04)

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Note: The preferred sample for the estimation of causal effects is Panel C, which is used in Figure 3.4.

3.7.4 Does Size Matter?

Table 3.11: Results of two-sample t-tests with equal variance (ADM2-Towns).

Affected = Cut Off Nearest ADM2 Town; Unaffected = Not Cut Off Nearest ADM2 Town					
Panel A:		**Full Sample**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	16,596	15,726	870	
Population (1961)	**Mean**	847	864	531	333**
	(Std. Error)	(36)	(37)	(82)	(160)
Ann. PopGrowth (1948-1961)	**Mean**	0.39%	0.41%	0.17%	0.24%***
	(Std. Error)	(0.02)	(0.02)	(0.06)	(0.08)
Panel B:		**Towns and islands dropped + NotCutByADM2 dropped**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	4,513	3,646	867	
Population (1961)	**Mean**	574	585	527	58
	(Std. Error)	(19)	(12)	(82)	(47)
Ann. PopGrowth (1948-1961)	**Mean**	0.20%	0.21%	0.16%	0.05%
	(Std. Error)	(0.03)	(0.03)	(0.06)	(0.07)
Panel C:		**Panel B + Only within 20km of an ADM1 Border Road**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	1,756	903	853	
Population (1961)	**Mean**	502	476	530	-53
	(Std. Error)	(42)	(23)	(83)	(84)
Ann. PopGrowth (1948-1961)	**Mean**	-0.10%	-0.34%	0.15%	-0.48%***
	(Std. Error)	(0.04)	(0.06)	(0.06)	(0.09)
Panel D:		**Panel B + Only within 5km of an ADM1 Border Road**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	399	83	316	
Population (1961)	**Mean**	405	354	418	-64
	(Std. Error)	(31)	(75)	(34)	(77)
Ann. PopGrowth (1948-1961)	**Mean**	-0.19%	-0.98%	0.02%	-1.00%***
	(Std. Error)	(0.10)	(0.22)	(0.10)	(0.23)

* p<0.10, ** p<0.05, *** p<0.01

Note: These are the balancing tests for the subsample of settlements that are cut off their nearest administrative town (ADM2) by an ADM1 border. The preferred sample for the estimation of causal effects is Panel B.

Table 3.12: Results of two-sample t-tests with equal variance (5k-Towns).

Affected = Cut Off Nearest 5k-Town; Unaffected = Not Cut Off Nearest 5k-Town					

Panel A:		**Full Sample**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	16,596	15,014	1,582	
Population (1961)	**Mean**	847	891	428	463***
	(Std. Error)	(36)	(39)	(46)	(122)
Ann. PopGrowth (1948-1961)	**Mean**	0.39%	0.44%	-0.01%	0.45%***
	(Std. Error)	(0.02)	(0.02)	(0.06)	(0.02)

Panel B:		**Towns and islands dropped + NotCutByADM2 dropped**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	9,521	7,965	1,556	
Population (1961)	**Mean**	521	545	397	148***
	(Std. Error)	(10)	(7)	(46)	(26)
Ann. PopGrowth (1948-1961)	**Mean**	0.20%	0.25%	-0.06%	0.32%***
	(Std. Error)	(0.02)	(0.02)	(0.06)	(0.06)

Panel C:		**Panel B + Only within 20km of an ADM1 Border Road**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	3,702	2,254	1,448	
Population (1961)	**Mean**	434	458	398	60
	(Std. Error)	(20)	(11)	(49)	(42)
Ann. PopGrowth (1948-1961)	**Mean**	-0.11%	-0.11%	-0.09%	-0.02%
	(Std. Error)	(0.03)	(0.04)	(0.06)	(0.07)

Panel D:		**Panel B + Only within 5km of an ADM1 Border Road**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	642	248	394	
Population (1961)	**Mean**	345	365	333	32
	(Std. Error)	(20)	(29)	(27)	(41)
Ann. PopGrowth (1948-1961)	**Mean**	-0.39%	-0.49%	-0.33%	-0.16%
	(Std. Error)	(0.09)	(0.15)	(0.10)	(0.18)

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Note: These are the balancing tests for the subsample of settlements that are cut off their nearest town with at least 5,000 inhabitants by an ADM1 border. The preferred samples for the estimation of causal effects are Panel C and Panel D.

(a) Full Sample   (b) Reduced Control

Figure 3.12: Test for parallel trends: CutOffADM2Town.

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the nearest administrative town sphere. The treatment group includes all settlements that are cut off their nearest administrative town (ADM2) by an ADM1 border. Towns and islands are excluded. Following the balancing tests in Table 3.11, Panel A uses the full sample, Panel B drops settlements that are *not cut off* their nearest town by an ADM2 border.

(a) Dist-to-ADM1-Border: 20km   (b) Dist-to-ADM1-Border: 5km

Figure 3.13: Test for parallel trends: CutOff5kTown.

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the nearest 5k-town sphere. The treatment group includes all settlements that are cut off their nearest town with at least 5,000 inhabitants by an ADM1 border. Both regressions use the reduced sample, which drops settlements that are *not cut off* their nearest town by an ADM2 border. Additionally, towns and islands are excluded. Following the balancing tests in Table 3.12, Panel A reduces distance to the nearest ADM1-Border-Road to 20km, Panel B reduces distance to the nearest ADM1-Border-Road to 5km.

3.7.5 Spheres of Larger Towns

Table 3.13: Regression results for settlements that are cut off their nearest town with at least 10,000, 20,000 and 50,000 inhabitants.

	Annualised Population Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
CutOff10kTown × Federalism	-0.902***	-1.374***				
	(0.337)	(0.348)				
CutOff20kTown × Federalism			-0.651*	-0.896**		
			(0.342)	(0.348)		
CutOff50kTown × Federalism					0.319	0.497
					(0.280)	(0.376)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full^F	Full^F	Full^F	Full^F	Full^F	Full^F
Restriction1^{R1}	Yes	Yes	Yes	Yes	Yes	Yes
Restriction2	Yes^{R2}	Yes^{R2}	Yes^{R3}	Yes^{R3}	Yes^{R4}	Yes^{R4}
Dist-To-ADM1 Border Road	175km^M	20km	175km^M	20km	175km^M	20km
Clusters	86	48	49	36	14	13
Settlements	11,947	4,334	13,297	4,522	14,912	4,947
Observations	59,735	21,670	66,485	22,610	74,560	24,735
R-Square	0.4073	0.3834	0.4121	0.3792	0.4117	0.3754

Standard errors in parentheses.
For Column 1-Column 2, standard errors are clustered at nearest 10k-town sphere.
For Column 3-Column 4, standard errors are clustered at nearest 20k-town sphere.
For Column 5-Column 6, standard errors are clustered at nearest 50k-town sphere.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements off near. 10k-town (Column 1-2).
R3: ADM2 border cuts control settlements off near. 20k-town (Column 3-4).
R4: ADM2 border cuts control settlements off near. 50k-town (Column 5-6).
* p<0.10, ** p<0.05, *** p<0.01

3.7.6 Alternative Towns

Table 3.14: Results of two-sample t-tests with equal variance (Alternatives).

Affected = Cut Off Nearest 5k-Town; Control = Not Cut Off Nearest 5k-Town					
Panel A:	**Towns, islands and NotCutByADM2 dropped. Sample reduced to 5km to nearest ADM1 border road.**				
		All	**Control**	**Affected-DistAlt**	**Difference**
	Observations	473	248	225	
Population (1961)	**Mean**	346	365	326	39
	(Std. Error)	(22)	(29)	(33)	(44)
Ann. PopGrowth (1948-1961)	**Mean**	-0.32%	-0.49%	-0.14%	-0.35%*
	(Std. Error)	(0.11)	(0.15)	(0.15)	(0.21)

Panel B:	**Towns, islands and NotCutByADM2 dropped. Sample reduced to 5km to nearest ADM1 border road.**				
		All	**Control**	**Affected-NearAlt**	**Difference**
	Observations	417	248	169	
Population (1961)	**Mean**	355	365	341	23
	(Std. Error)	(25)	(29)	(45)	(52)
Ann. PopGrowth (1948-1961)	**Mean**	-0.53%	-0.49%	-0.59%	0.10%
	(Std. Error)	(0.11)	(0.15)	(0.14)	(0.22)

Affected = Cut Off Nearest 5k-Town; Control = Not Cut Off Nearest 5k-Town					
Panel C:	**Towns, islands and NotCutByADM2 dropped. Sample reduced to 4km to nearest ADM1 border road.**				
		All	**Control**	**Affected-DistAlt**	**Difference**
	Observations	344	175	169	
Population (1961)	**Mean**	356	369	343	26
	(Std. Error)	(27)	(35)	(41)	(53)
Ann. PopGrowth (1948-1961)	**Mean**	-0.28%	-0.43%	-0.12%	-0.32%
	(Std. Error)	(0.18)	(0.18)	(0.13)	(0.26)

Panel D:	**Towns, islands and NotCutByADM2 dropped. Sample reduced to 4km to nearest ADM1 border road.**				
		All	**Control**	**Affected-NearAlt**	**Difference**
	Observations	304	175	129	
Population (1961)	**Mean**	354	369	333	36
	(Std. Error)	(31)	(35)	(57)	(63)
Ann. PopGrowth (1948-1961)	**Mean**	-0.47%	-0.43%	-0.53%	-0.1%
	(Std. Error)	(0.12)	(0.18)	(0.15)	(0.25)

* p<0.10, ** p<0.05, *** p<0.01

Note: These are the balancing tests for the subsample of settlements that are cut off their nearest town with at least 5,000 inhabitants by an ADM1 border. The treatment variable is split into settlements with a near alternative 5k-town in the same federal unit, and with a distant alternative. Whether the alternative is distant or near is determined by comparison to the median of the additional distances to the nearest alternative town in the same federal unit. In Panel A only the 1948-1961 annualised population growth rates of affected towns with a distant alternative is biased at the 10% level. However, this bias is removed if the sample is further restricted to max 4km to the nearest ADM1 border crossing road (Panel C), which does also not affect the estimation results. As there is otherwise no bias, Table 3.14, together with Figure 3.14, supports causal interpretation.
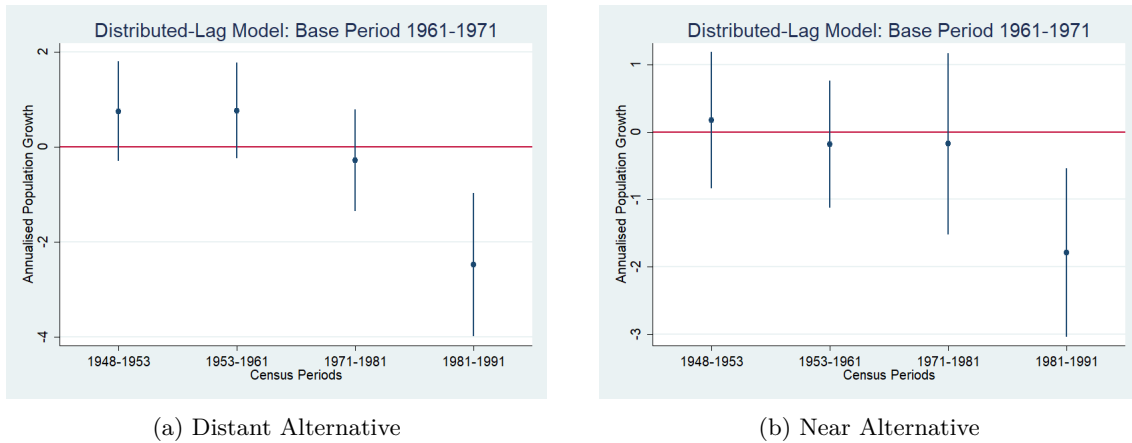
(a) Distant Alternative

(b) Near Alternative

Figure 3.14: Test for parallel trends: CutOff5kTown and Alternative Towns

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the nearest 5k-town sphere. The treatment group includes all settlements that are cut off their nearest town with at least 5,000 inhabitants by an ADM1 border. Here the treatment group is split into a group of settlements with a distant or near alternative within the same federal unit. Whether the alternative is distant or near is determined by comparison to the median of the additional distances to the nearest alternative town in the same federal unit. Both regressions use the reduced sample, which drops settlements that are *not cut off* their nearest town by an ADM2 border. Additionally, towns and islands are excluded. Following the balancing tests in Table 3.14, the sample is reduced to include only settlements within 5km of an ADM1 border crossing road. Panel A drops settlements with a near alternative, Panel B drops settlements with a distant alternative.

3.7.7 Border Sections and Ethnicity

Table 3.15: Regression results split into all available ADM1 border sections.

	Annualised Population Growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CutOff5kTownHRVSLO × Federalism	0.471 (0.503)	0.546 (0.513)	0.129 (0.557)	-0.552 (0.544)		-0.139 (0.552)		
CutOff5kTownHRVBIH × Federalism	-0.289 (0.224)	-0.271 (0.237)	-0.659** (0.321)	-1.255*** (0.455)	-0.0219 (0.347)	-0.792*** (0.290)		
CutOff5kTownHRVVOJ × Federalism	-0.385 (0.262)	-0.335 (0.273)	-0.621* (0.312)	-1.033** (0.473)		-0.806** (0.329)		-2.345 (1.602)
CutOff5kTownSRBVOJ × Federalism	0.428 (0.415)	0.480 (0.423)	0.0868 (0.480)	0.0480 (0.707)			0.886 (1.189)	0.0845 (0.296)
CutOff5kTownSRBBIH × Federalism	-1.268*** (0.382)	-1.216*** (0.420)	-1.497*** (0.472)	-1.724*** (0.432)	-0.825** (0.404)		0.103 (0.156)	
CutOff5kTownSRBKOS × Federalism	-2.520*** (0.781)	-2.460*** (0.784)	-2.751*** (0.899)	-2.783** (1.104)			-2.311*** (0.785)	
CutOff5kTownSRBMON × Federalism	-1.529*** (0.440)	-1.472*** (0.445)	-1.819*** (0.525)	-4.002*** (0.403)			-1.386*** (0.436)	
CutOff5kTownBIHMON × Federalism	-1.777*** (0.331)	-1.744*** (0.347)	-2.134*** (0.398)	-3.263*** (1.255)	-1.230*** (0.400)			
CutOff5kTownOTHER × Federalism	-0.523 (0.376)	-0.466 (0.398)	-0.613 (0.470)		-0.617 (0.410)	-0.357 (0.448)	-0.763 (1.322)	-0.700*** (0.197)
Settlement FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census-Period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full^F	Full^F	Full^F	Full^F	BIH^{FB}	HRV^{FH}	SRB^S	VOJ^{FV}
Restriction1^{R1}	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Restriction2^{R2}		Yes	Yes	Yes		Yes	Yes	Yes
Dist-To-ADM1 Border Road	175km^M	175km^M	20km	5km	99km^{MB}	117km^{MC}	175km^{MS}	117km^{MV}
Clusters	156	145	75	43	45	51	47	30
Settlements	16,586	9,511	3,693	637	3,399	3,620	2,325	163
Observations	82,930	47,555	18,465	3,185	16,995	18,100	11,625	815
R-Square	0.4203	0.4131	0.3894	0.3679	0.4394	0.3401	0.5152	0.3846

CutOff5kTownHRVSLO = 1 if settlement within 10km of Croatia-Slovenia border.
CutOff5kTownHRVBIH = 1 if settlement within 10km of Croatia-Bosnia-Herzegovina border.
CutOff5kTownHRVVOJ = 1 if settlement within 10km of Croatia-Vojvodina border.
CutOff5kTownSRBVOJ = 1 if settlement within 10km of Central-Serbia-Vojvodina border.
CutOff5kTownSRBBIH = 1 if settlement within 10km of Central-Serbia-Bosnia-Herzegovina border.
CutOff5kTownSRBKOS = 1 if settlement within 10km of Central-Serbia-Kosovo border.
CutOff5kTownSRBMON = 1 if settlement within 10km of Central-Serbia-Montenegro border.
CutOff5kTownBIHMON = 1 if settlement within 10km of Bosnia-Herzegovina-Montenegro border.
CutOff5kTownOther = 1 if settlement is cut off 5k town but more than 10km from an ADM1 border.

Standard errors in parentheses, clustered at nearest 5k-town sphere.
F: Includes all settlements in Bosnia-Herzegovina, Croatia, Central Serbia and Vojvodina.
FB: Includes all settlements in Bosnia-Herzegovina.
FH: Includes all settlements in Croatia.
FS: Includes all settlements in Central Serbia.
FV: Includes all settlements in Vojvodina.
M: The maximum distance to an ADM1 Border Crossing Road is 175km.
MB: In Bosnia-Herzegovina, the maximum distance to an ADM1 Border Crossing Road is 99km.
MC: In Croatia, the maximum distance to an ADM1 Border Crossing Road is 117km.
MS: In Central Serbia, the maximum distance to an ADM1 Border Crossing Road is 175km.
MV: In Vojvodina, the maximum distance to an ADM1 Border Crossing Road is 117km.
R1: Towns and islands dropped.
R2: ADM2 border cuts control settlements off their nearest 5k-town.
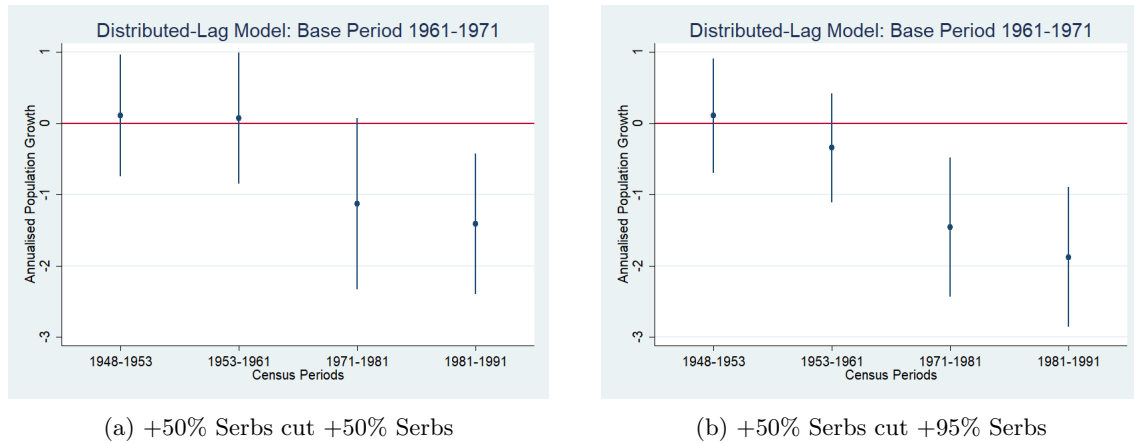* p<0.10, ** p<0.05, *** p<0.01

(a) +50% Serbs cut +50% Serbs

(b) +50% Serbs cut +95% Serbs

Figure 3.15: Test for parallel trends: CutOff5kTown, Serbs cut off Serbs.

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the settlement level. In both panels the treatment group consists of settlements that are cut off towns with a Serb majority located in Serbia, within 20km of the border between Bosnia-Herzegovina and Serbia, towns and islands excluded. Panel A uses only settlements with at least 50% Serbs, Panel B uses only settlements with at least 95% Serbs. Ethnicity data for towns come from the 1961 census, ethnicity data for settlements come from the 1981 (Croatia, Serbia) and 1991 (Bosnia-Herzegovina) censuses. Both regressions use the reduced sample, which drops settlements that are *not cut off* their nearest 5k-town by an ADM2 border. The regressions relate to Column 1-2 in Table 3.7.
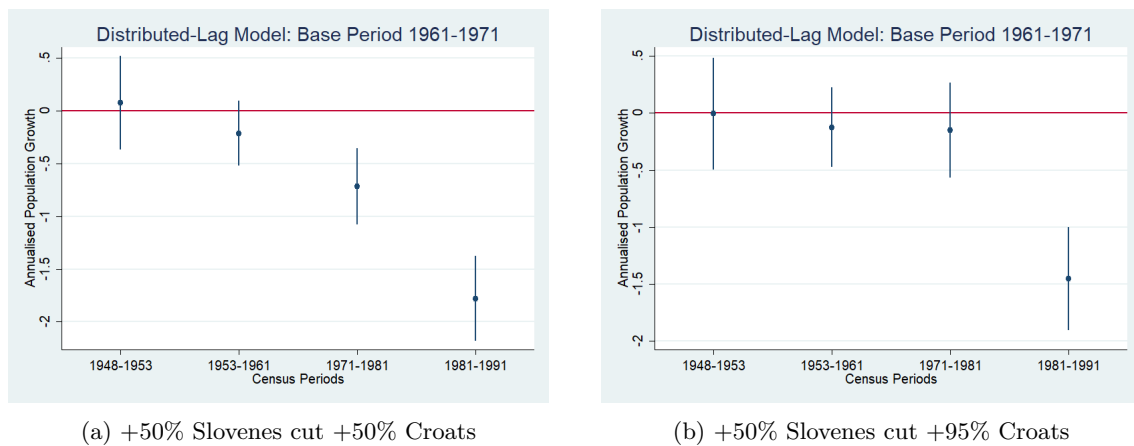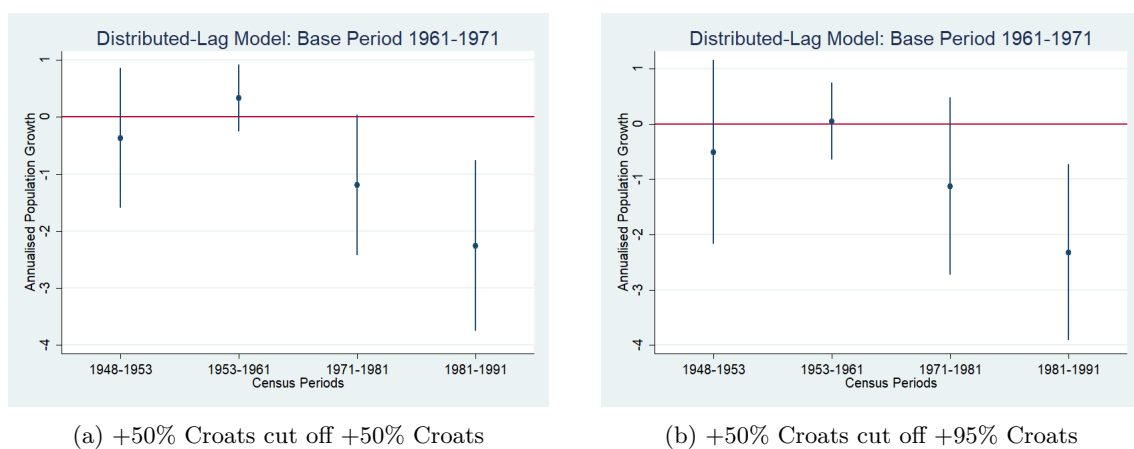

(a) +50% Slovenes cut +50% Croats

(b) +50% Slovenes cut +95% Croats

Figure 3.16: Test for parallel trends: CutOff5kTown, Slovenes cut off Croats.

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the settlement level. In both panels the treatment group consists of settlements that are cut off towns with a Slovene majority located in Slovenia, within 20km of the border between Croatia and Slovenia, towns and islands excluded. Panel A uses only settlements with at least 50% Croats, Panel B uses only settlements with at least 95% Croats. Ethnicity data for towns come from the 1961 census, ethnicity data for settlements come from the 1981 (Croatia, Serbia) and 1991 (Bosnia-Herzegovina) censuses. Both regressions use the reduced sample, which drops settlements that are *not cut off* their nearest 5k-town by an ADM2 border. The regressions relate to Column 3-4 in Table 3.7.

(a) +50% Croats cut off +50% Croats

(b) +50% Croats cut off +95% Croats

Figure 3.17: Test for parallel trends: CutOff5kTown, Croats cut off Croats.
Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include settlement fixed effects and census-period fixed effects. Standard errors are clustered at the settlement level. In both panels the treatment group consists of settlements that are cut off towns with a Croat majority located in Croatia, within 20km of the border between Bosnia-Herzegovina and Croatia, towns and islands excluded. Panel A uses only settlements with at least 50% Croats, Panel B uses only settlements with at least 95% Croats. Ethnicity data for towns come from the 1961 census, ethnicity data for settlements come from the 1981 (Croatia, Serbia) and 1991 (Bosnia-Herzegovina) censuses. Both regressions use the reduced sample, which drops settlements that are *not cut off* their nearest 5k-town by an ADM2 border. The regressions relate to Column 5-6 in Table 3.7.

3.7.8 Towns

Table 3.16: Results of two-sample t-tests with equal variance for Equation 3.1.

Affected = 5k-town lost +1% of settlements within its sphere				
Unaffected = All other towns				

Panel A:		**Full Sample**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	339	207	132	
Population (1961)	**Mean**	10,698	11,341	9,689	1,652
	(Std. Error)	(1,524)	(1,183)	(3,453)	(3,129)
Ann. PopGrowth (1948-1961)	**Mean**	2.70%	2.63%	2.81%	-0.18%
	(Std. Error)	(0.11)	(0.14)	(0.19)	(0.23)

Affected = 5k-town lost +50% of settlements within its sphere				
Unaffected = Towns within 40km of ADM1 border crossing road				

Panel B:		**Islands dropped**			
		All	**Unaffected**	**Affected**	**Difference**
	Observations	121	39	82	
Population (1961)	**Mean**	7,203	8,466	6,602	1,864
	(Std. Error)	(1,270)	(2,555)	(1,433)	(2,723)
Ann. PopGrowth (1948-1961)	**Mean**	3.06%	3.02%	3.08%	-0.05%
	(Std. Error)	(0.19)	(0.32)	(0.24)	(0.41)

* p<0.10, ** p<0.05, *** p<0.01

Note: Balancing tests for the subsample of towns that lost at least 1% (Panel A) and at least 50% (Panel B) of the settlements within their sphere due to an ADM1 border. Panel A uses the full sample without restrictions. Panel B drops islands and reduces the sample towns within 40km of an ADM1 border crossing road. Together with Figure 3.18, both Panel A and Panel B support causal interpretation.
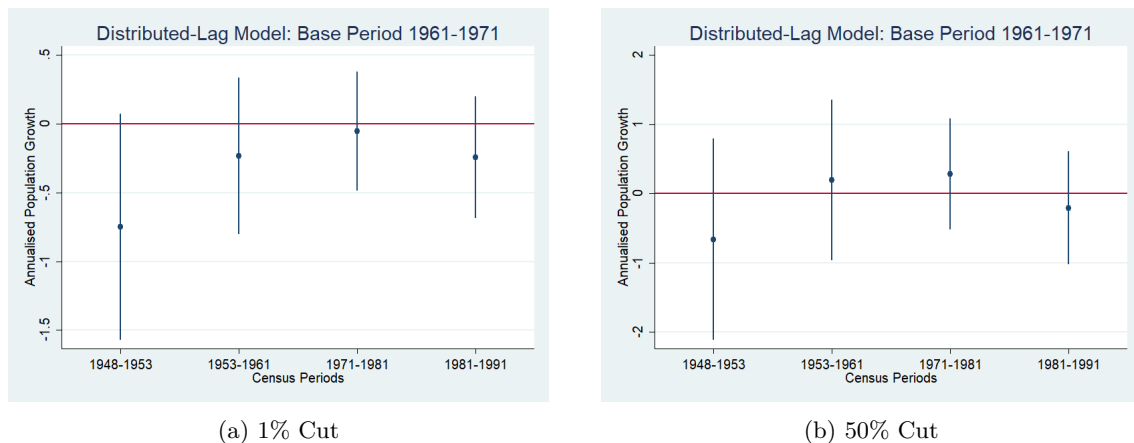

(a) 1% Cut

(b) 50% Cut

Figure 3.18: Test for parallel trends: 5kTownsLostSettlements

Note: Coefficients with confidence bands from distributed-lag regressions of the annualised population growth rate on the binned sequence of the treatment dummy. The red bar shows the base period (1961-1971). Both regressions include town fixed effects and census-period fixed effects. Standard errors are clustered at the town level. In Panel A the treatment group includes all towns with at least 5,000 inhabitants that had at least 1% of the settlements within their sphere cut by an ADM1 border. In Panel A the full sample is used without restrictions. In Panel B the treatment group includes all towns with at least 5,000 inhabitants that had at least 50% of the settlements within their sphere cut by an ADM1 border. In addition the sample is restricted to include only towns within 40km of an ADM1 border crossing road, and towns located on islands are dropped. Together with the balancing tests in Table 3.16, both Panel A and Panel B support causal interpretation.

3.7.9 Serbia-Kosovo border
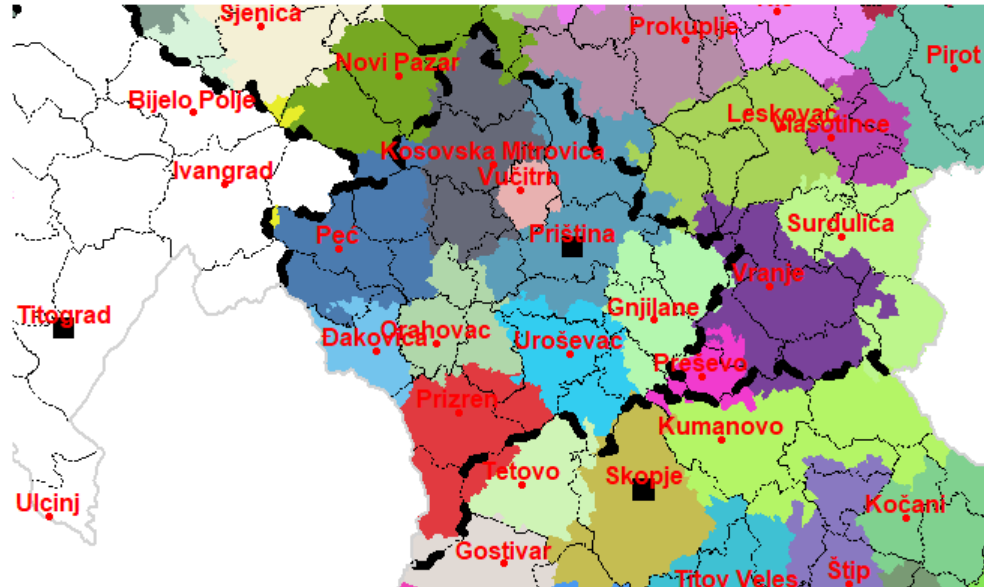
Kosovo: Spheres of 5k-Towns

Figure 3.19: 5k-Town Spheres around Kosovo.

Note: Since the formal dissolution of the Socialist Federal Republic of Yugoslavia in 1992 the relations between Serbia and Kosovo remain uncertain. To this date Kosovo legally remains part of the Republic of Serbia, but considers itself independent. Kosovo's government in Priština increasingly insists on border checkpoints, which is rejected by Serbia's government in Belgrade. Here the population data of 1961 indicate significant overlap of commuting spheres on both sides of the border.

Chapter 4

Global Cartels and Anti-Dumping[1]

4.1 Introduction

It is well documented that private firms aim to establish and maintain cartels in order
to gain the profits of successful collusion (Ivaldi et al. 2003, Harrington Jr 2017). They
have incentives to use policy tools of international trade when facing defection risk, new
competitors or to sanction non-members. Anecdotal evidence suggests that targeted trade
protection measures, such as anti-dumping laws, serve cartels to establish and maintain
collusion. For instance, Evenett et al. (2001, p. 1228) refer to the citric acid antitrust case
where U.S. cartel firms filed anti-dumping petitions to block the market entry of Chinese
producers that threatened the cartel's stability. Possibly unaware of the existence of the
cartel at the same time, the United States International Trade Commission (USITC)
imposed anti-dumping duties against the Chinese firms. To avoid such anticompetitive
abuse of trade protection, Hoekman et al. (1997) propose the introduction of antitrust
criteria into anti-dumping laws.

Whether or not cartels use anti-dumping laws for anticompetitive purposes remains
an important gap in the empirical literature. This is surprising given the long historical
linkages between antitrust and anti-dumping legislation (Blonigen & Prusa 2016, p. 111),
a strong theoretical foundation (Staiger & Wolak 1992, Prusa 1992, Zanardi 2004b), and
numerous anecdotal links between cartels and anti-dumping (Irwin 1998, Evenett et al.
2001, Harrington Jr et al. 2006, Beyer 2010). This research question is of particular
importance as anti-dumping has become one of the most favoured trade policy tools, while
globalisation processes contribute to the global reach of collusive motives. Empirically,
the use of anti-dumping policy is associated with reductions in trade (Vandenbussche &
Zanardi 2010, Egger & Nelson 2011) and trade deflection (Bown & Crowley 2007). As
a result, Prusa (2005, p. 683) concludes that anti-dumping laws produce economically
more harmful effects than dumping itself.

To the best of our knowledge, Messerlin (1990) is the only contribution that addresses
evidence of widespread use of anti-dumping in cartel industries. Looking at the European
Commission's antitrust cases in 1980-1987, the paper documents that one quarter of these

---

[1]This chapter is based on joined work with Arevik Gnutzmann-Mkrtchyan (Gnutzmann-Mkrtchyan & Hoffstadt 2020).

cases were dealing with products that were at the same time involved in anti-dumping investigations. Messerlin (1990, p. 491) finds that the firms' benefits of anti-dumping protection outweighted later antitrust fines, leading him to predict increasing use of anti-dumping. Indeed, this increase occurred in the past 30 years (Zanardi 2004a, Bown 2008).

A number of theoretical studies demonstrate that anti-dumping laws can be abused to foster collusive outcomes. Staiger & Wolak (1989, 1992) show that the mere existence of anti-dumping laws leads to lower output and trade volumes, and higher prices, both via the threat of anti-dumping and actual anti-dumping measures. This happens both when the domestic producer is a monopolist (Staiger & Wolak 1989) and when the domestic market is competitive (Staiger & Wolak 1992), but in particular in states of low demand. Prusa (1994) demonstrates that anti-dumping creates a price floor for foreign firms targeted in anti-dumping investigations, which leads to a change in pricing behaviour. Prusa (1992) discusses industry-withdrawn anti-dumping petitions as a signal of a collusive out-of-court agreement between domestic and foreign producers. Extending the model of Prusa (1992), Zanardi (2004b) argues that the likelihood to achieve an out-of-court agreement depends on the coordination cost within the cartel and on the bargaining power of the petitioning domestic industry.[2]

This chapter contributes by analysing empirically whether anti-dumping helps global cartels to initiate and maintain collusion. We estimate the world import price and quantity effects of anti-dumping investigations before, during and after cartel activity to isolate different channels of impact. Analysing cartel case studies, we identify several important mechanisms, how trade policy can be used by cartels for collusive purposes. While anti-dumping cases initiated before the cartel start are a powerful mechanism to induce cartel agreements (Irwin 1998), anti-dumping cases initiated during cartel periods help cartels to react to deviating cartel members (Beyer 2010, p. 3), and to react to the market entry of new competitors (Evenett et al. 2001, p. 1228). Motivated by theoretical models of anti-dumping and anticompetitive behaviour, we also separately look at anti-dumping petitions later withdrawn by the petitioning industry, investigations that result in no duties being imposed, and anti-dumping duties.

As numerous countries lack the resources to prosecute and sanction anticompetitive behaviour (Hoekman et al. 1997, p. 399), researchers can only use the sample of cartels from countries that have the resources to conduct antitrust investigations.[3] Moreover, antitrust authorities are restricted by national borders, while the activities of some cartels are of continental or even global reach (Levenstein et al. 2015). We circumvent this limitation by focusing on the sample of global cartels, i.e. those that operate on at least two continents. Hence we define a product to be a cartel product if it is included in at least one antitrust investigation against the global cartels in our sample. Empirically, the impact of these cartels is visible in world import prices and quantities.

---

[2] A famous example is the case of the U.S.-Japanese semiconductor industry (Irwin 1998).

[3] In fact, some countries pro-actively attempt to destabilise cartels with the introduction of leniency programmes (Miller 2009).

Our identification strategy looks at the impact of anti-dumping in cartel products on world import prices and quantities relative to anti-dumping in non-cartel products, cartels without anti-dumping, and products not involved in either anti-dumping or cartels. We thus estimate whether anti-dumping, a bilateral measure, is able to affect world import prices and quantities when it is used in cartel industries for strategic purposes.

The empirical analysis results from intensive data collection and matching procedures. First, we construct a novel cartel data set that matches product descriptions from the Private International Cartels data set (PIC) to 6-digit Harmonised Classification (HS) product codes. For this purpose, we review legal antitrust case documents of global cartels to identify the relevant products. Our data cover global cartels for the period from 1992 and 2014. Second, based on the 6-digit Harmonised Classification, we are then able to match cartel products with the Global Anti-Dumping Database (GAD). The obtained data set of twin anti-dumping and antitrust cases allows us to define the timing of anti-dumping cases relative to antitrust investigations. This allows us to estimate whether anti-dumping investigations before, during or after cartel periods help global cartels to raise world import prices.

Key results suggest that anti-dumping laws serve as a collusive device for global cartels. We find that both withdrawn anti-dumping petitions and anti-dumping duties in cartel industries lead to increased world import prices, which is in strong contrast to the impact of withdrawn anti-dumping petitions and anti-dumping duties in non-cartel industries. Anti-dumping duties imposed before the cartel period raise world import prices by 12 to 41%, and anti-dumping duties imposed during the cartel period raise world import prices by 15 to 27%. Strikingly, anti-dumping cases that are withdrawn during the cartel period are associated with higher world import prices by 26 to 47%. These strong effects come on top of the cartel effect, that on average raises world import prices by 9 to 12%.

This chapter continues with Section 4.2, where we discuss the existing relevant literature. In Section 4.3 we identify mechanisms and motivations for the use of anti-dumping laws in cartelised industries. In Section 4.4 we describe the construction of the data set and provide descriptive statistics. In Section 4.5 we present our estimation strategy. Section 4.6 discusses the results, and Section 4.7 concludes.

4.2 Background on anti-dumping and Competition

Our research question is embedded in two strands of literature: first, on the use of anti-dumping policy (Anderson 1992, 1993, Bown & Crowley 2013, Flaaen et al. 2020) and, second, on the determinants of cartel success (Levenstein & Suslow 2006, Röller & Steen 2006, Fonseca & Normann 2012, Bernheim & Madsen 2017). The increasing number of countries using anti-dumping legislation since 1990 has motivated extensive research on the implications of anti-dumping laws (Bown 2008). But while research on the implications of anti-dumping laws has produced the hypothesis that the increasing

use of anti-dumping policy may be linked to cartel behaviour, most of at least 125 years of research on the determinants of cartel success (Connor 2014*a*, p. 252) has paid little attention to the role of anti-dumping investigations.

As a matter of fact, the link between antitrust and anti-dumping legislation dates back to the early 20th century, when a number of Western developed countries began to regulate large cartels and monopolies (Blonigen & Prusa 2016, p. 111). Beginning with the Clayton Act of 1914, the United States prohibited a number of anticompetitive policies. One of these policies was to price low with the intent of driving competitors out of the market - a strategy nowadays known as predatory pricing. Only two years later, the same principle was applied towards imports in the first Anti-Dumping Act of the United States. According to Viner (1966, p. 242), this step came as a response to the highly cartelised German industries that were selling excess capacity at low prices in the U.S. market. Staiger & Wolak (1989, 1992) formalise this behaviour in a theoretical model, which shows that firms dump their excess capacity in foreign markets in times of low demand. Similarly, Brander & Krugman (1983) demonstrate that rivalry between oligopolistic firms leads to dumping in the home market of the rivalling firm. However, while the threat of cartels played a key motivation in the development of anti-dumping laws, the role of anti-dumping laws in cartel formation and stabilization has been unnoticed until the late 1980s and early 1990s (Messerlin 1990, Staiger & Wolak 1992, Prusa 1992).[4]

The only empirical contribution that systematically links anti-dumping and antitrust cases is the study on the European chemical industry by Messerlin (1990). For the European Commission's antitrust cases between 1980 and 1987, Messerlin (1990) observes that one quarter of these cases were dealing with products that were also involved in anti-dumping investigations. Messerlin (1990, p. 491) finds that the firms' benefits of anti-dumping protection outweighted later antitrust fines, leaving him to expect the number of anti-dumping cases to increase in the future.[5] Some 20 years later, this expectation became a reality (Zanardi 2004*a*, Bown 2008).[6]

A number of theoretical models address the question whether a cartel of domestic and foreign firms has an incentive to strategically exploit anti-dumping investigations (Staiger & Wolak 1989, 1992, Prusa 1992, Veugelers & Vandenbussche 1999, Zanardi 2004*b*). Staiger & Wolak (1989, 1992) show that the mere existence of anti-dumping laws leads to lower output and trade volumes, and higher prices, both via the threat of anti-dumping and actual anti-dumping measures. This happens both when the domestic producer is a monopolist (Staiger & Wolak 1989) and when the domestic market is competitive (Staiger & Wolak 1992).

Modelling the anti-dumping procedure in the U.S., Prusa (1992) shows that domestic firms have an incentive to file anti-dumping petitions in order to align defecting foreign

---

[4]Relatedly, Agnosteva et al. (2020) model show that preferential trade liberalisation improves cartel discipline.

[5]Moreover, it is well-documented that the number of anti-dumping petitions increases after macroeconomic shocks (Knetter & Prusa 2003).

[6]In contrast to the 1980s when Australia, Canada, the EU and the USA accounted for 73.1% of anti-dumping investigations, Bown observed that since 1995 39.5% of anti-dumping investigations were initiated by "new user" countries, such as Argentina, Brazil, Colombia, India, Indonesia, Mexico, Peru, Turkey and Venezuela.

firms in an out-of-court agreement - a process after which the anti-dumping petition is withdrawn. As a result, Prusa (1992) concludes that a withdrawn anti-dumping case could be a signal of a collusive agreement between domestic and foreign industry. For the anti-dumping procedure in the EU, Veugelers & Vandenbussche (1999) show that anti-dumping policy can both have procompetitive and anticompetitive effects, depending on the initial market structure.

The theoretical implication of Prusa (1992) is that domestic industries would always prefer to withdraw their petition and reach an out-of-court agreement with the foreign firm (Zanardi 2004b, p. 96). As this was not observed in practice, Zanardi (2004b) extends Prusa's model to account for coordination costs between firms and bargaining power of the domestic industries, which implies that the domestic industry withdraws its anti-dumping petition only in two situations. First, if coordination cost among the domestic and foreign firms are low, an out-of-court agreement is negotiated and the anti-dumping petition is withdrawn. This may be the case when the cartel consists of only a few members that are able to coordinate an out-of-court agreement. Second, if the domestic firm is a small firm that has little bargaining power towards its government, the chance of the anti-dumping petition leading to the imposition of anti-dumping duties is low, which gives the firm an incentive to negotiate an out-of-court agreement. In contrast, domestic industries that employ larger shares of the working population typically enjoy higher levels of bargaining power towards their government. This increases the likelihood for anti-dumping petitions to lead to the imposition of anti-dumping measures, implying that firms with high bargaining power can use anti-dumping petitions at least as a credible threat to align foreign competitors (Zanardi 2004b, p. 105). Moreover, Conconi et al. (2017) show that bargaining power also depends on electoral cycles.

Prusa (1994) demonstrates that anti-dumping laws affect both domestic and foreign firms' pricing behaviour, even if duties are never levied.[7] According to Prusa (1994), foreign firms have an incentive to increase prices in order to decrease the chance of a less-than-fair-value determination. As a consequence, domestic firms may profit from the price increase of the foreign firm by raising their prices, too. However, domestic firms also have an incentive to decrease their price in order to impact the injury determination. In the words of Zanardi (2004b), the optimal pricing strategy for domestic firms likely depends on coordination cost and bargaining power.

Motivated by the theoretical models of Staiger & Wolak (1989, 1992) and Prusa (1992), the following contributions focused on the empirical assessment of the anticompetitive effects of anti-dumping. More specifically, it is debated whether the withdrawal mechanism proposed by Prusa (1992) indicates tacit collusion. The empirical results are mixed. On the one hand, withdrawn anti-dumping petitions were not associated with significant effects on trade in the anti-dumping investigations in the U.S. between 1980 and 1985 (Staiger & Wolak 1994) and between 1990 and 1997 (Taylor

---

[7]Blonigen & Park (2004) demonstrate that foreign firm's pricing strategy depends on expectations concerning possible AD enforcement.

2004). On the other hand, Zanardi (2004*b*) uses the entire 1980-1997 U.S. data and concludes that withdrawn anti-dumping petitions indicate tacit collusion. Similarly, Rutkowski (2007) finds for the European Union's anti-dumping cases between 1996 and 2004 that withdrawals likely signalled collusion. Still, the key problem in this strand of the literature is that evidence of collusion is difficult to establish, creating a challenge to observe the unobservable (Connor 2014*a*, Blonigen & Prusa 2016).

In the absense of cartel data, it has been assessed empirically whether and how domestic industries benefit from anti-dumping protection. Konings & Vandenbussche (2005) demonstrate for more than 4,000 EU producers that eventual anti-dumping protection had positive and significant effects on domestic markups. In a later contribution Konings & Vandenbussche (2013, p. 316) add that anti-dumping protection had positive effects on domestic sales of non-exporting firms, while sales and exports of exporting firms decreased. Nieberding (1999) assesses the implications of anti-dumping measures for domestic market shares, finding that firms receiving anti-dumping protection increase their domestic market power, while firms who had their petition rejected experience a decrease in market power. In contrast, Reynolds (2013) finds that domestic firms in the U.S. semiconductor and tapered roller industries were not able to increase their market shares through anti-dumping protection.

4.3 Use and Abuse of Anti-Dumping Policy: Mechanisms

This section reviews cartel case studies and provides an overview of three mechanisms that motivate globally active cartel firms to engage in predatory dumping or to file anti-dumping petitions either directly in the home market or via subsidiaries abroad. At the core of these mechanisms is the question how cartels initiate and maintain cartel agreements. The initiation of cartels requires some form of coordination in order to negotiate the initial cartel agreement. While cartels are active, they not only face a challenge to coordinate prices and quantities, but they need to develop mechanisms to respond to defecting cartel members and to the market entry of new competitors (Levenstein & Suslow 2006). In the cartel literature, examples of dumping and abuse of anti-dumping laws is discussed in individual case studies (Evenett et al. 2001, Harrington Jr et al. 2006). We review these case studies and add examples from our data set to the discussion to identify the main impact mechanisms discussed below.

4.3.1 Before the Cartel

Irwin (1998) assesses a case where the U.S. anti-dumping law helped governments and industries to jointly establish a global cartel. This case of the 1970s semiconductor industry originates from a Japanese subsidy programme that aimed to increase the efficiency and capacity of Japan's semiconductor exporters. As a result of the programme, Japanese producers increased their exports of semiconductors to many

countries, including the United States. The increased quantities of semiconductors led to a global price reduction of semiconductors, which led to the filing of an anti-dumping petition in the United States by U.S. firm Micron. Following the initiation of the anti-dumping investigation, a suspension agreement was negotiated with support of the U.S. Department of Commerce and the Japanese Ministry of International Trade and Industry (MITI). Since both Micron and several Japanese producers were caught in a cartel by the U.S. Department of Justice in 2002, the case of the U.S. semiconductors provides hard evidence for the relationship between cartels and and anti-dumping laws. Moreover, since the anti-dumping petition led to a suspension agreement rather than an actual duty, this case supports the literature that has assessed withdrawn anti-dumping petitions as an indicator of tacit collusion (Prusa 1992, Zanardi 2004*b*, Rutkowski 2007).

We observe similar characteristics in the case of the nitrile synthetic rubber cartel. Between 1996 and 2002, five multinational firms headquartered in the United States, Germany, Japan and Mexico operated a cartel in the nitrile synthetic rubber sector. Affecting an estimated 944 million USD of worldwide commerce, this global cartel was ultimately fined a total of 100 million USD (Connor 2014*b*). Figure 4.1 presents the development of the logarithmised mean world import price of nitrile synthetic rubber between 1992 and 2014. In Figure 4.1, gray bars mark the initiation year of anti-dumping investigations, and the light blue background highlights that at least one anti-dumping duty for nitrile synthetic rubber is in force in a given year.
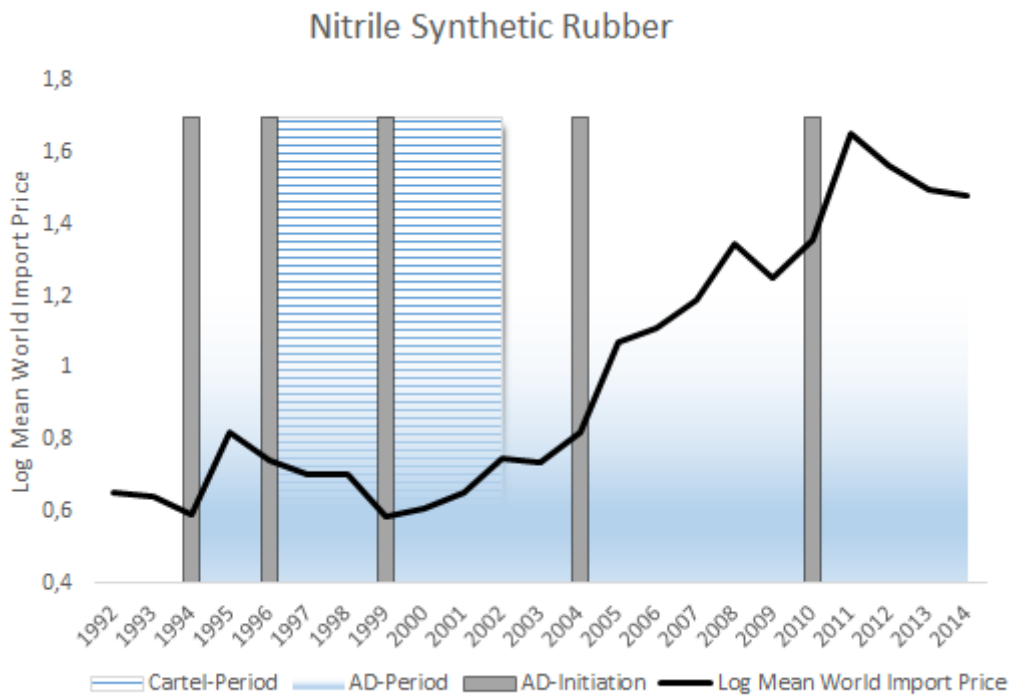

Figure 4.1: The logarithmised mean world import price for nitrile synthetic rubber (HS-Code: 400259) between 1992-2014. The cartel was caught for its anticompetitve behaviour for the period 1996-2002.

The link between the nitrile synthetic rubber cartel and anti-dumping investigations

appeared first before the start of the cartel. In 1994, India launched an anti-dumping case against Japan, which later turned out to be part of the cartel. Figure 4.1 shows a spike in world import prices of nitrile synthetic rubber following the initiation of India's anti-dumping case against Japan. Further anti-dumping cases for nitrile synthetic rubber were initiated in 1997 and 1999 (both during the cartel period) as well as in 2004 and 2010 (both after the cartel period). As world import prices increased with each initiation of new anti-dumping investigations after the cartel period, it is possible that a new cartel agreement was arranged with the help of anti-dumping laws. In any case, antitrust authorities did not find formal evidence for a cartel after 2002. Consistent with Irwin (1998), the example of the nitrile synthetic rubber cartel shows that anti-dumping cases could indeed function as a device to induce collusion in a global market.

4.3.2 During the Cartel

Existing cartels face the challenge to align defecting cartel members. Beyer (2010) discusses the case of the monosodium glutamate (MSG) cartel, where Japanese firm Ajinomoto successfully filed an anti-dumping complaint against its fellow Korean cartel partner. A similar pattern was observed in the lysine cartel, where the mere threat of an anti-dumping petition was enough for a defecting cartel member to comply with cartel rules (Harrington Jr et al. 2006, p. 64). Since in both cases anti-dumping has been used as a strategic tool to maintain cartel agreements, the initiation of an anti-dumping case could signal instability of an existing (yet undetected) cartel.

A second challenge to existing cartels provides the market entry of new competitiors. Since anti-dumping laws provide the power to target individual firms, undetected incumbent cartel industries can file anti-dumping petitions to create barriers to the market entry of new competitors. According to Zanardi (2004b), the likelihood for anti-dumping petitions to lead to the imposition of anti-dumping duties increases with the bargaining power or domestic importance of the petitioning industry.

Several instances for this scenario are documented in the literature. In the citric acid industry, U.S. cartel members attempted twice to block the entry of Chinese firms to the U.S. market (Evenett et al. 2001, p. 1228). Partially successful was the U.S. ferrosilicon cartel whose petition led to the imposition of anti-dumping duties against Brazil, China, and other countries. However, after the United States International Trade Commission found out about the conspiracy, anti-dumping duties were reversed (Pierce Jr 1999). In contrast, the PVC and LdPE (chemical industry) cartels successfully prevented entry of East European competitors into the EC market via anti-dumping protection (Messerlin 1990, p. 477). Another example is the polyester staple fiber cartel, which prevented the entry of Korean and Taiwanese firms into the U.S. market (Reynolds 2013, p. 416). A historical example provides the international steel cartel, which used anti-dumping duties in order to keep U.S. imports out of the South African market (Hexner 1943, Staiger & Wolak 1994). The examples imply that new market entrants are threatened by anti-

dumping measures, leaving them to decide either to join the cartel or to stop exporting to cartelised markets. Thus the filing of anti-dumping petitions during the cartel period provides cartel firms with a tool to maintain cartel agreements.
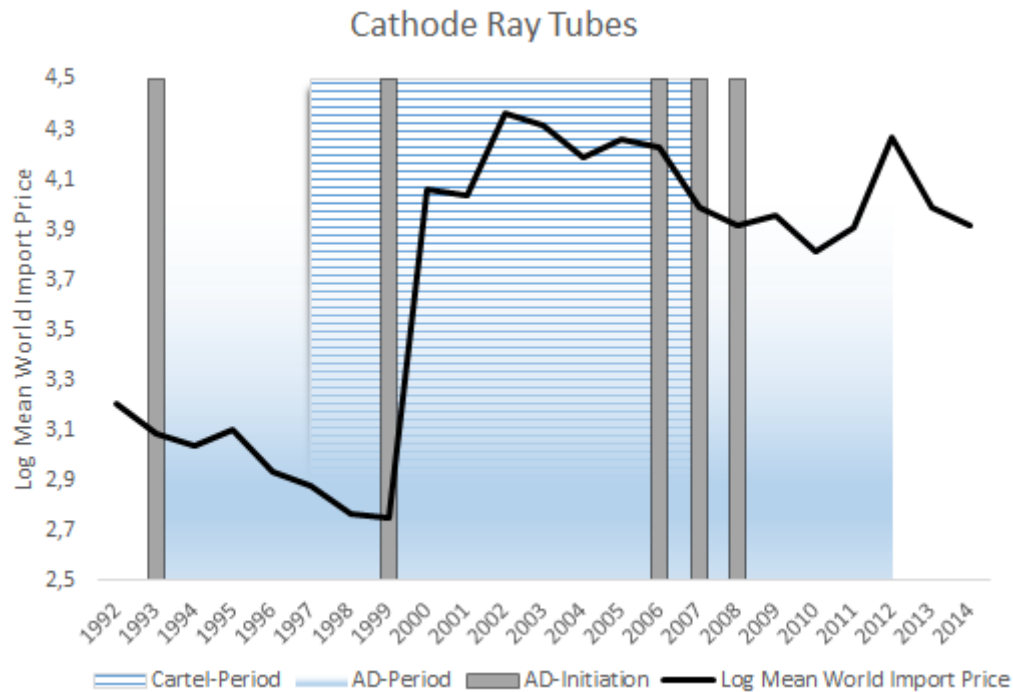

Figure 4.2: The logarithmised mean world import price for cathode ray tubes (HS-Code: 854011) between 1992-2014. The cartel was caught for its anticompetitve behaviour for the period 1997-2007.

To illustrate the power of anti-dumping cases during cartel activity, we add here the example of cathode ray tubes, which are used in television, computer and camera production. Between 1997 and 2007, 19 multinationals originating from Asia and Western Europe operated a global cartel in the cathode ray tubes industry. Affecting an estimated 82.5 billion USD of worldwide commerce, this global cartel was fined about 140 million USD in the United States, Korea and Japan (Connor 2014*b*) and 1.5 billion EUR in the European Union (European Commission 2012).

Figure 4.2 presents the development of the logarithmised mean world import price of cathode ray tubes between 1992 and 2014. In Figure 4.2, gray bars mark the initiation year of anti-dumping investigations, and the light blue background highlights that at least one anti-dumping duty for cathode ray tubes is in force in a given year. While cartel authorities found evidence for a cartel start in 1997, Figure 4.2 illustrates that prices of cathode ray tubes only increased significantly in 1999-2000, which coincides with an anti-dumping case initiated by the EU against South Korea and India - both of which were later found to be cartel members. Thus it is very well possible that the anti-dumping case in the EU allowed the cathode ray tubes cartel not only to preserve collusion, but to enlarge the cartel by including the new entrants from South Korea and India.

4.4 Data

In order to assess empirically whether cartels systematically exploit anti-dumping laws we require information on twin antitrust and anti-dumping cases – that is, products that are subject to both antitrust and anti-dumping investigations. To the best of our knowledge, Messerlin (1990) is the only paper that linked antitrust and anti-dumping investigations, but only for cases in the European Commission in the 1980s. In the following we present the data sources and methodology that helps us to construct a twin data set of global anti-dumping and antitrust cases.

As a starting point, we turn to the Global Anti-Dumping Database (GAD), which holds information on all anti-dumping cases filed in 33 countries between 1978 and 2015 (Bown 2015). Next to all relevant dates concerning anti-dumping investigations (e.g. start of investigation, imposition date of anti-dumping duties, revocation dates) and outcomes (e.g. duties, withdrawals), GAD provides detailed 6-digit HS codes for each product listed in the legal documentation of each anti-dumping case.[8] In addition, GAD informs about all domestic firms that filed an anti-dumping petition and all foreign firms accused in anti-dumping investigations.

Since we wish to map anti-dumping and antitrust cases based on a common identifier, we would ideally use an antitrust database similar to GAD, which should hold 6-digit HS codes. As such a cartel database is not yet available, we turn to the second best alternative, which is the Private International Cartels (PIC) data set developed by Connor (2014*b*).[9] As the largest known collection of legal and economic information on antitrust investigations, the PIC data set covers 869 antitrust cases, with the earliest cartel start year in 1875 and the latest cartel end year in 2012. Besides detailed information on the duration and characteristics of cartels, the data set provides the names of firms listed in the legal case documentation, and their country of origin. That is, the PIC data set records the firm name and country listed in legal antitrust documents, and adds the country of the headquarter if the firm is a subsidiary of a multinational firm. Also available are estimates of the affected commerce and at least partial information on cartel fines.

The PIC data set classifies cartels into three categories: domestic, international and global cartels. We focus here exclusively on global cartels. According to Connor (2014*b*, p. 51), these cartels were fined in legal antitrust investigations for fixing prices on at least two continents, making them most relevant to our research question. We exclude cartels that are in services, as there are no trade data for services available on such disaggregated level. Also, we drop cartels that were active exclusively before 1992 due to the lack of reliable worldwide trade data. As a result, we obtain 61 global cartels. Figure 4.6 shows the share of countries involved in our set of global cartels, suggesting that the majority of cartel firms originate from the European Union, the United States and Japan.

---

[8]In some instances there are also 2-digit, 4-digit and 8-digit HS codes. We transform 8-digit HS codes into 6-digit HS codes. Eventually we can use only 6-digit HS codes, as this unit of observation allows us to match the anti-dumping data with the available trade data.

[9]The data set was available at https://purr.purdue.edu/publications/2732/1 , last accessed 11/11/2020.

Unfortunately, the PIC data set does not contain any sort of codes on the products involved in antitrust investigations. We therefore made it our task to individually review each cartel and identify the relevant 6-digit HS codes by comparing product descriptions in the legal antitrust case documentations and descriptions of 6-digit HS codes on the UN's Comtrade website. In this process we complement the PIC data set with summary court decisions and press releases. Where missing, we also added information on the firms involved in the cartels and on the fines received by the cartel participants.

The cathode ray tubes cartel discussed in the previous section provides an excellent example to illustrate how we identify the relevant 6-digit HS codes for each of the 61 global cartels. First, we read the product description provided in the legal antitrust document of the European Commission's Directorate-General for Competition, with CASE-ID *"AT.39437 –TV and computer monitor tubes".*[10] In this legal document the EC informs that there are two types of cathode ray tubes – colour display tubes used in computer monitors and colour picture tubes used for colour televisions. Accordingly, these distinct versions of cathode ray tubes cannot be interchanged because television and computer monitors require specialised and different resolution.

Next, we turn to the UN's Comtrade website to search and review the relevant 4-digit HS code, which is 8540. The description for this 4-digit HS code is as follows: *"Thermionic, cold cathode or photo-cathode valves and tubes (for example, vacuum or vapour or gas filled valves and tubes, mercury arc rectifying valves and tubes, cathode-ray tubes, television camera tubes)."* Since the term "cathode ray tube" is part of this description among other subjects (such as television camera tubes), we decided to read through the description of all 6-digit HS codes listed below the 4-digit HS code 8540.

Figure 4.4 shows the descriptions of all 6-digit HS codes listed below the 4-digit HS code 8540. After assessing these descriptions, we identify and collect codes 854011, 854012 and 854060 for our data set since their description is directly related to the product listed in the EC's antitrust investigation. In contrast, codes such as 854072 refer to microwave tubes, which are clearly not relevant to the cathode ray tubes cartel. We are therefore sure that the 6-digit HS code is the level of detail we require to identify twin antitrust and anti-dumping cases. We also repeat the exercise of reviewing HS codes for each HS vintage, because codes are updated, merged, abandoned or added as the evolution of the Comtrade database proceeds.

Based on the 6-digit HS code, we are able to merge our data set of global cartels to the Global Anti-Dumping Database. In our twin antitrust and anti-dumping data set we test the validity of our approach by comparing the product description variables originating from the PIC and the GAD data set. For example, we notice that AD-Case *IND-AD-189*, which refers to an anti-dumping case for *Paracetamol* in India, includes product codes *854511* and *854519*, both of which refer to *Graphite Electrodes*. As this anti-dumping case is unlikely related to the graphite electrodes cartel, we exclude AD-Case *IND-AD-*

---

[10]The legal documentation for the European Commission's antitrust investigations is available at https://ec.europa.eu/competition/elojade/isef, last accessed 11/11/2020.

189 from our twin data set of antitrust and anti-dumping cases. However, we keep both product codes as they match a number of anti-dumping cases in graphite electrodes to the graphite electrodes cartel.

Table 4.1: Antitrust and anti-dumping Descriptive Statistics

(a) Panel A: Number of cartels and cartel products with at least one anti-dumping case.

	Matched with AD	No match with AD	Total
Number of cartel cases	43 (70%)	18 (30%)	61 (100%)
Number of cartel products	79 (52%)	74 (48%)	153 (100%)

(b) Panel B: Number of products with at least one anti-dumping case.

	Involved in AD	Not involved in AD	Total
Number of products	1,838 (33%)	3,811 (67%)	5,649 (100%)

Table 4.1 summarises the matches that we obtain after consolidating our final twin data set of antitrust and anti-dumping cases. Out of the total 61 global cartels that were active at least until 1992, we find that *43 or 70%* are matched to *at least one* anti-dumping investigation between 1992 and 2014. This figure reads very well in response to Messerlin (1990). Only for the European Commission's 1980-1987 antitrust cases, Messerlin (1990) reports that roughly one quarter was matched to anti-dumping cases, with the expectation to see this figure increase after 1990. Our data confirm this hypothesis. Table 4.1 also reports the number and share of products in the Comtrade database that are matched to anti-dumping investigations, and to both antitrust and anti-dumping investigations. Out of *153* cartel products, *79 or 52%* are matched to *at least one* anti-dumping investigation. Since only *1,838 out of all 5,649 (33%)* products in the Comtrade database are matched to *at least one* anti-dumping investigation, it can be concluded that anti-dumping investigations are much more frequent in cartel products than in non-cartel products.

Figure 4.7 shows the share of countries involved in any of the 43 global cartels that are matched to at least one anti-dumping investigation. The distribution of countries in the twin data set is very similar to the distribution of countries in the entire antitrust data set (Figure 4.6), which suggests that the sample of cartels in the twin data set is comparable to the full sample of cartels in the antitrust data set. As our sample includes only global cartels, it is also of little surprise that the European Union, the United States and Japan together comprise 85% of the countries in the cartel data set. These countries are home to the headquarters of the largest multinational firms in the world.

Figure 4.3 visualises the matches between antitrust and anti-dumping cases relative to the cartel period. Comparing the first black and grey bars in Figure 4.3, it appears that *38 out of the 43* cartels are linked to at least one anti-dumping case either during the cartel period, up to five years before the cartel start or up to five years after the cartel end. This figure underlines the timely overlap between antitrust and anti-dumping
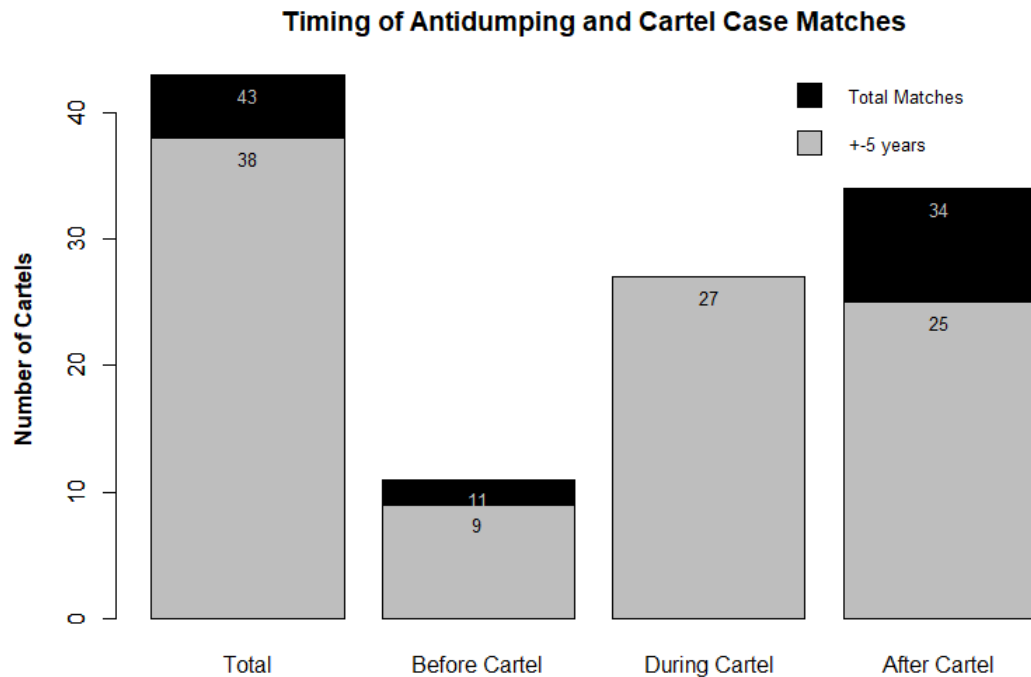
Figure 4.3: Antitrust and anti-dumping case matches relative to the cartel period. The figure shows the number of antitrust cases that are matched to at least one anti-dumping investigation relative to the cartel period.

investigations in the same products. Moreover, Figure 4.3 highlights that *27 out of the 43* cartels are linked to at least one anti-dumping investigation while these cartels were active. If we only consider matches between antitrust and anti-dumping cases that occur up to five years before the cartel, during the cartel period or up to five years after the cartel, then we can conclude that the majority of twin antitrust and anti-dumping cases occur during the cartel period. This interpretation is also true if we consider matches between antitrust and anti-dumping cases based on products, visualised by Figure 4.5.

Figure 4.8 shows the share of countries that initiated anti-dumping investigations in the entire anti-dumping data set, and Figure 4.9 shows the share of countries that initiated anti-dumping investigations in the twin antitrust and anti-dumping data set. In the entire anti-dumping data set, the most prominent users of anti-dumping are the United States (28%), India (9%), the European Union (9%), Canada (8%), Argentina (7%), Russia (5%), Mexiko (5%), Argentina (5%) and Brazil (4%). The pattern is in line with Bown (2015), who discusses the increasing use of anti-dumping by newly industrialised countries. In the twin data set of anti-dumping and antitrust cases, the most prominent user of anti-dumping is India (20%), the European Union (15%), the United States (14%), Argentina (10%), South Africa (7%), Brazil (5%), Australia (4%), China (4%) and Mexico (4%). Relative to the full anti-dumping data, we conclude that the use of anti-dumping by cartels is more prominent in India and Europe, but less prominent in the United States.

Figure 4.10 shows the share of countries targeted in anti-dumping investigations in the entire anti-dumping data set, and Figure 4.11 shows the share of countries targeted in anti-dumping investigations in the twin antitrust and anti-dumping data set. In the entire anti-dumping data set, the most prominent targets of anti-dumping are China (19%), South Korea (6%), Taiwan (5%), Japan (4%), Brazil (4%), the United States (4%), India (3%), Indonesia (3%) and Germany (3%). In the twin data set of antitrust and anti-dumping cases, the most prominent target of anti-dumping is China (19%), South Korea (9%), the United States (9%), Germany (7%), Brazil (6%), Italy (5%), Japan (4%), Malaysia (4%) and India (3%). In comparison to the entire anti-dumping data set, it can be concluded that high-technology countries such as South Korea, the United States and Germany are more prominent targets of anti-dumping in cartel industries.

4.5   Estimation Strategy

Our empirical research comes as a response to the theoretical literature discussed in Section 4.2 and as a test of the mechanisms reviewed in Section 4.3. First, we test empirically whether anti-dumping has a trade and price altering impact by stalling competition through duties (Staiger & Wolak 1992, Veugelers & Vandenbussche 1999) or by mere threat (Prusa 1992, Zanardi 2004b). Therefore, our empirical strategy should account both for the impact of anti-dumping duties and for the impact of withdrawn anti-dumping petitions.

Second, we test the hypotheses that anti-dumping can lead to international cartels as well as be used by cartels to maintain collusive prices during their activity, as implied by theoretical models and case-study based mechanisms of Section 4.3. We test, whether cartel-prone industries use anti-dumping to successfully induce collusive price and quantity outcomes as predicted by Prusa (1992), Veugelers & Vandenbussche (1999), and Zanardi (2004b), and whether anti-dumping is used as a disciplining device during the cartel activity as found by Staiger & Wolak (1989, 1992).

To test these hypotheses, our empirical strategy identifies whether global cartels use anti-dumping as a collusive device to manipulate import prices and quantities. The identification assesses the differential impact of anti-dumping in products that have been in global cartels at some point in the sample period, relative to those products that have never been linked to global cartels or anti-dumping investigations. In Section 4.6.2 we also assess different outcomes of anti-dumping investigations, such as anti-dumping cases that are withdrawn by the petitioning industry.

Our baseline regression estimates whether the world import price of product x is different in years t, where product x is either part of an active global cartel, or where product x is subject to *at least one*[11] anti-dumping investigation.[12]   In addition, our

---

[11]In Table 4.5 we alternatively estimate the effect on world import prices when product x is subject to *more than one* anti-dumping investigation in year t.

[12]Note that we define an *anti-dumping investigation* to be the period between the initiation of legal antitrust investigation and until the revocation of anti-dumping duties.

baseline regression estimates whether the world import price of product x is different in years t, when product x is a cartel-prone[13] product that is either subject to *at least one* anti-dumping investigation *before*, *during* or *after* the legally proven cartel period.[14] This set of coefficients should inform about the timing of anti-dumping cases relative to the activity of globally active cartels in the same product.

In order to capture the full extent of our sample of global cartels, we treat the world as a single market by focussing on world import prices. As a measure of the world import price we use three alternative specifications, all of which source from all bilaterally traded quantities and values available in the Comtrade data set between 1992 and 2014. First, we calculate the world import price based on the mean of all bilaterally traded quantities and values. Second, we calculate the world import price based on the median of all bilaterally traded quantities and values. Third, we calculate the trade-weighted world import price based on the aggregate of all bilaterally traded quantities and values. To be precise, the three dependent variables of interest are the *logarithmised mean world import price*, the *logarithmised median world import price* and the *logarithmised trade-weighted world import price* of each product at 6-digit HS classification that we observe for each year between 1992 to 2014. Our unit of observation is the $Product - Year$ and the sample includes all products at 6-digit HS classification reported in the UN Comtrade database.

The baseline regression is as follows:

$$
\begin{aligned}
lnPrice_{xt} = {} & \alpha_0 AD_{xt} + \alpha_1 AD_{xt} 1_{CartelProduct}(ADBeforeCartel) \\
& + \alpha_2 AD_{xt} 1_{CartelProduct}(ADDuringCartel) \\
& + \alpha_3 AD_{xt} 1_{CartelProduct}(ADAfterCartel) \\
& + \gamma CartelPeriod_{xt} + \omega_x + \delta_t + \epsilon_{xt}
\end{aligned}
$$

where the dependent variable $lnPrice_{xt}$ is the logarithmised world import price of product x in year t, for any of the three specifications of the world import price introduced above. AD_{xt} is a dummy that turns *1* if product x is involved in *at least one* anti-dumping investigation in year t.[15] $CartelProduct_{xt}$ is a dummy that classifies all products that are subject to *at least one* antitrust investigation in the sample period. The vector $Timing^T = (Before, During, After)$ refers to the timing of anti-dumping investigations relative to legally proven cartel periods. That is, anti-dumping investigations may be initiated *before*, *during* or *after* the legally proven cartel period. $CartelPeriod_{xt}$ controls for the cartel period reported in the relevant legal antitrust documents. Finally, ω_x controls for all product-specific fixed-effects and δ_t controls for all time-specific fixed effects.

---

[13]This wording is purposefully cautious: we do not claim that these products have not been cartelised but rather that our strict matching procedure did not link them to cartels or that cartels in those products have not been identified at all.

[14]In Table 4.6 we show that our results hold when we reduce the matches between anti-dumping and antitrust cases so that we consider only anti-dumping cases that are initiated up to five years before the legally proven cartel start and up to five years after the legally proven cartel end.

[15]Since 6-digit-products can be part of multiple anti-dumping investigations, in an alternative regression reported in Table 4.5 we add an additional dummy that accounts for multiple anti-dumping investigations in the same product.

In contrast to our empirical strategy, much of the cartel literature studies the impact of individual cartel cases in single countries (Irwin 1998, Harrington Jr et al. 2006, Beyer 2010). Yet the anticompetitive behaviour of multinational firms likely affects prices beyond the jurisdiction of a single antitrust authority. The best known empirical study on the trade effect of international cartels is Levenstein et al. (2015), who estimate a gravity model and do not find a significant impact of seven international cartels on bilateral trade. Similarly, Agnosteva (2016) reports that only 50% of the 170 international cartels in her data set significantly affected bilateral trade. Although we have also collected a large data set of firms that were sanctioned for their anticompetitive behaviour on at least two continents, we are conservative in the use of these data. In fact, due to the complexity of multinational firms it is likely that the firms listed in legal antitrust investigations only show the tip of an iceberg. For instance, Evenett et al. (2001, p. 1229) mention that only a subsidiary of a Japanese multinational was sanctioned in the U.S. antitrust case in graphite electrodes. As legal antitrust investigations require concise documentation and data as evidence of collusion, it is likely that much of the anticompetitive behaviour of multinational firms goes unnoticed.

4.6 Results

We discuss our empirical results in three parts. Section 4.6.1 presents the baseline import price impact of anti-dumping in cartel products. In this section, the variable *AD* refers to any year t where product x is subject to *at least one* anti-dumping case. In Section 4.6.2 we refine our approach to distinguish anti-dumping cases that lead to an anti-dumping duty, those that were withdrawn by the petitioning industry, and those that did not result in duties due to other reasons. In Section 4.6.3 we discuss regression results for quantities.

4.6.1 Baseline Results

Table 4.2 presents the result of our baseline estimation. First, during legally proven cartel periods of globally active cartels, the world import price of the relevant cartel products increases relative to the world import price of non-cartel products. The coefficient we estimate here suggests that world import prices increase by 9 to 12% during the cartel period. This finding shows that globally active cartels are powerful enough to concert prices in a global environment, highlighting the need for antitrust authorities to cooperate at a global level to capture the true damage caused by global cartels (Hoekman et al. 1997).

Second, in years where a product is subject to *at least one* anti-dumping case the world import price of that product decreases on, average, by 5 to 10%.[16] The coefficient we estimate for the anti-dumping period is highly statistically significant and robust to all alternative calculations of the world import price. Given that anti-dumping investigations

---

[16] We also estimate whether it makes a difference when a product is subject to more than anti-dumping investigation in the same year in Table 4.5. The results are similar, with involvement in more than one anti-dumping case leading to larger reductions in world import prices.

Table 4.2: Baseline Regression.

	(1) Log Mean Price	(2) Log Median Price	(3) Log Trade-Weighted Price
Cartel Period[1]	0.0912**	0.121***	-0.0377
	(2.50)	(2.64)	(-0.47)
AD[2]	-0.0568***	-0.102***	-0.101***
	(-3.57)	(-4.75)	(-4.64)
AD Before Cartel[3]	0.129**	0.201***	0.416***
	(2.09)	(2.84)	(2.61)
AD During Cartel[4]	0.175**	0.159*	0.271*
	(2.20)	(1.79)	(1.78)
AD After Cartel[5]	-0.0561	-0.133**	-0.144*
	(-1.28)	(-2.53)	(-1.70)
Observations	116,153	116,153	116,157
Products	5,649	5,649	5,649
Product-FE	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, based on robust standard errors clustered at product level.

[1] Dummy that is 1 in years where a product is part of an antitrust case with firms from at least two continents.

[2] Dummy that is 1 in years where a product is subject to at least one AD case.

[3] Dummy that is 1 in years where a cartel product is included in at least one AD case, before the cartel start.

[4] Dummy that is 1 in years where a cartel product is included in at least one AD case, during the cartel period.

[5] Dummy that is 1 in years where a cartel product is included in at least one AD case, after the cartel end.

only concern bilateral affairs, their impact on world import prices is ex-ante ambiguous. On the one hand, firms hit by anti-dumping investigation have an incentive to increase export prices to avoid imposition of duties (Prusa 1994, 2001). On the other hand, these firms might reduce their export prices in other markets as they deflect their exports to these markets (Bown & Crowley 2007).

Third, our results suggest that cartels take advantage of anti-dumping strategically as anti-dumping cases have very different effects on world import prices when they involve cartel products. We estimate that anti-dumping cases in cartel products before the cartel start lead to a world import price increase of 12 to 41%.[17] This result is consistent with the hypothesis that cartel-prone industries can reach collusive outcomes through anti-dumping cases, as documented by the examples presented in Section 4.3.

Anti-dumping cases initiated during the cartel period lead to an additional increase of world import prices by 15 to 27%, controlling for the price impact of the cartel period. Again, this finding is statistically significant and robust to all specifications of the world import price. One has to note that antitrust authorities require hard evidence to prove the initiation and might use a conservative start-date in the cartel investigation. In this case, our finding for the impact before the cartel start might capture an earlier start of a cartel. However the positive price impact of anti-dumping during the cartel activity is

---

[17]Table 4.6 shows that our results hold when we consider only anti-dumping cases initiated up to five years before the cartel start and up to five years after the cartel end.

robust to such concerns as we control for the impact of the cartel period.

Interestingly, anti-dumping investigations initiated after the breakdown of global cartels are associated with declines in world import prices, which might signal that the anticompetitive use of anti-dumping laws itself is not sufficient for cartels to reinstate collusion. For instance, the breakdown of cartels might also be due to technological developments or the secular decline of certain industries, such as colour tube televisions.

4.6.2 Multiple Outcomes of anti-dumping Investigations

Table 4.3: Five-year lag from the initiation of anti-dumping cases.

			(1) Log Mean Price	(2) Log Median Price	(3) Log Trade-Weighted Price
Cartel Period			0.102***	0.133***	-0.0347
			(2.89)	(2.99)	(-0.42)
AD Duty[1]			-0.0592***	-0.107***	-0.0993***
			(-3.68)	(-4.99)	(-4.48)
	×	Before Cartel	0.130**	0.193***	0.459***
			(2.19)	(2.74)	(3.33)
	×	During Cartel	0.231***	0.227**	0.291*
			(2.70)	(2.42)	(1.84)
	×	After Cartel	-0.0534	-0.115**	-0.144*
			(-1.19)	(-2.11)	(-1.92)
AD Withdrawn[2]			-0.122***	-0.182***	-0.112***
			(-3.35)	(-3.73)	(-2.74)
	×	Before Cartel	-	-	-
	×	During Cartel	0.264**	0.323	0.471***
			(2.04)	(1.62)	(3.31)
	×	After Cartel	0.0836	0.144**	0.0837
			(1.61)	(2.24)	(1.28)
AD Other[3]			0.0260	0.0518**	0.00489
			(1.60)	(2.35)	(0.25)
	×	Before Cartel	-0.0407	0.0114	-0.302
			(-0.52)	(0.11)	(-0.81)
	×	During Cartel	-0.250***	-0.306***	-0.117
			(-3.74)	(-3.33)	(-1.24)
	×	After Cartel	-0.0454	-0.129**	-0.0389
			(-1.06)	(-2.48)	(-0.56)
Observations			116,153	116,153	116,157
Products			5,649	5,649	5,649
Product-FE			Yes	Yes	Yes
Year-FE			Yes	Yes	Yes

Notes: t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, based on robust standard errors clustered at product level.
[1] Antidumping investigations that lead to antidumping duties.
[2] Antidumping investigations withdrawn at the request of the domestic industry.
[3] Antidumping investigations that did not result in imposition of antidumping duties for other reasons.

In the baseline setting, we define AD as a dummy variable that is 1 for any year where at least one anti-dumping case for product x is initiated or where at least one anti-dumping measure for the same product is in force. Since not all anti-dumping investigations lead to an anti-dumping duty, we refine the estimation strategy to distinguish for the anti-

dumping investigations that do not lead to an anti-dumping duty. This modification allows to connect our results to the literature that studies the withdrawal of anti-dumping cases as a sign of tacit collusion (Prusa 1992, Zanardi 2004*b*, Rutkowski 2007).

Specifically, *AD Duty* is a dummy that turns 1 in years between the initiation of an anti-dumping investigation and until the eventual revocation of anti-dumping duties. *AD Withdrawn* is a dummy that turns 1 for the initiation year and the following four years of an anti-dumping case that is withdrawn by the petitioning industry. This is done to capture the potential anti-competitive effect of withdrawn cases. *AD Other* is a dummy that turns 1 for the initiation year and the following four years of an anti-dumping case that does not lead to an anti-dumping duty for other reasons, for instance due to insufficient evidence of dumping.

Table 4.3 presents the results. First, we look at anti-dumping cases that eventually lead to a duty. Anti-dumping measures are associated with decline of world import prices by 5 to 10%. Cartel-related anti-dumping that eventually leads to an anti-dumping duty and initiated *before* the cartel start, increases the world import price of that product by additional 13 to 45%. Similarly, anti-dumping initiated *during* the cartel period is associated with a world import price increase by 23 to 29%, controlling for the price effect of the cartel period. Again these findings confirm the baseline results in Table 4.2.

Second, we look at anti-dumping cases that were withdrawn by the domestic industry that filed the anti-dumping petition (*AD Withdrawn*). Withdrawn anti-dumping cases are associated with decline of world import prices by 11 to 18% in the five years following the initiation. An anti-dumping case withdrawn by the petitioning industry during the cartel period is associated with an increase in world import prices of the affected product by additional 26 to 47%.[18] In line with Prusa (1992) and Zanardi (2004*b*), this coefficient demonstrates anticompetitive use of withdrawn anti-dumping cases.

Third, we provide estimates for the impact of anti-dumping cases that do not lead to anti-dumping duties due to other reasons, such as a small import market share of investigated imports or insufficient evidence of dumping (*AD Other*). Anti-dumping cases in this category do not have a robust statistically significant effect on world import prices in the five years following the initiation. Indeed, if anti-dumping authorities find, for example, that there was no evidence of dumping, then it is no surprise that there are no significant price effects at the global level. Similarly, anti-dumping in cartel products that does not lead to a duty and is not industry-withdrawn has no significant world import price impact except when initiated during cartel periods. Anti-dumping cases initiated during a cartel period are associated with world import price declines by 25 to 30%. This result is somewhat surprising, as we also find a corresponding increase in import quantities (see subsection 4.6.3 below).

Overall, supporting the theoretical predictions, cartel-related anti-dumping that either leads to duties or is withdrawn by the petitioning industry is associated with increases in

---

[18]There are no industry-withdrawn anti-dumping cases initiated before the cartel start.

world import prices relative to anti-dumping in other products. And consistent with the model predictions as well, this anticompetitive effect is present in cases initiated before and during cartel activity, controlling for cartel period and product fixed effects.

4.6.3   Traded Quantities

Table 4.4: Five-year lag from the initiation of anti-dumping Cases: Quantity.

			(1) Log Mean Quantity	(2) Log Median Quantity	(3) Log Trade-Weighted Quantity
Cartel Period			-0.0918** (-2.42)	-0.116** (-2.55)	-0.0201 (-0.20)
AD Duty[1]			0.103*** (6.55)	0.151*** (7.71)	0.243*** (7.21)
	×	Before Cartel	-0.0359 (-0.21)	-0.0410 (-0.19)	-0.396 (-1.40)
	×	During Cartel	-0.235** (-2.36)	-0.324** (-2.50)	-0.369** (-2.40)
	×	After Cartel	0.00560 (0.09)	0.0117 (0.13)	0.166 (1.64)
AD Withdrawn[2]			0.146*** (3.74)	0.170*** (3.43)	0.151*** (2.72)
	×	Before Cartel	-	-	-
	×	During Cartel	-0.342** (-2.23)	-0.479** (-1.98)	-0.726*** (-7.13)
	×	After Cartel	0.101 (1.58)	0.101 (1.58)	-0.166* (-1.95)
AD Other[3]			-0.000780 (-0.04)	-0.0275 (-1.26)	0.0340 (1.19)
	×	Before Cartel	-0.0693 (-0.49)	-0.210 (-1.25)	-0.0143 (-0.03)
	×	During Cartel	0.145* (1.69)	0.195* (1.77)	0.0235 (0.21)
	×	After Cartel	0.0852 (1.40)	0.169** (2.36)	0.115 (1.16)
Observations			116,153	116,153	116,157
Products			5,649	5,649	5,649
Product-FE			Yes	Yes	Yes
Year-FE			Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, based on robust standard errors clustered at product level.

[1] Antidumping investigations between initiation year and revocation year.

[2] Antidumping investigations withdrawn at the request of the domestic industry.

[3] Antidumping investigations that did not result in imposition of antidumping duties for other reasons.

To this point we have only focused on world import prices. As firms operate by setting prices and quantities, in this subsection we look at the import quantities. We use the same specification as in Section 4.6.2 to assess the impact of anti-dumping in global cartels on world import quantities (Table 4.4).

Results for quantities in Table 4.4 are consistent with the price effects in Table 4.6. First, world import quantities decline by 9 to 11% during the cartel period of global cartels. Thus globally active cartels affect world import prices by reducing import quantity and increasing import prices. Second, consistent with declining price effects, anti-dumping activity leading to duties or industry-withdrawn, is associated with

increasing world import quantities (by 10 to 25%).

Third, cartel-related anti-dumping cases that result in duties or are industry-withdrawn, lead to quantity reductions in world trade. However, in contrast to Table 4.3, quantity effects are found only for anti-dumping initiated during cartel activity. It is interesting that the estimated reductions in traded quantities are larger when anti-dumping cases are withdrawn by the petitioning industry than when they lead to a duty. Our estimates imply that an out-of-court settlement between anti-dumping-initiating and anti-dumping-target country helps global cartels more than the imposition of anti-dumping duties.

4.7   Conclusion

Although antitrust authorities usually investigate anticompetitive behaviour domestically, it is well-known that cartels of multinational firms operate across international borders (Levenstein et al. 2015). Based on the theoretical foundation developed by Staiger & Wolak (1989), who demonstrate that cartels have an incentive to use anti-dumping laws strategically, this chapter studies empirically whether anti-dumping laws help globally active cartels to raise world import prices. This research question is in particular important for the development of international trade policy, where Hoekman et al. (1997, p. 403) already emphasised the need to introduce antitrust criteria into anti-dumping investigations.

We motivate our empirical work by an early contribution of Messerlin (1990), who observes that roughly one quarter of antitrust cases in the European Commission between 1980 and 1987 were dealing with products that were also involved in anti-dumping investigations. Thanks to the Global Anti-Dumping Database (GAD) (Bown 2015) and the Private International Cartels data set (PIC) (Connor 2014*b*), we are able to track all anti-dumping cases of 61 globally active cartels between 1992 and 2014. In order to match both databases, we identify and assign relevant 6-digit HS product codes for all globally active cartels in the PIC data set. Between 1992 and 2014, nearly half of these cartels (27 out of 61) were dealing with products that are matched with at least one anti-dumping case during cartel activity. *70%* of all global cartels, corresponding to 52% of cartel products, are matched to *at least one* anti-dumping case at any time in the sample. In contrast, only 33% of all products have been involved in anti-dumping investigations.

Our empirical results are as follows. Cartel periods are associated with increases in world import prices by *9 to 12%* and reductions in traded quantities by *9 to 11%*. As anti-dumping is a bilateral policy instrument, its implications for world trade is less clear. We find that anti-dumping cases - that is the time between the initiation year and until the year where anti-dumping duties are revoked - are associated with decreasing world import prices and increasing world import quantities. A reason behind this effect might

be that firms hit by anti-dumping duties divert their exports to alternative markets.

Anti-dumping cases initiated before or during the cartel period are associated with increases in world import prices. Thanks to the rich collection of anti-dumping data (Bown 2015), we are also able to address the theoretical literature that has analysed withdrawn anti-dumping cases as a sign of tacit collusion. Prusa (1992) and Zanardi (2004b) have demonstrated that the filing of anti-dumping petitions provides domestic firms with a tool to facilitate or maintain cartel agreements by negotiating an out-of-court settlement before the conclusion of the anti-dumping investigation. Our empirical estimates show that industry-withdrawn anti-dumping initiated during cartel activity is associated with an increase in world import prices by 26 to 47% and reductions in quantities by 34 to 72%. This effect comes on top of the cartel effect that increases prices and declines quantities. Our results highlight that global cartels may find it more beneficial to negotiate an out-of-court settlement and withdraw the petition rather than to have duties imposed on the foreign firm. Finally, the strong contrast between the impact of anti-dumping cases in general and anti-dumping cases that are matched to global cartels highlights the need for anti-dumping and antitrust authorities to collaborate in their aim to achieve a competitive market environment.

4.8 Appendix

Figure 4.4: UN Comtrade's descriptions for all HS6 codes listed below HS4 8540. We review this list for each version of HS codes (HS92, HS96, HS02, HS07, HS12, HS17).

Table 4.5: Robustness: More than one anti-dumping Case.

	(1) Log Mean Price	(2) Log Median Price	(3) Log Trade-Weighted Price
Cartel Period	0.0946***	0.126***	-0.0357
	(2.64)	(2.78)	(-0.44)
AD	-0.0379**	-0.0611**	-0.0816***
	(-1.98)	(-2.41)	(-3.22)
Many AD	-0.0447*	-0.0955***	-0.0445
	(-1.92)	(-3.20)	(-1.58)
AD Before Cartel	0.0713	0.109	0.372**
	(1.11)	(1.36)	(2.34)
Many AD Before Cartel	0.421***	0.633**	0.295**
	(2.93)	(2.55)	(2.46)
AD During Cartel	0.163***	0.152**	0.283
	(2.94)	(2.42)	(1.43)
Many AD During Cartel	0.0536	0.0750	-0.00202
	(0.55)	(0.81)	(-0.01)
AD After Cartel	-0.0666	-0.139*	-0.236**
	(-0.91)	(-1.67)	(-2.11)
Many AD After Cartel	0.0353	0.0482	0.152*
	(0.51)	(0.60)	(1.69)
Observations	116,153	116,153	116,157
Products	5,649	5,649	5,649
Product-FE	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, based on robust standard errors clustered at product level.

Table 4.6: Robustness: Five-year lag from the initiation of anti-dumping Cases. AD initiated max. 5 years before or after cartel.

			(1) Log Mean Price	(2) Log Median Price	(3) Log Trade-Weighted Price
Cartel Period			0.102***	0.133***	-0.0343
			(2.89)	(2.99)	(-0.41)
AD Duty[1]			-0.0590***	-0.107***	-0.0992***
			(-3.67)	(-4.97)	(-4.48)
	×	Before Cartel (max. 5 years)	0.128**	0.200***	0.443***
			(2.15)	(2.93)	(3.10)
	×	During Cartel	0.228***	0.221**	0.289*
			(2.67)	(2.33)	(1.81)
	×	After Cartel (max. 5 years)	-0.0577	-0.133**	-0.140*
			(-1.35)	(-2.54)	(-1.78)
AD Withdrawn[2]			-0.122***	-0.180***	-0.112***
			(-3.36)	(-3.73)	(-2.75)
	×	Before Cartel (max. 5 years)	-	-	-
	×	During Cartel	0.272**	0.330*	0.515***
			(2.13)	(1.72)	(3.81)
	×	After Cartel (max. 5 years)	-	-	-
AD Other[3]			0.0252	0.0500**	0.00446
			(1.59)	(2.32)	(0.23)
	×	Before Cartel (max. 5 years)	-0.0306	-0.0435	-0.250
			(-0.47)	(-0.45)	(-0.71)
	×	During Cartel	-0.247***	-0.297***	-0.114
			(-3.72)	(-3.25)	(-1.20)
	×	After Cartel (max. 5 years)	-0.0770	-0.163**	-0.196*
			(-1.51)	(-2.43)	(-1.91)
Observations			116,153	116,153	116,157
Products			5,649	5,649	5,649
Product-FE			Yes	Yes	Yes
Year-FE			Yes	Yes	Yes

Notes: t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, based on robust standard errors clustered at product level.

[1] Antidumping investigations between initiation year and revocation year.

[2] Antidumping investigations withdrawn at the request of the domestic industry.

[3] Antidumping investigations that did not result in imposition of antidumping duties for other reasons.

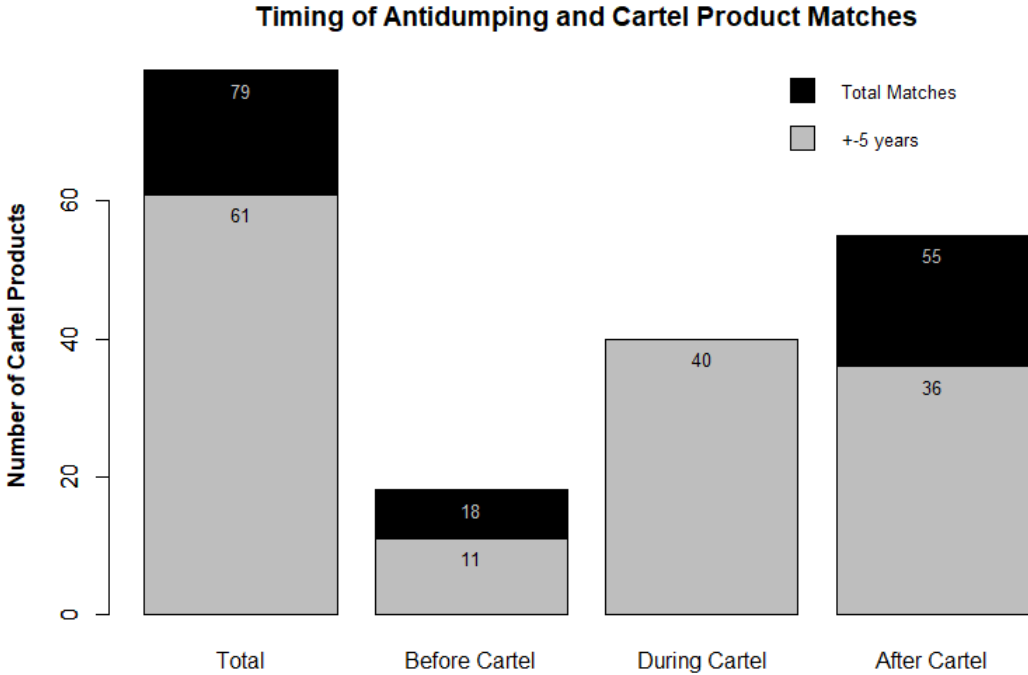## Timing of Antidumping and Cartel Product Matches

Figure 4.5: Antitrust and anti-dumping product matches relative to the cartel period. The figure shows the number of products included in at least one antitrust investigation that are matched to at least one anti-dumping investigation, relative to the cartel period.
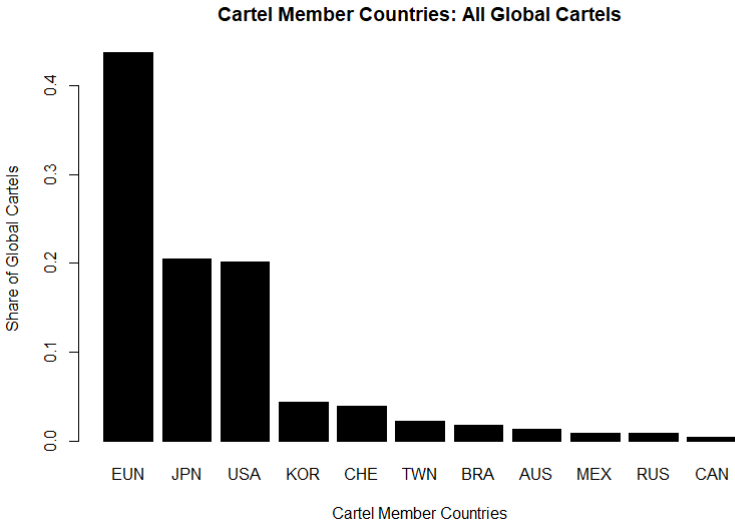
Cartel Member Countries: All Global Cartels

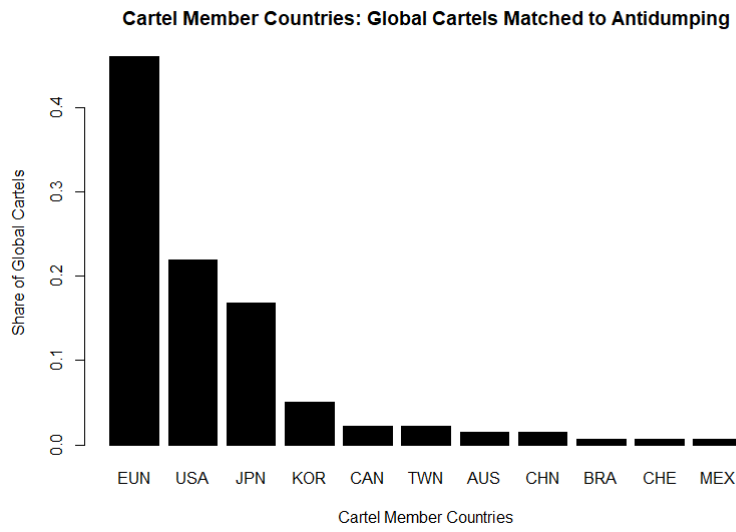Figure 4.6: Share of countries involved in 61 global cartels.

Figure 4.7: Share of countries involved in the 43 global cartels that are matched to at least one antidumping investigation.
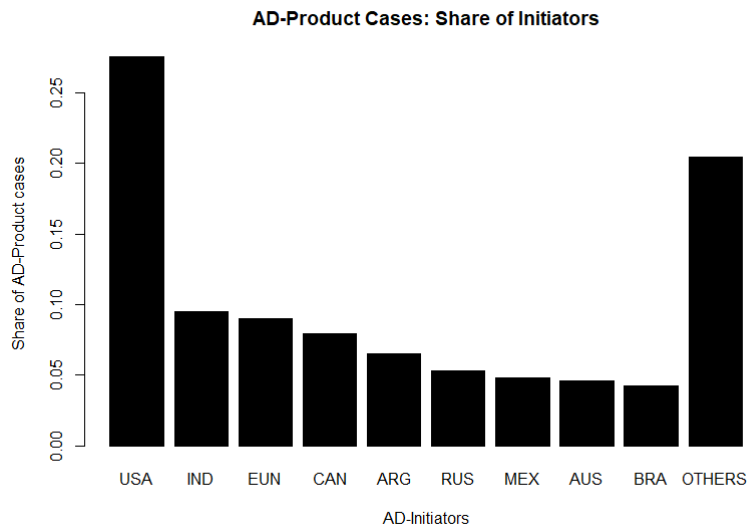

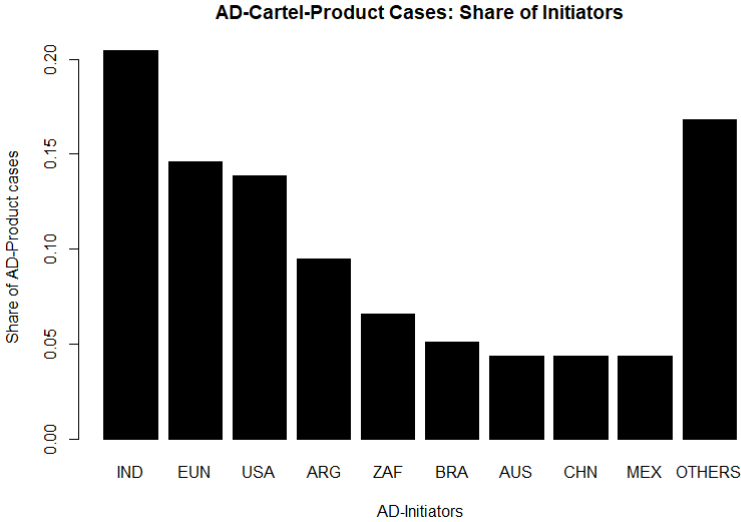Figure 4.8: Share of anti-dumping-initiating countries in the anti-dumping data set.

AD-Cartel-Product Cases: Share of Initiators

Figure 4.9: Share of anti-dumping-initiating countries in the twin antitrust-anti-dumping data set.
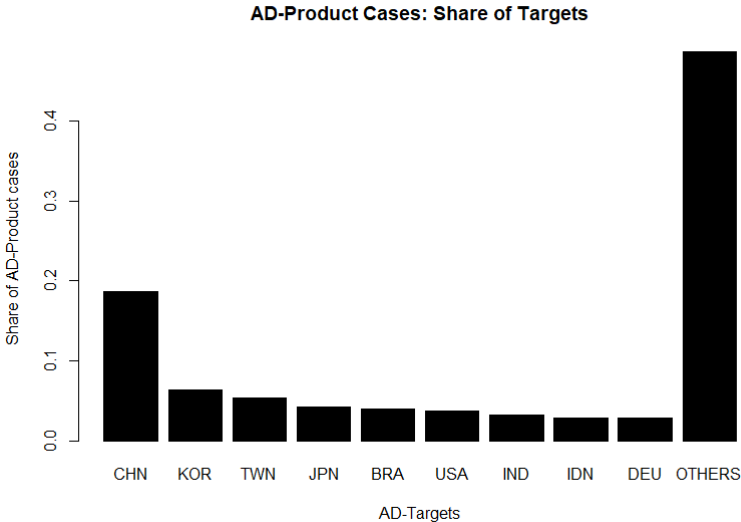
AD-Product Cases: Share of Targets

Figure 4.10: Share of anti-dumping targeted countries in the anti-dumping data set.
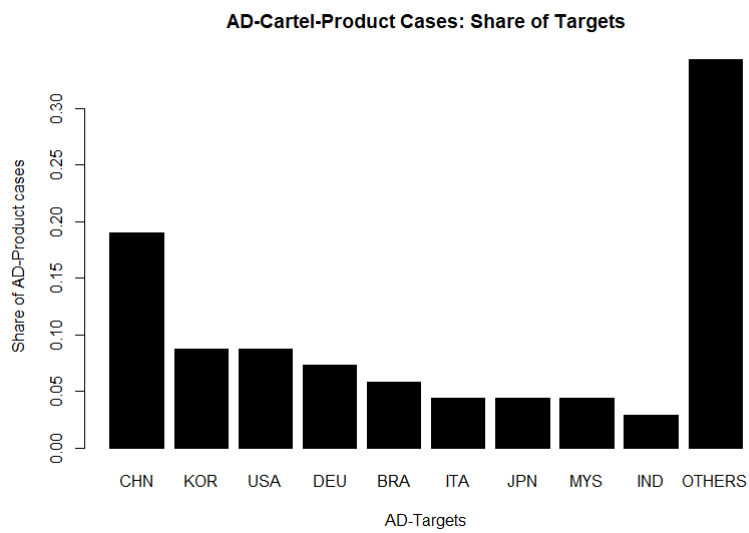
Figure 4.11: Share of anti-dumping-targeted countries in the twin antitrust-anti-dumping data set.

Chapter 5

Concluding Remarks

This PhD thesis studies the implications of local governance, decentralisation and regional autonomy under federalism. Furthermore, it contributes to the trade literature by bringing together the largely separated research on cartel behaviour and anti-dumping policy. Importantly, it identifies that there is more behind policies that are all intended to enhance social welfare. Precisely, this dissertation identifies empirically that policy-makers run into illusions if they expect communal mergers only to enhance governance efficiency, if they expect federalism only to more accurately reflect preferences of local populations, and if they expect anti-dumping policy only to protect competitive markets.

Chapter 2 and Chapter 3 assess the local implications of federalism in the context of the Socialist Federal Republic of Yugoslavia between 1945 and 1991. Despite this historical setting, Chapter 2 and Chapter 3 are important contributions on a wider scale. With regard to the literature on communal mergers, Chapter 2 identifies that communal mergers can induce local disparities between the merging partners. Adding to the literature that considers the devolution of powers to act as a conflict-reducing device, Chapter 3 identifies that federal borders harm local market access if the institutional setting allows local politicians to erect barriers around their jurisdictions.

The empirical evidence of Chapter 2 highlights the need to study the implications of communal merger reforms at a more disaggregated level than the previous literature. While Chapter 2 uses employment data for administrative centres, future research may use similar census data for education variables. Thanks to the work of Nobel laureate Elinor Ostrom (1972), further hypotheses concerning the outcome of communal mergers wait for empirical testing. In the light of Chapter 2 the most worrying concern is the conclusion of Blesse & Baskaran (2016), who argue that only *compulsory mergers* improve governance efficiency. Against this conclusion I hold the case study of the merger between Okučani (Serbs) and Nova Gradiška (Croats), which highlights that mergers between *non-friends* can create local disparities. Forcing neighbours to merge may therefore foster tensions between winners and losers. Thus I agree with Ostrom (1972, p. 487) and conclude that, without deeper knowledge, communal mergers may produce more harm than good. Based

on Chapter 2, I formulate the hypothesis that communal mergers only lead to cost savings when the socio-economic difference between the merging partners is large enough.

Pinkovskiy (2017) recently argued that sharp discontinuities in economic activity at country borders are not due to geography, climate or public goods provision. Chapter 3 provides an important contrast to this conclusion. Using geospatial elevation, river and road data, Chapter 3 derives commuting spheres around each of Yugoslavia's towns. Following the intuition that individuals do not constrain their activities by administrative borders, the commuting sphere methodology of Chapter 3 helps to identify areas where borders harm local interactions. As this methodology identifies the emergence of border effects due to Yugoslavia's federalisation reforms of 1966-1976, I conclude that future research should be careful in their causal interpretation concerning the origin of border effects in the Balkans today. Importantly, the evidence of Chapter 3 supports Redding & Sturm (2008) in the interpretation that borders cut market access. Even more, the case of socialist Yugoslavia documents that even federal borders can harm market access if local politicians obtain the competencies to erect barriers around their jurisdictions.

Beyond the context of Yugoslavia, the methodology of Chapter 3 appears as a promising alternative to study the local implications of the reunification of Germany after 1989, and of the EU accession waves that gradually dismantled borders between EU states. With regard to policy-making, it appears highly relevant whether there are still elements that harm cross-border economic activity in Europe today. As the former German-German border persists until today, it is of particular relevance to understand the forces behind this effect. Here I emphasise the work of Wolf (2009) and Becker et al. (2020), who argue that part of the German-German border effect already existed prior to World War II. With a focus on Yugoslavia's successor states, Chapter 3 provides an important background to the current situation in Bosnia-Herzegovina, Serbia and Kosovo. Regarding Bosnia-Herzegovina, the results of Chapter 3 imply that the highly decentralised governance structure of Bosnia-Herzegovina harms local market access and interaction between the inhabitants of the two entities. The same conclusion is true for the unresolved status of the Serbia-Kosovo border, where the gradual hardening of the border through border controls provokes local tensions. Here it appears paradoxical that the local population on both sides of the border is nowadays blamed for *smuggling.*

In summary, the evidence of Chapter 3 leads me to conclude that the devolution of powers to autonomous regions does not necessarily act as a medicine to multi-ethnic states. Future research on the relationship between federalism and conflict propensity should be aware that the devolution of powers to local jurisdictions only decentralises the conflict. Importantly, decentralisation is likely to create another set of outsiders, who do not benefit from local autonomy due to the geography of federal borders. In the light of the Bosnian tragedy the redrawing of such borders is *no* solution.

To the best of my knowledge, Chapter 4 is the first attempt since Messerlin (1990) to identify twin anti-dumping and antitrust cases. For the European Commission's 1980-

1987 antitrust cases, Messerlin (1990) documents that roughly one quarter was matched to at least one anti-dumping case. Chapter 4 develops a methodology to systematically identify products that are included both in anti-dumping and antitrust investigations. For this purpose, Chapter 4 combines the largest known global databases of antitrust and anti-dumping investigations, which identifies that 43 out of 61 global cartels are matched to at least one anti-dumping investigation between 1992 and 2014. Hence, Chapter 4 confirms Messerlin (1990, p. 491), who expected the number of twin cases to increase.

Beyond the descriptive match of these cases, Chapter 4 uses global trade data to estimate the impact of global cartels, anti-dumping, and of the use of anti-dumping in global cartel industries. The key result is that anti-dumping cases in cartel industries increase world import prices on top of the general cartel effect. While this estimate appears to confirm the theoretical expectation that cartels abuse anti-dumping laws (Staiger & Wolak 1989, Prusa 1992), I acknowledge that the empirical strategy of Chapter 4 does not allow causal interpretation. Moreover, due to the complexity of multi-national firms, it appears a rather fruitful avenue to study the impact of anti-dumping policy at the level of individual multi-national firms and their subsidiaries. Nonetheless, the theoretical foundation and the case study evidence summarised in Chapter 4 lead me to conclude that it is an illusion to expect that anti-dumping policy is only used to protect competitive markets.

Bibliography

Abadie, A. (2021), 'Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects', *Journal of Economic Literature* **59**(2), 391–425.

Abadie, A., Diamond, A. & Hainmueller, J. (2010), 'Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program', *Journal of the American Statistical Association* **105**(490), 493–505.

Abadie, A. & Gardeazabal, J. (2003), 'The Economic Costs of Conflict: A Case Study of the Basque Country', *American Economic Review* **93**(1), 113–132.

Acemoglu, D., Johnson, S. & Robinson, J. A. (2002), 'Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution', *The Quarterly Journal of Economics* **117**(4), 1231–1294.

Agnosteva, D. (2016), 'International Cartels and Bilateral Trade: An Empirical Investigation', *Available at SSRN 2481880* .

Agnosteva, D., Syropoulos, C. & Yotov, Y. V. (2020), 'Preferential Trade Liberalization with Endogenous Cartel Discipline: Implications for Welfare and Optimal Trade Policies'.

Alesina, A., Baqir, R. & Hoxby, C. (2004), 'Political Jurisdictions in Heterogeneous Communities', *Journal of Political Economy* **112**(2), 348–396.

Alix-Garcia, J. & Sellars, E. A. (2020), 'Locational Fundamentals, Trade, and the Changing Urban Landscape of Mexico', *Journal of Urban Economics* **116**, 103213.

Allers, M. A. & Geertsema, J. B. (2016), 'The Effects of Local Government Amalgamation on Public Spending, Taxation, and Service Levels: Evidence From 15 Years of Municipal Consolidation', *Journal of Regional Science* **56**(4), 659–682.

Anderson, J. E. (1992), 'Domino Dumping I: Competitive Exporters', *The American Economic Review* pp. 65–83.

Anderson, J. E. (1993), 'Domino Dumping II: Anti-dumping', *Journal of International Economics* **35**(1-2), 133–150.

Anderson, J. E. & Van Wincoop, E. (2004), 'Trade Costs', *Journal of Economic Literature* **42**(3), 691–751.

Becker, S. O., Boeckh, K., Hainz, C. & Woessmann, L. (2016), 'The Empire is Dead, Long Live the Empire! Long-Run Persistence of Trust and Corruption in the Bureaucracy', *The Economic Journal* **126**(590), 40–74.

Becker, S. O., Mergele, L. & Woessmann, L. (2020), 'The Separation and Reunification of Germany: Rethinking a Natural Experiment Interpretation of the Enduring Effects of Communism', *Journal of Economic Perspectives* **34**(2), 143–171.

Bernheim, B. D. & Madsen, E. (2017), 'Price Cutting and Business Stealing in Imperfect Cartels', *American Economic Review* **107**(2), 387–424.

Bertsch, G. K. (1977), 'Ethnicity and Politics in Socialist Yugoslavia', *The Annals of the American Academy of Political and Social Science* **433**(1), 88–99.

Beyer, J. (2010), 'Are Global Cartels More Effective Than "National" Cartels', *European Commission* . Accessed: 11/11/2020.

Blesse, S. & Baskaran, T. (2016), 'Do Municipal Mergers Reduce Costs? Evidence from a German Federal State', *Regional Science and Urban Economics* **59**, 54–74.

Blom-Hansen, J., Houlberg, K., Serritzlew, S. & Treisman, D. (2016), 'Jurisdiction Size and Local Government Policy Expenditure: Assessing the Effect of Municipal Amalgamation', *American Political Science Review* **110**(4), 812–831.

Blonigen, B. A. & Park, J.-H. (2004), 'Dynamic Pricing in the Presence of Antidumping Policy: Theory and Evidence', *American Economic Review* **94**(1), 134–154.

Blonigen, B. A. & Prusa, T. J. (2016), Dumping and Antidumping Duties, *in* 'Handbook of Commercial Policy', Vol. 1, Elsevier, pp. 107–159.

Bluhm, R., Lessmann, C. & Schaudt, P. (2020), 'The Political Geography of Cities'. mimeo, available at `http://www.richard-bluhm.com/wp-content/uploads/2020/10/The\_Political\_Geography\_of\_Cities\_WEB.pdf`.

Bookman, M. Z. (1990), 'The Economic Basis of Regional Autarchy in Yugoslavia', *Soviet Studies* **42**(1), 93–109.

Bown, C. P. (2008), 'The WTO and Antidumping in Developing Countries', *Economics & Politics* **20**(2), 255–288.

Bown, C. P. (2015), 'Global Antidumping Database. The World Bank. June'.

Bown, C. P. & Crowley, M. A. (2007), 'Trade Deflection and Trade Depression', *Journal of International Economics* **72**(1), 176–201.

Bown, C. P. & Crowley, M. A. (2013), 'Self-Enforcing Trade Agreements: Evidence from Time-Varying Trade Policy', *American Economic Review* **103**(2), 1071–90.

Brander, J. & Krugman, P. (1983), 'A 'Reciprocal Dumping' Model of International Trade', *Journal of International Economics* **15**(3-4), 313–321.

Broekmeyer, M. J. (1977), 'Self-Management in Yugoslavia', *The Annals of the American Academy of Political and Social Science* **431**(1), 133–140.

Buchanan, J. M. (1950), 'Federalism and Fiscal Equity', *The American Economic Review* **40**(4), 583–599.

Buchanan, J. M. (1965), 'An Economic Theory of Clubs', *Economica* **32**(125), 1–14.

Burkett, J. & Škegro, B. (1988), 'Are Economic Fractures Widening?', *Yugoslavia: Fractured Federalism, Washington, DC* pp. 142–155.

Casella, A. & Frey, B. (1992), 'Federalism and Clubs: Towards an Economic Theory of Overlapping Political Jurisdictions', *European Economic Review* **36**(2-3), 639–646.

Cederman, L.-E., Hug, S., Schädel, A. & Wucherpfennig, J. (2015), 'Territorial autonomy in the shadow of conflict: Too little, too late?', *American Political Science Review* **109**(2), 354–370.

Cochrane, N. J. (1990), Trade Liberalization in Yugoslavia and Poland, Technical report.

Conconi, P., DeRemer, D. R., Kirchsteiger, G., Trimarchi, L. & Zanardi, M. (2017), 'Suspiciously Timed Trade Disputes', *Journal of International Economics* **105**, 57–76.

Connor, J. M. (2014*a*), 'Price-Fixing Overcharges: Revised 3rd Edition'.

Connor, J. M. (2014*b*), 'The Private International Cartels (PIC) Data Set: Guide and Summary Statistics, 1990-2013'.

Davis, D. R. & Weinstein, D. E. (2002), 'Bones, Bombs, and Break Points: The Geography of Economic Activity', *American Economic Review* **92**(5), 1269–1289.

Dijkstra, E. W. et al. (1959), 'A Note on Two Problems in Connexion With Graphs', *Numerische Mathematik* **1**(1), 269–271.

Djilas, M. (1957), *The New Class: An Analysis of the Communist System*, San Diego: Harcourt Brace Jovanovich.

Djordjevic, J. (1959), 'The Communal System in Yugoslavia', *Annals of Public and Cooperative Economics* **30**(2-3), 169–207.

Dulić, T. (2004), 'Tito's Slaughterhouse: A Critical Analysis of Rummel's Work on Democide', *Journal of Peace Research* **41**(1), 85–102.

Egger, P. H., Koethenbuerger, M. & Loumeau, G. (2021), 'Local Border Reforms and Economic Activity', *Journal of Economic Geography* **forthcoming**.

Egger, P. & Nelson, D. (2011), 'How bad is Antidumping? Evidence From Panel Data', *Review of Economics and Statistics* **93**(4), 1374–1390.

Engels, F. (1894), *Herrn Eugen Dühring's Umwälzung der Wissenschaft (Anti-Dühring)*, Dietz, Stuttgart.

European Commission (2012), 'Antitrust: Commission Fines Producers of TV and Computer Monitor Tubes €1.47 Billion for two Decade-Long Cartels'. Accessed: 11/11/2020.
URL: *http://europa.eu/rapid/press-release_IP − 12 − 1317_en.htm*

Evenett, S. J., Levenstein, M. C. & Suslow, V. Y. (2001), 'International Cartel Enforcement: Lessons From the 1990s', The World Economy **24***(9), 1221–1245.*

Felbermayr, G. & Gröschl, J. (2014), 'Within US Trade and the Long Shadow of the American Secession', Economic Inquiry **52***(1), 382–404.*

Fisher, J. C. (1964), 'The Yugoslav Commune', World Politics **16***(3), 418–441.*

Fisher, J. C. (1966), Yugoslavia - A Multinational State: Regional Difference and Administrative Response, *Chandler Pub. Co.*

Flaaen, A. B., Hortaçsu, A. & Tintelnot, F. (2020), 'The Production Relocation and Price Effects of US Trade Policy: The Case of Washing Machines', American Economic Review **110***(7), 2103–27.*

Fonseca, M. A. & Normann, H.-T. (2012), 'Explicit vs Tacit Collusion—The impact of Communication in Oligopoly Experiments', European Economic Review **56***(8), 1759–1772.*

Frankel, J. (1955), 'Federalism in Yugoslavia', American Political Science Review **49***(2), 416–430.*

Frankel, J., Stein, E. & Wei, S.-J. (1995), 'Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-Natural', Journal of Development Economics **47***(1), 61–95.*

Gnutzmann-Mkrtchyan, A. & Hoffstadt, M. (2020), 'Use and Abuse of Antidumping by Global Cartels', CESifo Working Papers **8729***, 1–45.*

Grosfeld, I. & Zhuravskaya, E. (2015), 'Cultural vs. Economic Legacies of Empires: Evidence From the Partition of Poland', Journal of Comparative Economics **43***(1), 55–75.*

Grupković, D. (1991), Statistical Yearbook of the Socialist Federal Republic of Yugoslavia, *Socijalistička Federativna Republika Jugoslavija, Savezni Zavod za Statistiku.*

Halpern, J. M. (1956), A Serbian village, *Columbia University Press.*

Halpern, J. M. (1963), 'Yugoslav Peasant Society in Transition-Stability in Change', Anthropological Quarterly **36***(3), 156–182.*

Halpern, J. M. (1965), 'Peasant Culture and Urbanization in Yugoslavia', Human Organization **24***(2), 162–174.*

Halpern, J. M. (1975), 'Some Perspectives on Balkan Migration Patterns (With Particular Reference to Yugoslavia)', Anthropology Department Faculty Publication Series *p. 54.*

Hamilton, F. E. I. (1968), Yugoslavia, Patterns of Economic Activity, *Frederick A. Praeger, Publishers, New York, Washington.*

Harrington Jr, J. E. (2017), The Theory of Collusion and Competition Policy, *MIT Press.*

Harrington Jr, J. E. et al. (2006), 'How do Cartels Operate?', Foundations and Trends® in Microeconomics **2***(1), 1–105.*

Hexner, E. (1943), 'International Cartels in the Postwar World', Southern Economic Journal *pp. 114–135.*

Hinnerich, B. T. (2009), 'Do Merging Local Governments Free Ride on Their Counterparts When Facing Boundary Reform?', Journal of Public Economics **93***(5-6), 721–728.*

Hirota, H. & Yunoue, H. (2017), 'Evaluation of the Fiscal Effect on Municipal Mergers: Quasi-Experimental Evidence From Japanese Municipal Data', Regional Science and Urban Economics **66***, 132–149.*

Hoekman, B. et al. (1997), 'Competition Policy and the Global Trading System', The World Economy **20***(4), 383–406.*

Holt, S. & Stapleton, K. (1971), 'Yugoslavia and the European Community 1958-70', Journal of Common Market Studies **10***(1), 47–57.*

Horvat, B. (1971), 'Yugoslav Economic Policy in the Post-war Period: Problems, Ideas, Institutional Developments', The American Economic Review *pp. 71–169.*

Irwin, D. A. (1998), The Semiconductor Industry, in 'Brookings Trade Forum', JSTOR, pp. 173–200.

Ivaldi, M., Jullien, B., Rey, P., Seabright, P. & Tirole, J. (2003), 'The Economics of Tacit Collusion'.

Jakir, A. (2005), 'Workers' Self-Management in Tito's Yugoslavia Revisited', Moving the Social **33***, 137–155.*

Jordahl, H. & Liang, C.-Y. (2010), 'Merged Municipalities, Higher Debt: on Free-Riding and the Common Pool Problem in Politics', Public Choice **143***(1-2), 157–172.*

Jović, D. (2009), Yugoslavia: A State That Withered Away, *Purdue University Press.*

Kardelj, E. (1955a), 'Socialist Democracy in Yugoslav Practice', Annals of Public and Cooperative Economics **26***(1), 1–39.*

Kardelj, E. (1955b), 'The New Organization of Municipalities and Districts', New Yugoslav L. **6***, 3.*

Kasoff, M. J. (1976), 'Local Government in Yugoslavia and the Constitutional Reform of 1974 A Case Study of Ljubljana', Journal of the American Institute of Planners **42***(4), 399–409.*

Kežić, D. (2017), Bauen für den Einheitsstaat: Die Eisenbahn Belgrad-Bar und die Desintegration des Wirtschaftssystems in Jugoslawien (1952–1976)*, De Gruyter Oldenbourg.*

Knetter, M. M. & Prusa, T. J. (2003), 'Macroeconomic Factors and Antidumping Filings: Evidence From Four Countries', Journal of International Economics **61***(1), 1–17.*

Konings, J. & Vandenbussche, H. (2005), 'Antidumping Protection and Markups of Domestic Firms', Journal of International Economics **65***(1), 151–165.*

Konings, J. & Vandenbussche, H. (2013), 'Antidumping Protection Hurts Exporters: Firm-Level Evidence', Review of World Economics **149***(2), 295–320.*

Krugman, P. (1991), 'Increasing Returns and Economic Geography', Journal of Political Economy **99***(3), 483–499.*

Lampe, J. R. (2000), Yugoslavia as History: Twice There Was a Country, Second Edition*, Cambridge University Press.*

Lapenna, I. (1972), 'Main Features of the Yugoslav Constitution 1946-1971', International & Comparative Law Quarterly **21***, 209.*

Levenstein, M. C., Sivadasan, J. & Suslow, V. Y. (2015), 'The Effect of Competition on Trade: Evidence From the Collapse of International Cartels', International Journal of Industrial Organization **39***, 56–70.*

Levenstein, M. C. & Suslow, V. Y. (2006), 'What Determines Cartel Success?', Journal of Economic Literature **44***(1), 43–95.*

Lockwood, W. G. (1973), 'The Peasant-Worker in Yugoslavia', Studies in European Society **1***(1), 91–110.*

Lockwood, W. G. (1975), European Moslems: Economy and Ethnicity in Western Bosnia*, Academic Press.*

Lydall, H. (1989), Yugoslavia in Crisis*, Oxford University Press, USA.*

Marx, K. (1900), The Civil War in France*, International library Publishing Company.*

McCallum, J. (1995), 'National Borders Matter: Canada-US Regional Trade Patterns', The American Economic Review **85***(3), 615–623.*

Messerlin, P. A. (1990), 'Anti-Dumping Regulations or Pro-Cartel Law? The EC Chemical Cases', The World Economy **13***(4), 465–492.*

Michalopoulos, S. & Papaioannou, E. (2014), 'National Institutions and Subnational Development in Africa', The Quarterly Journal of Economics **129***(1), 151–213.*

Milanović, B. (1987), 'Patterns of Regional Growth in Yugoslavia, 1952–83', Journal of Development Economics **25***(1), 1–19.*

Milenkovitch, D. D. (1977), 'The Case of Yugoslavia', The American Economic Review **67***(1), 55–60.*

Miller, N. H. (2009), 'Strategic Leniency and Cartel Enforcement', American Economic Review **99***(3), 750–68.*

Miller, R. F. et al. (1989), 'Developments in Yugoslav Agriculture: Breaking the Ideological Barrier in a Period of General Economic and Political Crisis', East European Politics and Societies **3***(03), 500–533.*

Musgrave, R. A. (1959), The Theory of Public Finance; A Study in Public Economy*, Kogakusha Co.*

Musgrave, R. A. (1971), 'Economics of Fiscal Federalism', Nebraska Journal of Economics and Business *pp. 3–13.*

National Assembly of the People's Republic of Bosnia and Herzegovina (1955), 'Službeni list'.

Neal, F. W. (1958), Titoism in Action*, University of California Press.*

Nieberding, J. F. (1999), 'The Effect of US Antidumping law on Firms' Market Power: An Empirical Test', Review of Industrial Organization **14***(1), 65–84.*

Nitsch, V. & Wolf, N. (2013), 'Tear Down This Wall: On the Persistence of Borders in Trade', Canadian Journal of Economics/Revue canadienne d'économique **46***(1), 154–179.*

Novak, A. (1955), Statistical Yearbook of the Federal People's Republic of Yugoslavia*, Federativna Narodna Republika Jugoslavija, Savezni Zavod za Statistiku.*

Oates, W. E. (1972), Fiscal Federalism*, New York, Harcourt Brace Jovanovich.*

Oates, W. E. (1999), 'An Essay on Fiscal Federalism', Journal of Economic Literature **37***(3), 1120–1149.*

Ostrom, E. (1972), 'Metropolitan Reform: Propositions Derived from two Traditions', Social Science Quarterly *pp. 474–493.*

Petković, R. (1955), Local Self-Government in Yugoslavia (the Commune), *Publicity and Pub. Enterprise" Jugoslavija".*

Pierce Jr, R. J. (1999), 'Antidumping law as a Means of Facilitating Cartelization', Antitrust Law Journal **67**, *725.*

Pinkovskiy, M. L. (2017), 'Growth Discontinuities at Borders', Journal of Economic Growth **22***(2), 145–192.*

Prusa, T. J. (1992), 'Why are so Many Antidumping Petitions Withdrawn?', Journal of International Economics **33***(1-2), 1–20.*

Prusa, T. J. (1994), 'Pricing Behavior in the Presence of Antidumping law', Journal of Economic Integration *pp. 260–289.*

Prusa, T. J. (2001), 'On the spread and impact of anti-dumping', Canadian Journal of Economics/Revue Canadienne d'Économique **34***(3), 591–611.*

Prusa, T. J. (2005), 'Anti-Dumping: A Growing Problem in International Trade', The World Economy **28***(5), 683–700.*

Pusić, E. (1975), 'Intentions and Realities: Local Government in Yugoslavia', Public Administration **53***(2), 133–152.*

Radan, P. (1999), 'Yugoslavia's Internal Borders as International Borders: A Question of Appropriateness', East European Quarterly **33***(2), 137.*

Ramet, S. P. (1992), Nationalism and Federalism in Yugoslavia, 1962-1991*, Vol. 703, Indiana University Press.*

Redding, S. J. & Sturm, D. M. (2008), 'The Costs of Remoteness: Evidence From German Division and Reunification', American Economic Review **98***(5), 1766–97.*

Reingewertz, Y. (2012), 'Do Municipal Amalgamations Work? Evidence From Municipalities in Israel', Journal of Urban Economics **72***(2-3), 240–251.*

Reynolds, K. M. (2013), 'Under the Cover of Antidumping: Does Administered Protection Facilitate Domestic Collusion?', Review of Industrial Organization **42***(4), 415–434.*

Röller, L.-H. & Steen, F. (2006), 'On the Workings of a Cartel: Evidence From the Norwegian Cement Industry', American Economic Review **96***(1), 321–338.*

Rusinow, D. I. (1978), The Yugoslav Experiment 1948-1974*, University of California Press.*

Rutkowski, A. (2007), 'Withdrawals of Anti-dumping Complaints in the EU: A Sign of Collusion', The World Economy **30***(3), 470–503.*

Schmidheiny, K. & Siegloch, S. (2020), 'On Event Studies and Distributed-Lags in Two-Way Fixed Effects Models: Identification, Equivalence, and Generalization'. CEPR Discussion Paper 13477.

Simić, A. (1973), 'The Peasant Urbanites', A Study of Rural-Urban Mobility in Serbia .

Simić, A. (1974), 'Urbanization and Cultural Process in Yugoslavia', Anthropological Quarterly *pp. 211–227.*

Simmie, J. (1989), 'Self-Management and Town Planning in Yugoslavia', Town Planning Review *pp. 271–286.*

Staiger, R. W. & Wolak, F. A. (1989), Strategic use of Antidumping law to Enforce Tacit International Collusion, Technical report, National Bureau of Economic Research.

Staiger, R. W. & Wolak, F. A. (1992), 'The Effect of Domestic Antidumping law in the Presence of foreign Monopoly', Journal of International Economics **32***(3-4), 265–287.*

Staiger, R. W. & Wolak, F. A. (1994), Measuring Industry Specific Protection: Antidumping in the United States, Technical report, National Bureau of Economic Research.

Stigler, G. J. (1957), 'The Tenable Range of Functions of Local Government', Federal Expenditure Policy for Economic Growth and Stability: Papers Submitted by Panelists Appearing Before the Subcommittee on Fiscal Policy .

Štiks, I. (2015), Nations and Citizens in Yugoslavia and the Post-Yugoslav States: One Hundred Years of Citizenship, *Bloomsbury Publishing.*

Stott, G. (2000), 'Safeguarding 'The Frog Pond': London West and the Resistance to Municipal Amalgamation 1883–1897', Urban History Review **29***(1), 53–63.*

Taylor, C. T. (2004), 'The Economic Effects of Withdrawn Antidumping Investigations: Is There Evidence of Collusive Settlements?', Journal of International Economics **62***(2), 295–312.*

Tiebout, C. M. (1956), 'A Pure Theory of Local Expenditures', Journal of Political Economy **64***(5), 416–424.*

Tobler, W. (1993), 'Three Presentations on Geographical Analysis and Modeling'.

Uvalić, M. (1983), 'Il Problema del Mercato Unitario Jugoslavo', Est-Ovest **14***(4), 7–43.*

Vandenbussche, H. & Zanardi, M. (2010), 'The Chilling Trade Effects of Antidumping Proliferation', European Economic Review **54***(6), 760–777.*

Veugelers, R. & Vandenbussche, H. (1999), 'European Anti-Dumping Policy and the Profitability of National and International Collusion', European Economic Review **43***(1), 1–28.*

Viner, J. (1966), 'Dumping: A Problem in International Trade', The WTO and Anti-Dumping I **393**.

Ward, B. (1957), 'Workers' Management in Yugoslavia', Journal of Political Economy **65***(5), 373–386.*

Ward, B. (1965), 'The Nationalized Firm in Yugoslavia', American Economic Review **55***(1/2), 65–74.*

Ward, B. (1968), 'Political Power and Economic Change in Yugoslavia', American Economic Review **58***(2), 568–579.*

Weidmann, N. B. (2011), 'Violence 'from above' or 'from below'? The Role of Ethnicity in Bosnia's Civil War', Journal of Politics **73***(4), 1178–1190.*

Wolf, H. C. (2000), 'Intranational Home Bias in Trade', Review of Economics and Statistics **82***(4), 555–563.*

Wolf, N. (2009), 'Was Germany Ever United? Evidence from Intra-and International Trade, 1885-1933', The Journal of Economic History *pp. 846–881.*

Woodward, S. L. (1995), Socialist Unemployment: The Political Economy of Yugoslavia, 1945-1990, *Princeton University Press.*

Zanardi, M. (2004a), 'Anti-dumping: What are the Numbers to Discuss at Doha?', The World Economy **27***(3), 403–433.*

Zanardi, M. (2004b), 'Antidumping law as a Collusive Device', Canadian Journal of Economics/Revue Canadienne d'Économique **37***(1), 95–122.*

Zimmerbauer, K. & Paasi, A. (2013), 'When old and new Regionalism Collide: Deinstitutionalization of Regions and Resistance Identity in Municipality Amalgamations', Journal of Rural Studies **30***, 31–40.*

Zimmerbauer, K., Riukulehto, S. & Suutari, T. (2017), 'Killing the Regional Leviathan? Deinstitutionalization and Stickiness of Regions', International Journal of Urban and Regional Research **41***(4), 676–693.*