Extractive Institutions: A Little Goes a Long Way! The Soviet Occupation of Austria*

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Abstract

What is the effect of a short exposure to extractive institutions on long-run economic development? We use the post-World War II occupation of Austria as a laboratory setting. Austria was divided into different occupation zones for ten years. The Soviet occupation was exploitative, while the occupation by the Western Allies was more supportive. After ten years with different institutions, the regions returned to the same institutions. Methodologically, we combine a regression-discontinuity design in space with a difference-in-differences approach. We find that areas in the former Soviet zone are still less economically developed today. These areas are less populated, host fewer and lower-paying jobs, and their residents are more likely to commute outside the former Soviet zone. We conclude that even brief institutional shocks can have long-lasting effects.

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1 Introduction

In the last decades scholars have studied extensively how armed conflict, terrorism and occupation affects economic development (Besley *et al.*, 2015; Abadie and Gardeazabal, 2003; Besley and Mueller, 2012). This has shown that the costs of even short institutional shocks are enormous. Paired with this is the increasing prevalence of short-term territorial control by violent (non-state) actors: The Islamic State, warlords throughout Africa and Asia and, most recently, Russia's war of agression in Ukraine. Since these studies typically take place in underdeveloped countries shortly after the conflict has occurred, the data availability is often not sufficient to assess outcomes in which economists are typically interested in. This paper tries to overcome this issue by focusing on a historic context where long-run outcomes can be studied.

The situation of Austria after World War II offers an appealing context to study this question. In the immediate aftermath of the war, Austria was occupied by the Allied forces. The country was divided into four occupation zones, which were allotted to the US, the USSR, the UK and France (see upper panel of Figure 1). Unlike in the case of occupied Germany, the Soviet occupation forces neither installed a sovereign state in their Austrian occupation zone nor implemented a socialist system. Despite Austria's partition during its occupation, it was treated as one political unit, that is, a state to be. Nevertheless, the occupying forces differed dramatically in their behavior.

A rough description of the Soviet occupation would be *exploitative*, while the occupation by the Western Allies was more supportive. After ten years (1945-1955) with different institutions in place, the two regions return to the same set of institutions. Importantly, the strongest part of the institutional shock, travel restrictions along the border between occupation zones, only lasted for the first 2-3 years of the Allied occupation but was quickly relaxed afterwards. Thus, the effect stems most likely from an even shorter period in the immediate aftermath after World War II, as the occupation forces treated Austria as a prospective sovereign state more and more as time went on.[1]

We suggest to interpret the Allied occupation of Austria as a natural experiment, which resembles a temporary split of *one nation* into two parts, where one part features *inclusive institutions* and the other one exhibits *extractive institutions*. In the period between the end of the war and the first weeks of the occupation, the population in the East was exposed to more misconduct as compared to the West (Stelzl-Marx, 2012). Then, for the remainder of the occupation, the East was economically exploited, while the West received support. We utilize this unique setting to answer two questions: Does a short temporary shock affect economic prosperity in the long-run, even if all institutional features are restored? Which mechanism created this path dependency?

[1] As a matter of fact, the Allies handed over most of the responsibilities for policing and security to the Austrian authorities quite early in the occupation period and only kept a minimal military footprint in Austria towards the end (Stelzl-Marx, 2012).

The natural experiment is special, since the institutional framework is not externally imposed, but fully reversed after only ten years.[2] This allows us to evaluate the long-run consequences of a short institutional shock. We can examine how persistent effects are after the regulatory framework is fully restored.

Our analysis is based on newly compiled regional data from different censuses spanning the period before, during and after WW2. We compare population levels and different economic indicators between municipalities bordering the former demarcation line, established on 1 July 1945 as the boundary between the Western and Soviet occupation zones (see lower panel of Figure 1). Our long series, dating back to 1900, allows us to demonstrate that the regions east and west to this border were following parallel trends in development prior to WW2. This suggests that the exact position of the demarcation line was exogenous. We combine ideas from a *Difference-in-Differences* (DiD) approach with those from a *Regression Discontinuity Design* (RDD) to study the economic development over time.

First, we examine the effect on the spatial distribution of the population based on Austrian census data sources, covering the period from 1869 until today. This outcome measure is the standard proxy for economic activity in the existing literature so far. Second, we improve on the existing evidence by employing more precise and informative measurements of economic activity. For more recent decades, we obtain detailed information on local employment, commuting streams, sectoral composition, and productivity. This type of data allows us to distinguish between places of residence and work in our analysis.

We find evidence that the Soviet occupation had a strong and persistent effect on population. In particular, the size of the population in the Soviet zone is on average about 11 percent smaller compared to the non-Soviet zone in the post-WWII period. Generalizing to municipalities that are further away from the demarcation line, the population response is quantitatively very comparable, ranging from about minus 14 to minus 11 percent. Turning to employment, the share of the employed population declined compared to the residential population. We estimate a reduction in local employment in the Soviet zone of 13 percent in 1961 compared to the non-Soviet zone. This difference is increasing over time in absolute terms, and amounts to minus 28 percent in 2011. Economic activity (as measured in labor market outcomes) is more concentrated in the former non-Soviet occupation zone in terms of residential population. Based on detailed *information on commuting streams*, we show that the dominant commuting stream is from the former Soviet to the non-Soviet zone. The existing employment in the Soviet zone was characterized by a slower transition to manufacturing, but a faster growing dominance of services.

[2] Acemoglu *et al.* (2005) talk about the case of the division of Korea and the following economic development. But in that case the institutional shock is still present.

In terms of mechanisms, we provide evidence that agglomeration effects (i.e., how economic agglomeration occurs in locations where cost savings naturally arise) are the channel through which the impact of the Soviet occupation persists. The increase in the density of population led to a disproportionately high concentration of economic activity. That means the examination of labor-market outcomes reveals that the economic activity is substantially more concentrated in the former non-Soviet occupation zone compared to the resident population. Put differently, in our case, population data are an invalid proxy for economic activity, since commuting behavior is not uniformly distributed in space. One crucial aspect of the Austrian context is the fact that there was no coordination device to create this (economic) agglomeration. Other than in most cases studied previously, there is no entity (e.g. a government) organizing this resettlement. It was rather an ad-hoc movement induced by the fast-changing political situation at the end of World War II. Lastly, we examine measures of productivity directly: We find that, ceteris paribus, workers earn roughly 3 percentage points less if the are employed in the former Soviet zone. This estimated wage differential is quite constant over time.

We contribute to several strands of the literature: First, to the best of our knowledge, this study provides the most comprehensive evidence of the long-run effects of a temporary, extractive shock to a country's economy. Early works study the direct effect of war and armed conflict on personal, individual economic outcomes (Imbens and Klaauw, 1995; Miguel and Roland, 2011a; Ghobarah *et al.*, 2003). However, more recent research has studied how occupation, terrorism and armed conflict affects economic development in a broader context. Besley *et al.* (2015) show that a breakdown of the rule of law has a sizable economic effect. Piracy at the coast of Somalia has lead to an 8% to 12% increase in shipping costs. Eckstein and Tsiddon (2004) examine the effects of terrorism on the Israeli economy. In a counterfactual exercise they show that in absence of terrorism over a 3-year period, output per capita would have been 10% higher than it was. Abadie and Gardeazabal (2003) study terorism in Basque Country: Per capita GDP decreased by 10 percentage points compared to a counterfactual without terrorism. Additionally, firm value increased once a cease-fire was announced. On the labor market consequences of conflict, Kondylis (2010) finds that displaced Bosnians are less likely to be employed compared to those who stayed. Lastly, Besley and Mueller (2012) estimate the impact of violence in Northern Ireland and find a peace dividend on house prices. Our study is closest to the last two, as we offer comprehensive measures on these outcomes and more insights regarding mechanisms.

Second, this paper contributes to the literature on the persistence of historic shocks to institutions: It is a well established finding that institutions evolve gradually over time (Acemoglu *et al.*, 2005). For historic shocks to institutions to persist, the elite must be affected by the institutions (Banerjee and Iyer, 2005; Dell, 2010), culture has to change (Becker *et al.*, 2016) or some institutional features must remain in place (Acemoglu *et al.*,

2011). Only in rare instances, institutions are externally imposed (e. g. Dell, 2010; Acemoglu *et al.*, 2011). Such institutional shocks facilitate the identification of causal effects. The existing literature provides evidence that the exposure to extractive institutions is detrimental to long-run growth performance, both across countries (Acemoglu *et al.*, 2001, 2002) and within countries (Dell, 2010; Lowes and Montero, 2018). Common features of most exiting studies are an institutional shock with a *long duration* and a focus on low-income countries.[3]

The paper closest to our work is Ochsner (2017): He studies the 74 day-long occupation of parts of Styria (a state in the south of Austria) in 1945 which was reversed when the allied forces retreated from the lines of contact to the pre-planned occupation-borders. The author finds a local within-state reallocation of skilled workers and negative economic outcomes for the previously occupied territory that persist to this day. We see our contribution as a natural extension of this *local* aspect: Our work generalizes these long-lasting outcomes to a *national* level. The soviet occupied part is still economically less developed today. These areas are less populated, host less and lower-paying jobs and its residents are more likely to commute outside the former Soviet zone. We conclude that even short-term institutional shocks can have persistent effects in the long-run.

The rest of this paper proceeds as follows. Section 2 reviews the historical background of the Allied occupation of Austria after WWII and describes the nature of the institutional shock. Section 3 describes our research design. We introduce our data, presents some descriptive statistics, and outline our estimation strategy and the underlying identifying assumptions. Section 4 tests whether the institutional shock has had an impact on economic activity since 1955. Section 5 examines mechanisms, and Section 6 offers concluding remarks. A Web Appendix contains additional robustness checks and details on data construction.

2 The Allied Occupation of Austria after WWII

Already in October 1943 the major Allies (UK, US, and USSR) started to coordinate planning for the post-war period. Most importantly for Austria, the foreign secretaries have agreed in the so-called *Moscow Declaration* that Austria had been the first victim to fall prey to the aggressive foreign policy of Nazi Germany.[4] They regarded '*the annexation imposed upon Austria by Germany's penetration of March 15, 1938, as null and void*' and called for the re-establishment of a free and independent Austria after the victory over Nazi Germany.

[3]With respect to the duration of the shock, see Lowes and Montero (2018).

[4]The validity of this so-called *victim theory* has been questioned ever since. Historians, politicians and the public in Austria have debated whether the *Anschluss* was voluntary or forced. Today there is absolute consensus that the *Anschluss* found broad support in the Austrian population at the time and that a large proportion of Austrians were collaborators and co-perpetrators.

2.1 Establishment of Occupation Zones

The establishment of occupation zones was refereed to the newly established *European Advisory Commission* (EAC), which began its planning in January 1944. The purpose of this occupation (as formulated in the final version of the so-called *Agreement on Control Machinery in Austria*) was to achieve the separation of Austria from Germany; to secure the establishment of a central Austrian administrative machine, to prepare the way for free elections; and to provide a provisional administration of Austria. The major Allies started to unilaterally submit their proposals for the zoning to EAC as early as January 1944. This initiated long and tough negotiations. In January 1945, France joined and made her bid for a zone in Austria (Erickson, 1950). An agreement was not reached until three months after Austria had fallen to the Allies on July 9, 1945. Immediately after this first agreement a zone swap took place, which altered the former agreement substantially (Eisterer, 2009).[5] Parts of Upper Austria were only temporarily under non-Soviet occupation, while parts of Styria were under Soviet occupation only for a couple of months. A summary of the final zone agreements was released simultaneously by the four governments on August 8, 1945 (Erickson, 1950). Figure 1 displays the finals borders, which we use for our analysis. The USSR obtained a northeast sector, the US a northwest sector, France the south-western tip, and UK a southeast sector. Vienna, the capital, was similarly subdivided but the central district was administered jointly by the Allied Control Council. Our analysis based on the final borders, provides a conservative estimate for the regions affected by the last-minute zone swaps, to the extent that the exposure to the other occupation force before the zone swap had an effect on the outcomes of interest.[6]

2.2 Phases of the Occupation

The time period from the invasion of the Soviet troops in the end of March, 1945 until the first agreement on the occupation zones in early July, 1945 was marked by chaos. Everything depended on the military administration that had been installed. Conditions differed not only among the occupation zones to be, but also with respect to the individual division and the particular local commander (Eisterer, 2009). The different military commanders shared their interest in ensuring the security of their troops as well as in maintaining law and order. In line with this, several oral historic sources report the presence of curfews and strict travel restrictions.[7] Thus, it seems not reconstructable at

[5] Among others, the UK took over most of Styria from the Soviets and the Americans, the Soviets replace the Americans in the North of Upper Austria (in the so-called Mühlviertel), and France received Tyrol, which was initially assigned to the US.

[6] The area previously held by the Soviets makes up roughly 40% of the border municipalities (our preferred specification) and contains around 30% of the population in this sample.

[7] See, for instance, `https://www.stadt-salzburg.at/pdf/stadtchronik_1945_bis_1955.pdf`.

which time in which region people had the opportunity to escape the Soviet zone to be. This escape was further complicated by the the unclear position of the demarcation line, and the last-minute zone swaps.

The period after July, 1945 can be characterized by two regimes defined by the so-called first and second control agreement. Under the first control agreement from July 4, 1945 the occupying power had full control and travelling across occupation zones was heavily restricted. The period after the second control agreement from June 28, 1946, was characterized as a gradual emancipation of the Austrian government, which took back more and more powers from the occupiers. Already, starting from October 22, 1945 it was possible for Austrian citizens to travel across occupation zones. A so-called inter-Allied identity card was needed. The constant checking of the movement of people and goods across lines of demarcation, however, was only ceased on the June 9, 1953.[8]

The occupation lasted much longer than initially intended, since state treaty negotiations were obstructed by the emerging Cold War (Ferring, 1968). The negotiations started in 1947, were in a state of suspension from mid-1950 through 1953, were resumed in 1954, and finalized in 1955. On May 15, 1955 the *Austrian State Treaty* was signed among the allied occupying forces and re-established a free, sovereign, and democratic Austria by July 27, 1955. As a result of this treaty the Allies left Austrian territory on October 25, 1955.

2.3 Differential Impact of the Occupation

A rough description of the Soviet occupation in economic terms would be 'exploitative', while the non-Soviet occupation (in particular, the one by the US) could be described as more 'supportive'. In order to describe the differences between the two occupation regimes, it is useful to distinguish two periods. In the period between the end of the war and the first weeks of the occupation, the population in the East was exposed to more misconduct as compared to the West. Second, for the remainder of the occupation, the East was economically exploited, while the West received support.

2.3.1 Level of Misconduct

Due to Nazi propaganda demonizing communists, as well as factual reports on misconduct of the Soviet Army in Hungary, the Austrian population was terrified by the Soviet Army. Sadly, the seeking of revenge and craving for booty indeed led to assaults on the local population. In particular, there is evidence for mass rapes taking place in connection with combat operations, but also during the subsequent occupation (Dack,

[8]Within the occupation zones of the Western Allies cross-border control were ceased already in 1947.

2008).[9] By contrast, the reputation of the troops of the Western Allies, who crossed the German border in the West about one month later, was much better. While there are also documented cases of rape, the incidence seems much lower.

2.3.2 Economic exploitation versus support

Referring to the *Potsdam Agreement* the Soviets claimed 'German assets' (i.e., properties which previously belonged to Germans) within their Austrian occupation zone. Between February and July 1946, the Soviets seized unilaterally some 280 industrial enterprises (including the entire Austrian oil industry, and the Danube Steam Shipping Company) and a huge area of highly productive agricultural land (Bischof, 2009). In contrast, the Western Allies (especially the US) started to support Austria in 1946. That year Austria was facing a severe food crisis. National agricultural production barley managed to contribute half the food needed to feed the population. In the fall of 1946, the US government started to provide massive amounts of food aid. About one year later the *European Recovery Program* (commonly known as the Marshall Plan, henceforth ERP) was launched. No European country benefited more from the ERP than Austria.[10] Notably, Austria was the only Soviet-occupied country to join the ERP. From 1947 to 1953, Austria received about USD 1.1 billion without any repayment obligations.[11] These funds were predominantly spent on projects in the zones of the Western Allies (about 81 percent), and to a smaller extent (about 19 percent) in the Soviet zone (Haas, 2007).

3 Research Design

We aim to estimate the effect of the differential occupation on the economic development for the period after 1955, when the demarcation line became completely obsolete. Our research design is based on the idea that the difference in post-treatment outcomes can be identified by focusing on a small area around the former demarcation line. We have to overcome two challenges to identify the causal effect at this discontinuity in space. First, we should allow for the possibility of unobserved differences between areas in the two occupation zones that were already in place before the demarcation line was decided.

[9] The best available evidence is not for Austria, but for Germany. Using information from hospital records in Berlin, Johr and Sander (2002) estimates that in the period between April 1945 and September 1945 about 7 percent of all women of childbearing age were raped at least once by members of the Soviet army.

[10] The US government provided in total USD 17 billion (approximately USD 120 billion in current dollar value) of economic support in the frame of the ERP to 17 western and southern European countries. The goals of the US were to rebuild war-devastated regions, remove trade barriers, modernize industry, make Europe prosperous again, but also to gain market platforms in Europe and to prevent the spread of communism.

[11] About 41 percent of these funds were spent immediately on basic foodstuffs, to rebuild infrastructure (such as power plant construction) and to reform the currency. The remaining 59 percent were used for medium- and long-term economic assistance.

To do so, we have collected a long data series starting in 1900. These data allow us to compare population levels and trends across regions in a period before separation. It turns out that the regions east and west to the demarcation line had been following parallel trends in population development prior to WW2. This suggests that the exact position of the demarcation line was exogenous. Motivated by these parallel trends in the pre-occupation period, we assume in our analysis that the population trends would have been parallel in the absence of the separation later on.[12] Second, we have to be careful to rule out other time-varying confounding factors, such as differences in the proximity to Western markets in the post-WW2 period. To address this, we exploit the demarcation line as a discontinuity in space. Small geographic units bordering the demarcation line have the same geographic features and equal access to markets. More generally speaking, we assume that there are no confounding factors, which change discontinuously at the demarcation line.

3.1 Data

We use municipality-level data on the size of the population, different indicators for economic activity and commuting streams. These data are drawn from different sources published by *Statistik Austria* (the Austrian statistical agency) and its predecessor agencies. The vast majority of these data originates from the decennial census. These have been conducted since 1869 with irregular intervals in the inter-war period.[13] For earlier years we have to resort to printed publications. For later years (1971 and onwards) we have access to electronic individual-level data, which we aggregate at the municipality level ourselves. Population data is available for the full sample period from 1869 through 2011. These long panel data set allows us to check for any pre-WWII differences across regions. Other variables are only available for the post-WWII period. Information on economic activity and commuting streams is available from 1961 through 2011 and 2001, respectively.

Municipality borders have changed significantly since the beginning of our sample period. For instance, since 1934 the number of municipalities has dropped from $4,397$ to $2,354$ in the year 2011. In the case of population data, *Statistik Austria* provides the adjusted figures after any revision of municipality borders. Thus, we have consistent time-series based on the current municipality borders. An overview of this sample can be

[12] We refrain from referring to our estimation procedure as a DiD approach, since a standard DiD approach assumes that only one group was affected by the treatment. We recognize that both the East and West have been affected by the events after WW2 and we aim to estimate the relative difference in population.

[13] For the years 1946 (Österreichisches Statistisches Zentralamt, 1948) and 1948 (Österreichisches Statistisches Zentralamt, 1949) we obtain information on the population from two non-census sources. In 1946, population estimates are based on the number of food stamps. In 1948, population figures are based on an administrative inquiry.

found in the top panel of Table B.1 in the Appendix. For all other variables, we generate our own time series for the smallest geographic unit we can cleanly trace over time.[14] In our main estimation sample, which covers the area along the demarcation line (our RDD-sample, to be defined below), we end up with 95 mutually exclusive geographic units that comprise 128 municipalities according to the current borders.[15] For simplicity, we will refer to these larger geography units also as municipalities below. Of these municipalities there are 50 in the former Soviet zone and 45 in the non-Soviet zone.

3.2 Estimation Strategy

The core idea of our estimation strategy is to exploit the demarcation line (i. e., the later inner Austrian border between 1945-1955) as a discontinuity in space. This lends itself to a conventional RD approach, in which the distance to the demarcation line serves as the running variable. A drawback of this approach is the mismatch between a one-dimensional running variable in a two-dimensional plane. Our preferred approach accounts for the two-dimensionality of space in a simple but effective way. We focus on the sample of municipalities that border the demarcation line highlighted in the bottom map of Figure 1. Among these, we form pairs of areas that share a common border (which is the demarcation line). For each of these pairs we calculate the difference in the population level for each year and compare the mean of the differences over time. This approach translates into the following estimation model:

$$O_{i,j,t} \quad = \quad \alpha + \beta_t \cdot Soviet_{i,j} + \phi_{j,t} \cdot Area\text{-}Pair_j + \varepsilon_{i,j,t}, \tag{1}$$

where $O_{i,j,t}$ is the log population in municipality i, belonging to pair j, measured in year t. The binary variable $Soviet_{i,j}$ is equal to one if the municipality is in the Soviet zone, and zero otherwise. The estimate of $\phi_{j,t}$ denotes a time-varying fixed-effect for municipality-pair j in year t. These are quite powerful controls, since they account for all time-varying factors that affect the population levels of bordering municipalities on both sides of the former demarcation line.

The parameters of primary interest are the β_t.[16] These parameters provide the average difference between the population of a municipality in the West to one in the East in a given year t relative to the baseline year of 1939. Estimates of β_t for years before WW2 test for differential pre-occupation trends and provide suggestive evidence for the parallel-

[14] If municipalities have merged, we simply aggregate pre-merger data across the merging municipalities. If one municipality has been divided and it parts merged with other municipalities, we aggregate the pre-merger data across all affected municipalities. See Figure A.1 for a stylized example.

[15] The descriptive statistics for this sample are shown in the second panel of Appendix Table B.1. There also border districts and big cities are presented.

[16] We have six data points before WW2 (1900, 1910, 1923, 1934, 1939), three during WW2 (1943, 1944, 1945), three during the occupation period (1946, 1948, 1951) and six after the establishment of the new state (1961, 1971, 1981, 1991, 2001, 2011). The year 1939 serves as the base year in all our estimations.

trend assumption. Estimates of β_t post WW2 show at what point in time the East-West population gap arises and how it has developed over time. The estimate β_{1939} is the average difference in the outcome variable between municipalities in the East and the West in 1939.

4 The Long-run Impact of the Soviet Occupation

4.1 Population Size

Table 1 summarizes estimation results for the population size based on specification (1). The main finding is a large and statistically significant reduction in the size of the population in the former Soviet zone.

4.2 Local effect

Columns (I)-(V) are based on our "RDD-sample", which comprises the municipalities along the demarcation line. The estimate suggests that the population size in the Soviet zone is on average about 11 percent smaller (as compared to the non-Soviet zone) in the post-WWII period. This is also depicted in Panel A of Figure 2. It reveals two important insights. First, the population response is indeed immediate and constant. In 2011 (66 years after the end of WWII) the estimated population drop is more or less the same as in 1946 (less than one year after the end of the war). Second, the included leads are neither individually nor jointly statistically significant. This strengthens our confidence that the parallel-trend assumption, which is at the core of our identification strategy, holds.[17] Based on our RDD-sample we conclude that the internal migration shock (induced by the Soviet occupation) was persistent and shifted the long-run spatial equilibrium.

By construction, many municipalities along the demarcation line appear in several area-pairs. Therefore, we cluster standard errors by municipality within a pair. In Appendix Table B.2, we will demonstrate the robustness of our estimation results with respect to different approaches of inference using different levels of clustering and synthetic controls.

4.3 Generalizability

The focus on the municipalities along the demarcation line bears the risk of missing out on the larger picture. Our estimated effect in columns (I)-(V) of Table 1 may only be a local phenomenon that is specific to the geographic area along the demarcation line. For instance, people might have left their homes to escape the approaching Soviet army, but

[17] In Figure A.2 we present results of a flexible estimation of the population during WW2, showing similar results.

did not go far away from their previous homes. Therefore, we examine the generalizability of this result in Appendix Table B.3 (see Figure A.3 for a graphical representation). It turns out that the population response is quantitatively very comparable, as we move further away from the demarcation line. In columns (II) through (V) we employ estimation samples that are based on municipality pairs which share the same absolute distance to the demarcation line. In this way we can observe the population drop as we move away from the demarcation line. The effects slightly increase as we expand the geographical coverage of our estimation sample, but are very comparable with a range from about minus 8 to minus 20 percent.[18]

In column (VI) of Table 1 we include *all* municipalities in the bordering districts in our sample. In this estimation, we do not form municipality-pairs and, thus, do not control for pair-year fixed effects. This set of results is convincing evidence that the estimated effect in column (I) is *not* just a local phenomenon. The population drop (rise) in the Soviet (non-Soviet) zone is present throughout. This means that migrants' points of departure (their initial residence) and the points of arrival (their new residence) were equally distributed in space in the respective occupation zone, and (more importantly) this initial distribution was highly persistent over the following seven decades.

The demarcation line between the Soviet and non-Soviet zones often runs through rural areas. When we estimate the effect of the Soviet occupation in our framework with bordering areas, we therefore estimate the effect in mostly rural areas. Of course, it is also interesting if the Soviet occupation has the same effect in urban areas, where economic activity is more concentrated. Previous literature has shown persistent effects of population shocks to local labor markets (Braun *et al.*, 2020).

Figure A.4 shows the population development of Austrian cities relative to 1939 by occupation zone. Interestingly, even in the sample of all municipalities over 10,000 inhabitants in 2011, the cities in the Soviet zone developed with precisely the same trend before WWII as the cities in the non-Soviet zone. The difference in population levels after WWII, however, is remarkable. There is a wide gap between cities in the two zones. There is an immediate effect of minus 30 percent in the Soviet zone that remains more or less stable over time.

4.4 Placebo tests

One threat to our identification strategy is that the occupation zone borders followed the Danube river through Upper Austria and federal state borders, which are natural or pre-existing lines of division. If the area north of the Danube river or certain federal

[18] We have also estimated the effect based on a so-called "doughnut sample". This contains municipality pairs along the demarcation line that are not further apart than 10 km, but do not share a common border. Based on this sample we estimate a population drop of 11.8 percent, which is statistically indistinguishable from the main result.

states had different population growth paths after WWII, then the estimated effects might be a spurious correlation that we capture. To rule out this possibility, we run placebo tests that implement hypothetical occupation zone borders. First, we define a placebo demarcation line along the border of the federal states of Lower Austria and Burgenland; both federal states belonged to the Soviet occupation zone. Second, we define a placebo demarcation line along the Danube River in the federal state of Lower Austria, which was located within former Soviet zone. Lastly, we also run a placebo test along the borders between the US-UK and the US-French occupation zones.

Table B.4 presents the results of these placebo specifications. Columns (I) and (II) present the differences in population size for the Placebo demarcation lines along the State borders and Danube, including fixed effects for each pair and year of bordering municipalities. Then, columns (III) and (IV) do the same for the other zone borders. These results are also reported in Panel B of Figure 2. As expected, in neihter of these specifications there is any significant or quantitatively important effect of these placebo occupation zones. These findings support the causal interpretation of our estimation results presented above.

4.5 Number and Size of Firms

We use data from Austrian firm censuses at the district level between 1930 and 2011 to estimate the effect of the Soviet occupation on the number of workers, firms, and firms by size outside of agriculture. Here, we form pairs of neighboring districts along the demarcation line and estimate equation (1).

Table 2 shows that the effect of the Soviet occupation on the number of workers and firms is immediate and larger the estimated effect on population.[19] The number of workers in non-agricultural firms is already 28 percent lower in districts in the Soviet zone in 1964. By 1981, the difference increased to 36 percent and remains constant since then.

The estimated effect on the number of firms of any size is smaller, but follows the same pattern as column (III) shows. Columns (IV) and (V) use the number of firms with more than 20 and 100 workers, respectively, as the dependent variable. These results suggest, that the Soviet occupation had a larger effect on the development of these larger firms. A Poisson model for count data estimates very similar effects for the number of firms by size (not shown).

The large results of the Soviet occupation arouse doubt whether these effects are in fact causal. At least two pieces of evidence point in this direction. *First,* the estimated difference in the base year of 1930 is never significantly different from zero. Even though

[19]Table B.5 in the Appendix shows the same regression as in Table 2 with log population as the dependent variable for reference. The estimated effect of the Soviet occupation on population is about –20 percent and constant over time.

a significant difference in the base year would not be a problem, it is reassuring that there were no pre-WWII differences in levels. *Second,* columns (VI) and (VII) use a longer time series to check if the districts followed the same pre-WWII development of workers and firms on both sides of the demarcation line. In this robustness check, we loose 6 districts that we can not track between 1902 and 1930. The estimated effects are very close to zero, which indicates that there was no different development of economic activity before WWII in the two zones.

4.6 Local Workers and Frontier Workers

To complement our use of population as a proxy for econmic activity, we add further evidence on local employment.[20] Since 1961, we have information on employment at the municipality level and since 1971 we have access to a 5 percent sample of individual-level census data. These data include information on individuals' place of residence, employment status, type of employment, place of employment, and commuting behavior. We use these data to examine employment, local employment, and commuting streams, in particular, across the former demarcation line. We construct the following municipality-level outcome variables:

- $Workers_i$: number of residents of municipality i who are employed
- *Local workers*$_i$: number of workers who are employed in municipality i (irrespective of their municipality of residence)
- *Frontier-workers*$_i$: number of residents of municipality i who commute across the former demarcation line.

Since we do not observe labor-market information in pre-WWII data, we have to adjust our estimation strategy and estimate the model specified in equation (2). Thus, conditional on observable pre-WWII municipality characteristics interacted with year fixed effects and year-specific pair fixed effects, we assume that municipalities belonging to different occupation zones within in our RDD sample are comparable. While this assumption is clearly more restrictive, we can provide evidence in its support based on population data. Column (I) of Table 3 summarizes the estimates for the population response based on equation (2). These estimates are very comparable to those obtained based on the model specified in equation (1), which requires less restrictive assumptions (see the lower panel in Figure A.5 in the Appendix). We assume the same holds for labor-market data.

$$Y_{i,j,t} \;=\; \alpha'' + \beta''_t \cdot Soviet_{i,j} + \gamma''_t \cdot X_{i,j,pre-WWII} + \phi''_{j,t} \cdot Area\text{-}Pair_j + \varepsilon''_{i,j,t}, \qquad (2)$$

[20] We use the term *local workers* for people who are employed in a location, but do not necessary live in that location.

The remaining columns of Table 3 summarize the estimation results for different labor-market outcomes. Column (II) shows that the employed population (*workers*) dropped by a similar magnitude compared to the resident population (column (I)). Thus, the share of the residential population that is economically active is comparable in the former Soviet and non-Soviet zones. The main result of this section is the large difference in *local workers*, as shown in column (III). We estimate a reduction in local employment in the Soviet zone of 13 percent in 1961. This difference is increasing over time in absolute terms, and amounts to minus 28 percent in 2011. Thus, the examination of labor-market outcomes reveals that the economic activity is substantially more concentrated in the former non-Soviet occupation zone compared to the resident population. Put differently, in our case, population data are an invalid proxy for economic activity, since commuting behavior is not uniformly distributed in space.

In the final column, we examine frontier workers and ask whether more people commute from the former Soviet zone to the former non-Soviet zone compared to the other way round. This estimate is based on a 5 percent random sample of the decennial censuses from 1971 to 2001. The dependent variable is the share of workers who cross the former demarcation line on their way to work. As expected, we find that substantially more people commute from the former Soviet to the former non-Soviet zone than vice versa. The estimated effect is between 4–8 percentage points.

We conclude that the distribution of economic activity in space is substantially more concentrated as the distribution of the resident population. A further important difference between these two distributions is their dynamic development over time. The drop in the relative population size was persistent, but stayed more or less constant over time (see Appendix Figure A.5). By contrast, the difference in economic activity, as captured by the local workers, increased over time and almost tripled over a period of about 5 decades. Figure A.6 illustrates these differing trends graphically, contrasting resident population with local working population and local employment. Put differently, if population data were used exclusively as a proxy for economic activity, the degree to which economic activity is unevenly distributed across space would be underestimated.

As in the case of 'population' outcomes, we also estimate the effect of the Allied occupation for different labor-market outcomes in the four different samples, comprising municipal pairs that are further away from the demarcation line. Appendix Table B.6 summarizes the estimation output for the outcome of 'local workers'.[21] We find a very similar pattern across samples, with quite comparable effects. This finding also applies to all other labor-market outcomes. The only notable difference is that the extent of commuting across the former demarcation line decreases somewhat in municipalities that

[21]Note, in this table we cannot control for the full set of covariates, as in Table 3. We do not have information on the sectoral employment and sex ratio in 1934 for municipalities further away form the demarcation line, since we did not track the development of their municipality borders since 1934. Fortunately, the estimation results in Table 3 change only marginally if we exclude these covariates.

are 30–40 km away. Detailed estimation output is available in Table B.7 in the Appendix.

To validate our results, we return to our district-level analysis above to compare the effect of the Soviet occupation on firms and workers. The higher level of aggregation on the district-level is mainly due to data constraints in obtaining data on firms and workers. In Table 2 we present our results for this specification: Column (I) shows the district-level results for population, column (II) on workers and columns (III)-(V) on firms, the latter two split up by firm size. Lastly, columns (VI) and (VII) present results for a longer series that includes pre-WWII data. Overall, these results are in line with the municipality-level analysis and show a large, significant and persistent effect of the Soviet occupation on workers and firms.

4.7 Effect on Public Health

Lastly, we examine the effect of the Soviet occupation on public health and in turn its potential impact on population size. Previous studies, e.g. Ghobarah *et al.* (2003) show that episodes of violence, civil war and occupation can have long-lasting effects on health. Importantly, despite Austria's partition during the occupation, services concerning public health were already provided by the newly established Austrian government. To add to this fact, after only ten years under Soviet vs. Western occupation, the two regions returned to the same set of institutions again. Thus, to test for this theory, we collected *data on infant mortality* for our period of observation. Figure A.7 shows that there were no differences before WW2 and crucially, none past 1955 either. This finding supports the facts on the institutional background we presented above.

5 Mechanism of Persistence

Results so far suggest a strong persistence in our main outcomes, population size, number of firms and local/frontier workers. A natural question that follows from the large, persistent effects shown above concerns the channel through which population was affected. The seminal paper by Becker *et al.* (2016) discusses as possible mechanisms for persistence the following explanations: (i) governmental institutions, (ii) geography, (iii) education and (iv) culture. Recent contributions to the literature argue that multiple equilibria should be added to this list (see Nunn (2014), Fuchs-Schündeln and Hassan (2016)). In particular, they ask whether the economy shifted to another spatial equilibrium. Papers on population shocks through bombing during wars find no evidence for multiple equilibria (Davis and Weinstein, 2002; Brakman *et al.*, 2004; Miguel and Roland, 2011b). In other instances the literature does find those (Bleakley and Lin, 2012).

In a first step, we provide suggestive evidence to rule out the above stated channels for persistence. Then we provide evidence that agglomeration effects are the channel

through which the impact of the differential occupation persists.

5.1 Persistence in the Literature

5.1.1 Governmental Institutions and Public Services

The previous literature provides evidence that the exposure to extractive institutions is detrimental to long-run growth performance across countries (Acemoglu *et al.*, 2001, 2002). However, it is important to stress that despite Austria's partition during the occupation, it was treated as one political unit, that is, a state to be. While the occupying forces differed dramatically in their behavior, the public services were already provided by the newly established Austrian government. Important determinants of long-lasting change like schooling (unlike in Germany, see Fuchs-Schündeln and Hassan (2016)) and health care were not under the control of the occupying authorities and thus unlikely to be the channel for the persistence observed here. Furthermore, after only ten years under differential occupation regimes, the two regions returned to one joint independent state completely.

5.1.2 Market Access

Redding and Sturm (2008) use the German reunification as natural experiment to test for the importance of market access for economic development. They find that West German cities close to the former border to Eastern Germany experience less population growth compared to other cities in the West. Thus, we have to be careful to rule out time-varying confounding factors, such as the differences in proximity to Western markets in the post-WW2 period. To address this issue, we exploit the demarcation line as a discontinuity in space and introduce the area-pairs specification (1). Small geographic units bordering the demarcation line have the same geographic features and equal access to markets. Thus we are confident, that the effect examined in Redding and Sturm (2008) is ruled out by our research design.

5.1.3 Selective Migration

A further issue that could drive the results is selective migration. Ochsner and Roesel (2016) document a migration wave of Nazi supporters fleeing the Soviet occupation westwards. For the economic outcomes discussed here, the following issue however is more pressing: Did high-potentials leave the Soviet zone and never return (Acemoglu *et al.*, 2011)? This is hard to test, as there is little consistent data in terms of human capital. We attempt to tackle the issue of selective migration twofold: First, we look at the effect of the Soviet occupation on population by decomposing the location of birth. In 1945, there was a large influx into Austria of ethnic German refugees (so-called *Volksdeutsche*)

and other displaced people, who had left their homes either voluntarily or by compulsion. The majority of the ethnic German refugees came from neighboring countries, such as Yugoslavia, Czechoslovakia, Romania, and Hungary. From these approximately 540.000 refugees, only 340.000 stayed permanently in Austria (Radspieler, 1955). For the purpose of our analysis, it is decisive to know in which proportion these refugees settled, or were allowed to settle, in the Soviet and non-Soviet zones. To test for this directly, in Table 4 we re-run our district-level specification splitting the sample into people born in Austria and those who were not. The results suggest that this mechanism did not drive the population shock. Second, we look at the difference in educational attainment over time. Here a major limitation is the lack of a long time-series of education data. We adress this in two ways: In Panel A of Table 5 we use district level data on the share of individuals visiting school in 1900 during the eve of the Habsburg empire. This allows us to search for differential trends in schooling long before the turmoil of war and occupation. There is no significant difference between the later occupation zones, and this result is robust to a sample split by gender (column (II) and (III)) and just focusing on bordering municipalities (columns (IV)-(VI)). As our main point of comparison we examine the educational attainment of individuals born before 1920 living in the Soviet and non-Soviet zone. This allows us to compare individuals who completed their schooling before the onset of the occupation (and are thus unaffected in their education choices by the institutional shock). In Panel B of Table 5 we compare the education levels on the state level from the 1971 census. If anything, there is a small (sometimes insignificant) positve coefficient for the Soviet zone. Thus the theory of more educated people leaving is not supported by the evidence we gathered.

5.1.4 Culture

Another important aspect of persistence after an exogenous shock like the one Austria experienced is people's preferences. Alesina and Fuchs-Schündeln (2007) show that, after the German reunification, East Germans favor state intervention more than West Germans. This is mainly a function of age and converges as time goes on. Lichter *et al.* (2021) discuss a different effect induced by a shock in institutions: Investigating the long-run effects of government surveillance in Eastern Germany they find persistent effects on interpersonal and institutional trust. Importantly, they also find the surveillance caused lower income, higher exposure to unemployment, and lower self-employment in the long-run. We test for this effect with survey results on trust towards others on the district level from the Austrian Gender & Generations Survey (GGS). Appendix Table B.8 shows the results from this estimation. The reported estimates are small and insignificant. This is suggestive evidence that the channel of institutional shocks affecting economic outcomes through trust is not present in our setting.

5.2 Human Capital and Effects on Productivity

The previous empirical literature exploiting natural experiments to learn about the *determinants of spatial equilibria* relies heavily on population data as a proxy for economic activity (see, e.g., Davis and Weinstein, 2002; Brakman, Garretsen and Schramm, 2004; Bleakley and Lin, 2012; Schumann, 2014). However, population data are a valid proxy for economic activity under only very restrictive assumptions. One has to assume that both the share of the residential population that is economically active and its commuting behavior are evenly distributed in space. As shown in Section 4.6 this is not the case in our setting.

Austria provides an opportunity to improve upon this literature by analyzing detailed firm and labor-market data. The Austrian data satisfy two necessary conditions to form a panel dataset: (a) administrative units can be tracked over time, and (b) published census items did not change over time. Both conditions are not satisfied in most other countries often used to study this issue, most prominently Germany, where administrative units changed significantly in the last century and data was collected by the statistical offices in West and East Germany with different standards.

With the Austrian case we have the opportunity to go beyond the analysis of population data and look at more direct measures of economic activity: The number of local workers we explored above, the number of firms by size, and commuting streams. Most importantly, we have access to an administrative matched employer–employee data set, which allows directly to test for agglomeration effects. In particular, we test whether workers in the area of the former Soviet occupation zone are *ceteris paribus* less productive.

5.2.1 Productivity Measures

In the next step, we want to test directly for agglomeration effects in the sense of productivity differentials. Thus, we consider that the increased density in the former non-Soviet zone increased workers' productivity and wages (relative to the downsized former Soviet zone). If this would be the case, it would provide a plausible explanation for the persistence of the temporary institutional shock with respect to the residing population, but also for the growing effect on jobs.

To test this hypothesis we use data from the *Austrian Social Security Database* (henceforth ASSD). The ASSD includes administrative records to verify pension claims and is structured as a matched employer–employee data set. Starting from 1972, we observe for each worker basic socio-economic information and on a daily basis employment along with her occupation. Information on earnings is provided per year and per employer.[22] In a

[22]The limitations of the data are top-coded wages and the lack of information on (contracted) working hours (Zweimüller *et al.*, 2009).

first step, we run log wage regression on individual-level wage determinants (sex, age, citizenship, occupation) for each year of data. We then calculate the mean of residuals from each of these regressions by municipality and year. In a second step, we use these average wage residuals to estimate the effect of the Soviet occupation. Therefore, we follow the specification outlined in equation (2). Column (I) of Table 6 summarizes the estimation output of our baseline specification. The regression is weighted (frequency weights) with the number of workers per municipality (from the wage regression in the first step.). We find that *comparable* workers earn roughly 3 percentage points less if the are employed in the former soviet zone. This estimated age differential is quite constant over time. In Column (II), we control in addition (in the first step of our estimation procedure) for workers industry affiliation (where we distinguish between 85 different industry types, NACE two-digit classification). Column (III) removes immigrants from the dataset as they could contaminate the results. Lastly, in Column (IV), we combine both. We can see that results on productivity are robust to the inclusion of these controls and remain highly persistent over time. One concern with our specification is that there might be differential selection into employment in the Soviet vs. the Western-Allied occupation zones. Thus, we test the effect of the Soviet occupation on labor force participation using our municipality level data. In Table 7 we present the results for the overall labor force participation in Column (I), for men in Column (II), for women in Column (III) and the gap between (II) and (III) in Column (IV). We do not find any significant difference between the occupation zones, suggesting no differences in selection into employment.

In summary, we find robust evidence for a persistent response to the Soviet occupation, in particular as measured by productivity differentials. This more direct measure provides the most credible evidence on the existence of agglomeration effects. One particular insight that the Austrian setting provides is the persistence of these effects even in the absence of a coordination device. Previous literature (e.g. Becker *et al.* (2020)) found agglomeration effects in the presence of a coordinating force, e.g. in the case above the resettlement of millions of Poles after World War II. In our case, the effect stems purely from the flight from east to west in anticipation of the occupation that followed.

5.2.2 Education and Human Capital Accumulation

To complement our results on population, employment and productivity we also look at human capital accumulation in the form of the highest level of schooling attained by individuals. Becker *et al.* (2020) finds that people affected by forced migration are significantly more educated decades after the resettlement following World War II. This trend is driven by a shift in preferences away from material possessions toward investment in human capital. In our setting, the extractive nature of the Soviet occupation plays a

major role in peoples' behavioral responses: Because the Soviet occupation in economic terms was more exploitative (and included dismantling industrial estates and removal of almost any mobile equipment), while the non-Soviet occupation (in particular, the one by the US) was more supportive, one might supect a similar trend as documented by Becker *et al.* (2020).

To test for this hypothesis directly, we come back to the municipality-level data from the decennial censuses. For education however, these detailed data are only available from 1971 onwards. The pre-WWII data presented in Table 5 is providing suggestive evidence that there were no differential trends between the Soviet and the Western-Allied occupation zone before World War II. Thus, in Table 8 we present the results for the effect on at least middle-school educated (column (I)), at least high school educated (column (II)) and individuals receiving tertiary education (column (III)). There is a significant positive effect of the Soviet occupation on educational attainment that is increasing over time. The effect is more pronounced for higher levels of education. This is in line with the previous literature and the hypothesis of replacement of physical capital with human capital.

5.2.3 Sectoral Composition

In a last step, we analyze whether the Allied occupation affected the spatial distribution of economic activities across sectors. Census data provide us with the number of people working in agriculture, manufacturing, and the service sector from 1934 through 2011.[23] As in most industrialized countries, the importance of the agriculture sector decreased sharply over this period in Austria (from 45% to 4%), while the service sector expanded (from 21% to 69%). The relative size of the manufacturing sector follows an inverted U-shaped pattern, with a peak in 1971 at 44% of total employment.[24] Since we have pre-WWII data, we can employ the estimation strategy described in equation (1). The respective estimation results for the log share of people working in agriculture, manufacturing, and the service sector are summarized in Table 9.[25] The mostly insignificant coefficients on the interaction term between the binary variables capturing the data from the year 1934 and the one for the Soviet zone (see first row), indicate that the munici-

[23]The sector shares are calculated based on the employees' municipality of residence. Given that the we find stronger employment effects for *local workers* as compared to *workers* in general (see Table 3) and a strong effect for productivity, it would be interesting to define the sector shares also based on the location of the employer. However, this information is not available in the census data before 1971.

[24]These numbers do no include the city of Vienna.

[25]Log shares are appropriate in a DiD framework if the common trend of the treatment and control groups changes the sector share by a factor, not a constant. Since sector shares changed considerably between the base year (1939) and some of the post-war periods, we do not assume that a potential effect on the sector share in 1951 remained constant over time, but assume instead a constant percentage change in the sector shares. We therefore assume a data generating process of the form $s_{i,t} = \alpha^t \bar{s}_i \gamma^{Soviet_i}$, where α is a trend parameter and γ is the effect of the Soviet occupation, so that the log share is $\log s_{i,t} = t \log \alpha + \log \bar{s}_i + Soviet_i \log \gamma$.

palities along the demarcation line did not differ in their sectoral development before the occupation in agriculture and manufacturing. The significant effect of the service sector trend is economically small, since the service sector accounted for only 12% at that time.

The treatment effects are given by the interaction terms using the post-WWII years. We find that it took the Soviet zone initially longer to shift from agriculture to manufacturing and services. The smaller manufacturing sector remains fairly constant over time, but the coefficients are insignificant from 1971 onwards. Between the 1970s and the 1990s there are no differences in the sectoral compositions between the zones discernable. Interestingly, we see that the Soviet zone is more service-focused in more recent decades. [26] In sum, results on sector shares are not as pronounced as compared to the other outcomes studied above and are mostly temporary in our sample.

Our findings relate to two empirical facts established in other, previous work: Ochsner (2017) shows that the dismantling of infrastructure and outflow of skilled workers caused by the temporary Soviet occupation of Styria resulted in differential development of investment in industries. We corroborate the results on this mechanism with detailed employment data. Eder (2022) documents a faster shift from agriculture to manufacturing and later from manufacturing to services in Austrian regions which suffered more casualties during World War II.

[26] When the sector shares are used as outcome variables, the qualitative picture is very similar, but less pronounced. See Table B.9 in the Appendix for additional results on firms and workers.

6 Conclusions

The empirical literature studied extensively how armed conflict, terrorism and occupation affects economic development (Besley *et al.*, 2015; Abadie and Gardeazabal, 2003; Besley and Mueller, 2012). Other influential work shows that institutions are the main determining factor for economic development (see, e.g., Acemoglu *et al.*, 2001, 2002). We add to these strands of the literature by demonstrating that even short temporary shocks of extractive institutions can have long-lasting effects. Depending on the length and strength of these extractive institutions, the effect might even increase after the institutional reversal. We provide evidence of the importance of agglomeration effects. In particular, we show a reduction in local employment in the Soviet zone which increases over time. Our empirical evidence is based on a population shock induced by the Allied occupation of post-WWII Austria, which lasted from 1945 to 1955. Before tight travel restrictions came into place, about 11 percent of the population residing in the Soviet zone moved across the demarcation line to the occupation zone of the Western Allies. We find that the distorted spatial population distribution has fully persisted until today, over 60 years after the demarcation became obsolete. The uneven spatial distribution in economic activity measured by labor-market outcomes has even increased, with large commuting streams out of the former Soviet zone. We add direct evidence for agglomeration effects in the sense of productivity differentials by exploiting linked employer-employee data.

References

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

Acemoglu, D., Cantoni, D., Johnson, S. and Robinson, J. (2011). The Consequences of Radical Reform: The French Revolution. *American Economic Review*, **101** (7), 3286–3307.

—, Johnson, S. and Robinson, J. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, **91** (5), 1369–1401.

—, — and — (2002). Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *Quarterly Journal of Economics*, **117** (4), 1231–1294.

—, — and Robinson, J. A. (2005). Institutions as a Fundamental Cause of Long-run Growth. In P. Aghion and S. N. Durlauf (eds.), *Handbook of Economic Growth*, vol. 1A, *6*, Elsevier, pp. 385–472.

Alesina, A. and Fuchs-Schündeln, N. (2007). Goodbye Lenin (or Not?): The Effect of Communism on People. *American Economic Review*, **97** (4), 1507–1528.

Banerjee, A. and Iyer, L. (2005). History, institutions, and economic performance: The legacy of colonial land tenure systems in india. *American Economic Review*, **95** (4), 1190–1213.

Becker, S., Boeckh, K., Hainz, C. and 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., Grosfeld, I., Grosjean, P., Voigtländer, N. and Zhuravskaya, E. (2020). Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers. *American Economic Review*, **110** (5), 1430–63.

Besley, T., Fetzer, T. and Mueller, H. (2015). The Welfare Cost of Lawlessness: Evidence from Somali Piracy. *Journal of the European Economic Association*, **13** (2), 203–239.

— and Mueller, H. (2012). Estimating the Peace Dividend: The Impact of Violence on House Prices in Northern Ireland. *American Economic Review*, **102** (2), 810–33.

Bischof, G. (2009). Allied Plans and Policies for the Occupation of Austria, 1938–1955. In R. Steininger, G. Bischof and M. Gehle (eds.), *Austria in the Twentieth Century*, New Brunswick and London: Transaction Publishers, pp. 190–211.

Bleakley, H. and Lin, J. (2012). Portage and Path Dependence. *Quarterly Journal of Economics*, **127** (2), 587–644.

Brakman, S., Garretsen, H. and Schramm, M. (2004). The Strategic Bombing of German Cities during World War II and its Impact on City Growth. *Journal of Economic Geography*, **4** (2), 201–218.

Braun, S. T., Kramer, A., Kvasnicka, M. and Meier, P. (2020). Local labor markets and the persistence of population shocks: evidence from West Germany, 1939–1970. *Journal of Economic Geography*, **21** (2), 231–260.

Dack, M. (2008). Crimes committed by soviet soldiers against german civilians, 1944-1945: A historiographical analysis. *Journal of Military and Strategic Studies*, **10** (4).

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

Dell, M. (2010). The Persistent Effects of Peru's Mining Mita. *Econometrica*, **78** (6), 1863–1903.

Eckstein, Z. and Tsiddon, D. (2004). Macroeconomic Consequences of Terror: Theory and the Case of Israel. *Journal of Monetary Economics*, **51** (5), 971–1002.

Eder, C. (2022). Missing Men: Second World War Casualties and Structural Change. *Economica*, **89** (354), 437–460.

Eisterer, K. (2009). Austria under Allied Occupation. In R. Steininger, G. Bischof and M. Gehle (eds.), *Austria in the Twentieth Century*, New Brunswick and London: Transaction Publishers, pp. 190–211.

Erickson, E. L. (1950). The Zoning of Austria. *Annales of the American Academy of Political and Social Science*, **267**, 106–113.

Ferring, R. L. (1968). The Austrian State Treaty of 1955 and the Cold War. *Western Political Quarterly*, **21** (4), 651–667.

Fuchs-Schündeln, N. and Hassan, T. A. (2016). Natural Experiments in Macroeconomics. In J. B. Taylor and H. Uhlig (eds.), *Handbook of Macroeconomics*, vol. 2a, Elsevier, pp. 923–1012.

Ghobarah, H. A., Huth, P. and Russett, B. (2003). Civil Wars Kill and Maim People—Long after the Shooting Stops. *American Political Science Review*, **97** (2), 189–202.

Haas, J. (2007). 60 Years of Marshall Plan Aid – A Critical Appraisal from an Austrian Perspective. *Monetary Policy & the Economy*, **Q2**, 126–139.

Imbens, G. and Klaauw, W. V. D. (1995). Evaluating the Cost of Conscription in the Netherlands. *Journal of Business & Economic Statistics*, **13** (2), 207–215.

Johr, B. and Sander, H. (2002). *BeFreier und Befreite: Krieg, Vergewaltigungen, Kinder*. Kunstmann.

Kondylis, F. (2010). Conflict Displacement and Labor Market Outcomes in Post-War Bosnia and Herzegovina. *Journal of Development Economics*, **93** (2), 235–248.

Lichter, A., Löffler, M. and Siegloch, S. (2021). The long-term costs of government surveillance: Insights from stasi spying in east germany. *Journal of the European Economic Association*, **19** (2), 741–789.

Lowes, S. and Montero, E. (2018). *Concessions, Violence, and Indirect Rule: Evidence from the Congo Free State*. Unpublished manuscript, Bocconi University.

Miguel, E. and Roland, G. (2011a). The Long-Run Impact of Bombing Vietnam. *Journal of Development Economics*, **96** (1), 1–15.

— and — (2011b). The Long-run Impact of Bombing Vietnam. *Journal of Development Economics*, **96** (1), 1–15.

Nunn, N. (2014). Historical Development. In P. Aghion and S. Durlauf (eds.), *Handbook of Economic Growth*, *Chapter 7*, vol. 2A, North Holland: Elsevier.

Ochsner, C. (2017). *Dismantled once, diverged forever? A quasi-natural experiment of Red Army misdeeds in post-WWII Europe*. Tech. rep., ifo Working Paper.

— and Roesel, F. (2016). *Migrating Extremists*. CESIfo Working Paper 5799, Center for Economic Stduies & Ifo Institute.

Österreichisches Statistisches Zentralamt (1948). *Gemeindeverzeichnis von Österreich: Auf Grund einer besonderen Erhebung aus dem Jahre 1946*, vol. 1. Wien: Überreuter.

Österreichisches Statistisches Zentralamt (1949). *Gemeindeverzeichnis von Österreich*, vol. 3. Wien: Überreuter.

Radspieler, T. (1955). *The Ethnic German Refugee in Austria 1945 to 1955*. The Hague, Netherlands: Martinus Nijhoff.

Redding, S. J. and Sturm, D. M. (2008). The Costs of Remoteness: Evidence from German Division and Reunification. *American Economic Review*, **98** (5), 1766–1797.

Schumann, A. (2014). Persistence of Population Shocks: Evidence from the Occupation of Wets Germany after World War II. *American Econmic Journal: Applied Economics*, **6** (3), 189–205.

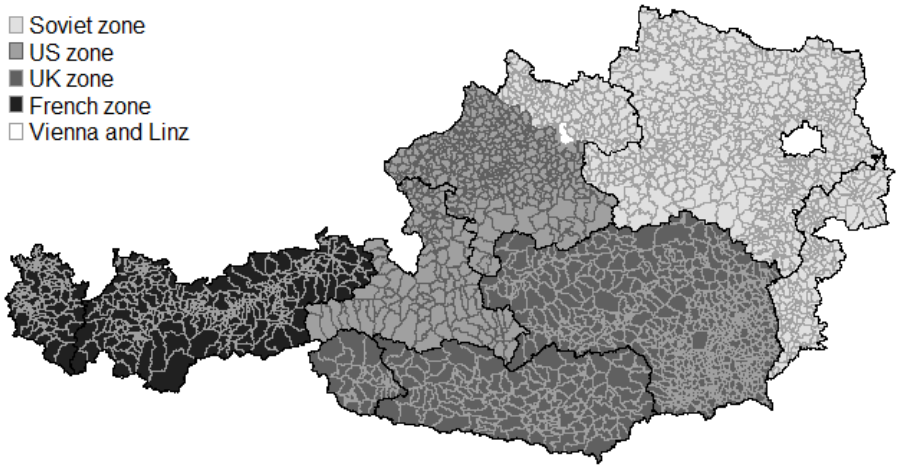
Stelzl-Marx, B. (2012). *Stalins Soldaten in Österreich*, vol. 6. München: Böhlau Verlag Wien - Oldenbourg Verlag.

Zweimüller, J., Winter-Ebmer, R., Lalive, R., Kuhn, A., Wuellrich, J.-P., Ruf, O. and Büchi, S. (2009). Austrian social security database. *Available at SSRN 1399350*.

7 Figures (to be placed in article)

Figure 1: Occupation Zones and Bordering Municipalities

Panel A: Occupation Zones (1945–1955)



Panel B: Municipalities at the Zone Border

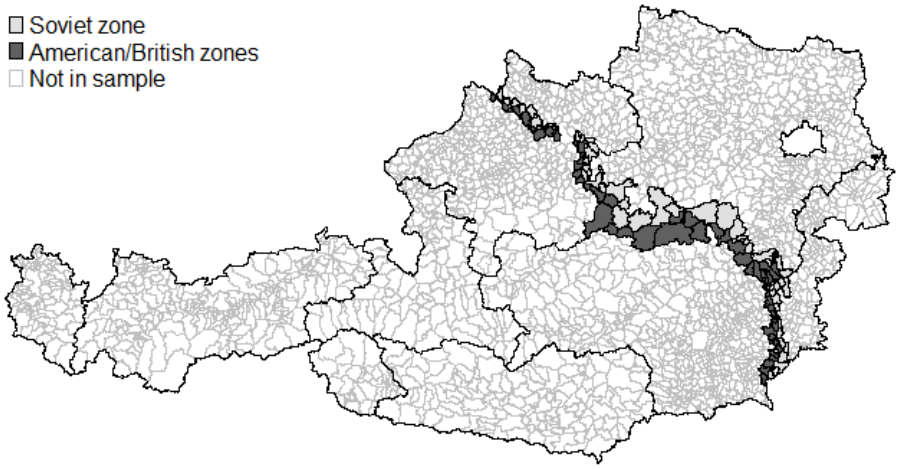
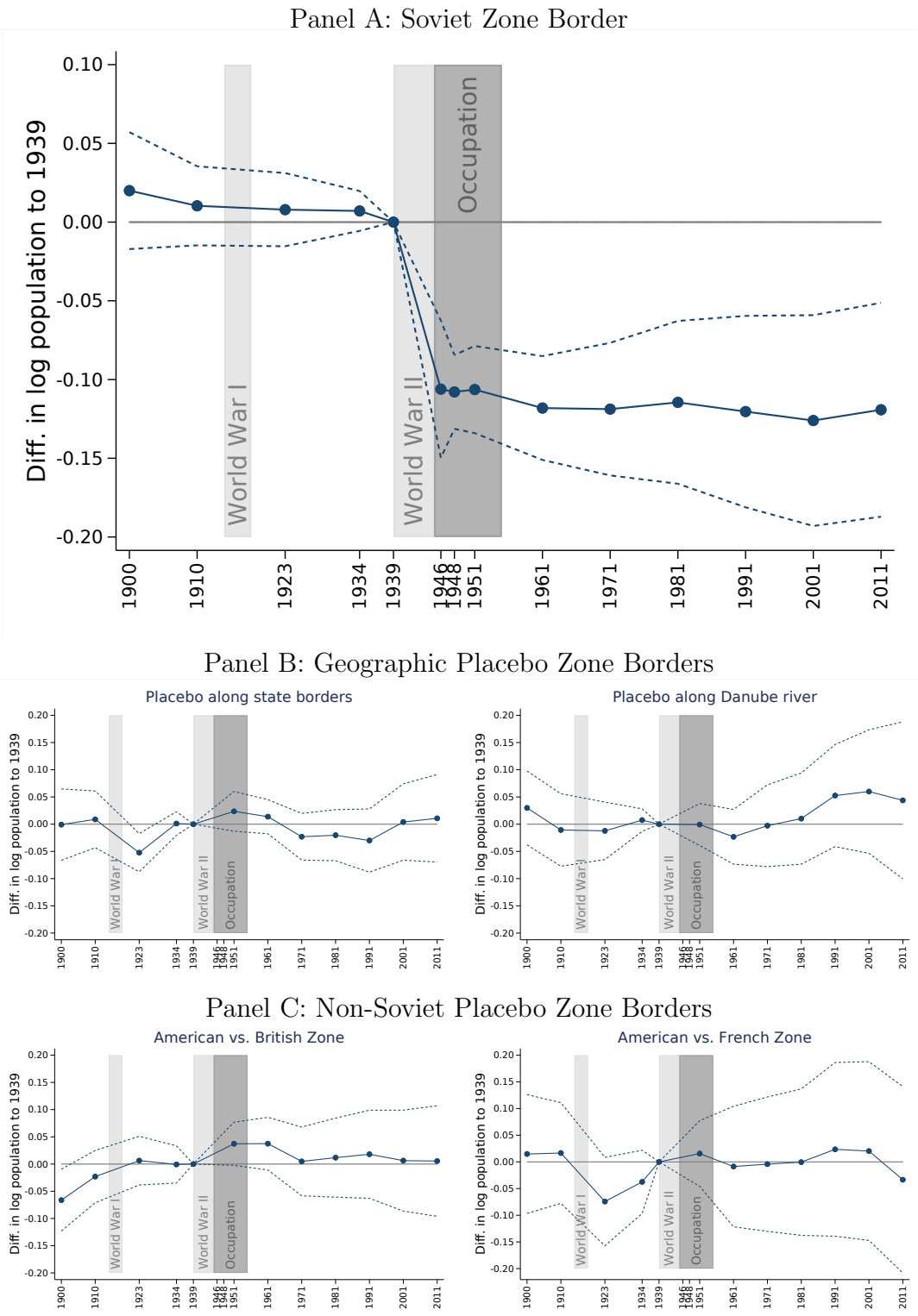


Figure 2: Estimation of the Effect of the Soviet and Placebo Occupations on Population



Notes: The graphs show the effect of the Soviet occupation on population in bordering municipalities along the placebo demarcation line or along American and British/French zone borders. Dashed lines show the 95% confidence intervals. Table B.4 shows corresponding estimation results.

8 Tables (to be placed in article)

Table 1: Estimation of the Effect of the Soviet Occupation on Population

	Log Population					
Estimation method:	RDD-DiD with year-specific pair fixed-effects					
Sample definition:	Bordering municipalities					Bordering districts
	(I)	(II)	(III)	(IV)	(V)	(VI)
Pre-WW2 differences						
1900 × Soviet zone	0.020	−0.018	0.014	−0.024	0.009	
	(0.021)	(0.029)	(0.028)	(0.029)	(0.028)	
1910 × Soviet zone	0.010	0.005	0.015	−0.000	0.004	
	(0.016)	(0.024)	(0.019)	(0.020)	(0.021)	
1923 × Soviet zone	0.008	−0.006	0.015	−0.007	0.008	
	(0.014)	(0.016)	(0.015)	(0.016)	(0.016)	
1934 × Soviet zone	0.007	0.002	0.008	0.003	0.012	0.014
	(0.008)	(0.009)	(0.009)	(0.010)	(0.008)	(0.015)
Base-year (1939) differences						
Soviet zone	0.109	−0.040	0.089	−0.040	0.179	0.094
	(0.165)	(0.160)	(0.187)	(0.153)	(0.199)	(0.132)
Within-WW2 differences						
1943 × Soviet zone						−0.009
						(0.025)
1944 × Soviet zone						−0.004
						(0.025)
1945 × Soviet zone						−0.003
						(0.025)
Post-WW2 differences						
1946 × Soviet zone	−0.106***	−0.080*	−0.094**	−0.085*	−0.073**	−0.111***
	(0.030)	(0.043)	(0.039)	(0.043)	(0.034)	(0.024)
1948 × Soviet zone	−0.108***	−0.083***	−0.102***	−0.093***	−0.092***	−0.089***
	(0.015)	(0.014)	(0.017)	(0.015)	(0.017)	(0.023)
1951 × Soviet zone	−0.106***	−0.091***	−0.100***	−0.089***	−0.087***	−0.078***
	(0.017)	(0.015)	(0.018)	(0.016)	(0.018)	(0.018)
1961 × Soviet zone	−0.118***	−0.112***	−0.121***	−0.105***	−0.120***	−0.096***
	(0.020)	(0.020)	(0.022)	(0.018)	(0.022)	(0.010)
1971 × Soviet zone	−0.119***	−0.112***	−0.132***	−0.110***	−0.130***	
	(0.026)	(0.032)	(0.026)	(0.024)	(0.030)	
1981 × Soviet zone	−0.114***	−0.117***	−0.136***	−0.110***	−0.138***	
	(0.031)	(0.042)	(0.030)	(0.031)	(0.033)	
1991 × Soviet zone	−0.120***	−0.116**	−0.143***	−0.110***	−0.155***	
	(0.036)	(0.049)	(0.035)	(0.039)	(0.035)	
2001 × Soviet zone	−0.126***	−0.135**	−0.149***	−0.117***	−0.168***	
	(0.041)	(0.056)	(0.041)	(0.044)	(0.042)	
2011 × Soviet zone	−0.119***	−0.137**	−0.141***	−0.114**	−0.153***	
	(0.041)	(0.057)	(0.040)	(0.045)	(0.044)	
Pair-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
1930s econ. and pol. controls		Yes		Yes		
Geography controls (slope, aspect)			Yes	Yes		
Drop pairs along Danube river					Yes	
No. observations	2,604	2,604	2,604	2,604	2,016	216
No. pairs	93	93	93	93	72	12
No. unique municipal./districts	95	95	95	95	74	14
No. periods	14	14	14	14	14	9
R-squared	0.48	0.72	0.57	0.77	0.45	0.55
Mean of dep. var.	7.66	7.66	7.66	7.66	7.62	10.98

This table summarizes estimation results based on municipality-level data. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of population. The control variables in each specification are interacted with year dummies. The *1930s controls* include the share in agriculture, in manufacturing, and of males all in 1934, the market status in 1939, and the vote share for Social Democrats and Conservatives in 1930. *Geography controls* include the mean slope and five equal-sized groups of mean aspect of the municipalities topography. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included.Robust standard errors (allowing for clustering by municipality within a pair and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 2: Estimation of the Effect of the Soviet Occupation on Firms and Workers

						Robustness: long series	
	Population	Workers	Firms all	Firms $\geq$ 20 workers	Firms $\geq$ 100 workers	Workers	Firms all
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Pre-WWII differences							
1902 × Soviet zone	0.050*					0.036	−0.027
	(0.028)					(0.171)	(0.182)
Base-year (1930) differences							
Soviet zone	−0.243	−0.201	−0.214	−0.245	0.186	−0.022	−0.132
	(0.195)	(0.247)	(0.197)	(0.241)	(0.296)	(0.317)	(0.206)
Post-WWII differences							
1954 × Soviet zone	−0.154***		−0.083***	−0.364***	−0.536***		−0.073**
	(0.026)		(0.024)	(0.099)	(0.140)		(0.030)
1964 × Soviet zone	−0.173***	−0.264***	−0.150***	−0.392***	−0.488***	−0.283**	−0.163***
	(0.040)	(0.080)	(0.040)	(0.121)	(0.166)	(0.097)	(0.048)
1973 × Soviet zone	−0.201***	−0.298***	−0.188***	−0.364***	−0.706***	−0.348**	−0.224***
	(0.044)	(0.090)	(0.056)	(0.126)	(0.179)	(0.128)	(0.067)
1981 × Soviet zone	−0.206***	−0.357***	−0.212***	−0.430***	−0.736***	−0.410***	−0.243***
	(0.051)	(0.089)	(0.061)	(0.135)	(0.208)	(0.135)	(0.069)
1991 × Soviet zone	−0.210***	−0.365***	−0.270***	−0.445***	−0.842***	−0.403**	−0.305***
	(0.054)	(0.113)	(0.074)	(0.142)	(0.168)	(0.176)	(0.083)
2001 × Soviet zone	−0.208***	−0.372***	−0.298***	−0.341**	−0.942***	−0.427*	−0.329***
	(0.057)	(0.128)	(0.069)	(0.143)	(0.191)	(0.201)	(0.079)
2011 × Soviet zone	−0.204***	−0.370**	−0.270***	−0.411**	−0.838***	−0.417	−0.249**
	(0.062)	(0.155)	(0.093)	(0.159)	(0.203)	(0.243)	(0.116)
Pair-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	360	280	320	320	320	208	234
No. pairs	20	20	20	20	20	13	13
No. unique districts	21	21	21	21	21	15	15
No. periods	9	7	8	8	8	8	9
R-squared	0.58	0.73	0.70	0.80	0.76	0.73	0.73
Mean of dep. var.	10.97	9.59	7.72	4.51	2.57	9.71	7.84

This table summarizes estimation results based on district-level data. The cities Linz is excluded, since the demarcation disunited the city. The specification includes the variables listed and pair-wise year fixed effects (where pairs are given by neighboring districts along the demarcation line). The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 3: Estimation of the Effect of the Soviet Occupation on Labor Market Outcomes

	Resident Population	Workers	Local Workers	Share of frontier workers
	(I)	(II)	(III)	(IV)
1961 × Soviet zone	−0.119***	−0.086**	−0.130**	0.047***
	(0.022)	(0.034)	(0.051)	(0.009)
1971 × Soviet zone	−0.122***	−0.108***	−0.222***	0.034***
	(0.031)	(0.029)	(0.056)	(0.010)
1981 × Soviet zone	−0.120***	−0.114***	−0.174***	0.030**
	(0.040)	(0.040)	(0.056)	(0.014)
1991 × Soviet zone	−0.128***	−0.126***	−0.244***	0.036**
	(0.047)	(0.047)	(0.066)	(0.015)
2001 × Soviet zone	−0.141***	−0.140***	−0.316***	0.044**
	(0.051)	(0.051)	(0.083)	(0.017)
2011 × Soviet zone	−0.133**	−0.119**	−0.282***	0.063***
	(0.051)	(0.050)	(0.079)	(0.018)
Pair-year FE	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes
No. observations	1,116	1,116	1,116	1,110
No. pairs	93	93	93	93
No. unique municipal.	95	95	95	95
No. periods	6	6	6	6
R-squared	0.97	0.97	0.95	0.59
Mean of dep. var.	7.71	6.89	6.45	0.09

This table summarizes estimation results based on municipality-level data. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of the respective variable. The control variables in each specification are interacted with year dummies and include a Soviet zone dummy, the log population in 1934 and 1939, the log population in agriculture and in manufacturing, and the share of males in the population, all measured in 1934. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 4: Estimation of the Effect of the Soviet Occupation on Population: Decomposition by Location of Birth

	Ratio of pop. of group g in t to total pop. in 1934		
	Born in Austria	Not born in Austria	Overall
	(I)	(II)	(III)
Base-year (1934) differences			
Soviet zone	−0.009	0.009	0.000
	(0.009)	(0.009)	(0.000)
Post-WW2 differences			
1951 × Soviet zone	−0.059***	−0.036**	−0.095***
	(0.014)	(0.013)	(0.017)
Pair-Year FE	Yes	Yes	Yes
No. observations	48	48	48
No. pairs	12	12	12
No. districts	14	14	14
No. periods	2	2	2
R-squared	0.80	0.68	0.87
Mean of dep. var.	0.96	0.05	1.01
in 1934	0.96	0.04	1.00
in 1951	0.94	0.06	1.00
ratio 1951 to 1934	1.00	1.88	1.02

This table summarizes estimation results based on district-level data according to borders in 1939. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of the respective variable. The control variables in each specification are interacted with year dummies and include a Soviet zone dummy, the log population in 1934 and 1939, the log population in agriculture and in manufacturing, and the share of males in the population, all measured in 1934. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 5: Educational Attainment Distribution in the Soviet and in the non-Soviet Zone

Panel A: Schooling in 1900 by Occupation Zone

	Share of individuals visiting school by district					
	full sample	male	female	full sample	male	female
	(I)	(II)	(III)	(IV)	(V)	(VI)
Soviet zone	−0.003	0.006	−0.014	−0.008	−0.001	−0.015
	(0.008)	(0.009)	(0.012)	(0.009)	(0.009)	(0.017)
Border Sample	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
No. observations	51	51	51	18	18	18
R-squared	0.00	0.01	0.03	0.04	0.00	0.05
Mean of dep. var.	1.00	1.00	1.01	1.00	1.00	1.01
S.d. of dep. var.	0.03	0.03	0.04	0.02	0.02	0.03

Panel B: Educational Attainment in Individuals Born Before 1920

	Share with educational attainment of				
	mandatory educ. only	apprent-iceship	middle school or more	high school or more	tertiary education
	(I)	(II)	(III)	(IV)	(V)
1971 × Soviet zone	0.013*	−0.017***	0.005	0.004	0.001
	(0.007)	(0.005)	(0.004)	(0.003)	(0.001)
Pair-year FE	Yes	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes	Yes
No. observations	186	186	186	186	186
No. pairs	93	93	93	93	93
No. unique municipal.	95	95	95	95	95
R-squared	0.85	0.81	0.83	0.79	0.71
Mean of dep. var.	0.84	0.12	0.04	0.02	0.01

Panel A of this table summarizes estimation results based on district-level data from 1900. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the ratio of children receiving any type of schooling in 1900 to the total number of children in mandatory schooling age in 1900. Standard errors are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Panel B of this table summarizes estimation results based on municipality-level data from 1971. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the share of the respective variable. The control variables in each specification are interacted with year dummies and include the log population in 1934 and 1939, the log of the population in agriculture and in manufacturing and the share of males in the population. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 6: Estimation of the Effect of the Soviet Occupation on Productivity (in Terms of Wage Residuals)

	Baseline	Industry controls	No immigrants	Industry controls + no immigrants
	(I)	(II)	(III)	(IV)
1972 × Soviet zone	−0.036**	−0.036**	−0.037**	−0.036**
	(0.015)	(0.015)	(0.015)	(0.015)
1981 × Soviet zone	−0.029**	−0.037***	−0.031**	−0.038***
	(0.013)	(0.010)	(0.012)	(0.010)
1991 × Soviet zone	−0.027***	−0.028***	−0.028***	−0.029***
	(0.010)	(0.008)	(0.010)	(0.009)
2001 × Soviet zone	−0.019*	−0.021**	−0.021*	−0.024**
	(0.011)	(0.010)	(0.011)	(0.010)
2011 × Soviet zone	−0.030*	−0.036***	−0.032**	−0.035***
	(0.016)	(0.012)	(0.016)	(0.013)
Pair-year FE	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes
No. pairs	106	106	106	106
No. unique municipal.	104	104	104	104
No. periods	5	5	5	5
No. observations	435,948	435,948	404,235	404,235
R-squared	0.82	0.79	0.82	0.78
Mean of dep. var.	−0.01	−0.02	−0.00	−0.02

This table summarizes estimation results based on municipality-level data. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of the respective variable. The control variables in each specification are interacted with year dummies and include a Soviet zone dummy, the log population in 1934 and 1939, the log population in agriculture and in manufacturing, and the share of males in the population, all measured in 1934. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 7: Estimation of the Effect of the Soviet Occupation on Labor Force Participation

	Labor force participation			
	Overall	Male	Female	Gender gap
	(I)	(II)	(III)	(IV)
Post-WW2 differences				
1951 × Soviet zone	0.023***			
	(0.008)			
1961 × Soviet zone	0.010*	0.015	0.026	−0.010
	(0.006)	(0.027)	(0.050)	(0.067)
1971 × Soviet zone	0.002	−0.008	0.007	−0.015
	(0.005)	(0.006)	(0.009)	(0.010)
1981 × Soviet zone	0.000	0.001	−0.000	0.001
	(0.004)	(0.004)	(0.007)	(0.008)
1991 × Soviet zone	−0.005	−0.004	−0.006	0.002
	(0.005)	(0.005)	(0.008)	(0.007)
2001 × Soviet zone	0.002	0.006	−0.002	0.008**
	(0.003)	(0.004)	(0.004)	(0.004)
2011 × Soviet zone	0.007	0.009*	0.005	0.004
	(0.004)	(0.004)	(0.005)	(0.005)
Pair-Year FE	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes
No. observations	1,302	1,116	1,116	1,116
No. pairs	93	93	93	93
No. unique municipal.	95	95	95	95
No. periods	7	6	6	6
R-squared	0.87	0.95	0.85	0.92
Mean of dep. var.	0.46	0.47	0.44	0.03

This table summarizes estimation results based on municipality-level data. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of the respective variable. The control variables in each specification are interacted with year dummies and include a Soviet zone dummy, the log population in 1934 and 1939, the log population in agriculture and in manufacturing, and the share of males in the population, all measured in 1934. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 8: Estimation of the Effect of the Soviet Occupation on Educational Outcomes

	Middle school or more	High school or more	Tertiary education
	(I)	(II)	(III)
1971 × Soviet zone	0.007	0.005*	0.001
	(0.004)	(0.003)	(0.001)
1981 × Soviet zone	0.009	0.012***	0.003**
	(0.007)	(0.004)	(0.002)
1991 × Soviet zone	0.006	0.013***	0.007***
	(0.007)	(0.005)	(0.003)
2001 × Soviet zone	0.015**	0.019***	0.008***
	(0.006)	(0.005)	(0.003)
2011 × Soviet zone	0.027***	0.026***	0.013***
	(0.006)	(0.005)	(0.003)
Pair-year FE	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes
No. observations	930	930	930
No. pairs	93	93	93
No. unique municipal.	95	95	95
No. periods	5	5	5
R-squared	0.95	0.93	0.91
Mean of dep. var.	0.18	0.09	0.03

This table summarizes estimation results based on municipality-level data from 1971, 1981, 1991, 2001, and 2011. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the share of the respective variable. The control variables in each specification are interacted with year dummies and include the log population in 1934 and 1939, the log of the population in agriculture and in manufacturing and the share of males in the population. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 9: Estimation of the Effect of the Soviet Occupation on Sector Employment Shares

	Employment share		
	Agriculture	Manufacturing	Services
	(I)	(II)	(III)
Pre-WW2 differences			
1934 × Soviet zone	0.013	−0.000	
	(0.011)	(0.012)	
Base-year (1939) differences			
Soviet zone	−0.006	0.022	−0.017
	(0.028)	(0.025)	(0.011)
Post-WW2 differences			
1951 × Soviet zone	0.027***	−0.021**	−0.007
	(0.009)	(0.010)	(0.009)
1961 × Soviet zone	0.022*	−0.022*	0.000
	(0.011)	(0.012)	(0.011)
1971 × Soviet zone	0.006	−0.003	−0.003
	(0.018)	(0.022)	(0.013)
1981 × Soviet zone	−0.007	0.010	−0.003
	(0.023)	(0.026)	(0.014)
1991 × Soviet zone	0.001	−0.003	0.002
	(0.026)	(0.028)	(0.016)
2001 × Soviet zone	−0.002	−0.021	0.022
	(0.027)	(0.028)	(0.014)
2011 × Soviet zone	0.000	−0.023	0.023*
	(0.026)	(0.026)	(0.013)
Pair-Year FE	Yes	Yes	Yes
No. observations	1,674	1,674	1,488
No. pairs	93	93	93
No. unique municipal.	95	95	95
No. periods	9	9	8
R-squared	0.90	0.76	0.94
Mean of dep. var.	0.31	0.36	0.34

This table summarizes estimation results based on municipality-level data. The cities Linz and Steyr are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of the respective variable. The control variables in each specification are interacted with year dummies and include a Soviet zone dummy, the log population in 1934 and 1939, the log population in agriculture and in manufacturing, and the share of males in the population, all measured in 1934. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Appendix A: Additional Figures

Figure A.1: Stylized Example of Bordering Area Pairs

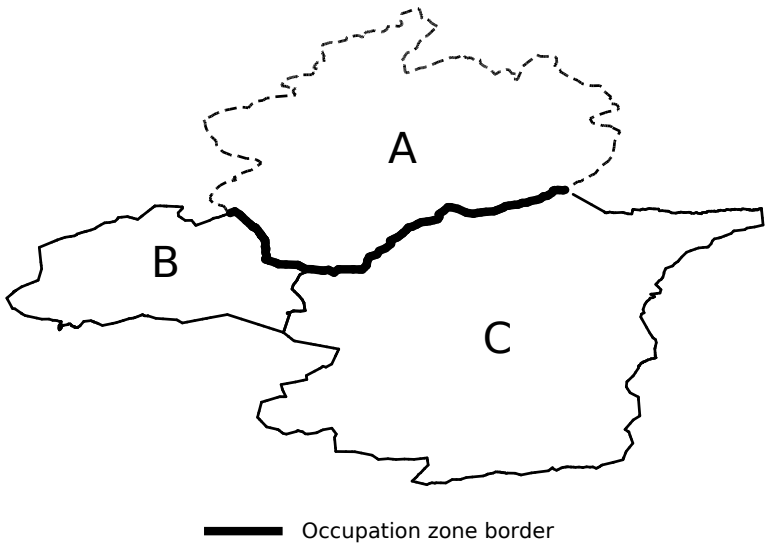
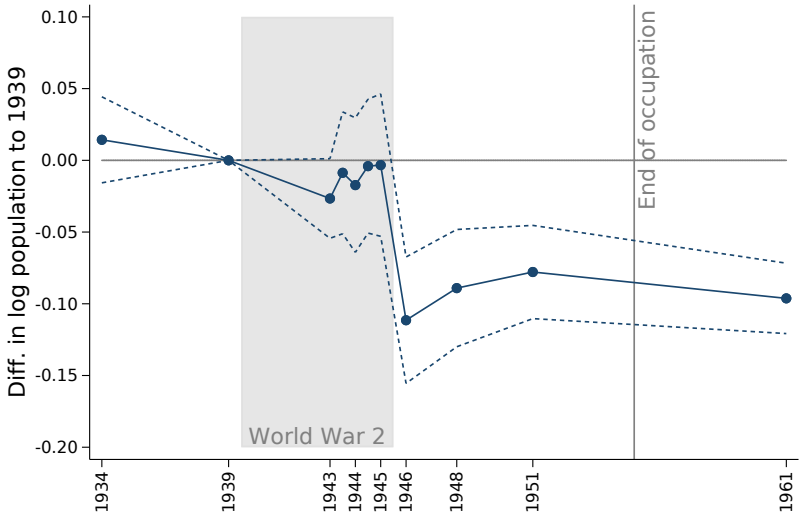
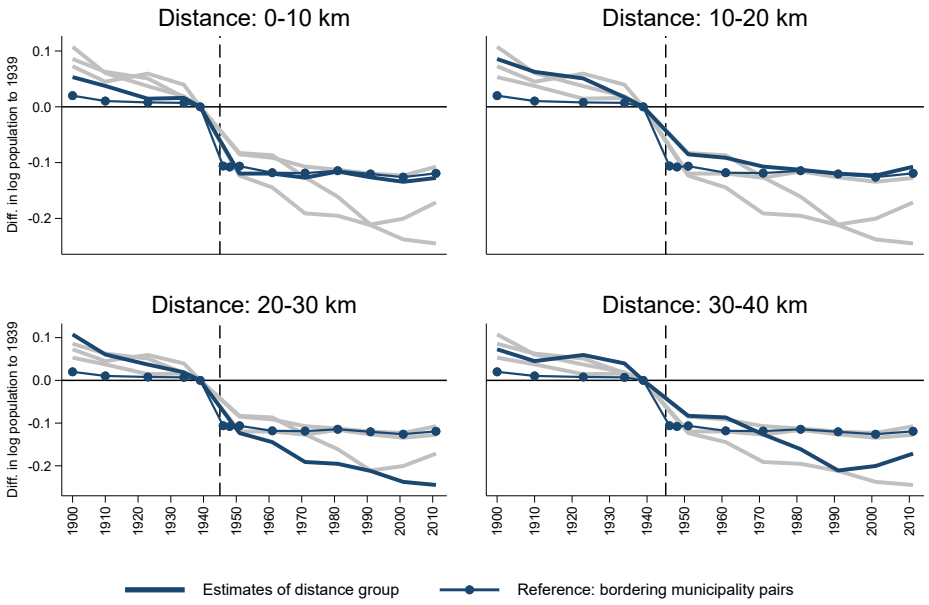


Figure A.2: Flexible Estimation of the Effect of the Soviet Occupation on Population during WW2



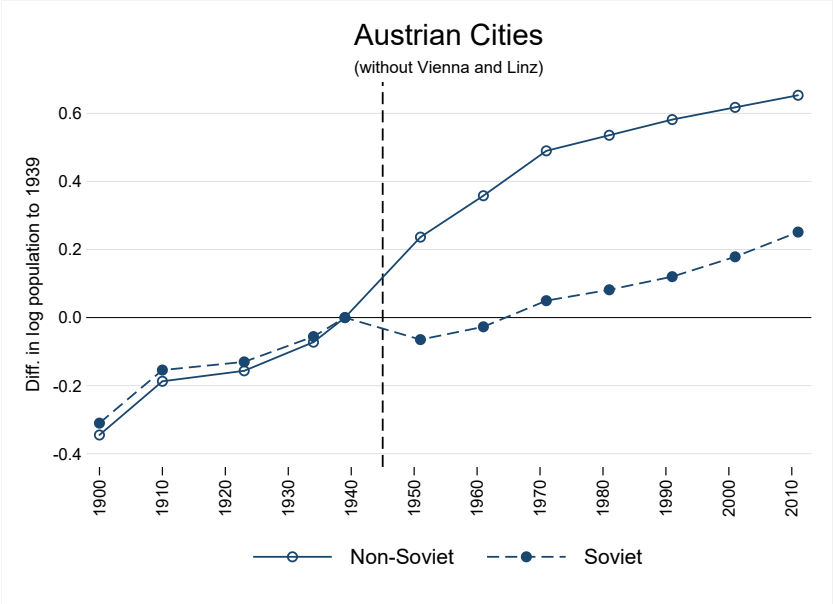
Notes: The graphs show the effect of the Soviet occupation on population in bordering districts along the demarcation line. Dashed lines show the 95% confidence intervals.

Figure A.3: Robustness Check: Estimation of the Effect of the Soviet Occupation on Population



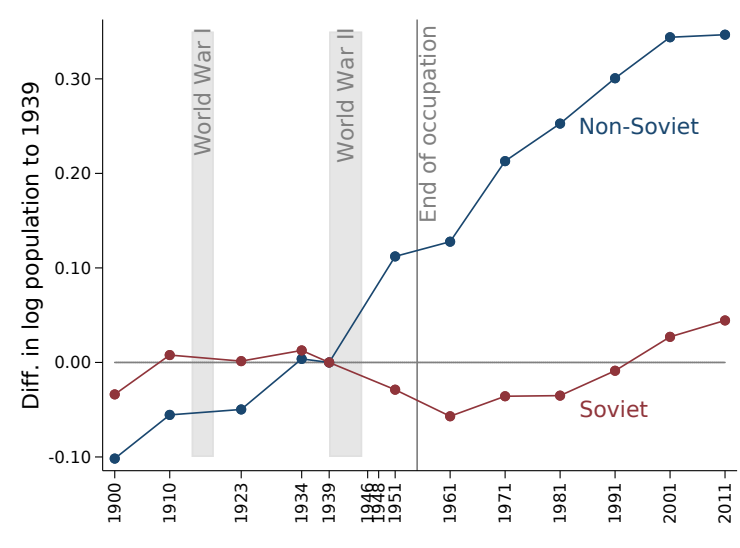
Notes: Geographic areas are municipalities in Austria. Table B.3 in the Appendix shows corresponding estimation results for Austria.

Figure A.4: Development of Population in the Soviet and in the non-Soviet Zone in Cities

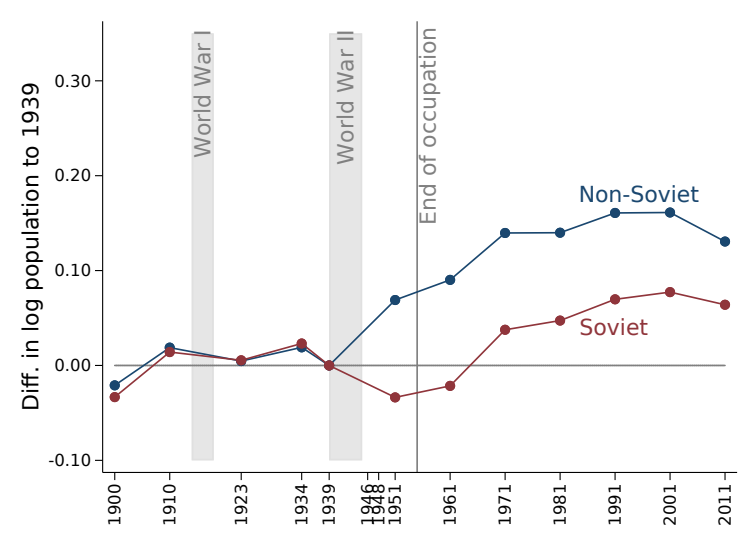


Notes: This figure uses data from all Austrian municipalities with a population of 10,000 in 2011 (except Linz, and Vienna). The vertical line marks the end of World War II.

Figure A.5: Development of Population in the Soviet and in the non-Soviet Zone



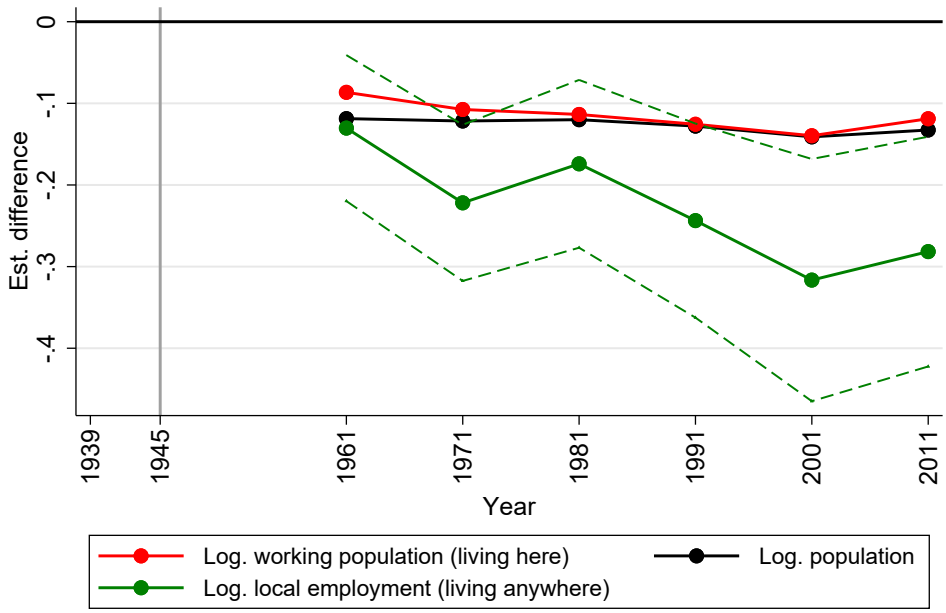
(a) All municipalities (except Vienna and Linz)



(b) Bordering municipalities

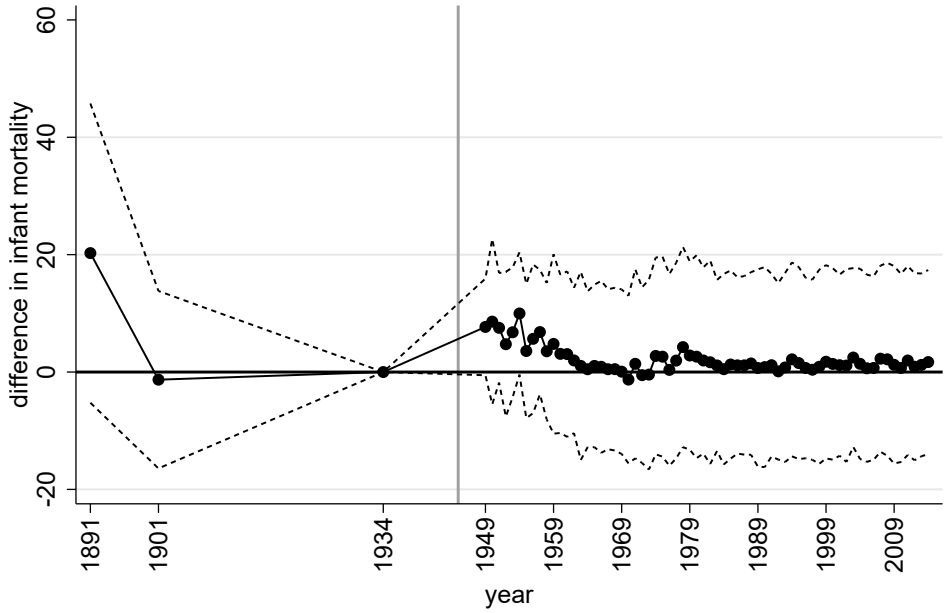
Notes: The upper panel uses data from all municipalities (except Vienna and Linz). The lower panel uses only data from municipalities situated along the demarcation line between the Soviet and the non-Soviet zones. The vertical line marks the end of occupation.

Figure A.6: Estimation of the Effect of the Soviet Occupation on Workers



Notes: Geographic areas are municipalities in Austria. Table 3 shows corresponding estimation results for Austria.

Figure A.7: Infant Mortality in Austria by State



Notes: This figure shows the infant mortality in Austria over time. The data was collected on the district level and is displayed here by occupation zone.

Appendix B: Additional Estimation Output

Table B.1: Descriptive Statistics

	Both Zones		Non-Soviet Zone	Soviet Zone
	Mean	Std. Dev.	Mean	Mean
All municipalities (without Linz and Vienna) (N=2,352)				
Population				
in 1900	1,765.0	4,236.9	1,590.7	2,064.2
in 1939	2,021.0	5,623.2	1,901.5	2,226.1
in 1951	2,182.4	6,260.4	2,199.5	2,153.2
in 2011	2,762.7	7,774.1	2,912.9	2,505.0
Municipalities within 40KM of demarcation line (N=889)				
Population				
in 1900	1,599.3	1,676.5	1,462.7	1,765.6
in 1939	1,722.1	2,313.3	1,619.1	1,847.3
in 1951	1,822.6	2,484.7	1,827.1	1,817.0
in 2011	2,173.6	3,384.1	2,207.5	2,132.4
Neighboring municipalities (N=95)				
Population				
in 1900	2,217.6	1,953.5	2,106.4	2,317.7
in 1939	2,322.5	2,306.1	2,257.3	2,381.2
in 1951	2,428.2	2,532.3	2,494.2	2,368.9
in 2011	2,938.5	3,612.1	3,079.3	2,811.7
Workers				
in 1961	1,142.7	1,154.3	1,174.5	1,114.0
in 2011	1,425.9	1,742.8	1,477.9	1,379.1
Local workers				
in 1961	994.7	1,118.9	1,040.4	953.6
in 2011	1,045.6	1,710.8	1,185.7	919.5
Frontier workers				
in 1971	3.3	5.1	2.3	4.3
in 2001	8.1	10.3	5.2	10.6
Neighboring districts (N=22)				
Population				
in 1934	51,837.9	24,386.1	57,881.3	46,801.8
in 1951	54,684.7	25,926.4	65,628.8	45,564.6
in 2011	64,802.7	32,813.6	77,232.8	54,444.2
Local workers				
in 1930	7,464.5	5,407.7	8,022.7	6,999.3
in 1964	11,860.2	8,715.0	14,918.8	9,311.4
in 2011	26,774.9	15,174.4	34,567.5	20,281.0
Firms (all)				
in 1930	2,291.4	1,022.6	2,520.7	2,100.3
in 1954	1,691.1	787.9	1,909.8	1,508.9
in 2011	5,305.7	2,655.5	6,455.7	4,347.3
Firms ($\geq$ 20 workers)				
in 1930	32.6	23.5	36.3	29.5
in 1954	44.2	29.2	56.2	34.3
in 2011	207.9	131.3	276.3	150.9
Firms ($\geq$ 100 workers)				
in 1930	5.3	5.3	4.7	5.9
in 1954	7.7	8.2	9.3	6.4
in 2011	26.1	20.5	36.1	17.8
Cities (N=72)				
Population				
in 1900	12,460.2	20,961.7	13,040.4	11,299.8
in 1939	17,404.8	27,478.7	18,465.9	15,282.7
in 1951	19,449.4	30,531.7	22,157.7	14,032.7
in 2011	26,059.4	36,658.3	30,091.2	17,995.8

Table B.2: Estimation of the Effect of the Soviet Occupation on Population: Robustness Checks

	Log Population						
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Pre-WWII differences							
1900 × Soviet zone	0.020	0.020	0.020	0.020	0.020	0.017	0.021
	(0.021)	(0.019)	(0.027)	(0.032)	(0.029)	(0.025)	(0.024)
1910 × Soviet zone	0.010	0.010	0.010	0.010	0.010	0.014	0.006
	(0.016)	(0.013)	(0.018)	(0.024)	(0.022)	(0.016)	(0.017)
1923 × Soviet zone	0.008	0.008	0.008	0.008	0.008	0.014	−0.000
	(0.014)	(0.012)	(0.017)	(0.022)	(0.017)	(0.016)	(0.015)
1934 × Soviet zone	0.007	0.007	0.007	0.007	0.007	0.007	0.002
	(0.008)	(0.006)	(0.009)	(0.012)	(0.012)	(0.009)	(0.009)
Base-year (1939) differences							
Soviet zone	0.109	0.109	0.109	0.109	0.109	−0.160	0.326**
	(0.165)	(0.115)	(0.163)	(0.182)	(0.278)	(0.158)	(0.133)
Post-WWII differences							
1946 × Soviet zone	−0.106***	−0.106***	−0.106***	−0.106***	−0.106**	−0.109***	−0.103***
	(0.030)	(0.022)	(0.031)	(0.038)	(0.047)	(0.032)	(0.026)
1948 × Soviet zone	−0.108***	−0.108***	−0.108***	−0.108***	−0.108***	−0.121***	−0.100***
	(0.015)	(0.012)	(0.017)	(0.021)	(0.022)	(0.016)	(0.015)
1951 × Soviet zone	−0.106***	−0.106***	−0.106***	−0.106***	−0.106***	−0.122***	−0.101***
	(0.017)	(0.014)	(0.020)	(0.024)	(0.026)	(0.018)	(0.021)
1961 × Soviet zone	−0.118***	−0.118***	−0.118***	−0.118***	−0.118***	−0.136***	−0.117***
	(0.020)	(0.017)	(0.024)	(0.027)	(0.029)	(0.019)	(0.024)
1971 × Soviet zone	−0.119***	−0.119***	−0.119***	−0.119***	−0.119***	−0.136***	−0.113***
	(0.026)	(0.021)	(0.030)	(0.035)	(0.039)	(0.026)	(0.026)
1981 × Soviet zone	−0.114***	−0.114***	−0.114***	−0.114***	−0.114**	−0.133***	−0.109***
	(0.031)	(0.026)	(0.037)	(0.040)	(0.048)	(0.031)	(0.035)
1991 × Soviet zone	−0.120***	−0.120***	−0.120***	−0.120**	−0.120**	−0.134***	−0.118***
	(0.036)	(0.031)	(0.044)	(0.048)	(0.055)	(0.037)	(0.042)
2001 × Soviet zone	−0.126***	−0.126***	−0.126**	−0.126**	−0.126*	−0.144***	−0.120**
	(0.041)	(0.034)	(0.048)	(0.053)	(0.064)	(0.041)	(0.047)
2011 × Soviet zone	−0.119***	−0.119***	−0.119**	−0.119**	−0.119*	−0.138***	−0.108**
	(0.041)	(0.034)	(0.049)	(0.054)	(0.063)	(0.042)	(0.046)
Pair-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. pairs	93	93	93	93	93	50	45
No. unique municipal.	95	95	95	95	95	100	90
No. periods	14	14	14	14	14	14	14
No. observations	2,604	2,604	2,604	2,604	2,604	1,400	1,260
R-squared	0.48	0.48	0.48	0.48	0.48	0.47	0.53
Mean of dep. var.	7.66	7.66	7.66	7.66	7.66	7.69	7.59
S.d. of dep. var.	0.78	0.78	0.78	0.78	0.78	0.77	0.64

This table summarizes estimation results based on municipality-level data. The dependent variable is equal to the log of population. Each specification includes the variables listed and pair-wise year fixed effects (where pairs are given by neighboring municipalities along the placebo demarcation line). The method of estimation is least squares. Standard errors are in parentheses below (see below for a description of Table B.2). *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Description of Table B.2:

(I) Our standard approach for reference (see column (1) in Table B.3). Standard errors are clustered within each municipality, no matter in which pair the municipality is.

(II) Standard errors are clustered at the municipality-level within each pair.

(III) Standard errors are clustered within each pair.

(IV) Standard errors are clustered within each municipality in the Soviet zone plus all bordering municipalities in the non-Soviet zones.

(V) Standard errors are clustered within each municipality in the Non-Soviet zones plus all bordering municipalities in the Soviet zones.

(VI) Dataset is transformed so that for each municipality in the Soviet zone, there is a synthetic control municipality in the non-Soviet zones. The synthetic control municipality is the mean of all bordering municipalities in the non-Soviet zones.

(VII) Dataset is transformed so that for each municipality in the non-Soviet zones, there is a synthetic control municipality in the Soviet zone. The synthetic control municipality is the mean of all bordering municipalities in the Soviet zone.

Table B.3: Estimation of the Effect of the Soviet Occupation on Population in Austria

	Bordering municipalities	Municipalities with distance to the demarcation line of 0-10 km	10-20 km	20-30 km	30-40 km
	(I)	(II)	(III)	(IV)	(V)
Pre-WWII differences					
1900 × Soviet zone	0.020	0.053***	0.086***	0.108***	0.073***
	(0.019)	(0.017)	(0.014)	(0.012)	(0.019)
1910 × Soviet zone	0.010	0.037***	0.063***	0.061***	0.045***
	(0.013)	(0.011)	(0.012)	(0.012)	(0.016)
1923 × Soviet zone	0.008	0.015	0.051***	0.037***	0.059***
	(0.012)	(0.010)	(0.009)	(0.010)	(0.013)
1934 × Soviet zone	0.007	0.016**	0.017***	0.019***	0.040***
	(0.006)	(0.008)	(0.005)	(0.006)	(0.012)
Base-year (1939) differences					
Soviet zone	0.109	−0.074	0.045	0.024	−0.037
	(0.115)	(0.071)	(0.067)	(0.062)	(0.052)
Post-WWII differences					
1946 × Soviet zone	−0.106***				
	(0.022)				
1948 × Soviet zone	−0.108***				
	(0.012)				
1951 × Soviet zone	−0.106***	−0.120***	−0.085***	−0.123***	−0.083***
	(0.014)	(0.017)	(0.012)	(0.008)	(0.014)
1961 × Soviet zone	−0.118***	−0.120***	−0.091***	−0.144***	−0.087***
	(0.017)	(0.020)	(0.016)	(0.011)	(0.017)
1971 × Soviet zone	−0.119***	−0.127***	−0.107***	−0.191***	−0.126***
	(0.021)	(0.021)	(0.020)	(0.016)	(0.021)
1981 × Soviet zone	−0.114***	−0.116***	−0.113***	−0.195***	−0.161***
	(0.026)	(0.026)	(0.022)	(0.021)	(0.026)
1991 × Soviet zone	−0.120***	−0.126***	−0.120***	−0.212***	−0.211***
	(0.031)	(0.031)	(0.022)	(0.024)	(0.032)
2001 × Soviet zone	−0.126***	−0.134***	−0.123***	−0.238***	−0.200***
	(0.034)	(0.033)	(0.023)	(0.028)	(0.037)
2011 × Soviet zone	−0.119***	−0.127***	−0.107***	−0.245***	−0.171***
	(0.034)	(0.033)	(0.025)	(0.032)	(0.043)
Pair-Year FE	Yes	Yes	Yes	Yes	Yes
No. pairs	93	128	228	210	194
No. unique municipal.	95	157	244	218	199
No. periods	14	12	12	12	12
No. observations	2,604	3,072	5,472	5,040	4,656
R-squared	0.48	0.64	0.53	0.55	0.59
Mean of dep. var.	7.66	7.29	7.23	7.23	7.19
S.d. of dep. var.	0.78	0.67	0.78	0.67	0.67

This table summarizes estimation results based on municipality-level data from 1900, 1910, 1923, 1934, 1939, 1946, 1948, 1951, 1961, 1971, 1981, 1991, 2001, 2011. The cities Linz, Steyr, and Vienna are excluded, since in both cases the demarcations disunited the city. The dependent variable is equal to the log of population. Each specification includes the variables listed. Specifications (I)-(V) controls in addition for pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line). The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.4: The Effect of the Placebo Demarcation Lines on Population

	Dep. var.: **Log Population**			
	Placebo demarcation line		Other zone borders	
	State borders	Danube river	US-UK	US-French
	(I)	(II)	(III)	(IV)
Pre-WW2 differences				
1900 × Placebo/American zone	−0.001	0.030	−0.066**	0.015
	(0.033)	(0.034)	(0.029)	(0.055)
1910 × Placebo/American zone	0.009	−0.011	−0.023	0.017
	(0.026)	(0.033)	(0.024)	(0.047)
1923 × Placebo/American zone	−0.052***	−0.012	0.006	−0.074*
	(0.018)	(0.026)	(0.023)	(0.041)
1934 × Placebo/American zone	0.001	0.008	−0.001	−0.037
	(0.011)	(0.010)	(0.017)	(0.029)
Base-year (1939) differences				
Placebo/American zone	−0.006	−0.962***	0.099	0.080
	(0.100)	(0.218)	(0.127)	(0.166)
Post-WW2 differences				
1951 × Placebo/American zone	0.024	−0.001	0.037*	0.016
	(0.018)	(0.019)	(0.020)	(0.030)
1961 × Placebo/American zone	0.014	−0.023	0.038	−0.009
	(0.016)	(0.025)	(0.024)	(0.056)
1971 × Placebo/American zone	−0.023	−0.003	0.005	−0.004
	(0.022)	(0.038)	(0.032)	(0.062)
1981 × Placebo/American zone	−0.020	0.010	0.012	−0.000
	(0.024)	(0.042)	(0.037)	(0.068)
1991 × Placebo/American zone	−0.030	0.053	0.018	0.024
	(0.029)	(0.047)	(0.041)	(0.081)
2001 × Placebo/American zone	0.004	0.060	0.006	0.020
	(0.035)	(0.057)	(0.047)	(0.083)
2011 × Placebo/American zone	0.011	0.044	0.006	−0.033
	(0.041)	(0.072)	(0.051)	(0.086)
Pair-year FE	Yes	Yes	Yes	Yes
No. pairs	56	34	68	21
No. unique municipal.	56	41	70	22
No. periods	12	12	12	12
No. observations	1,344	816	1,632	504
R-squared	0.63	0.72	0.53	0.75
Mean of dep. var.	7.43	7.80	7.25	7.17

This table summarizes estimation results based on municipality-level data. The dependent variable is equal to the log of population. Each specification includes the variables listed and pair-wise year fixed effects (where pairs are given by neighboring municipalities along the placebo demarcation line). The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.5: Estimation of the Effect of the Soviet Occupation on Population

	Additional Results: District Level
	(I)
Base-year (1930) differences	
Soviet zone (Base = 1934)	−0.173
	(0.168)
Post-WWII differences	
1951 × Soviet zone	
1961 × Soviet zone	
1971 × Soviet zone	−0.207***
	(0.036)
1981 × Soviet zone	−0.208***
	(0.043)
1991 × Soviet zone	−0.211***
	(0.048)
2001 × Soviet zone	−0.207***
	(0.052)
2011 × Soviet zone	−0.201***
	(0.057)
Pair-Year FE	Yes
No. pairs	21
No. unique districts	22
No. periods	9
No. observations	378
R-squared	0.53
Mean of dep. var.	10.97

This table summarizes estimation results based on district-level data. The city Linz is excluded, since the demarcation disunited the city. The specification includes the variable listed and pair-wise year fixed effects (where pairs are given by neighboring districts along the demarcation line). The method of estimation is least squares. Robust standard errors (allowing for clustering by district and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.6: Estimation of the Effect of the Soviet Occupation on Local Workers

	Robustness for economic activity: local workers			
	Municipalities with distance to the demarcation line of			
	0-10 km	10-20 km	20-30 km	30-40 km
	(I)	(II)	(III)	(IV)
1961 × Soviet zone	−0.169**	−0.117***	−0.051	−0.072**
	(0.067)	(0.038)	(0.039)	(0.031)
1971 × Soviet zone	−0.238***	−0.167***	−0.218***	−0.064
	(0.060)	(0.046)	(0.047)	(0.040)
1981 × Soviet zone	−0.192***	−0.168***	−0.281***	−0.090**
	(0.072)	(0.057)	(0.052)	(0.045)
1991 × Soviet zone	−0.280***	−0.284***	−0.338***	−0.096*
	(0.081)	(0.065)	(0.057)	(0.057)
2001 × Soviet zone	−0.345***	−0.217***	−0.433***	−0.201***
	(0.099)	(0.065)	(0.061)	(0.066)
2011 × Soviet zone	−0.335***	−0.247***	−0.486***	−0.255***
	(0.091)	(0.071)	(0.063)	(0.072)
Pair-Year FE	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes
No. pairs	88	180	170	137
No. unique municipal.	115	199	179	141
No. periods	6	6	6	6
No. observations	1,056	2,160	2,040	1,644
R-squared	0.87	0.89	0.86	0.89
Mean of dep. var.	6.28	6.01	5.98	6.15
S.d. of dep. var.	1.01	1.19	0.97	0.93

This table summarizes estimation results based on municipality-level data. The dependent variable is equal to the share of local workers. In addition, pairwise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.7: Estimation of the Effect of the Soviet Occupation on Commuting Behavior

	Commuting Workers			
	Municipalities with distance to the demarcation line of			
	0-10 km	10-20 km	20-30 km	30-40 km
	(I)	(II)	(III)	(IV)
1971 × Soviet zone	0.084***	0.011**	−0.017***	−0.003
	(0.014)	(0.006)	(0.004)	(0.002)
1981 × Soviet zone	0.088***	−0.000	−0.002	−0.005*
	(0.019)	(0.008)	(0.005)	(0.002)
1991 × Soviet zone	0.100***	0.029***	0.015**	0.020***
	(0.021)	(0.009)	(0.006)	(0.004)
2001 × Soviet zone	0.159***	0.058***	0.022***	0.009***
	(0.023)	(0.010)	(0.006)	(0.003)
Pair-Year FE	Yes	Yes	Yes	Yes
Flex. control variables	Yes	Yes	Yes	Yes
No. pairs	912	912	912	912
No. unique municipal.	971	971	971	971
No. periods	4	4	4	4
No. observations	1,044	1,827	1,675	1,560
R-squared	0.51	0.48	0.54	0.60
Mean of dep. var.	0.15	0.06	0.03	0.02
S.d. of dep. var.	0.15	0.08	0.06	0.03

This table summarizes estimation results based on municipality-level data. The dependent variable is equal to the share of commuters. In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.8: Estimation of the Effect of the Soviet Occupation on Trust in Austria

	Trust towards others in 2008/09		
	(I)	(II)	(III)
Soviet zone	0.005	−0.023	−0.021
	(0.024)	(0.023)	(0.025)
Exogenous control variables			
Female		0.077***	0.082***
		(0.025)	(0.027)
Born in 1970's		−0.086***	−0.105***
		(0.020)	(0.020)
Born in 1980's		−0.053***	−0.078***
		(0.018)	(0.016)
Endogenous control variables			
Educ. 2			0.062**
			(0.025)
Educ. 3			0.106***
			(0.038)
Educ. 4			0.306***
			(0.059)
Educ. 5			−0.304***
			(0.039)
Married			0.024
			(0.018)
Divorced			−0.006
			(0.059)
Widowed			−0.087
			(0.078)
Numer of children			−0.022**
			(0.009)
Urban area			−0.011
			(0.023)
Pair FE	Yes	Yes	Yes
No. pairs	22	22	22
No. unique districts	23	23	23
No. unique indiv.	878	878	878
No. observations	1,998	1,998	1,998
R-squared	0.03	0.03	0.07
Mean of dep. var.	0.42	0.42	0.42
S.d. of dep. var.	0.49	0.49	0.49

This table summarizes estimation results based on district-level data. The city Linz is excluded, since the demarcation disunited the city. The specification includes the variable listed and controls which are plausibly exogenous (and endogenous controls in (III) as well). In addition, pair-wise year fixed effects (where pairs are given by neighboring municipalities along the demarcations line) are included. The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table B.9: Estimation of the Effect of the Soviet Occupation on Firms and Workers by Sector

	Workers		Firms		Robustness: long series			
					Workers		Firms	
	manuf.	service	manuf.	service	manuf.	service	manuf.	service
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Pre-WWII differences								
1902 × Soviet zone					0.006	0.047	−0.011	0.159
					(0.165)	(0.210)	(0.159)	(0.213)
Base-year (1930) differences								
Soviet zone	−0.194	−0.235	−0.217	−0.199	0.030	−0.154	−0.098	−0.156
	(0.257)	(0.234)	(0.206)	(0.198)	(0.324)	(0.304)	(0.176)	(0.247)
Post-WWII differences								
1954 × Soviet zone			−0.090***	−0.078***			−0.083**	−0.062**
			(0.029)	(0.023)			(0.037)	(0.028)
1964 × Soviet zone	0.000	0.000	−0.125**	−0.172***	0.000	0.000	−0.134**	−0.172***
	(.)	(.)	(0.045)	(0.035)	(.)	(.)	(0.049)	(0.043)
1973 × Soviet zone	−0.303***	−0.261**	−0.166**	−0.207***	−0.389***	−0.224	−0.216**	−0.212**
	(0.102)	(0.106)	(0.075)	(0.058)	(0.121)	(0.143)	(0.078)	(0.075)
1981 × Soviet zone	−0.383***	−0.282**	−0.208**	−0.226***	−0.464***	−0.247	−0.227**	−0.233***
	(0.106)	(0.108)	(0.077)	(0.060)	(0.150)	(0.145)	(0.082)	(0.073)
1991 × Soviet zone	−0.370***	−0.332**	−0.222***	−0.298***	−0.417**	−0.303	−0.255***	−0.304***
	(0.125)	(0.133)	(0.075)	(0.082)	(0.192)	(0.175)	(0.077)	(0.101)
2001 × Soviet zone	−0.341**	−0.362**	−0.265***	−0.319***	−0.406*	−0.338	−0.314***	−0.314**
	(0.144)	(0.147)	(0.074)	(0.087)	(0.227)	(0.198)	(0.081)	(0.109)
2011 × Soviet zone	−0.341**	−0.370**	−0.300***	−0.309***	−0.432	−0.336	−0.364***	−0.300**
	(0.158)	(0.171)	(0.069)	(0.103)	(0.245)	(0.236)	(0.075)	(0.136)
Pair-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	240	240	320	320	182	182	234	234
No. pairs	20	20	20	20	13	13	13	13
No. unique districts	21	21	21	21	15	15	15	15
No. periods	6	6	8	8	7	7	9	9
R-squared	0.66	0.81	0.66	0.73	0.60	0.90	0.78	0.78
Mean of dep. var.	8.91	8.88	6.47	7.26	9.11	8.75	6.69	7.31

This table summarizes estimation results based on district-level data. The cities Linz is excluded, since the demarcation disunited the city. The specification includes the variables listed and pair-wise year fixed effects (where pairs are given by neighboring districts along the demarcation line). The method of estimation is least squares. Robust standard errors (allowing for clustering by municipality and heteroskedasticity of unknown form) are in parentheses below. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Appendix C: Data Sources

Table C.1: Census Data at the Municipality Level in Austria

Variable	Year	Source
Population	1900-2011	"Ein Blick auf die Gemeinde." (http://www.statistik.at/blickgem). Statistik Austria. Wien.
Population	1946	"Gemeindeverzeichnis von Österreich." 1948. Statistisches Zentralamt. Wien.
Population	1948	"Gemeindeverzeichnis von Österreich." 1949. Statistisches Zentralamt. Wien.
Workers, local workers	1961	"Ergebnisse der Volkszählung vom 21. März 1961." 1963. Statistisches Zentralamt. Wien
Workers, local workers	1971	"Ergebnisse der Volkszählung vom 12. Mai 1971." 1972. Statistisches Zentralamt. Wien
Workers, local workers	1981	"Volkszählung 1981." 1985. Statistisches Zentralamt. Wien
Workers, local workers	1991	"Volkszählung 1991." 1993. Statistisches Zentralamt. Wien
Workers, local workers	2001	"Ein Blick auf die Gemeinde." (http://www.statistik.at/blickgem). Statistik Austria. Wien.
Workers, local workers	2011	"Ein Blick auf die Gemeinde." (http://www.statistik.at/blickgem). Statistik Austria. Wien.
Frontier workers	1971–2001	"Individual level census data (5% sample)." Statistik Austria. Wien.

Table C.2: Firm and Worker Data at the District Level in Austria

Variable	Year	Source
Firms, workers	1902	"Ergebnisse der gewerblichen Betriebszählung vom 3. Juni 1902 in den im Reichsrate vertretenen Königreichen und Ländern." K. K. Statistischen Zentralkommission. Wien.
Firms, workers	1930	"Gewerbliche Betriebszählung in der Republik Österreich vom 14. Juni 1930." Bundesamt für Statistik. Wien.
Population by location of birth	1951	"Ergebnisse der Volkszählung vom 1. Juni 1951. Tabellenband 1." Österreichisches Statistisches Zentralamt. Wien.
Firms	1954	"Nichtlandwirtschaftliche Betriebszählung vom 1. September 1954." Österreichisches Statistisches Zentralamt. Wien.
Firms, workers	1964	"Betriebsstätten in Österreich. Ergebnisse der Vorerhebung zur nichtlandwirtschaftlichen Betriebszählung vom 10. Oktober 1964." Österreichisches Statistisches Zentralamt. Wien.
Firms, workers	1981	"Arbeitsstättenzählung 1981." Österreichisches Statistisches Zentralamt. Wien.
Firms, workers	1991	"Arbeitsstättenzählung 1991." Österreichisches Statistisches Zentralamt. Wien.
Firms, workers	2001	"Arbeitsstättenzählung 2001." Statistik Austria. Wien.
Firms, workers	2011	"Arbeitsstättenzählung 2011." Statistik Austria. Wien.