Forced Melting Pot: Temporary Migration and International Cooperation*

Ann-Kristin Becker
University of Cologne†

Carola Stapper
Johannes Kepler University Linz‡

Preliminary draft.
Last update: 2026-02-28
Most recent version here.

Abstract

This paper examines the effects of temporary migration on international cooperation. We explore this question within the context of forced migration in Germany during World War II. We exploit the quasi-random assignment of temporary migrants across German counties, which was not determined by prior migration patterns or existing ties. We find that a greater presence of temporary migrants from a given country increases social connectivity as well as the number of firm links and joint patents between German counties and the forced migrants' countries of origin in the post-war period, when migrants had returned home. We further show that this effect persists when ties are institutionalized via town twinning. These findings show that even coercive, temporary migration can foster lasting international cooperation when embedded in formal institutions.

Keywords: Temporary migration; Forced migration; Town twinning; International cooperation; Gravity model

JEL Codes: F22, F55, D02, N44, Z13

*We are especially grateful to Erik Hornung for his support throughout this project. We also thank participants at EHES 2025 (Hohenheim) and ASREC 2025 (Copenhagen), as well as seminar participants in Cologne and Linz, for helpful comments and suggestions.

†University of Cologne, Albertus-Magnus-Platz, 50923 Cologne, Germany; (ann-kristin.becker@wiso.uni-koeln.de)

‡Johannes Kepler University Linz, Altenbergerstr. 69, 4040 Linz, Austria. (carola.stapper@jku.at)

1 Introduction

International cooperation is essential not only for economic development, innovation, and global stability, but also for addressing transnational challenges such as climate change and pandemics. A large literature shows that long-term exposure through migration fosters cross-border linkages (e.g., Burchardi et al., 2019), yet we know much less about whether short-term exposure and temporary migration generate cooperative ties that persist. This question is particularly important because temporary migration is widespread: depending on the destination country, 20% to 50% of immigrants leave within five years of arrival (OECD, 2020).

This paper examines whether temporary migration can generate cooperative ties, and under what conditions these ties persist. We study this question in the context of forced migration in Germany during World War II (WWII). During the war, millions of civilians from occupied countries were brought to Germany. Crucially, their allocation across German counties was not driven by self-selection or pre-existing ties: Instead, their assignment was determined centrally given labor demands at the time of transportation (Marx, 2019). Foreign migrants, estimated to number between 10–15 million people, often interacted with the local population through shared housing, workplace interactions, and participation in religious or cultural events (Buggeln, 2017; Spoerer & Fleischhacker, 2002). We restrict our analysis to non-Soviet migrants, almost all of whom were repatriated shortly after the war (Proudfoot, 1957). This setting provides a rare opportunity to causally identify the impact of temporary migration on subsequent international cooperation.

We compile county-level data on the number and nationality of forced migrants who were present in Germany during WWII (Arolsen Archives, 2024) and link them to multiple present-day indicators of international cooperation varying at the county-country level. First, we use a social connectivity measure based on Facebook friends (Bailey et al., 2018; Facebook, 2025) to confirm the existence of interpersonal relationships between German counties and the migrants' countries of origin. To measure economic cooperation, we use cross-border firm links (foreign direct investment) using data from Bureau van Dijk (2024), as well as joint patenting using data from Bergeaud and Verluise (2024). To understand whether the institutionalization of initial ties explains the persistent effects of temporary wartime contact, we use data on town twinnings (RGRE, 2024). Town twinnings largely emerged after WWII as part of a European initiative to promote

reconciliation between former enemies and to foster international cooperation. We hypothesize that such institutionalization may help explain the persistence of the effects of temporary migration on long-term cooperation.

Using a gravity model with German county and country fixed effects, we find that an increase in the number of temporary migrants increases social and economic cooperation between German counties and the migrant's countries of origin in the post-war period, when migrants had returned home. Specifically, we find that doubling the number of temporary migrants (at the mean) leads to a 4.97 % increase in social connectivity. We also find effects on economic behavior: Doubling the number of temporary migrants (at the mean) leads to 3.17 % more firm links and 6.95 % more joint patents. To distinguish whether these effects are driven by direct personal connections or broader shifts in attitudes toward people from the same country of origin as the temporary migrants, we will conduct a case study using regional variation within the Netherlands. Furthermore, we demonstrate that closer contact with the population of origin, more favorable treatment of migrants, and greater similarity between natives and migrants are associated with increased international cooperation. Lastly, we show that the effects of temporary migration on international cooperation only persist in the long term in country-country pairs where initial connections have been formalized through town twinning. In the absence of such institutions, temporary migration does not appear to have a persistent effect on international cooperation.

In summary, we show in this paper that temporary migration, even under coercive conditions, can foster cross-border cooperation. This is particularly evident in situations where contact was more frequent, treatment was less severe, and cultural differences were less pronounced. We also show that the persistence of this cooperation depends on the institutionalization of ties, which ensures that individual connections translate into long-term social and economic cooperation.

Our findings contribute to several strands of literature. First, we add to research on connectivity and economic activity (Burchardi & Hassan, 2013; Campante & Yanagizawa-Drott, 2018; Flückiger et al., 2022; Guiso et al., 2009; Portes & Rey, 2005; Redding & Sturm, 2008), where long-term migration has been shown to be an important driver of cross-border ties (e.g. Bahar et al., 2020, 2022; Burchardi et al., 2019; Genc et al., 2012; Gould, 1994; Jansen and Piermartini, 2009; Javorcik et al., 2011; Leblang, 2010; Mayda et al., 2022; Parsons and Vézina, 2018; Rapoport et al., 2021). Most closely related are Burchardi et al. (2019) and Mayda et al. (2022) who show that long-

term migration increases foreign direct investment (FDI).[1] Much less is known about the effects of temporary migration, which has received little attention despite its widespread prevalence (see Dustmann and Görlach (2016) for an overview).[2] We add to this by exploiting a rare setting of temporary migration with almost universal return, showing that not only long-term but also temporary migration can generate cross-border ties.[3] The variation we use is largely free from confounding factors such as chain migration or self-selection. This allows us to isolate causal effects of temporary migration on international cooperation. As we study a setting with coercive migration, our paper is related to the literature on forced displacement as well, which also lacks evidence on settings with return migration (see Becker, 2022 for a review).[4]

Second, our paper contributes to work on changes in attitudes and behavior through contact (Battiston, 2018; Carrell et al., 2019; Corno et al., 2022; Green, 2024; Lowe, 2025; Schindler & Westcott, 2021). This literature has shown that contact with foreigners can shift attitudes. We add to this by showing that contact with foreigners also affects economic behavior. Moreover, we highlight how the conditions of these interactions shape the effects. Specifically, we show that the effects on subsequent cross-border cooperation are stronger where contact was more frequent, treatment was less severe, and cultural differences were less pronounced. Moreover, we show that changes in social and economic behavior can emerge even when initial interactions occur under adverse conditions. This is consistent with the results of the review by Lowe (2025), who shows that intergroup contact can have positive effects even absent the classical facilitating conditions (equal status, common goals, intergroup cooperation, and support of authorities) formulated by Allport (1954).

[1] See Bahar et al., 2022 for a review of the literature on the effect of forced migration on trade and FDI.

[2] Recent papers on temporary migration have studied the decision to re-migrate (Adda et al., 2022; Beaman et al., 2022; Ward, 2017), their labor market and fiscal impact for sending and receiving countries (Görlach & Kuske, 2022), entrepreneurial investment (Bossavie et al., 2025), and migrant's labor market success after their return (Abramitzky et al., 2019; Fransen et al., 2017).

[3] Jansen and Piermartini (2009) show a positive association between temporary migration and trade flows for the US while migrants are still in the destination country. Jonkers and Cruz-Castro (2013) suggest that Argentinian life scientists who return home are more likely to collaborate with researchers from the continent they stayed on, and Choudhury (2016) suggests that return workers at an Indian firm increase patenting links with the US headquarters of the firm. We improve on this by exploiting exogenous variation in migrant location to identify causal effects on cooperation after temporary migrants have returned home. We use rich variation over multiple countries of origin and a population of temporary migrants that is not restricted to specific occupations.

[4] By studying the effects of temporary migration on joint patenting, our paper is also related to the literature on migration and innovation, e.g. Agrawal et al. (2006), Akcigit et al. (2017), Andersson et al. (2022), Bahar et al. (2020), Bergeaud et al. (2025), Burchardi et al. (2020), Ganguli (2015), Hunt and Gauthier-Loiselle (2010), Kerr (2008), Kerr and Lincoln (2010), and Moser et al. (2014).

Third, we add to the literature on the transmission of norms (Bisin & Verdier, 2001; Tabellini, 2008). Our findings emphasize the importance of institutionalization as a channel through which cooperative ties persist. We also contribute to the limited literature on town twinnings (Brakman et al., 2016), showing that it can serve as an institution to solidify short-term connections.

Finally, we contribute to the literature on nation-building and political integration, which highlighted war as a determinant for the formation of states (Alesina et al., 2020; Tilly, 1975). Prior work also shows that shared wartime experiences can strengthen in-group cooperation (see Bauer et al., 2016 for a literature review). We add by showing that exposure to foreigners during a war can also increase out-group cooperation. Moreover, our findings suggest that interpersonal contact can play a critical role in rebuilding trust and fostering the relationships that underpin international cooperation. In this sense, we also speak to the literature on the origins of European integration, where post-war reconciliation between former adversaries laid the groundwork for what would later become the European Union (Haas, 2004; Moravcsik, 2013; Rosamond, 2000).

2 Setting: Temporary Migrants in Germany during World War II

This section outlines the historical context of forced migration to Germany during WWII: The recruitment of forced migrants, their assignment across German counties, interactions with the local population, and their repatriation after the war.

2.1 Recruitment Process

To address acute labor shortages during WWII, driven by the rapid expansion of the armaments industry and the conscription of German men into military service, the Nazi regime largely relied on forced labor from occupied countries.[5] Beginning in the early 1940s, the Reich Ministry of Labor (*Reichsarbeitsministerium*) recruited civilians from occupied territories to work in Germany. Initially, this recruitment relied on voluntary advertising campaigns targeting mostly unemployed workers. However, it soon escalated into increasingly coercive measures (Spoerer, 2001).[6] Table A1

[5] The regime tried to avoid a renewed increase in employment of women, as had occurred after World War I (Homze, 1967).

[6] Note that the distinction between foreign workers who came voluntarily, forced workers who were deported, forced workers in concentration camps, and prisoners of war are not clear-cut and sometimes overlapping (Spoerer, 2001). We cannot distinguish between these different categories in our data, so throughout this paper, we will use forced migrants and temporary migrants interchangeably to indicate any type of displaced person.

in the appendix summarizes recruitment processes by country. Figure A1 shows examples of two recruitment posters posted in the Netherlands, one voluntary, one coercive.

In total, an estimated 10 to 15 million forced migrants and prisoners of war were present in Germany during the war, constituting roughly 20% of the wartime labor force (Buggeln, 2017).

2.2 Distribution across German Counties

The assignment of forced migrants within Germany was centrally coordinated by the Reich Labor Ministry. This process was driven primarily by local labor shortages, which firms would report to their local employment offices. Due to prohibitively high administrative costs considering the sheer number of forced migrants, the allocation process paid little attention to individual skills or nationality in the allocation process (Marx, 2019). While the total number of temporary migrants was endogenous to local labor demand, the composition of nationalities across German counties can be considered quasi-random. Figure A2 shows the geographic distribution of forced migrants from all countries in our sample across German counties during WWII.

2.3 Places of Encounter

Temporary migrants and German civilians interacted in multiple settings during WWII. First, they worked side by side across a wide range of sectors. Second, some migrants, particularly those employed in agriculture, lived in private German households. Third, outside of work, and despite restrictions on their mobility and leisure time, foreign workers occasionally took part in social activities such as sports, theater visits, and church services. This created further opportunities for contact with the local population (Spoerer, 2001; Stichting Holländerei et al., 1996). Historical records also document romantic relationships and children born to German women and foreign workers (Debus et al., 2025).

2.4 Post-War Repatriation

Following the liberation of Germany in 1945, the Allied Forces initiated a large-scale repatriation effort to return former forced workers and displaced persons to their countries of origin. This process was coordinated by military and humanitarian agencies. Almost all displaced persons from Western

European countries had been repatriated by the fall of 1945 (Proudfoot, 1957).[7] The situation was more complex for displaced persons from Eastern European countries, many of whom were not able or did not want to return (Grüter & van Mourik, 2020). By the fall of 1946, approximately 650,000 displaced persons from territories of the Soviet Union were still present in West Germany (Gatrell, 2013; Proudfoot, 1957). We therefore restrict our analysis to countries outside the former Soviet Union to ensure that we capture the effects of temporary migration only.

3 Data

For our empirical analysis, we combine historical data on the location of forced migrants during WWII with post-war data on cross-border connections between German counties and the forced migrants' countries of origin. Our final dataset is structured at the county-country level. In this section, we describe how we constructed the dataset, define key variables, and present summary statistics. Descriptive statistics for all variables are shown in Table A2.

3.1 Treatment: Temporary Migrants in Germany During World War II

To measure the allocation of foreign forced workers across Germany, we use data by the Arolsen Archives on displaced persons, defined as individuals deported by the Nazi regime (Arolsen Archives, 2024).[8] The data largely comes from registration efforts by the Allied forces after WWII who organized the repatriation of displaced persons to their countries of origin. The records include the forced migrants' nationality, the county in which they were located while in Germany, and, for a subset, also their place of birth.

To identify the effect of temporary migration on international cooperation, we restrict our analysis to occupied countries outside the former Soviet Union. This is because many displaced persons from the former Soviet Union did not repatriate after WWII. This makes it impossible to distinguish between the effects of temporary and long-term migration. Figure 1a shows the countries in our sample.

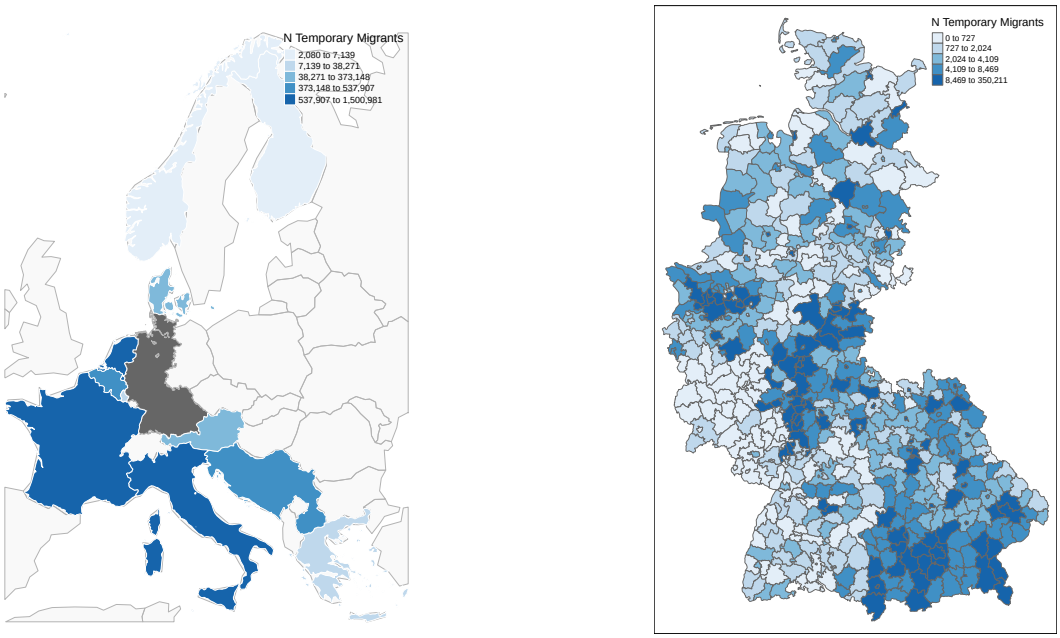
[7] Exact numbers are not available for all countries in our sample, but numbers for e.g. France and Italy, the countries with the highest number of temporary migrants, indicate a return rate of 102% and 99.9%, respectively, relative to the total number of temporary migrants in our data (Proudfoot, 1957).

[8] The records on displaced persons also include prisoners of war and former inmates of concentration camps.

In total, our sample covers 3.81 million displaced persons from eleven nationalities who were located in Germany during WWII. Most forced migrants were from France, accounting for 1.5 million persons (see Table A3). Our numbers are in line with historical evidence (Spoerer, 2001), indicating no systematic differences in coverage across nationalities. For a case study on the sub-national level focusing on the Netherlands, we geocode the place of birth of XX Dutch forced migrants, covering XX% of all Dutch individuals in our sample.

Figure 1b illustrates the distribution of forced migrants in German counties, showing that they were present throughout the country. Figure A2 shows the distribution of forced migrants separately by country of origin, which does mostly not show clear spatial clustering.[9]

On average, a German county hosted 7,209 forced foreign workers from the eleven countries in our sample, with a range from zero to over 350,000.



(a) Countries of Origin of Temporary Migrants

(b) Geographic Distribution of Temporary Migrants within Germany

Figure 1: Country Origins and Geographic Allocation of Temporary Migrants

Notes: Panel (a) shows the number of temporary migrants during WWII from each country of origin in our sample: Belgium, Denmark, France, Greece, Italy, the Netherlands, Norway, Yugoslavia, Austria, Luxembourg, and Finland. Panel (b) shows their distribution across German counties.

[9]Note that in all regressions, we control for the distance between a German county and the border of the country of origin.

3.2 Outcome: Cooperative Measures

3.2.1 Social Connectivity

To measure interpersonal connections between people from German counties and the respective countries of origin of temporary migrants, we use a social connectivity measure. Specifically, our measure captures the intensity of Facebook friendship links between users in different geographic regions as of 2023 (Bailey et al., 2018; Facebook, 2025). We aggregate the measure to the county-country level to construct a measure that reflects the relative intensity of social ties between German counties and the forced migrants' countries of origin, following Bailey et al. (2021). See Section A.3 for details on data construction.

Figure A3a shows the average social connectivity across German counties with all countries in our sample. Notably, the connections are stronger between regions with language similarity that are in close proximity. Since we control for distance to the country of origin, this does not affect our results. Table A3 shows the average social connectivity separately by country.

3.2.2 Firm Links

To complement our analysis of social ties, we use data on firm-level ownership links as an indicator for economic connections. We use data from the Bureau van Dijk's Orbis database, retrieved on July 3, 2024 (Bureau van Dijk, 2024), to measure economic relationships between German counties and foreign countries. The dataset provides detailed information on ownership structures, allowing us to identify cross-border firm links between German and foreign entities.

Our final dataset includes all links in which either a foreign entity holds shares in a German corporation or a German entity owns (part of) a foreign corporation.[10] We geolocate the German entities to the respective headquarters address and aggregate them to the county level. Additionally, we record the country of the foreign entity, which enables us to construct a county–country-level panel of firm links. We restrict the analysis to direct ownership links, i.e., those that do not pass through any intermediary entity, to focus on direct cooperation between two locations. We further restrict the sample to at least medium-sized firms, defined as having operating revenue of at least 1 million euros, total assets of at least 2 million euros, or at least 15 employees (Bureau van Dijk,

[10] Shareholders in the data can be corporations, private individuals, governments, or collectively described entities, while subsidiaries are always classified as corporations.

2024).

In total, we record 28,424 links between German counties and the eleven foreign countries in our sample. Most links are with Austria, namely 7,039 (see Table A3). Figure A3b shows the distribution of total firm links over German counties. On average, a German county has 53.8 links, with a span of zero to almost 2,900.

3.2.3 Joint Innovation

To capture cross-border collaboration in innovation, we use data on international co-inventorship from Bergeaud and Verluise (2024) covering the period 1946–2013. The data records the geographical location of each patentee listed on a patent application. We re-run the geocoding of the patentee's locations to improve on the precision of this dataset. We then aggregate co-inventorships to the county–country level. A joint innovation link is then defined as a patent co-authored by at least one patentee from a given German county and at least one patentee from a foreign country. A patentee here includes individual inventors and the firms to whom the patent is assigned to capture all economically relevant cooperation. In a robustness check, we repeat the analysis, restricting to joint patents of individual inventors only.

There are in total 23,534 patent links between German counties and the eleven foreign countries in our sample. Most joint patents are with France, namely 8,854 (see Table A3). Figure A3c shows the distribution of total joint patents across German counties. On average, a German county has 44.6 joint patents, with a span from zero to more than 1,000.

3.3 Further Variables

3.3.1 Controls

Distance to Border. Geographic proximity is a strong determinant of cross-border cooperation. Although forced migrants were centrally assigned, considerations such as transport costs or the possibility of them fleeing back to their home country could still have played a role in their allocation. To control for this potential confounder, we include the bilateral distance between each German county and the corresponding country of origin of forced migrants in our regressions. Distance is calculated as the great-circle distance between the centroid of the German county and the nearest

point on the border of the foreign country.

Pre-War Cooperation. Although the assignment of forced migrants is arguably exogenous when controlling for distance to the migrants' country of origin, one could still be concerned that counties' pre-existing ties to the migrants' countries of origin may be correlated with forced migrant inflows and international cooperation. We therefore construct a proxy for historical cooperation using joint patenting activity prior to WWII. Specifically, we draw on the patent database by Bergeaud and Verluise (2024) and restrict the sample to patents filed between 1877 and 1938. We aggregate the number of pre-war patents co-authored by patentees located in a given German county and patentees in a given foreign country. Figure A4b in the appendix illustrates the spatial distribution of pre-war patenting activity.

3.3.2 Heterogeneity

Sectoral Composition. To explore heterogeneity in the experience of forced migrants in Germany, we use data on the sectoral composition of German counties during WWII from the 1939 occupational census, taken from Braun and Franke (2021). Specifically, we calculate the ratio of industrial employment (manufacturing and industry) relative to agricultural employment (agriculture, forestry, and fishing). We classify a county as industrial if this ratio is above the median, and else as agricultural, with the median being 0.79. This classification allows us to compare the effects of forced migration in contexts where migrants were more likely to live and work in close proximity to German civilians (e.g., on farms) versus contexts where they were more often housed separately (e.g., in barracks or dormitories).

Exposure to War and Repression. Another dimension along which the experience of forced migrants varied is their exposure to violence and repression during their time in Germany. We proxy this using the distance to so-called *labor-education camps* (Lofti, 2000). These were temporary punishment facilities for forced migrants who disobeyed orders. Proximity to such camps serves as a proxy for the likelihood that the forced migrants experienced coercive punishment.

Cultural Similarity. We lastly examine whether the effects of forced migration vary depending on the cultural similarity between the migrants and the local German population. Following Braun

and Dwenger (2020), we construct a measure of religious distance by combining historical data on the religious composition of German counties in 1939 (shares of Protestants and Catholics) with data on the religious composition of the forced migrants' countries of origin, taken from Maoz and Henderson (2019) (see Section A.3). The idea is that migrants who were more culturally similar to the host population may have experienced more frequent and positive contact (e.g., in churches), which could strengthen the persistence of cross-border ties.

3.3.3 Mechanism

Institutionalization of Ties. To understand why the effects of short-lived wartime contact on cooperation persist for decades, we examine whether this cooperation is sustained through local institutions. We measure this using town twinning between German counties and foreign countries. After WWII, European countries sought to rebuild cross-border relationships and foster reconciliation among former adversaries. One institutional outcome of these efforts was the establishment of town twinning. These long-term partnerships between municipalities in different countries promote political understanding, cultural exchange, and economic cooperation (Brakman et al., 2016; Falkenhain et al., 2012).

Town twinning is typically initiated at the municipal level and often emerges from pre-existing social or civic ties.[11] This bottom-up structure distinguishes town twinning from nationally coordinated foreign policy and reflects a decentralized form of international cooperation. In practice, partnerships often involve official municipal visits, joint events, educational and language programs, as well as economic cooperation facilitated through local institutions such as chambers of commerce.

To measure town twinning, we use data on all international town twinnings involving German municipalities from 1945 to the present (RGRE, 2024).[12] We geolocate each German municipality and aggregate town twinnings at the county-country level.[13]

Town twinning expanded significantly after WWII.[14] Initial partnerships were mostly formed

[11] For example, the twinning between Cologne and Turin originated from the friendship between the Cologne-based art historian Albert-Erich Brinckmann and Turin museum director Vittorio Viale (Speer, 2022).

[12] We include both formal, open-ended partnership agreements as well as project-based partnerships. Our results are robust to restricting to only open-ended partnerships.

[13] Whenever we refer to a county's number of town twinnings, this reflects the total number of agreements across all municipalities within that county.

[14] Only very few town twinnings established before WWII.

with municipalities in Western Europe.[15] Figure A5 shows the number of new town twinnings over time between German counties and the Western European countries included in our sample.[16]

Figure A4a displays the geographic distribution of town twinning across German counties with the eleven countries in our sample. 97.4% of counties have at least one twinning agreement, and the average county has 6.4 partnerships. Table A3 summarizes the total number of town twinnings by partner country. In our sample, German counties have the most town twinnings with France (1,915).

4 Empirical Strategy: Gravity Model

To examine whether the presence of forced migrants during WWII shaped cooperation between German counties and the migrants' countries of origin, we estimate a gravity model using the Poisson pseudo–maximum likelihood (PPML) estimator. Formally, we estimate the following model at the county–country level:

$$\mathbb{E}\left[Y_{ij} \mid X_{ij}\right] = \exp\big(\beta_0 + \beta_1 \operatorname{ihs}(TemporaryMigrants_{ij}) + \beta_2 \ln(DistanceToBorder_{ij}) + \beta_3 \operatorname{ihs}(PreWarCooperation_{ij}) + \gamma_i + \delta_j\big), \tag{1}$$

where Y_{ij} denotes the cooperation measure of interest between German county i and country j. The variable $TemporaryMigrants_{ij}$ captures the number of wartime forced migrants from country j who were present in county i, and $DistanceToBorder_{ij}$ measures the distance between the centroid of county i and the nearest border point of country j. The term $PreWarCooperation_{ij}$ captures pre-WWII cooperation between the two locations. County fixed effects γ_i and country fixed effects δ_j absorb unobserved heterogeneity at both levels. We use the inverse hyperbolic sine transformation for variables that include zero values. We use two-way clustered standard errors at the county-country level. We additionally perform robustness checks using Conley and Kelly (2025) and standard errors clustered at the county level only.

[15] Partnerships with Eastern Bloc countries largely emerged after the end of the Cold War in 1989.

[16] There is a notable increase in new twinning agreements around the year 2000, likely driven by the European Union's enlargement and related integration initiatives. The subsequent decline reflects a saturation effect because most counties had already established partnerships by then, as well as constraints due to the municipal financial crisis (Wingert-Beckmann, 2012).

Identifying Assumption. Our identification strategy relies on the assumption that the distribution of forced migrants across German counties during WWII is independent of other factors that affect international cooperation between county i and country j, conditional on our controls. In many migration contexts, this assumption is difficult to satisfy due to endogeneity in migrants' location choices. Migrants typically self-select into areas with better economic prospects or established diaspora networks. This can bias estimates of migration effects. In contrast, in our setting, migrants had no agency over their placement within Germany. As discussed in Section 2, their allocation was centrally coordinated and determined by local labor shortages and wartime production needs at the time of deportation. That is, conditional on controls, the specific countries of origin represented in each county were not systematically related to pre-existing social or economic cooperation between those counties and the respective countries.

One potential concern is that proximity to the country of origin may have influenced placement decisions. For example, due to transportation costs, the Nazis may have placed migrants closer to their country of origin. Conversely, the Nazi authorities may have placed migrants farther from their country of origin for security reasons, to reduce the risk of escape. To address this, we control for the distance between the German county centroid and the nearest border of the migrant's country of origin in all specifications. Additionally, any county-specific determinants of labor demand, such as industrial structure or production capacity, are absorbed by county fixed effects (γ_i). Country fixed effects (δ_j) further account for differences across sending countries, such as baseline cooperation intensity or post-war geopolitical alignment with Germany.

In addition, we use the time-varying structure of the patent data to control for pre-WWII levels of patenting as a proxy for pre-war relationships between a German county and a foreign country, keeping any pre-existing international connections fixed.

To further assess the plausibility of our identification assumptions, we perform a placebo test where we regress pre-war measures of connectivity on the number of forced migrants (controlling for distance). Results are presented in Table A7. The findings show that neither the number of pre-WWII patents nor the religious similarity between a German county and a foreign country before the war is related to the assignment of forced migrants.

5 Results

5.1 Effect of Temporary Migration on International Cooperation

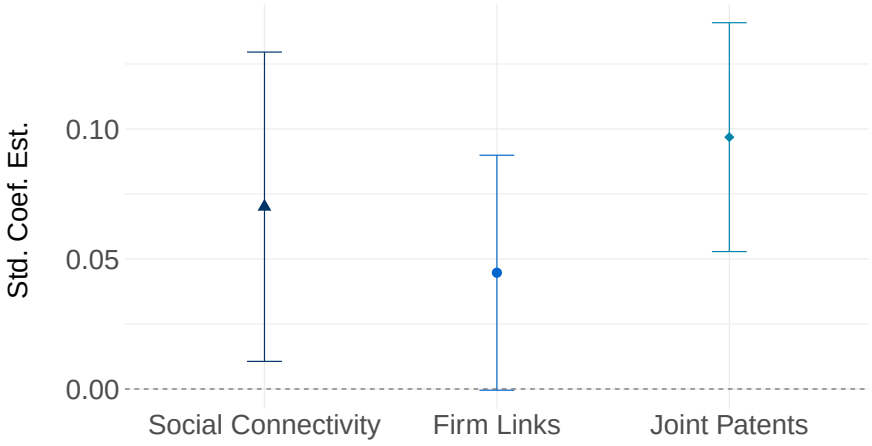


Figure 2: Effect of Temporary Migration on Cross-Border Cooperation

Notes: This figure plots estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on three measures of cross-border cooperation: the average social connectivity (left), the number of firm links (center), and the number of joint patents (right). The independent variable is the number of temporary migrants (inverse hyperbolic sine (ihs)-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in kilometers (km)). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. Error bands show 95% confidence interval. Table A4 shows the corresponding regression estimates.

We begin our analysis by estimating the effect of temporary migration during WWII on international cooperation between German counties and the countries of origin of the migrants. We find strong evidence that the presence of foreign forced migrants increased cross-border ties.

We distinguish between two broad types of cross-border cooperation: interpersonal ties, measured through social connectivity, and formal economic cooperation, captured by firm links and joint patenting. Using the gravity model specified in Equation 1, we estimate the impact of the presence of foreign forced migrants in a German county on later ties with the migrants' countries of origin. Figure 2 presents the estimated effects for our three main outcome variables.[17] Doubling the number of temporary migrants (from the mean, 655, to 1310) leads to a 4.97 % increase in social

[17] The corresponding regression estimates are reported in Table A4. The share of zeros in the dependent variable (zero for social connectivity, 46.6% for firm links, and 61.2% for joint patenting) is well within the range where PPML performs well (Santos Silva & Tenreyro, 2011). Note, though that observations of counties which have zero values for all eleven countries in our sample get dropped. This is because, conditional on county fixed effects, there is no variation left, which explains the differences in sample sizes (27 counties in the case of firm links, and 22 counties in the case of joint patenting).

connectivity, a 3.17 & increase in cross-border firm links, and a 6.95 % increase in joint patents.[18] Compared to Burchardi et al. (2019), who find an increase in the number of firm links by 6.5% when doubling the number of ancestors from a specific country, our estimate is about half of the magnitude, despite the short and involuntary contact in our setting.

These estimates suggest that even brief, involuntary contact between people can lead to social and economic cooperation across national borders. Importantly, the effects are not limited to one domain but appear across distinct dimensions of cooperation. Taken together, the results imply that temporary migration can foster the creation of social and economic ties.

Personal Connections or Shift in Attitudes? There are two possible explanations for our findings: One, it could be that the direct personal connections that emerged between Germans and forced migrants during WWII formed the basis of ongoing international cooperation. The alternative explanation is that the personal contact of Germans with forced migrants of a given nationality shifted the attitudes of Germans towards people of that nationality in general. This could have increased their probability of cooperating with people from that country more broadly, independent of direct personal connections. It is of course possible that both mechanisms are at play at the same time.

To possibly distinguish between the two alternative explanations, we run a supplementary analysis. Instead of using county-country variation, we exploit variation on the regional level in both Germany and the country of origin. At the moment, we focus on the Netherlands as a case study, as it has one of the highest shares of forced migrants for whom we have information about their place of birth (27.8%).[19]

We will estimate Equation 1 again, this time at the German county-Dutch municipality level. Instead of including country fixed effects, we include Dutch municipality fixed effects. Standard errors will be clustered at the German county-Dutch municipality level.

If the cooperation was directly born out of personal connections, the international cooperation of a given German county should be more pronounced with the exact places in the Netherlands where

[18] See Table A5 for results when standardizing the independent variable, which indicate that a one standard deviation increase in the ihs-transformed number of temporary migrants leads to a 24.11 % increase in social connectivity, a 14.8 % increase in cross-border firm links, and a 34.85 % increase in joint patents.

[19] Anecdotally, most former forced migrants from the Netherlands returned to their place of birth. In 1971, around 40% of conscripted men still lived in their municipality of birth (Stapper, 2024).

forced migrants came from. If we instead do not find positive effects on the county-municipality level, our main findings are more likely to be driven by shifts in attitudes of Germans towards people from the respective nationality in general.

Note that for a shift in attitudes of foreigners towards Germans to be driving our results, the foreigners would have needed to change their attitudes towards Germans from a specific county to explain our results, as we rely on county-variation on the German side.

5.2 Heterogeneity by Nature of Contact

Next, we examine whether the effects of temporary migration on cooperation depend on the context in which temporary migrants interacted with German civilians. Specifically, we explore whether variations in interaction frequency and nature, shaped by local employment structures, pre-existing cultural similarity, and wartime conditions, affected the persistence of international ties.

Sector of Employment. We first study heterogeneity by the sector of employment. Forced migrants employed in agriculture were often housed directly on farms, often sharing living quarters with German families. In contrast, those working in industry were more likely to be housed in separate facilities alongside other foreign workers, limiting their everyday interaction with the local population. This suggests that agricultural settings may have enabled more personal and intensive contact.

Panel A of Table 1 presents subsample regressions of our baseline specification separately for counties with more prevalent pre-war agricultural employment and those with a more industrial employment structure, across all three outcome measures. We find a positive and statistically significant effect of forced migration on social connectivity in counties with more dominant agricultural employment. In contrast, the corresponding estimate for more industrial counties is close to zero and not statistically significant. Notably, this heterogeneity is specific to social ties. We do not observe comparable differences between agricultural and industrial counties when examining firm links or joint patenting. Personal connections formed with Germans from more agricultural regions may have been less relevant in the creation of foreign direct investment and joint patenting activity, which is more common in the industrial sector.

Table 1: Heterogeneity in the Effect of Temporary Migration

Panel A: By Sector of Employment

	Social Connectivity			Firm Links			Joint Patents		
	Baseline	Industrial	Agricultural	Baseline	Industrial	Agricultural	Baseline	Industrial	Agricultural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Temporary Migrants	0.070**	0.015	0.086**	0.045*	0.045	0.043	0.097***	0.091***	0.095*
	(0.030)	(0.018)	(0.037)	(0.023)	(0.029)	(0.041)	(0.022)	(0.026)	(0.052)
Distance to Border	-0.661***	-0.524***	-0.739***	-0.508***	-0.423***	-0.725***	-0.344***	-0.323***	-0.390***
	(0.098)	(0.102)	(0.110)	(0.064)	(0.069)	(0.065)	(0.063)	(0.070)	(0.118)
Pre-War Cooperation	-0.029	-0.028	-0.026	-0.031	-0.021	0.085	0.319***	0.330***	0.538**
	(0.065)	(0.028)	(0.172)	(0.080)	(0.066)	(0.127)	(0.051)	(0.069)	(0.210)
Observations	5,808	2,893	2,893	5,511	2,750	2,750	5,258	2,816	2,420

Panel B: By Distance to Labor Education Camps

	Social Connectivity			Firm Links			Joint Patents		
	Baseline	Near	Far	Baseline	Near	Far	Baseline	Near	Far
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Temporary Migrants	0.070**	0.011	0.105***	0.045*	0.033	0.067**	0.097***	0.052	0.152***
	(0.030)	(0.025)	(0.034)	(0.023)	(0.022)	(0.029)	(0.022)	(0.034)	(0.036)
Distance to Border	-0.661***	-0.641***	-0.661***	-0.508***	-0.422***	-0.652***	-0.344***	-0.417***	-0.273***
	(0.098)	(0.169)	(0.093)	(0.064)	(0.075)	(0.068)	(0.063)	(0.098)	(0.084)
Pre-War Cooperation	-0.029	-0.062*	0.022	-0.031	-0.021	0.109**	0.319***	0.306***	0.325**
	(0.065)	(0.032)	(0.128)	(0.080)	(0.066)	(0.043)	(0.051)	(0.066)	(0.145)
Observations	5,808	2,904	2,904	5,511	2,783	2,728	5,258	2,739	2,519

Panel C: By Cultural Similarity

	Social Connectivity			Firm Links			Joint Patents		
	Baseline	Distant	Similar	Baseline	Distant	Similar	Baseline	Distant	Similar
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Temporary Migrants	0.070**	0.035**	0.082**	0.045*	0.034	0.058**	0.097***	0.059	0.096***
	(0.030)	(0.015)	(0.037)	(0.023)	(0.034)	(0.028)	(0.022)	(0.061)	(0.036)
Distance to Border	-0.661***	-0.203	-0.672***	-0.508***	-0.386**	-0.503***	-0.344***	-0.574***	-0.266***
	(0.098)	(0.125)	(0.093)	(0.064)	(0.152)	(0.062)	(0.063)	(0.162)	(0.029)
Pre-War Cooperation	-0.029	-0.072	-0.012	-0.031	0.086	-0.097	0.319***	0.474***	0.380***
	(0.065)	(0.054)	(0.064)	(0.080)	(0.060)	(0.091)	(0.051)	(0.149)	(0.127)
Observations	5,808	2,893	2,893	5,511	2,346	2,566	5,258	1,906	2,268

Notes: This table reports estimated coefficients from Equation 1 for three heterogeneity dimensions. Panel A stratifies by sector of employment; Panel B by distance to labor education camps; Panel C by cultural similarity between a German county and a foreign country. The groups are always split at the median. Outcomes are three measures of cross-border cooperation: the average social connectivity (Columns 1–3), the number of firm links (Columns 4–6), and the number of joint patents (Columns 7–9). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Exposure to War and Repression. We next examine whether the effects of forced migration on international cooperation depend on the severity of the conditions faced by foreign migrants during the war. Historical accounts suggest that forced migrants experienced particularly harsh conditions in areas close to so-called *labor education camps*. In these camps, migrants could be detained temporarily as punishment for disobedience. These experiences may have affected how migrants perceived their time in Germany and may have reduced the potential for forming cooperative ties.

To proxy adverse conditions, we use the distance to the nearest labor education camp, assuming proximity increased the probability for forced migrants to be sentenced to a stay in such camps. We derive the median value for this measures and split our sample into counties with above and below median values of exposure to harsh conditions.[20]

Panel B of Table 1 shows the results for counties with high and low exposure to labor education camps. We find that the positive effect of forced migration on international cooperation is weaker in counties characterized by more adverse wartime conditions for forced migrants: In areas with close proximity to labor education camps, the estimated effects on cooperation are smaller and statistically insignificant. By contrast, in counties further away from labor education camps, forced migration has positive and significant effects on cooperation outcomes. These results suggest that a more favorable experience of temporary migrants in Germany increased the probability that lasting cross-border ties emerged.

Cultural Similarity. The extent to which temporary contact translates into cooperation may depend on how similar the migrants are to the local population. We proxy cultural similarity with religious similarity, measured as the distance in religious composition between a German county and a given nationality. There are two possible mechanisms at play: First, as discussed in Section 2.3, churches were places where forced migrants and German civilians could interact during the war, increasing the frequency of contact. Second, shared religious affiliation may have facilitated trust, thereby amplifying the impact of temporary contact on later cooperation.

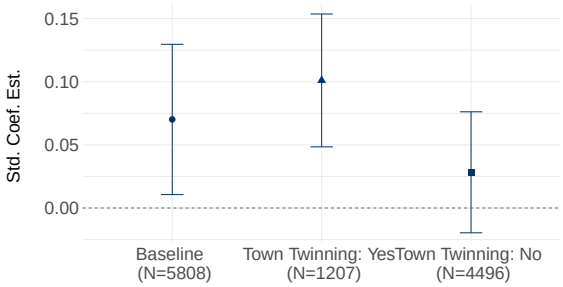
Panel C of Table 1 presents the corresponding coefficients, estimated separately for county-country pairs with above and below median religious distance. The effects are larger for migrants with higher cultural similarity. This indicates that a shared religious affiliation facilitated the

[20] Note that we assume the effect of harsh conditions to be similar across nationalities due to a lack of variation by country of origin.

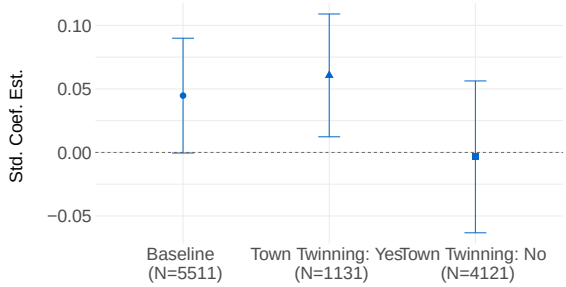
formation of cooperative ties, possibly due to more frequent contact and higher trust.

Taken together, the heterogeneity analysis indicates that closer contact, better treatment, and greater cultural similarity are all factors that increase the chances of cross-border cooperation happening as a consequence of temporary contact.

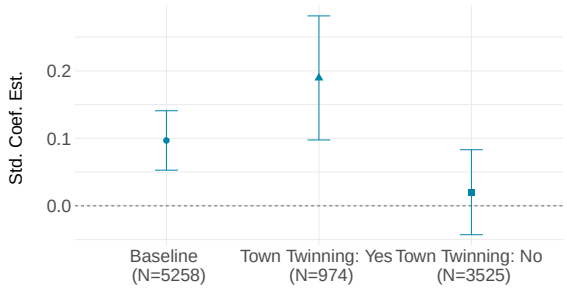
5.3 Mechanisms: Persistence of Cross-Border Ties



(a) Avg. Social Connectivity



(b) Number of Firm Links



(c) Number of Joint Patents

Figure 3: Heterogeneity in the Effect of Temporary Migration by Town Twinning Status

Notes: This figure plots estimated coefficients from Equation 1, showing the effect of temporary migration during WWII by town twinning status on three measures of cross-border cooperation: the average social connectivity (Panel a), the number of firm links (Panel b), and the number of joint patents (Panel c). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. Error bands show 95% confidence interval. Table A11 includes the corresponding regression estimates.

We have shown that temporary migration during WWII led to persistent increases in social and economic cooperation between German counties and the countries of origin of forced migrants. What explains this persistence? One possibility we investigate is that early interpersonal contact creates the foundation for formal institutional ties that continue to foster cross-border collaboration

long after the migrants have returned home. Once established, such institutions may sustain international engagement even when the individuals with initial personal connections are not the primary actors anymore.

To assess whether institutionalization helps explain long-term effects, we examine heterogeneity by town twinning status. As discussed in Section 3.3.3, town twinning is a decentralized local institution of international cooperation that is often rooted in interpersonal connections. If initial contact during the war led to the formation of town twinnings, then the institutionalization of these ties may have preserved and possibly reinforced the long-term effects of the initial contact. To test this, we first estimate the effect of forced migration on the formation of town twinning (see Table A12). We find positive and significant effects: A one standard deviation increase in the ihs-transformed number of forced migrants increases the probability of a town twinning by 3.88 %.

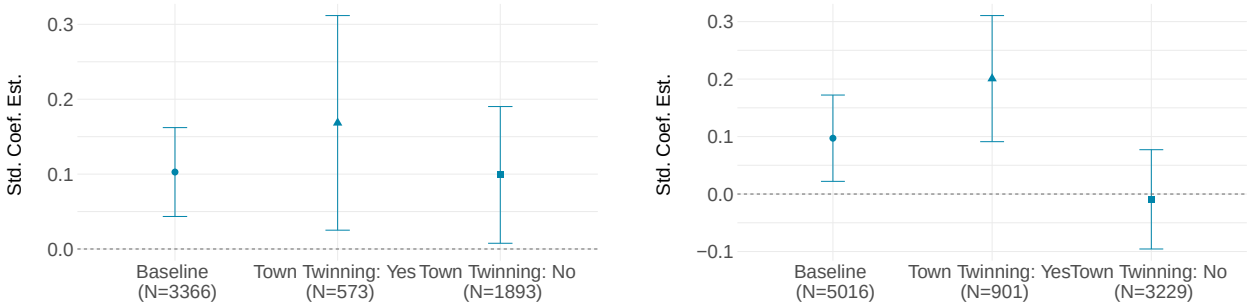
Next, we estimate the effect of forced migration separately for county-country pairs with and without town twinnings. Figure 3 presents the results. Our findings suggest that the long-term impact of temporary migration on cooperation is concentrated among county-country pairs that eventually establish town twinnings. In contrast, in pairs without such institutionalized ties, the coefficient size is closer to zero and no longer statistically significant. This pattern holds true for all three outcomes: social connectivity, firm links, and joint patenting. This suggests that local institutions played a critical role in maintaining cross-border ties over time.

Importantly, we do not observe the same heterogeneity by town twinning status for joint patenting in the early post-war period. As shown in Figure 4, the effect of forced migration on patents immediately after the war (1946–1965) appears similarly strong regardless of whether a formal partnership was eventually established. It is only for joint patenting activity in the later post-war period (1966–2013) that we see that town twinning drives the effect of temporary migration on long-term cooperation.[21]

Taken together, these findings suggest that interpersonal contact alone drives early cooperation, while institutionalization becomes critical for maintaining and reinforcing these ties over time. Town twinning appears to act as a channel through which temporary contact is translated into enduring

[21] Table A13 shows the underlying regression results. Note that observations of counties which have zero joint patenting activity with any country in our sample get dropped (166 counties for early patenting, 28 for late patenting). This is because, conditional on county fixed effects, there is no variation left, which explains the differences in sample sizes. In Table A10, we repeat the analysis with a restricted sample including only counties with at least one joint patenting link with any country in both periods.

international relationships.



(a) Number of Joint Patents Early Post-WWII

(b) Number of Joint Patents Late Post-WWII

Figure 4: Heterogeneity in the Time-varying Effect of Temporary Migration by Town Twinning Status

Notes: This figure plots estimated coefficients from Equation 1, showing the effect of temporary migration during WWII by town twinning status on the number of joint patents in the early post-war period (1946–1965) (Panel a), and the number of joint patents in the late post-war period (1966–2013) (Panel b), both standardized to have mean zero and unit standard deviation. The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. Error bands show 95% confidence interval. Table A13 includes the corresponding regression estimates.

5.4 Robustness of the Results

We conduct several robustness checks to assess the validity of our empirical strategy and the stability of our main findings.

Alternative Model Specifications. We re-estimate our main results dropping the control for pre-war cooperation in Table A8. The estimated coefficients are remarkably stable, which is additional evidence for the quasi-random distribution of forced migrants (conditional on distance and fixed effects). While the county fixed effects already control for differences in total labor demand for forced migrants, we re-estimate our main specification adding the total number of forced migrants in each county interacted with country fixed effects. This allows the total labor demand to affect nationalities differently. Additionally, we transfrom the treatment variable using a logarithm-transformation instead of the ihs-transformation. Table A9 shows the results that are robust to both specifications.

Alternative Inference Specifications. We perform robustness checks using different standard errors (see Table A4). In addition to our baseline of two-way clustered standard errors at the county-country level, we also report Conley and Kelly, 2025 standard errors using a 50 km cutoff and clustered standard errors at the county-level. Our findings remain significant in all specifications, with our baseline being the most conservative choice overall.

Alternative Variable Specifications. We perform robustness checks for choices regarding the specification of our outcome variables in Table A6: First, we re-calculate the social connectivity measure using only the population aged 15–64 as population weights as this may more closely represent the possible population using Facebook. Second, we restrict firm links to only small and medium firms. Third, we restrict joint patenting to only include inventors (excluding firms who own the patent). Across all specifications, our results are robust and significant, with very similar coefficient sizes.

Alternative Sample Specifications. To ensure that our results are not driven by certain countries, we repeat our analysis excluding one country at a time, see Figure A6.[22] The results are robust, remaining positive and mostly significant throughout.

Taken together, these robustness checks confirm that our findings are not an driven by specific model, variable, and sample choices.

6 Conclusion

This paper examines the effects of temporary migration on international cooperation. We study this in the context of forced migrants during WWII, when millions of civilians from occupied countries were deported to Germany. We exploit the quasi-random assignment of temporary migrants, which was independent of pre-existing cross-border ties or migration patterns. We estimate the impact of short-term interactions between forced migrants and German civilians on the development of cooperative relationships across borders.

[22] Especially, we want to ensure that our results are not driven by Austria as part of the *Greater German Reich*, as well as France as an occupying force, for which there may have been different connections with Germans apart from the ties with foreign migrants.

For our analysis, we combine archival data on the location and nationality of forced migrants with measures of social and economic cooperation at the county-country level. Using a gravity model, we find that counties with greater exposure to forced migrants from a given country had significantly stronger bilateral ties with that country after WWII. Specifically, we observe substantial and statistically significant increases in social connectivity, firm links, and joint patenting activity.

We also find that the effects depend on the nature of the initial contact. The positive impact of temporary migration on personal ties is stronger where contact was more frequent, treatment was less severe, and cultural differences were less pronounced. These patterns suggest that the context and quality of contact are critical in shaping international cooperation.

We further show that the persistence of these effects is closely linked to the institutionalization of early interpersonal ties. In particular, the long-run impact of forced migration on social connectivity, firm links, and joint innovation is concentrated in county–country pairs that later established town twinnings. Where no such institutional relationship exists, we find little evidence of enduring effects. This pattern suggests that while temporary contact can generate initial cross-border relationships, their durability depends on whether they are subsequently embedded in formal local institutions that promote repeated interaction and cooperation. Town twinning thus appears to have transformed short-term wartime encounters into stable and lasting international cooperation.

Our study contributes to the literature on migration and international cooperation by exploiting a setting of temporary migration with near-universal return and plausibly exogenous variation in exposure. We analyze multiple origin countries, draw on a migrant population that is not restricted to specific occupations, and measure cooperation using complementary outcomes (social connectivity, ownership links, and joint innovation), supporting external validity. Our results show that even short-lived and coercive contact can leave long-run social and economic ties. Our finding that effects are stronger under less coercive conditions suggests that our main estimates may provide a conservative benchmark relative to voluntary temporary migration.

Our findings have important implications for contemporary migration policies, as temporary mobility is widespread today: In 2023 alone, 2.4 million temporary labor migrants, 2.4 million asylum seekers, and 2.1 million international students arrived in OECD countries (OECD, 2024). Forced displacement has also been a major driver of temporary migration in Europe. For exam-

ple, the United Nations High Commissioner for Refugees (UNHCR) recorded about 6.3 million Ukrainian refugees in Europe in 2024 (UNHCR, 2025). Our study reveals three main implications for policymakers: First, in settings with (forced) temporary migration, facilitating contact between migrants and the local population can be a tool to foster subsequent social and economic cooperation. Second, building institutions that preserve and extend these initial ties, such as town-twinnings, may promote persistent international cooperation. Third, our findings suggest that programs promoting short-term cross-border contact, such as student exchanges, research visits, or volunteer initiatives, can have long-lasting effects, especially when these encounters are formalized through institutions.

Last but not least, our findings also speak to the origins of European integration, which started after a devastating war with Germany as the clear perpetrator. Personal connections and the subsequent cross-border cooperation and institutions appear to have played a critical role in laying the foundation for the post-war reconciliation and cooperation between former adversaries and laid the groundwork for what would later become the European Union.

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A Appendix

A.1 Additional Tables

A.1.1 Background

Table A1: Recruitment of Temporary Migrants by Country

Country	**Occupation**	**Recruitment process**
Austria	1936	Initial voluntary recruitment. Later mostly Jews and other political enemies.
Belgium	May 1940	Early recruitment was voluntary. From 1942 onward, all working-age individuals were required to hold employment and could be assigned to work in Germany; conscription of specific male cohorts followed in 1943.
Denmark	April 1940	Recruitment was formally voluntary and primarily targeted unemployed workers, promising favorable working conditions in Germany. In some cases, threats to cancel unemployment benefits were used.
Finland		No official recruitment, mostly as part of workers taken from formerly temporarily Russian areas.
France	June 1940	After an initial phase of voluntary recruitment, coercive measures intensified from 1942 onward, targeting unemployed workers and prisoners of war, who were exchanged for larger numbers of civilian laborers. Men from specific cohorts were also conscripted.
Greece	April 1941	Voluntary recruitment campaigns failed to generate sufficient labor inflows, leading to predominantly coercive recruitment.
Italy	1938 / July 1943	Initially characterized by voluntary migration of unemployed workers starting in 1938. Labor quotas were introduced in 1941. Following the overthrow of Mussolini in July 1943, Germany conscripted specific cohorts, conducted razzias, and deployed prisoners of war as forced labor.
Luxembourg		Were largely viewed as Germans, so recruitment mostly restricted to Jews and political enemies.
Netherlands	May 1940	Initially relied on advertising campaigns to encourage voluntary migration. Over time, coercive measures increased, including the cancellation of unemployment benefits, conscription of specific birth cohorts in 1943, and large-scale razzias, notably in Rotterdam.
Norway	April 1940	Mostly voluntarily.
Yugoslavia	April 1941	Some workers migrated voluntarily prior to occupation due to high unemployment. Recruitment became increasingly coercive, initially focusing on ethnic minorities and prisoners of war, and later extending to the general population through municipality-level quotas.

Notes: This table summarizes the recruitment processes of temporary migrants in the countries included in our sample. All information is based on Spoerer (2001, pp. 40–89).

A.1.2 Descriptive Statistics

Table A2: Descriptive Statistics of Main Variables

Variable	N	Mean	SD	Min	Max
N Temporary Migrants	5808	655	3302	0	123044
Avg. Social Connectivity	5808	780	3499	14	149686
N Firm links	5808	4.9	26	0	808
N Joint Patents (Pre-WWII)	5808	0.12	0.77	0	29
N Joint Patents (Post-WWII)	5808	1.3	7.4	0	386
N Joint Patents (Late Post-WWII)	5808	0.95	5.5	0	306
N Joint Patents (Early Post-WWII)	5808	0.37	2.7	0	103
Town Twinning (binary)	5808	0.23	0.42	0	1
Distance Country Border (km)	5808	574	432	1.9	1791

Notes: This table reports descriptive statistics at the county–country level for the main variables used in our analysis. The unit of observation is a German county × origin country pair. See Section A.3 for variable descriptions and data sources.

Table A3: Descriptive Statistics by Country of Origin of Temporary Migrants

Country	N Temporary Migrants	Avg. Social Connectivity	N Firm Links	N Joint Patents	N Town Twinnings
Austria	83618	2637	7042	2304	239
Belgium	373263	285	1243	1147	107
Denmark	38271	309	1263	221	49
Finland	2080	160	424	107	38
France	1500981	142	3875	1708	1915
Greece	33230	838	171	19	25
Italy	851387	391	3499	730	321
Luxembourg	7139	2146	4831	123	13
Netherlands	537907	462	4569	1102	130
Norway	5487	27	678	153	5
Yugoslavia	373148	1185	832	218	44

Notes: This table reports descriptive statistics by country of origin of temporary migrants during WWII. For each origin country, we show the total number of temporary migrants assigned to German counties, the average social connectivity, the number of firm links, the number of joint patents, and the number of town twinnings with German counties. See Section A.3 for variable descriptions and data sources.

A.1.3 Regression Tables

Table A4: Effect of Temporary Migration on Cross-Border Cooperation

	Social Connectivity (1)	Firm Links (2)	Joint Patents (3)
Temporary Migrants	0.070**	0.045*	0.097***
	(0.030)	(0.023)	(0.022)
	[0.017]	[0.018]	[0.012]
	{0.026}	{0.018}	{0.027}
Distance to Border	-0.661***	-0.508***	-0.344***
	(0.098)	(0.064)	(0.063)
	[0.146]	[0.072]	[0.062]
	{0.064}	{0.062}	{0.051}
Pre-War Cooperation	-0.029	-0.031	0.319***
	(0.065)	(0.080)	(0.051)
	[0.022]	[0.078]	[0.001]
	{0.072}	{0.074}	{0.079}
Observations	5,808	5,511	5,247
County fixed effects	✓	✓	✓
Country fixed effects	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on three measures of cross-border cooperation: the average social connectivity (Column 1), the number of firm links (Column 2), and the number of joint patents (Column 3). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. Standard errors are calculated as follows: ( ) two-way-level clustered (baseline), [ ] Conley and Kelly (2025) using a 50 km cutoff, { } county-level clustered. P-values are based on two-way-level clustered standard errors. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Effect of Temporary Migration on Cross-Border Cooperation: Standardized Treatment

	Social Connectivity (1)	Firm Links (2)	Joint Patents (3)
Temporary Migrants	0.216**	0.138*	0.299***
	(0.094)	(0.071)	(0.069)
Distance to Border	-0.661***	-0.508***	-0.344***
	(0.098)	(0.064)	(0.063)
Pre-War Cooperation	-0.029	-0.031	0.319***
	(0.065)	(0.080)	(0.051)
Observations	5,808	5,511	5,258
County fixed effects	✓	✓	✓
Country fixed effects	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on three measures of cross-border cooperation: the average social connectivity (Column 1), the number of firm links (Column 2), and the number of joint patents (Column 3). The independent variable is the number of temporary migrants (ihs-transformed), standardized to have mean zero and unit standard deviation. All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Effect of Temporary Migration on Cross-Border Cooperation (Robustness)

	Social Connectivity		Firm Links		Joint Patents	
	Baseline	Age 15–64	Baseline	Small and medium	Baseline	Inventors
	(1)	(2)	(3)	(4)	(5)	(6)
Temporary Migrants	0.070**	0.070**	0.045*	0.048**	0.097***	0.074**
	(0.030)	(0.030)	(0.023)	(0.023)	(0.022)	(0.030)
Distance to Border	-0.661***	-0.660***	-0.508***	-0.602***	-0.344***	-0.328***
	(0.098)	(0.098)	(0.064)	(0.064)	(0.063)	(0.051)
Pre-War Cooperation	-0.029	-0.029	-0.031	-0.006	0.319***	0.077*
	(0.065)	(0.064)	(0.080)	(0.049)	(0.051)	(0.045)
Observations	5,808	5,808	5,511	4,411	5,258	4,917
County fixed effects	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓

Notes: This table shows the estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on different specifications of the three measures of cross-border cooperation: Social connectivity calculated using the total population (Column 1) and only the population aged 15–64 (Column 2); Firm links using small, medium sized and large firms (Column 3) and only small and medium sized firms (Column 4); Number of all joint patents (Column 5), and number of joint patents from individual patentees (excluding joint patents with a firm as the patentee) only (Column 6). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Effect of Temporary Migration on pre-WWII characteristics

	Pre-WWII Patents	Cultural similarity
	(1)	(2)
Temporary Migrants	0.006	0.005
	(0.040)	(0.018)
Distance to Border	-0.270***	0.389***
	(0.099)	(0.130)
Observations	2,255	5,786
County fixed effects	✓	✓
Country fixed effects	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on two measures of pre-war connectivity: The number of joint patents (Column 1) and the religious distance (Column 2). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Effect of Temporary Migration on Cross-Border Cooperation Without Pre-Cooperation Control

	Social Connectivity		Firm Links		Joint Patents	
	Baseline	No Pre-War Coop.	Baseline	No Pre-War Coop.	Baseline	No Pre-War Coop.
	(1)	(2)	(3)	(4)	(5)	(6)
Temporary Migrants	0.070**	0.070**	0.045*	0.046**	0.097***	0.087***
	(0.030)	(0.031)	(0.023)	(0.023)	(0.022)	(0.026)
Distance to Border	-0.661***	-0.660***	-0.508***	-0.504***	-0.344***	-0.381***
	(0.098)	(0.098)	(0.064)	(0.070)	(0.063)	(0.082)
Pre-War Cooperation	-0.029		-0.031		0.319***	
	(0.065)		(0.080)		(0.051)	
Observations	5,808	5,808	5,511	5,511	5,258	5,258
County fixed effects	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on three measures of cross-border cooperation: the average social connectivity (Column 1), the number of firm links (Column 2), and the number of joint patents (Column 3). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, as well as the log-distance between the German county and the country of origin (in km). Columns (2), (4) and (6) additionally control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Effect of Temporary Migration on Cross-Border Cooperation (Robustness)

	Social Connectivity			Firm Links			Joint Patents		
	Baseline	Total Migr.	Log(+1)	Baseline	Total Migr.	Log(+1)	Baseline	Total Migr.	Log(+1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Temporary Migrants	0.070**	0.068**		0.045*	0.038**		0.097***	0.098***	
	(0.030)	(0.030)		(0.023)	(0.019)		(0.022)	(0.022)	
Log(Temp. Migr. +1)			0.077**			0.039*			0.105***
			(0.034)			(0.022)			(0.026)
Distance to Border	-0.661***	-0.662***	-0.661***	-0.508***	-0.583***	-0.516***	-0.344***	-0.348***	-0.343***
	(0.098)	(0.098)	(0.098)	(0.064)	(0.057)	(0.063)	(0.063)	(0.068)	(0.063)
Pre-War Cooperation	-0.029	-0.009	-0.030	-0.031	0.079**	-0.032	0.319***	0.345***	0.321***
	(0.065)	(0.067)	(0.065)	(0.080)	(0.035)	(0.081)	(0.051)	(0.081)	(0.052)
Observations	5,808	5,808	5,808	5,511	5,511	5,511	5,258	5,258	5,258
County fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE x Total Temp. Migr.			✓			✓			✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on on three measures of cross-border cooperation: the average social connectivity (Columns 1–3), the number of firm links (Columns 4–6), and the number of joint patents (Columns 7–9). The independent variable is the number of temporary migrants (ihs-transformed) in Columns (1), (3), (4), (6), (7), and (9). In Columns (2), (5) and (6), the independent variable is the logarithm of the number of temporary migrants plus one.All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). Columns (3), (5) and (7) additionally control for the total number of temporary migrants in a German county, interacted with country fixed effects. See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: Time-varying Effect of Temporary Migration on Joint Patents

	Unbalanced Sample			Balanced Sample		
	Baseline	Early Post-WWII	Late Post-WWII	Baseline	Early Post-WWII	Late Post-WWII
	(1)	(2)	(3)	(4)	(5)	(6)
Temporary Migrants	0.097***	0.103***	0.097**	0.098***	0.104***	0.098**
	(0.022)	(0.030)	(0.038)	(0.022)	(0.031)	(0.040)
Distance to Border	-0.344***	-0.301***	-0.360***	-0.337***	-0.297***	-0.357***
	(0.063)	(0.084)	(0.068)	(0.070)	(0.084)	(0.078)
Pre-War Cooperation	0.319***	0.593***	0.209***	0.322***	0.597***	0.211***
	(0.051)	(0.117)	(0.060)	(0.057)	(0.117)	(0.067)
Observations	5,258	3,366	5,016	3,124	3,124	3,124
County fixed effects	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on the total number of joint patents after WWII (Columns 1 and 4), on the number of joint patents in the early post-war period (1946–1965) (Columns 2 and 5), and the number of joint patents in the late post-war period (1966–2013) (Columns 3 and 6). Columns (4) through (6) use the restricted sample of counties which have at least one patent with at least one country in either period. The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A11: Heterogeneity in the Effect of Temporary Migration by Town Twinning Status

	Social Connectivity			Firm Links			Joint Patents		
	Baseline	Town Twinning		Baseline	Town Twinning		Baseline	Town Twinning	
		Yes	No		Yes	No		Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Temporary Migrants	0.070**	0.101***	0.028	0.045*	0.061**	-0.003	0.097***	0.190***	0.020
	(0.030)	(0.027)	(0.024)	(0.023)	(0.025)	(0.030)	(0.022)	(0.047)	(0.032)
Distance to Border	-0.661***	-0.394***	-0.731***	-0.508***	-0.505***	-0.520***	-0.344***	-0.167*	-0.439***
	(0.098)	(0.042)	(0.116)	(0.064)	(0.057)	(0.091)	(0.063)	(0.101)	(0.103)
Pre-War Cooperation	-0.029	-0.120*	-0.021	-0.031	0.069	-0.079	0.319***	0.366***	0.321***
	(0.065)	(0.066)	(0.095)	(0.080)	(0.059)	(0.106)	(0.051)	(0.107)	(0.071)
Observations	5,808	1,207	4,496	5,511	1,131	4,121	5,258	974	3,525
County fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII by town twinning status on three measures of cross-border cooperation: the average social connectivity (Columns 1–3), the number of firm links (Columns 4–6), and the number of joint patents (Columns 7–9). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A12: Effect of Temporary Migration on Town Twinning

	Town Twinning	
	Baseline	Formal
	(1)	(2)
Temporary Migrants	0.055**	0.058**
	(0.025)	(0.028)
Distance to Border	-0.488***	-0.462***
	(0.133)	(0.137)
Pre-War Cooperation	-0.110	-0.103
	(0.102)	(0.101)
Observations	5,654	5,577
County fixed effects	✓	✓
Country fixed effects	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on any form of town twinning in Column (1) and only formal town twinning in Column (2) (both measured as a dummy). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A13: Heterogeneity in the Time-varying Effect of Temporary Migration by Town Twinning Status

	Joint Patents: Early Post-WWII			Joint Patents: Late Post-WWII		
	Baseline	Town Twinning		Baseline	Town Twinning	
		Yes	No		Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Temporary Migrants	0.103***	0.168**	0.099**	0.097**	0.201***	-0.009
	(0.030)	(0.073)	(0.047)	(0.038)	(0.056)	(0.044)
Distance to Border	-0.301***	-0.117	-0.374**	-0.360***	-0.194***	-0.470***
	(0.084)	(0.182)	(0.148)	(0.068)	(0.072)	(0.103)
Pre-War Cooperation	0.593***	0.614**	0.595***	0.209***	0.278***	0.201***
	(0.117)	(0.243)	(0.140)	(0.060)	(0.071)	(0.047)
Observations	3,366	573	1,893	5,016	901	3,229
County fixed effects	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓

Notes: This table shows estimated coefficients from Equation 1, showing the effect of temporary migration during WWII by town twinning status on the number of joint patents in the early post-war period (1946–1965) (Columns 1–3), and the number of joint patents in the late post-war period (1966–2013) (Columns 4–6). The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A.2 Additional Figures

A.2.1 Historical Background

(a) *Source:* Stichting Holländerei et al. (1996)

(b) *Source:* NIOD Institute for War, Holocaust and Genocide Studies (2026)

Figure A1: Illustration of Recruitment Process in the Netherlands

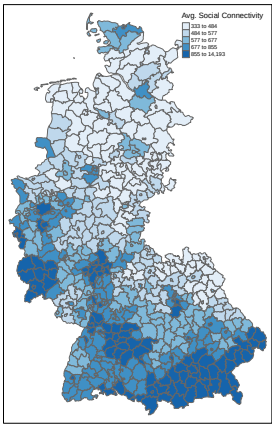
Notes: These two posters illustrate the evolution of the recruitment process in the Netherlands. The left panel shows an early voluntary labor recruitment campaign, while the right panel reflects later coercive practices, including the conscription of specific cohorts.

A.2.2 Maps

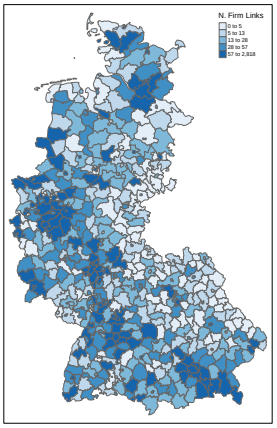
A.2.3 Descriptives

Figure A2: Distribution of Temporary Migrants over German Counties during WWII by Country of Origin

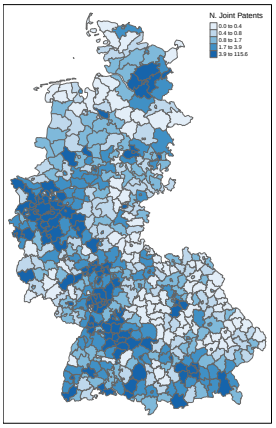
Notes: These maps shows the distribution of temporary migrants over German counties during WWII by country of origin. See Section A.3 for variable descriptions and data sources.



(a) Avg. Social Connectivity



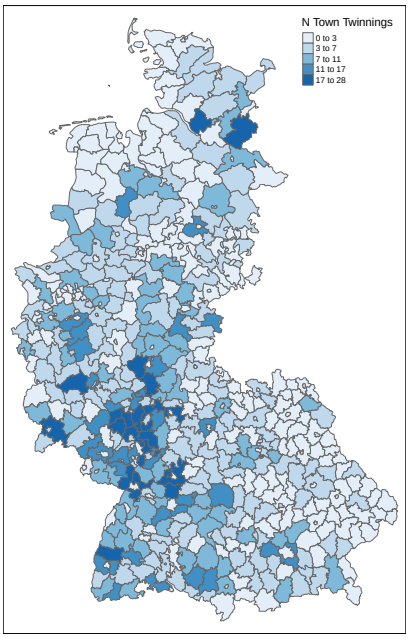
(b) Number of Firm Links



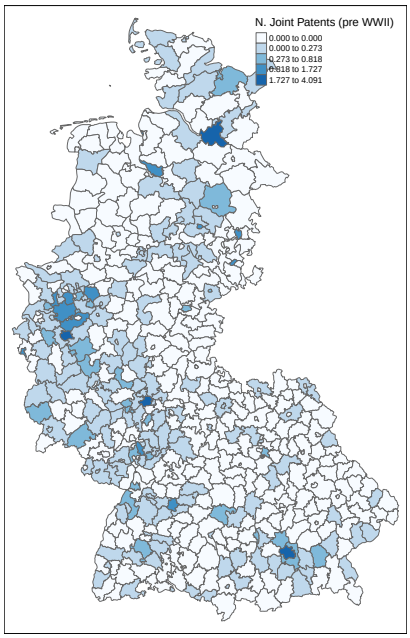
(c) Number of Joint Patents

Figure A3: Cross-Border Cooperation Between German Counties and Countries of Origin

Notes: These maps show the number of cross-border cooperation between German counties and the countries of origin of forced migrants, measured in three distinct ways: the number of Facebook friendship ties in Panel (a), the number of firm links in Panel (b), and the number of joint patents in Panel (c). See Section A.3 for variable descriptions and data sources.



(a) Town Twinnings



(b) Pre-War Cooperation

Figure A4: Geographic Distribution of Town Twinnings and Pre-War Cooperation

Notes: Panel a shows the total number of town twinnings between German counties and the countries of origin of temporary migrants in our sample. Panel b shows the number of joint patents filed between 1877—1938 by inventors in German counties and inventors in the same set of origin countries. See Section A.3 for variable descriptions and data sources.

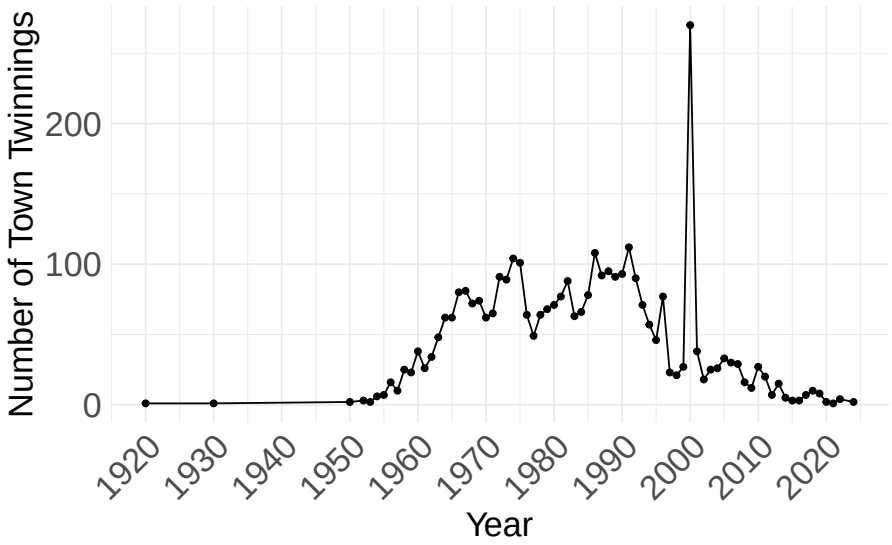
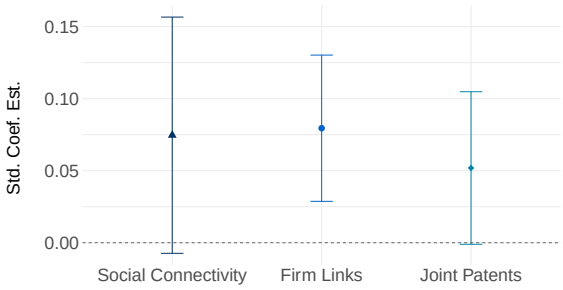


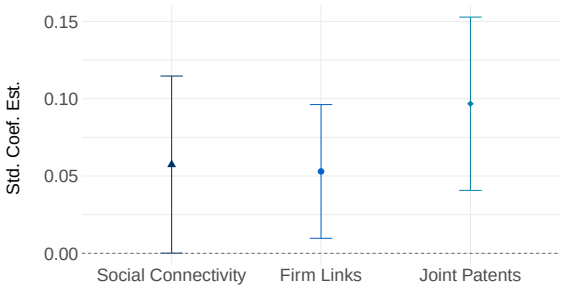
Figure A5: Establishment of New Town Twinnings Over Time

Notes: The figure shows the number of new town twinnings formed between German municipalities and foreign partners in each year. See Section A.3 for data sources.

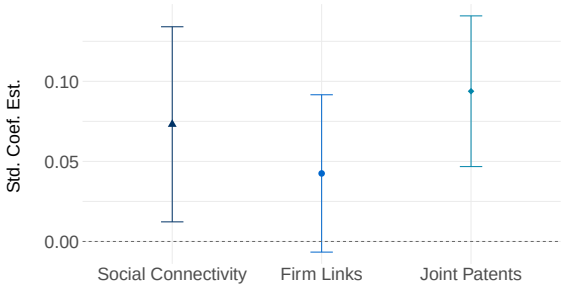
A.2.4 Coefficient Plots



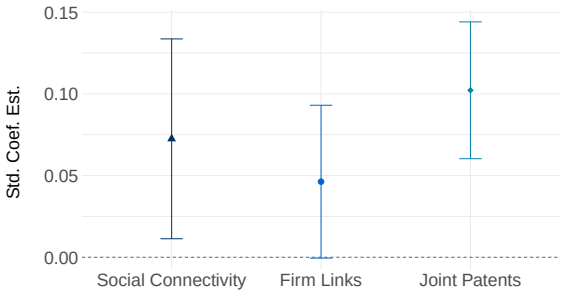
(a) Excluding Austria



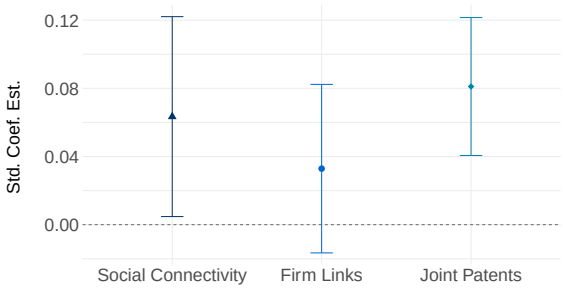
(b) Excluding Belgium



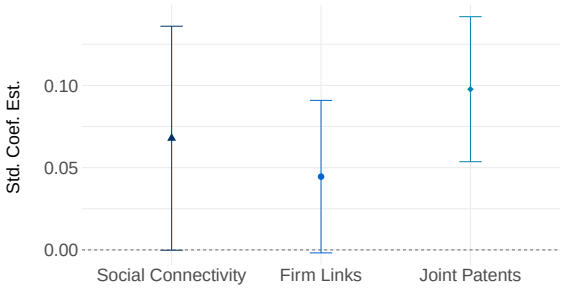
(c) Excluding Denmark



(d) Excluding Finland



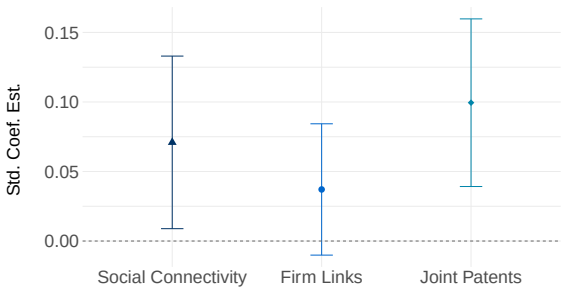
(e) Excluding France



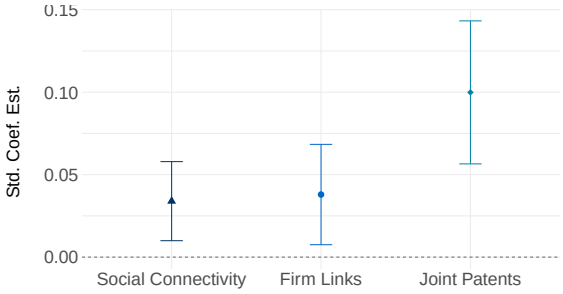
(f) Excluding Greece

Figure A6: Robustness: Excluding One Country at a Time (Part 1)

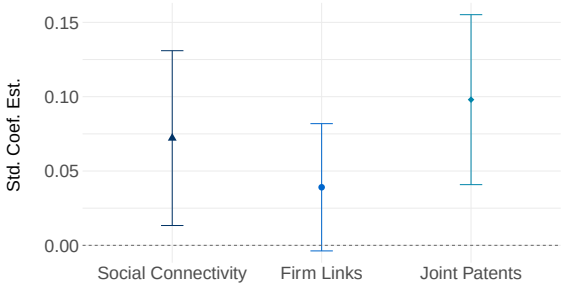
Notes: This figure plots estimated coefficients from Equation 1, showing the effect of temporary migration during WWII on three measures of cross-border cooperation: the average social connectivity (left), the number of firm links (center), and the number of joint patents (right), dropping one country at a time from the sample. The independent variable is the number of temporary migrants (ihs-transformed). All regressions include German county and country fixed effects, and control for pre-WWII cooperative ties, measured by the number of pre-war joint patents (ihs), as well as the log-distance between the German county and the country of origin (in km). See Section A.3 for variable definitions and data sources. We use two-way clustered standard errors at the county-country level. Error bands show 95% confidence interval.



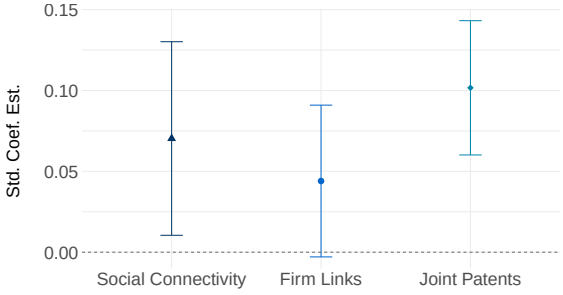
(g) Excluding Italy



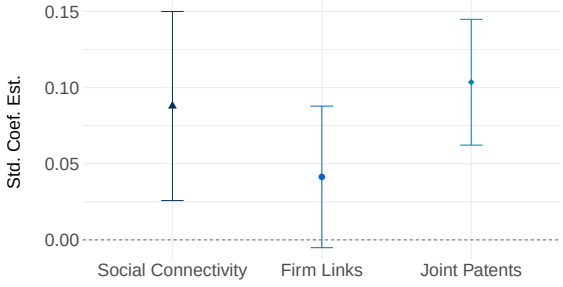
(h) Excluding Luxembourg



(i) Excluding Netherlands



(j) Excluding Norway



(k) Excluding Yugoslavia

Figure A6 continued: Robustness: Excluding One Country at a Time (Part 2)

A.3 List of Variables and Data Sources

A.3.1 Treatment

Temporary Migrants: The number of forced migrants from origin country (Belgium, Denmark, France, Greece, Italy, the Netherlands, Norway, Yugoslavia, Austria, Luxembourg, and Finland) in a German county during WWII. Constructed by aggregating individual-level records from the Arolsen Archives to the county-country level. Source: Arolsen Archives (2024).

A.3.2 Outcome

Social Connectivity:

Intensity of Facebook friendship links between residents of a German county and residents of a foreign country, based on Meta's Social Connectedness Index (SCI) data (2023) (Bailey et al., 2018; Facebook, 2025). The SCI is defined as

$$\text{SCI}_{ij} = \frac{\text{FacebookFriends}_{ij}}{\text{FacebookUsers}_i \times \text{FacebookUsers}_j}, \tag{2}$$

i.e., the number of Facebook friendships between locations i and j relative to the number of potential connections (Bailey et al., 2018). The raw data are available at the NUTS3 level. We aggregate the SCI to the county-country level following Bailey et al. (2021). Specifically, we use population weights because counts of Facebook users are not available for each NUTS3 region. In a robustness check, we use the population aged 15–64 instead of total population. Population data are from Eurostat (2025).

Firm Links: The number of direct cross-border firm links between German entities and foreign entities, aggregated to the county–country level. Based on corporate ownership data from the Bureau van Dijk Orbis database, retrieved July 3, 2024. Source: Bureau van Dijk (2024).

Joint Patents: The number of patents co-authored by inventors in German counties and inventors in foreign countries between 1946–2013, based on patentee-level data. The variable is constructed by aggregating data to the county–country level. Source: Bergeaud and Verluise (2024).

A.3.3 Controls

Distance to Border: The logarithm of the great-circle distance (in km) between the centroid of German county i and the nearest border of origin country j, calculated using geospatial shapefiles from Bundesamt für Kartographie und Geodäsie (2009) and Max Planck Institute for Demographic Research and Chair for Geodesy and Geoinformatics, University of Rostock (2011).

Pre-War Cooperation: The number of patents co-authored by patentees located in a German county and patentees in a foreign country before WWII, constructed by aggregating patentee-level

patent data to the county–country level. Patents are drawn from the database by Bergeaud and Verluise (2024) and restricted to applications filed between 1877 and 1938.

A.3.4 Heterogeneity

Sector of Employment: A binary indicator for whether the prewar economy of a county was predominantly agricultural or industrial. Based on historical employment statistics by sector from the 1939 occupational census, taken from Braun and Franke (2021). We calculate the ratio of industrial employment relative to agricultural employment. We then classify counties with a ratio above the national median as "industrial" and the remainder as "agricultural".

Wartime Conditions: We capture variation in hardship during the temporary migration period using proximity to labor education camps. The variable is calculated as the inverse distance from a county centroid to the nearest labor education camp (*Arbeitserziehungslager*), based on historical records of camp locations from Lofti (2000). We then classify counties with a distance below the national median as "near" and the remainder as "far" from a labor education camp.

Cultural Similarity:

Measured as the distance in religious composition between German county i and origin country j. Following Braun and Dwenger (2020), we compute the Euclidean distance between the shares of religious groups k in county i and country j:

$$\text{ReligiousDistance}_{ij} = \sqrt{\sum_{k} \left(\text{share}_{ik} - \text{share}_{jk}\right)^2}, \tag{3}$$

with $k \in \{\text{Catholic}, \text{Protestant}\}$. Smaller values indicate greater cultural similarity. The religious composition of German counties is taken from Braun and Dwenger (2020) (based on the 1939 census). The religious composition of origin countries is taken from Maoz and Henderson (2019) and measured in 1945 for all countries except Austria and the Netherlands, which are measured in 1955. We then classify counties with a value above the median as "distant" and the remainder as "similar".

A.3.5 Mechanism

Town Twinning: A binary variable indicating the presence of town twinnings between a German county and a foreign country. Source: RGRE (2024).