
Building Socialism on Abandoned Land: The Social Impact of Collectivization in Poland *

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Abstract

This paper examines how socialist institutions persistently shaped culture and identity, thereby leaving a lasting impact on civil society and political preferences. To identify the influence of socialist institutions, I utilize the uneven rollout of agricultural collectivization in Poland, the only Central and Eastern European country that was only partially collectivized. I utilize two historical policy shocks that strengthened state control over land to varying degrees in instrumental-variable and regression-discontinuity designs: Land expropriated during the 1944 land reform, and land abandoned after the deportation of ethnic and religious minorities in the 1940s. Both policies are strong predictors of collectivization, while showing no correlation with relevant pre-collectivization characteristics. For the analysis, I constructed a novel dataset combining data sources from over 100 years of Polish history. I demonstrate that historical collectivization is associated with stronger formal civil society and greater state dependency. I propose that the historical presence of social institutions and residential densification that accompanied collectivization are important drivers of these relationships and their persistence. This paper provides evidence that collective institutions generated organizational capacities and a state-oriented, hierarchical culture.

Keywords: collectivization, civil society, institutions, land reform, deportations, Poland

JEL Codes: N94, N34, P32, O43, Q15, Z13

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1. INTRODUCTION

Civil societies around the world display a significant heterogeneity in their organization. While civil society can overarchingly be defined as the intermediate sphere between the family and the state (Chambers & Kopstein, 2008), some societies are shaped more by trust and engagement with the state, while others are organized more from the bottom up based on informal networks. One important factor that can explain these differences is the experience of and exposure to institutions. Through these institutions, political and economic regimes cannot only influence the allocation of resources but also shape how people interact, organize, cooperate, and engage with the state. Moreover, the preferences and norms shaped by institutions can persist over time and influence social and economic development, even when these institutions cease to exist.

Socialism was a regime with comprehensive economic and social institutions. While we know that many of the socialist institutions were economically inefficient (Markevich & Vonyó, 2020), the “socialist experiment” is regarded as one of the most far-reaching economic and societal transformations of the 20th century (Pop-Eleches & Tucker, 2017). More specifically, socialist institutions restructured societies, controlled nearly all spheres of life, changed culture and identity, and thus shaped preferences and norms. However, we still lack an understanding of their long-term influence on civil society. This is problematic because strong civil society is widely seen as a fundament for market economics and resilient democracies (Putnam 1993; Guiso et al., 2004).

The aim of this paper is to examine the long-term impact of collectivized agriculture under socialism on contemporary Polish civil society. Collectivization was the most important socialist institution in the rural sphere, as it organized agricultural production and provided institutions for social, political, and private life. This makes collectivization a valuable case for studying the impact of socialism on contemporary society. Moreover, Poland constitutes a unique case, as it was the only Central and Eastern European socialist country that was solely partially collectivized. More specifically, only about 19% of the total land area of Poland was managed by state-owned agricultural enterprises in the 1980s (Bład, 2022), which provides valuable spatial variation.

To address the research aim, this paper exploits the uneven roll-out of collectivization by employing two identification strategies. Both strategies build on the idea that less fragmented smallholder agriculture were particularly well suited for collectivization, as the state had easier access to land there as well as lower implementation costs.

The first identification strategy is based on the 1944 land reform, during which the early communist government of Poland expropriated large landowners. A unique dataset of estate-

level expropriations with specified land use is employed to calculate a specific measure of expropriated land suitable for collectivization. While this measure strongly predicts the presence of collectivization in the 1970s and 1980s, it is orthogonal to measures of political preferences, demographic and economic characteristics, as well as collective movements in the interwar period. To nevertheless account for a potential direct effect of the land reform measure on civil society, the study applies the Conley et al. (2012) method. Additionally, this study reports weak-instrument confidence intervals and effective F-statistics (Andrews et al., 2019; Olea & Pflueger, 2013).

The second identification strategy is complementary in logic to the first one, yet historically independent. Between 1944 and 1947, the Polish government deported approximately 700,000 members of ethnic and religious minorities from the south-eastern regions of contemporary Poland in order to prevent further conflict. The study uses interwar census data to reconstruct these ethnic settlement patterns and to construct a border that separates the region into territories with significant minorities. It shows that this border strongly predicts collectivization while it is not associated with any interwar discontinuities. This discontinuity in collectivization is used to identify treatment effects in a fuzzy regression discontinuity design (Guzi et al., 2021; Testa, 2021).

While the north-eastern parts of Poland were more affected by collectivization, they also experienced border changes, large-scale population movements, and the resettlement of Poles from the former eastern territories, making clear identification difficult. In contrast, the south-eastern parts of contemporary Poland, while showing significant variation in collectivization, were not affected by confounding development. Therefore, the paper focuses its analysis on four regions (voivodeships) in southeastern Poland.

The paper builds a comprehensive, novel database using census data, statistical yearbooks, and registers, spanning over 100 years of Polish history. To link historical to modern municipalities, it introduces a crosswalk that allows linking interwar and contemporary boundaries for the first time.

The approach of this study is to conceptualize civil society as consisting of two spheres: a formal sphere that centers around institutionalized and state-organized bodies, and an informal one that is based more on interpersonal relationships and personal networks. Formal civil society can be rooted in hierarchical and state-organized institutions that encourage reliance on structure, as well as rule-based, collective solutions, and generate state dependency. A positive relationship between collectivization and formal civil society could reflect a legacy of institutional reliance, hierarchical social organization, and state-centered problem-solving. To quantify this sphere, the paper constructed a set of indicators, including local organization density, the proportion of cooperatives within the local economy, and measures of trade union

presence.

The findings of the empirical analysis confirm a consistent positive relationship between the historical strength of collectivization and contemporary formal civil society. In the IV regressions, an increase of one standard deviation in collectivized land is associated with an increase of 11.9% in the number of associations and foundations per 10,000 inhabitants.¹ Using survey and election data further shows that collectivization is associated with an increase in institutional trust and left-leaning political preferences. This confirms that collectivization generated persistent state-oriented preferences and norms.

Moreover, the study measures the informal sphere of civil society using a unique dataset of tax donations to NGOs and survey measures of network size, community involvement, and social integration. The findings of this analysis show no systematic relationship between collectivization and those measures.

The robustness of the findings is proven by study extensive evidence. This study uses alternative measures of collectivization, conducts a regression analysis with expanded arrays of historical and contemporary control variables, and employs spatial econometric models to avoid common problems of spatial autocorrelation (Conley & Kelly, 2025). Also, it runs different RDD specifications, uses a variety of instrument definitions, and conducts a thorough outlier and subsample analysis. Furthermore, the study shows that the results are unlikely to be driven by unobservables (Oster, 2019). A decomposition of collectivization into two components – one explained by the land reform and one by the deportations – shows that collectivization, rather than the means through which it was created, drives the results. Using election results going back to 1991, this study shows that the political effects were already visible before widespread privatization. Finally, it replicates a simpler version of the baseline analysis using all Polish municipalities which shows that the results are not specific to the southeastern regions of Poland.

Identifying the specific mechanisms underlying the observed results has proven to be a challenge, as collectivization fundamentally transformed rural social and institutional life by altering all forms of political, economic, and social relations, thus constituting a bundled treatment. This study, however, attempts to provide evidence on two key features. First, it shows that collectivization is associated with a higher density of social institutions during socialism. Exposure to these institutions could be an important contributor to the individual experience and attitudes towards state-organized civil society. Second, the study provides evidence that collectivization is associated with increased residential densification, resulting in more clustered locations with more agglomerated buildings. This residential densification

¹Effects based on a 3.796 unit increase in the number of associations and foundations per 10,000 inhabitants in the 2SLS regressions, given a mean of 32.046. See Table 2.

could have led to stronger neighbor exposure and social cohesion. The study conducts a mediation analysis and shows that both of these mechanisms are important mediators. More specifically, residential densification alone can account for almost 40% of the increase in the density of associations and foundations.

Furthermore, the paper discusses selective resettlement and population turnover as alternative potential mechanisms. Reconstructing population trajectories and archival evidence, however, show that those factors unlikely drive the results. The paper provides tentative evidence that most settlers came from nearby areas and that population trends between collectivized and non-collectivized regions do not show strong divergence. Finally, the paper provides evidence that the transition shock in the 1990s, measured by unemployment and emigration, does not drive the results either.

This paper contributes to the literature in three main ways. First, this paper contributes to the literature on the impact of institutions on social and political preferences by providing evidence that collectivized agriculture during socialism generated persistent forms of formal civil society, state dependency, and left-leaning political preferences. This paper thereby contributes to the literature on the persistent impact of institutions (Acemoglu et al., 2005). More specifically, it contributes to the literature that shows that exposure to socialist institutions can shape preferences for redistribution, markets, and democracy (Alesina & Fuchs-Schündeln, 2007; Fuchs-Schündeln & Schündeln, 2020; Kim et al., 2017), and influence human capital, gender norms, and trust (Campa & Serafinelli, 2019; Fuchs-Schündeln & Masella, 2016; Lichter et al., 2021; Lippmann & Senik, 2018; Nikolova & Popova, 2024). This paper adds the structure of formal civil society as an important, persistent outcome that can shape how people interact, trust the state, and behave politically. Therewith, it also complements findings on potential disruptive effects of authoritarian policies, such as forced migration or state repression (Guzi et al., 2021; Lichter et al., 2021; Mikula et al., 2023; Nikolova & Popova, 2024).

Second, this paper contributes to the literature on the origins of civil society and culture by showing that institutions implemented by political regimes can fundamentally reshape culture and norms. This paper thereby adds to the literature on the deep-rooted origins of culture (Buggle, 2020) and more specifically to the literature on the institutional foundations of culture (Becker et al., 2016; Bisin & Verdier, 2023; Bisin et al., 2024). It also expands the literature of cooperatives as drivers of social capital and social norms (Beltrán Tapia, 2012; Sabatini et al., 2014) by studying this relationship in a non-democratic setting.

Third, this paper contributes to the recent rise of literature on the economic history (Becker et al., 2020; Bukowski, 2019; Grosfeld & Zhuravskaya, 2015) and historical political economy of Poland (Charnysh et al., 2023) using disaggregated spatial data by providing detailed

economic, political, and demographic datasets from the interwar and socialist Poland and by building the first municipality crosswalk for interwar and contemporary municipalities.

Beyond its academic relevance, this paper links to contemporary debates in Poland on the lived experience and legacy of collectivization, which are rooted in conflicting historical memories and, therefore, remain deeply contested.²

The remainder of this paper is structured as follows: Section 2 provides the historical background. Section 3 proposes a dual civic framework to understand the specifics of civil society in Poland. Section 4 introduces the data and crosswalk methodology. Section 5 outlines the empirical strategies and presents the results and robustness checks. Section 6 discusses the proposed main mechanisms and alternative explanations. The paper concludes with Section 7.

2. HISTORICAL BACKGROUND

After World War II, the Polish People's Republic was established as an independent communist state but under close oversight of Moscow. The country quickly followed the Soviet example and began economic and political reforms. One of the largest transformations of the countryside was the early land reforms and the collectivization of agriculture. Those were often the primary tools for transforming rural society and building socialism in the countryside (Iordachi & Bauerkämper, 2014). Here, Poland diverged from its neighboring countries, as it never experienced large-scale collectivization of agriculture like other Soviet-bloc countries. Only a small portion of its agricultural sector was collectivized, making Poland an outlier within the soviet bloc (Iordachi & Bauerkämper, 2014).

Two important conditions shaped the success and the spatial distribution of collectivization: the 1944 land reform and population transfers. During the 1944 land reform, the government expropriated large landowners, redistributed land to individual farmers, and created state farms. World War II in Poland resulted in large population movements. In the north-west of contemporary Poland, the so-called “recovered territories”, the German population was expelled, and Poles from the east were settled (Becker et al., 2020; Charnysh, 2019). At the same time, the non-Polish population, consisting of Ukrainians, Lemkos, Boikos, and other ethnic and religious minorities, was deported from the south-eastern Parts of Poland (Lehmann, 2009).³ In the Recovered Territories, the depopulated regions were well suited

²Recent newspaper coverage illustrates this tension, for example: I miss you, PGR! It was one big family. We lived in symbiosis (Naszkowska, 2019), and They worked together, played together, drank together (Poraczala, 2015). This nostalgia is also evident in interviews provided by Panek (2024): [S]he liked the communist era because people stuck together. They would gather by the pond, sing, and dance to the sound of the accordion and violin. The children went to summer camps, there was work, and everyone had enough to eat.

³Lehmann (2009) refers to those groups as Ukrainians and as a “national minority”, since this was the term

to large-scale state farming (Gwiaździńska-Goraj et al., 2025). Similarly, the deportation in south-east facilitated extensive state intervention through the creation of state farms, infrastructure, and institutions, and resulted in low resettlement among Poles (Affek, 2011, 2015). These policies were part of a broader socialist social engineering inspired by high-modernist planning ideals (Lehmann, 2009; Scott, 1998). Both policies, therefore, generated abandoned land with favorable conditions for institutional experimentation and the establishment of collective farms (Błąd, 2021; Gwiaździńska-Goraj et al., 2025).

In 1948, a Komintern resolution mandated that all Soviet bloc countries had to adopt the Soviet model of agricultural organization. From this point, agriculture in Poland should be based on agricultural production cooperatives and state agricultural farms. In the early phase, the government used a combination of persuasion and coercion to achieve those goals (Jarosz, 2014; Kozerska & Stec, 2018). After the death of Stalin and the start of reforms in Poland in the 1950s, the system shifted from coercion to incentives (Jarosz, 2014). In 1956, First Secretary Władysław Gomułka declared that collectivization would be voluntary and that cooperatives should be self-governing (Kaliński, 1988). Collective farms collapsed rapidly, and only 17% were still operating in 1957 (Błąd, 2021). Those declines, however, were less severe in regions with favorable conditions for collectivization, such as south-eastern Poland. Regions such as Kraków, Lublin, Kielce, and Rzeszów experienced only a decline to 28%, 33%, 51%, and 23% of previous levels, respectively (Kaliński, 1988). Despite abandoning overt coercion, the regime did not abandon socialist agriculture. Instead, it increasingly promoted state employment in agriculture as an alternative to individual farming, aiming to transform rural agricultural workers into industrial-style wage laborers (Nagengast, 1982).

Poland (along with Yugoslavia) uniquely resisted large-scale collectivization, but where it was successful, it was not evenly distributed. As discussed, success was more likely in areas where the land ownership was not compartmentalized. Large parts of the rural populations feared bureaucratic control, inequality, and loss of traditional autonomy (Jarosz, 2014). The high level of rural social organization and political engagement in Poland often made it impossible for the regime to mobilize class conflict in the countryside (Pienkos, 1973). Many rural residents, however, found wage labor on state farms more attractive than the traditional agricultural life (Szpak, 2025). Stable wages, housing, welfare benefits, and opportunities for social advancement attracted many younger people (Gwiaździńska-Goraj et al., 2025; Panek, 2024).

Socialized agriculture in Poland consisted of state farms, cooperatives, and additional institutions, such as agricultural rings. At the end of the communist era in the 1980s, state

the communist leaders at that time did (mniejszość narodowa). This refers to their legal status, independent of their language, religion, or ethnicity.

agricultural enterprises managed around 19% of the total agricultural area of Poland (Błąd, 2022). To measure the full range of socialist agricultural institutions, I treat collectivization as land belonging to state farms and cooperatives combined.

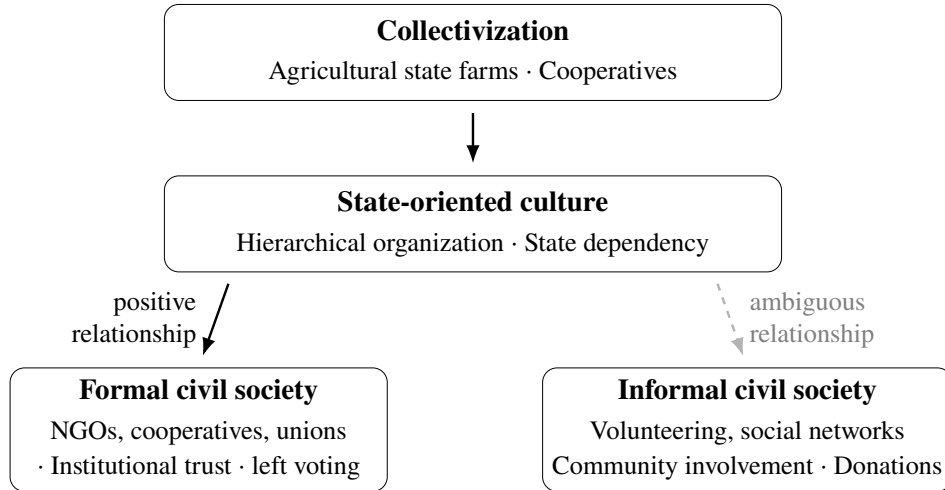
State farms were comprehensive institutions that organized agricultural production but also shaped the everyday life of their employees, their families, and their neighbors. They offered employment, housing, childcare, healthcare, transport infrastructure, and opportunities for cultural activities (Błąd, 2022; Niedzielski, 2017). Over time, they often evolved into monofunctional settlements. Through their comprehensive provision of benefits, they often created dependencies and shaped political life through embedded paternalism and hierarchies (Biegańska et al., 2019; Marks-Bielska & Opalach, 2020). State farm workers had an ambiguous stance between rural peasants and urban industrial workers. Outside their own environment, however, they were often stigmatized and associated with the dysfunctional class of the “homo sovieticus” (Maniak, 2024; Szpak, 2025). At the same time, they were often the only institutions responsible for rural social development (Niedzielski, 2017), providing, for example, infrastructure for local community events, such as harvest and cultural festivals (Buchowski, 2003; Chloupkova et al., 2003). Therewith, those places often became centers of social life where members of surrounding villages also participated (Wylegała, 2023). They could also serve as sites for unintended inclusion, by integrating people with disabilities into stable employment and social roles (Jabłoński, 2025).

After 1989, collective agriculture became a main target of the transition. In the early 1990s, all state farms, covering approximately 3.75 million hectares, were liquidated and privatized or leased (Błąd, 2022; Niedzielski, 2017). Together with agricultural production, the embedded welfare, social, and institutional systems were often abandoned. Many of those settlements experienced unemployment, poverty, and social marginalization (Biegańska et al., 2019; Błąd, 2022). Those areas were also characterized by increased outmigration and a shift in gender balances. Further, areas with collective farms experienced a decline in living standards during the transition period, as measured by differences in body heights by Wroński (2023). Some communities adapted more successfully than others, particularly those with stronger local institutions and labor-market connections (Krocak, 2014). Nowadays, former state farms are still widely regarded as areas of increased social and economic hardship (Szewc & Szewc, 2001; Tarkowska, 2006). At the same time, there exists a nostalgia among former workers that is characterized by a longing for predictability and safety that was provided by those places, and the experience of neighborly solidarity (Panek, 2024).

3. A DUAL CIVIC FRAMEWORK

I propose a dual civic framework to help hypothesize the impact of collectivization on civil society, as shown in Figure 1. Social capital is classically distinguished into bonding social capital, which involves local, dense, and ingroup-oriented ties, and bridging social capital, which links individuals across broader institutions and social groups (Dzialek, 2014; Putnam, 2000; Woolcock, 1998). In Central and Eastern Europe, civil society can also be understood as consisting of formal and informal dimensions. Socialism produced a large network of formal organizations that structured social and economic life. These included state farms, cooperatives, unions, and state enterprises. As Lampland (2002) argues, socialism was not only a set of inefficient economic policies but also a complex social and cultural world that influenced the social and civil spheres and institutionalized collective cooperation and bureaucratic coordination. This demonstrates the formal aspect of civil society.

Figure 1: Conceptual Framework: Collectivization and Civil Society



In addition to this sphere, a set of informal practices and personal networks existed that enabled people to navigate the social and economic constraints of the socialist economy. Stark (1996) describes how these informal routines “got the job done” by forming systems of interpersonal exchange and coordination. These practices constitute the informal element of civil society.

After the collapse of socialism and the economic and social transition, civil society did not emerge from a vacuum but was built on existing formal and informal civil society structures that influenced how people organized economic and social activity (Bernhard, 2020; Foa & Ekiert, 2017). Many routines, practices, organizational forms, and social ties persisted through the transition period and became important assets for coordinated action later on

(Stark, 1996).

Post-communist societies did not inherit an empty civic landscape but rather a multifaceted associational field (Ekiert & Kubik, 2014; Ekiert et al., 2017). While state-controlled organizations dominated formal civil society during socialism, informal civil society was based on networks and social movements. This created an active civil society that, however, lacked full autonomy and legal protection. This “incomplete civil society” was the foundation for the renewal of civil society in Poland after 1989 (Ekiert & Kubik, 2014).

Building on this literature, I propose a model of formal and informal civil society in order to capture the long-term effects of collectivization. Formal civil society involves participation in organized, rule-based, official structures, such as NGOs, unions, and professional organizations. Engagement in those structures can be rooted in or inspired by hierarchical and coordinated patterns inherited from socialist processes. This sphere can function similarly to bridging social capital by connecting actors across institutional channels. Informal civil society, on the other hand, can consist of local, spontaneous, and personal forms of associations, associated more with bonding social capital. Those can include neighborhood networks, volunteering, and community initiatives that emerge from interpersonal ties. Although both spheres are interrelated, they represent different traditions of cooperation: one based on institutional experience and the other on local, relational practices of mutual aid.

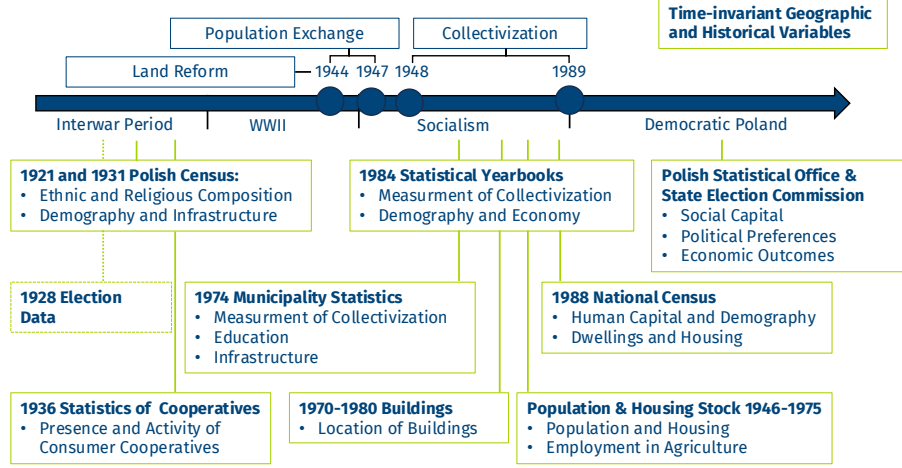
Consequently, areas with stronger socialist influence may have fostered a culture of formal engagement and reliance on structured cooperation by bundling employment, housing, welfare, and social activity within a single system. I therefore hypothesize that these regions show higher levels of formal civil society and trust in the state. Further, the preferences for structured, collective solutions and state dependence can also translate into political support for the political left (GrzymalaBusse2002). The relationship with informal civil society is more ambiguous, as centralized control could have eroded interpersonal trust and destroyed traditional local networks (Bernhard, 2020).

4. DATA

This study draws on a wide range of historical, administrative, and survey-based data sources to examine the long-term effects of collectivization on civil society in post-socialist Poland. The empirical strategy requires information to be spatially disaggregated across multiple historical periods: the Second Republic (1919–1939); the socialist Polish People’s Republic (1948–1989); and contemporary democratic Poland (1989–2022). Figure 2 illustrates the temporal coverage and primary datasets used in this paper.

The empirical analysis focuses on four south-eastern voivodships: Lesser Poland (Małopol-

Figure 2: Historical Timeline and Main Data Sources



skie), Subcarpathia (Podkarpackie), Holy Cross (Świętokrzyskie), and Lublin (Lubelskie). Compared with the western territories of Poland, these regions were not subject to mass resettlement campaigns or border changes. This allows for the use of consistent units of observation and analysis of long-term population trends. Additionally, agriculture has been and remains an important economic sector in these regions, making the study of historical agricultural institutions particularly relevant.

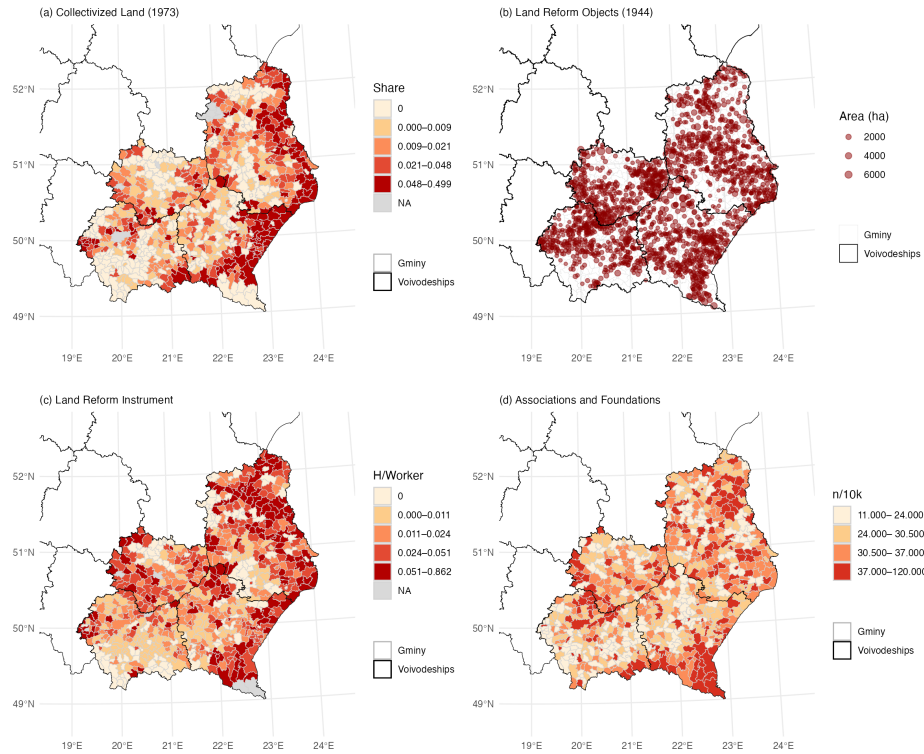
Using municipality-level data across multiple historical periods is particularly challenging due to changing administrative boundaries. While most data from the late socialist period can be manually harmonized with current municipalities, if necessary, data from the interwar period requires more intensive spatial reconstruction. To address this problem, I present a novel crosswalk that allows linking interwar and contemporary municipalities in Poland for the first time. I digitized a historical map of the 1938 administrative boundaries of Poland and overlaid it with contemporary municipal boundaries. Details on the crosswalk methodology are provided in the Appendix A. This allows me to use contemporary municipalities as the units of analysis throughout the paper.

The finalized dataset integrates newly digitized archival material, official statistics from the Polish Central Statistical Office (GUS), international datasets, and individual-level survey data. This enables a multidimensional measurement of civil society and social and political preferences and norms, robust measurement of collectivization and land reform, and detailed control for relevant pre-treatment and contemporary covariates. Table A.1 presents the descriptive statistics for the primary variables along with their sources and definitions.

4.1. Collectivization

To capture the intensity of collectivization during the socialist era, I digitized and geocoded data from the 1974 statistical yearbooks, covering the regions of Kraków, Lublin, Kielce, and Rzeszów, sourced from the GUS archives.⁴ This dataset provides information on the total agricultural area of a municipality, broken down by farm type (individual farms, agricultural cooperatives, and state farms). It also provides data on the number of cooperative and state farms and their share of total agricultural employment. Figure A1 provides an example page from the statistical yearbooks for the Rzeszów region. I calculate the share of collectivized land by dividing the total area of a municipality by the sum of cooperative and state farmland. Figure 3 (a) shows the spatial distribution of the main measure of collectivization.

Figure 3: Choropleth Maps



Note: This figure illustrates the spatial distribution of the main variables in the study region located in south-east Poland. The level of observation is a 2010 municipality. Sub-figure (a) presents the share of collectivized land in 1973, (b) the individual objects expropriated in the 1944 land reform, (c) the land reform instrument, and (d) the spatial distribution of the number of associations and foundations per 10,000 inhabitants.

For robustness, I use alternative data from the 1986 Statistical Yearbook (Rocznik Statysty-

⁴Full title of the publication of, e.g., Kraków: *Tablice Wynikowe. Wybrane dane dla powiatów, miast i gmin województwa krakowskiego*. Główny Urząd Statystyczny, Departament terenowych organów statystyki.

czny).⁵ Following the 1975 administrative reform, I manually transcribed and mapped the digitized yearbooks to present-day municipalities, adjusting for minor boundary changes by proportionate area distribution. At the municipal level, I use this data to measure collectivization by subtracting non-collectivized land (*Gospodarka nie uspołeczniona*) from the total area.

As an alternative, I measure exposure to collectivization using a binary indicator for the presence of a state farm, as introduced by Wroński (2023). Figure A3 (c) provides a visual representation of this dummy variable. This dummy variable is based on an official government list that identifies municipalities classified as post-state farm (post-PGR) areas. Figure A8 presents a correlation plot of all measures of collectivization, all of which exhibit strong, positive, and statistically significant correlations. I confirm the concerns in Wroński (2023) that the official post-PGR classification overestimates the number of municipalities with state farms.

For the main analysis, I use the 1973 data because they provide the most comprehensive measurement of collectivized land available during the socialist period. I replicate the results using alternative measures of collectivization as well. These exercises, along with the strong correlation among the various collectivization measures, provide reassurance that the main measure accurately reflects municipality-wide exposure to collectivization.

4.2. Civil Society

As outlined, I conceptualize civil society in terms of two dimensions: *formal civil society* and *informal civil society*. To operationalize these dimensions, I have constructed three primary indicators with which to measure local formal civil society.

4.2.1 Formal Civil Society

I use the number of foundations, associations, and social organizations (hereafter referred to as *organizations* or *NGOs*) per 10,000 residents as the main measure of formal civil society. This reflects the density of formal civic infrastructure and participation in officially recognized organizations (Chloupkova et al., 2003; Pawlewicz & Pawlewicz, 2020). This measure is commonly used to measure the strength and presence of civil society, as associations and foundations account for almost 90% of NGOs in Poland (Fałkowski & Kurek, 2024). Figure 3 (d) shows the distribution of this variable. In addition to NGO density, I use two additional measures of formal civil society: the share of cooperatives among registered entities in the

⁵The territory of the study region covers the following regions: Białkopodlaskie, Zamojskie, Chełmskie, Tarnobrzski, Siedleckie, Lubelskie, Krosnienskie, Przemyskie, Rzeszowskie, Nowosądeckie, Tarnowskie, Bielskie, Krakowskie, Katowickie, and Kieleckie.

national economy in a municipality and a dummy indicating the presence of a registered labor union in the municipality. The share of cooperatives measures the relative weight of cooperatives in the local economy. It reflects the dominance of collective, member-based economic organizations in local economic life. Trade unions are a classical pillar of civil society as they mediate between workers and employers. Their presence is a strong indicator of the institutionalization of worker interests and an important economic element of civil society.

4.2.2 Informal Civil Society

Identifying consistent administrative data on informal civil society is challenging. Informal groups and organizations such as neighborly help, grassroots initiatives, or self-help are mostly unregistered and do not report to official bodies. Furthermore, systematic local data on volunteering or donations is often unavailable. The present study utilizes a rarely available data set on donations that is made available by the Polish Ministry of Finance for 2017. The *one percent mechanism* is a Polish initiative that facilitates the allocation of one percentage of the income tax to public benefit organizations by individuals.⁶

The Polish Ministry of Finance provides data on the number of donors and the total amount of donations received by organizations. To geocode the organizations, I used the unique KRS identifier to retrieve the detailed address information from the *National Court Register*. The *tidygeocoder* package in R was used to geocode each organization, using the aforementioned address information to assign each organization to a contemporary municipality. A total of 8,679 organizations received financial contributions of 760 million PLN from more than 14 million donors.

I show that approximately 57% of all municipalities in Poland had at least one organization that received a donation. It is worth noting that a limitation of the dataset under consideration is that some foundations (for example, *Fundacja Dzieciom “Zdążyć z Pomocą”* in Warsaw) attract millions of donors from across Poland. It is evident that such practices distort national totals while failing to provide meaningful insight into local engagement, as data is available only at the organizational, not at the municipal level. Therefore, I limit the data to rural municipalities and exclude large cities. Thereby, the data represent small, mostly local organizations and provide the best available measures of local donations and informal civil society.

⁶In 2023, this percentage increased to 1.5%. Subsequently, people have referred to the mechanism as the *one and a half per cent mechanism*.

4.2.3 Polish Social Survey DIAGNOZA

In addition to the administrative variables, I use the 2015 wave of the Polish DIAGNOZA social survey. Following Rustagi (2024), I use survey questions that capture similar dimensions of civil society to construct indices using the first principal component from a principal component analysis (PCA). I construct indices for community involvement (involvement in actions for the benefit of the local community, attendance of public meetings, membership of organizations, parties, religious groups), institutional trust (trust in the Sejm, the president, the police, the courts), social networks (number of friends, regular contact with friends and acquaintances) and social interactions (going to restaurants, cafés and pubs, meeting with friends, number of regular contacts with family members and friends). Figures A4, A5, A6, and A7 provide additional information on the construction of the indices and the included variables, in respective order.

4.2.4 Political Preferences

Finally, I use vote shares for the four main political parties in Poland, the post-communist left (SLD), the centrist agrarian party (PSL), the right-wing conservative party (PiS), and the liberal-conservative party (PO), as well as turnout at the elections. For the main results, I use data from the 2011 parliamentary (Sejm) elections, provided by the National Electoral Commission of Poland. Moreover, I utilize election data for the SLD in all local and parliamentary elections from 1991 to 2023. Despite name and organizational structure changes, the SLD is a unique case due to its consistent political structure since 1990. Figure A3 (d) shows the spatial distribution of vote shares for the SLD in the 2011 election.

4.3. Other Socialist-Era Variables

I digitized several variables from the socialist period to control for broader socioeconomic legacies of Socialism. Firstly, the 1984 Statistical Yearbook provides data on population by gender and sectoral employment in the state-controlled economy, as well as infrastructure indicators such as the number of post offices and telephone subscribers. It also includes data on the commercial landscape, including the number and floor area of collectivized and general shops, as well as sales volume (in millions of Polish zloty).

Secondly, I use data from the 1988 Polish census to analyze human capital and housing conditions. This includes educational attainment, access to amenities, dwelling structure, and the age of the housing stock. To study temporal trends, I compiled a dataset of municipal-level population figures for 1946, 1950, 1960, 1970, and 1974, as well as non-agricultural

employment and housing stock data for 1950, 1960, and 1970.⁷

Finally, I present data on properties that were expropriated during the 1944 land reform, which targeted estates larger than 50 hectares. Using the dataset provided by Epsztein et al. (2024), I manually geocoded 2,233 properties within the study region.⁸ The dataset specifies the total area of each property by category. Based on this, I aggregated the data at the level of contemporary municipalities. Using the proportion of agricultural land and municipal area in 1931, I calculated the proportion of each municipality affected by the reform. Figure 3 (b) shows all geocoded properties, weighted by size. This study is the first to utilize disaggregated data from the 1944 land reform.

4.4. Interwar Poland

I draw on surviving data from two Polish censuses conducted during the interwar period. These censuses were published in official settlement indices (*Skorowidz Miejscowości*) in 1921 and 1931. The 1921 index reports on the number of dwellings and the population by gender, as well as the distribution of inhabitants by religion and nationality. Figure A2 provides an example page from the 1921 census for the Lwów region. The 1931 index provides information on the total municipal area, the area of agricultural land (including arable land), the population, and the number of dwellings. Complete coverage is available for the historical voivodeships of Lublin, Kraków, Lwów, and Kielce in the study region.

I have incorporated electoral data from the 1928 Polish parliamentary elections, including voter turnout and party vote shares, into the final dataset. While the elections were the last free elections, the data is incomplete. The reports for the regions of Lwów and Kraków cover only municipalities with at least 500 registered voters and group the remaining data at higher administrative levels. This prevents some regions from being assigned to individual municipalities. Complete municipal-level results are only available for the Lublin region. Since the electoral data from 1928 cover only 431 municipalities, the results based on that data should be interpreted with care.

Finally, I digitized a unique dataset on consumer cooperatives from the 1936 *Statistics of Union Cooperatives*, the only detailed, disaggregated source available on interwar cooperatives. Agricultural and consumer cooperatives formed a mutually reinforcing system that supported farmers and consumers in rural areas, playing an integral role in the peasant movement (Bilewicz, 2018, 2019). Although agricultural cooperatives played a more significant

⁷This dataset was created using the GUS publication: *Ludność i Zasoby Mieszkanowe w Latach 1946–1974*. Główny Urząd Statystyczny, Warszawa 1976.

⁸The original data included the property name, municipality, county, and region. Where exact locations were unavailable, the coordinates of the municipality seat were used instead.

economic role, consumer cooperatives had a great social importance as they created spaces for self-organization and civic engagement (Bilewicz, 2019). In the absence of comparable data on agricultural cooperatives, consumer cooperatives serve as a suitable substitute for local cooperative activity and the strength of the peasant movement during the interwar period. Within the territory studied in this paper, 385 consumer cooperatives operated in 224 municipalities (34% of all municipalities).⁹ Figure A3 (b) illustrates the spatial distribution of cooperatives and their membership strength across municipalities. Aggregating the cooperative data at the municipality level, I constructed three measures to proxy cooperative activity: (i) the number of cooperatives in a municipality; (ii) the proportion of cooperative members in 1936 relative to the population of a municipality in 1931; and (iii) total turnover per capita (in złoty per population in 1931). These indicators capture the presence of the cooperative movement, the depth of membership, and the economic strength of the movement.

4.5. Controls

To ensure that the results are not driven by time-invariant factors, I include a range of geographic and historical control variables. Following Nunn (2008), I calculate the average *Terrain Ruggedness Index* (TRI) for each municipality in Poland using 1x1 km grid-square data provided by Shaver et al. (2019). These values are then aggregated spatially to correspond to the current municipal boundaries.

I measure agricultural suitability using data from the *Global Agro-Ecological Zones* (GAEZ) database, provided by the *United Nations Food and Agriculture Organization* (FAO). For each municipality, I calculate suitability indices for the seven main crops (barley, buckwheat, maize, oats, potatoes, rye, and wheat) to then aggregate them into a single suitability index.

Additional geographic controls include average altitude, mean annual precipitation, and average temperature, based on data from Grosfeld and Zhuravskaya (2015). I also include the share of territory covered by flowing or standing water, which may influence local economic activity and land-use patterns. The Polish Central Statistical Office (GUS) provides data on water coverage.

In some specifications, I also control for proxies of general economic development. These include the log of the current population or population density, the unemployment rate, the average satellite-based luminosity in 1995, the number of welfare recipients per 10,000 inhabitants, total municipal expenditure per 10,000 inhabitants, and the average gross wage. These economic variables, which may be endogenous to the treatment, are used only for robustness checks and sensitivity analyses. I obtained the data from GUS, the wage data

⁹On average, a cooperative was founded in 1925 and had 161 members, 7.7% of whom were women. It operated 1.6 stores and reported an annual turnover of 59,184 Polish złoty.

directly from the Polish Ministry of Finance.

Lastly, I control for agricultural structure using data from Polish agricultural censuses. These variables are farm density, the number of large farms, the number of tractors per farm, and the proportion of agricultural land in good condition, provided by GUS. I also take into account human capital and educational attainment, using indicators compiled by Bukowski (2019).

5. EMPIRICAL STRATEGY

5.1. Baseline Regressions

To establish the correlation between historical collectivization and civil society, I first run a baseline OLS regression. I then turn towards two empirical strategies to provide evidence of a causal relationship. To demonstrate correlations, I start by estimating OLS regressions using the following baseline equation:

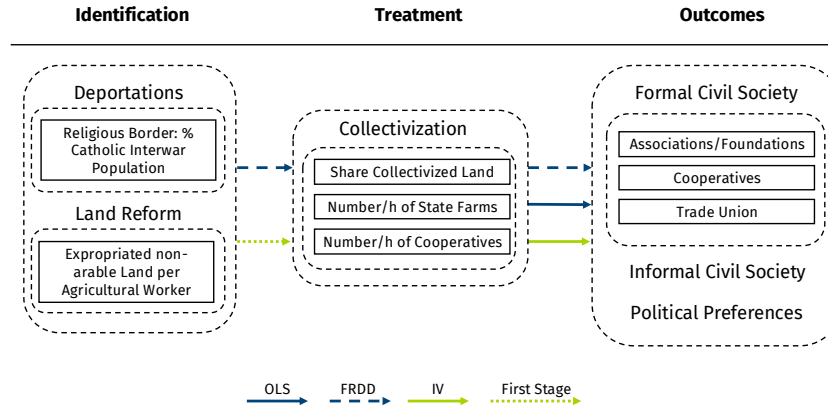
$$Outcome_i = \beta + \gamma Collectivization_i + \theta X_i' + \delta_r + \varepsilon_i \quad (1)$$

where $Outcome_i$ denotes the measures of civil society at the municipality level i . The main explanatory variable of interest, $collectivization_i$, is the share of collectivized land in 1973. The vector X_i includes historical and contemporary control variables and time-invariant geographic characteristics of municipality i : the 1921 share of Jewish population, the share of agricultural land in 1931, population and housing density in 1931, mean agricultural suitability, a terrain ruggedness index (TRI), average altitude, the share of urbanization of a municipality, and partition dummies. Region fixed effects δ_r are included at the voivodeship level. Standard errors are clustered at the voivodeship level. Following Wroński (2023), I exclude municipalities with more than 50,000 inhabitants to mitigate the influence of outliers. This exclusion criterion is applied consistently across all following analyses.

For analyses using the DIAGNOZA survey data, the same baseline framework is applied, with the addition of a vector of individual-level variables. This includes years of education, log household income, an indicator for living in the rural area of a municipality, gender, birth year, birth year squared, and a Kresy ancestry dummy following Becker et al. (2020). Standard errors are clustered at the municipality level to address potential intra-group correlation.

In the following sections, I introduce the identification strategies, as illustrated in Figure 4.

Figure 4: Empirical Framework



5.2. Instrumental Variable Strategy

5.2.1 Land Reform

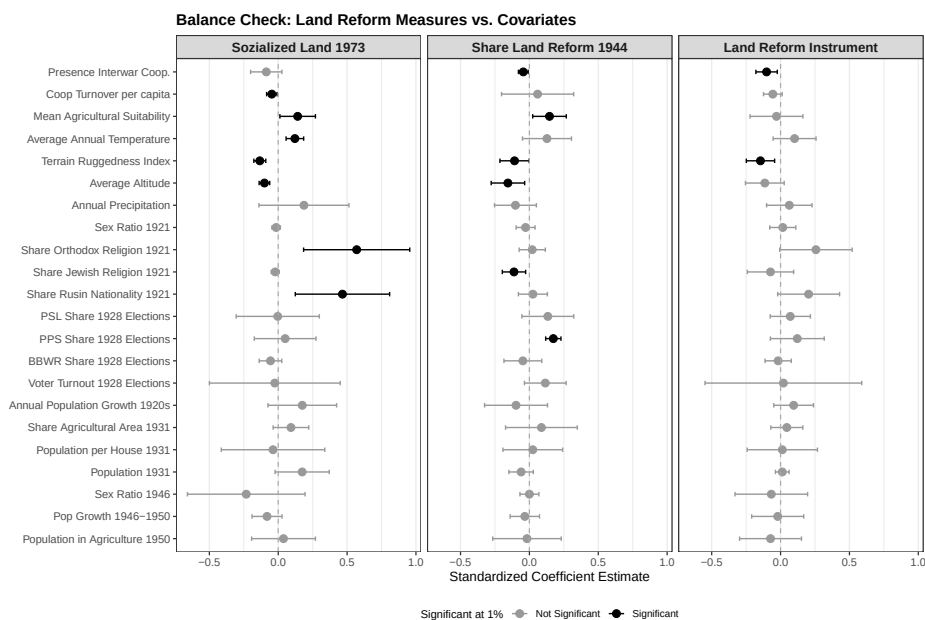
By 1949, the land redistribution that began in 1944 had resulted in the creation of over 1 million new plots, accounting for a significant part of all Polish farms (Bład, 2021).¹⁰ In addition to parcelization and redistribution to the peasantry, the state transferred and utilized land for purposes including collectivization (Ganguli, 1972; Kaliński, 1988). Galeski (1982) summarized that approximately 30% of the land was not redistributed, but instead retained by the state. Between 1944 and 1949, under the reform, authorities redistributed 234,100 hectares in the Lublin Voivodeship alone. Of this land, 67,300 hectares (28.6%) were allocated to the state farms, the State Forestry Administration, production cooperatives, and the Peasant Self-Help Association (Nazimek, 1959).

This study introduces a novel instrument for analyzing collectivization in Poland. This instrument is based on the historical fact that areas that experienced a greater impact from land reform processes were more likely to undergo a higher level of collectivization. Using the raw land reform directly as an instrument for collectivization is, however, challenging since one goal of the reform was to alter the social structure of the rural landscape and influence political preferences (Bład, 2021). Many scholars, however, regard the overall political success of the land reform as negligible (Bład, 2021; Jarosz, 2014). I ensure that the IV assumptions are not violated by leveraging the unique qualities of the data and separating the expropriated land into arable land and other types, such as meadows, pastures, and wasteland. Nazimek

¹⁰Poland also underwent a series of land reforms during the interwar period. However, these reforms were less successful, leaving a significant proportion of land under the control of large estates (Halamska, 2016). Compared to the comprehensive reform of 1944, it can be considered a minor intervention (Albertus, 2015).

(1959) states that the authorities carried out collectivization and established state farms largely on non-arable land. This refers in particular to arable land that had been abandoned or left uncultivated due to the war. I then calculate the area of these *other lands* (excluding forests) in hectares and divide it by the agricultural population in 1950, as it is the earliest post-war data available.¹¹ Throughout the remainder of the paper, I will refer to this measure as the *land reform instrument*. Figure 3 (c) shows the spatial distribution of the instrument. As most of the land distributed directly to farmers was likely to be arable, this approach should mitigate the potential risks associated with using total land reform exposure as a measure.

Figure 5: Covariates: Land Reform and collectivization



Note: This figure presents balance checks for three land reform-related measures against a wide set of pre-treatment covariates. Each dot represents a standardized coefficient estimate from a separate regression where the dependent variable is either the share of socialized land (1973), the share of land subject to the 1944 reform, or the land reform instrument (expropriated area per agricultural population in the 1950s). Independent variables include demographic, political, geographic, and economic characteristics measured before the treatment period. All regressions include voivodeship fixed effects and a dummy for urban status. 99% confidence intervals are plotted with black color indicating estimates statistically significant at the 1% level (clustered by voivodeship).

Figure 5 shows the correlations between the following key variables: the share of collectivized land in 1973, the total share of land affected by the 1944 land reform, and the land reform instrument, with a set of historical or time-invariant covariates. Collectivized land in 1973 is significantly correlated with certain geographical factors: higher agricultural suitability and temperature, and lower ruggedness and altitude. As expected, there is also a positive correlation with the proportion of the Orthodox or Rusin population in the interwar period.

¹¹In a few cases where data from 1950 is unavailable, I use data from 1960 instead.

Furthermore, collectivization is negatively correlated with the interwar per capita turnover of cooperatives.

When examining the simple measure of land reform impact, the proportion of land affected, I observe similar patterns as with the proportion of collectivized land. Although data on support for socialism during the socialist period are not available, I observe positive correlations with the vote shares of the interwar Socialist Party, PPS. While it does not indicate that land reform generated pro-socialist attitudes, it shows that land ownership and land inequality were positively associated with pro-socialist attitudes in the interwar period.

It is important to note that the land reform instrument shows no significant relationship with civil society or political preferences from the interwar period. The instrument itself exhibits almost no statistically or substantively significant associations, except for a minor negative correlation with terrain ruggedness and the presence of interwar cooperatives. In this case, the relationship is only negative with the dummy indicating the presence of a cooperative, and is not significant for the cooperative turnover measure. The results of the following specifications do not change when including the total share of the land reform as an additional control variable.

Figure 3 provides maps showing the spatial distribution of the following variables: (b) all properties subject to the 1944 land reform and their size; (c) the proportion of land subject to the 1944 land reform; (d) the land reform instrument.

5.2.2 Empirical Setup

Pre-existing local differences, socialist tendencies, and levels of cooperation could have affected the extent of collectivization. To address potential endogeneity in the relationship between collectivized land and contemporary outcomes, I estimate a two-stage least squares model using instrumental variables. The main endogenous regressor is the proportion of socialized land in 1973. The land reform instrument, $LandReform_i$, measures the proportion of non-arable land expropriated during the 1944 land reform, relative to the agricultural workforce. The regression formulas are as follows:

First Stage:

$$Collectivization_i = \alpha + \pi Z_i + \theta X_i' + \delta_r + v_i \quad (2)$$

Second Stage:

$$Outcome_i = \beta + \gamma \widehat{Collectivization}_i + \theta X_i' + \delta_r + \varepsilon_i \quad (3)$$

where $collectivization_i$ is the share of collectivized land, $LandReform_i$ is the instrument,

X_i is the same vector of historical and geographic controls as in the baseline regression, and δ_r are voivodeship fixed effects. The dependent variables are the same as in the baseline analysis. Standard errors are clustered at the voivodeship level. As in the OLS baseline analysis, I exclude municipalities with populations exceeding 50,000 to reduce the influence of urban outliers. Following the recommendations of Andrews et al. (2019) and the recent practice in Bartels et al. (2023), I report weak-instrument confidence intervals in each table to assess the robustness of the instrumental-variable (IV) estimates. I also compute the effective F-statistic to evaluate the strength of the instruments, following Olea and Pflueger (2013).

Table 1: First Stage Regressions

	<i>Dependent variable:</i>			
	Collectivized Land			
	(1)	(2)	(3)	(4)
Land Reform Instrument	0.472*** (0.036)	0.468*** (0.037)	0.457*** (0.036)	0.429*** (0.036)
Baseline Controls	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
Region FE	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>
Additional Controls	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>
First-stage partial F-statistic	171.17	159.79	159.37	145.35
Observations	612	606	612	606
R ²	0.219	0.240	0.233	0.317
Adjusted R ²	0.218	0.229	0.228	0.302

Comment: This table reports first-stage regressions where the outcome is the standardized share of collectivized land in 1973, and the main explanatory variable is the standardized land reform instrument. Columns vary by inclusion of historical covariates and region (voivodeship) fixed effects. Control variables include the interwar share of Jewish population, the share of agricultural land, population and housing density (1931), agricultural suitability, terrain ruggedness, altitude, and urban status. Additional controls include the share of Catholic and Orthodox population, and the presence and per capita turnover of interwar cooperatives. Voivodeship fixed effects account for regional heterogeneity. All variables are standardized to allow for direct comparison of coefficient magnitudes. Partial F-statistic testing the joint significance of the excluded instrument in the first-stage regression. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table 1 reports the results of the first-stage regressions. The land reform instrument coefficients are highly statistically significant and stable, with large magnitudes across all specifications. Column (3) corresponds to the actual first-stage regression. An increase of one standard deviation (SD) in the instrument is associated with an increase of between 0.43 and 0.47 SD in collectivized land. The reported first-stage partial F-statistics consistently exceed the conventional threshold of 10, indicating strong instrument relevance and reducing concerns about weak instrument bias. I also report the effective F-statistics from Olea and Pflueger (2013) in all subsequent 2SLS regressions.

5.3. Spatial Regression Discontinuity Design

5.3.1 Population Exchange and Deportations

During World War II, existing tensions and territorial conflict between Poles and Ukrainians led to widespread violence. In Volhynia and Galicia, in present-day western Ukraine, ethnic cleansing resulted in the deaths of tens of thousands of Poles and Ukrainians. Those events ultimately motivated the redrawing of borders and the idea of creating ethnically homogenous nation-states to prevent further conflict.

In 1944, Polish politician Stanisław Grabski proposed to Stalin that Poles and Ukrainians

should be resettled in an attempt to ease border tensions. The idea of national homogeneity soon gained political consensus. Stalin agreed to incorporate *Western Ukraine* into the USSR and support the establishment of a Polish nation-state. Between 1944 and 1946, approximately 780,000 Poles were resettled from Soviet Ukraine to the *recovered territories* in Poland, while around 480,000 Ukrainians were removed from south-eastern Poland, often through coercion or force. The NKVD facilitated the deportations, while the Polish authorities relied on German records and church registers to determine ethnicity.

Although the official resettlement campaign had ended by 1946, resistance from Ukrainian nationalists continued. In response, the Polish authorities launched *Operation Vistula* in 1947, ordering the internal displacement of the remaining Ukrainian population. Over 150,000 people were forcibly resettled within less than four months, and the authorities prohibited return migration (Misiło, 2012). The operation aimed to disrupt the potential support for militant groups and advance the vision of a *people's democracy* based on national homogeneity (Snyder, 2003, p. 198).

These deportations left many areas depopulated, with abandoned homes, churches, and farmland left behind. Although Poles were brought in from the east as part of resettlement efforts, the regions remained sparsely repopulated. This demographic and institutional vacuum facilitated agricultural collectivization, with state farms often taking over the abandoned land.

5.3.2 Defining the Religious Border

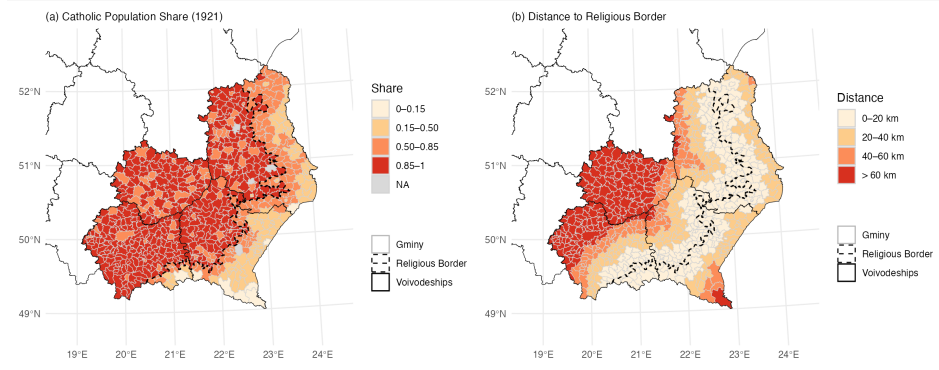
To strengthen causal inference, I implement a fuzzy geographic regression discontinuity design (FRDD). This approach exploits a spatial boundary to create a discontinuity in treatment allocation. It is based on the assumption that municipalities on either side of the boundary are similar due to their geographical proximity (Lee & Lemieux, 2010).

The treatment variable is based on historical exposure to forced population transfers during and after the Second World War. Using interwar census data, I define the borderland, also referred to as *Trans-Curzonina*, as municipalities with a Catholic population share above 85% in 1921. This indicates an absence of significant Ukrainian or other minority presence, and I code these areas as *Catholic territory*. I then delineate a boundary encompassing all contiguous municipalities with a Catholic population share above 85% in 1921. This area closely aligns with observed deportation patterns following the war (Snyder, 1999; Subtelny, 2001).

I refer to this demarcation as the Religious Border (RB). The RB broadly aligns with the description of a “border strip running from Chełm almost to Kraków” (Snyder, 1999, p.105). Subtelny (2001) describes how Ukrainian-inhabited lands inside Poland formed a belt

approximately 700 km long and 100 km wide to the west of the Curzon Line. There is no clear geographical definition of this area, and it varies across historical maps, sources, and the period under consideration (Eberhardt, 2000; Kordan, 1997). Figure 6 (a) illustrates the Catholic population share and the location of the RB, while (b) visualizes the border and the defined distance categories.

Figure 6: Choropleth Maps



Note: This figure illustrates the creation of the ethnic and religious border used in the RDD. The unit of observation is 2010 municipalities. Sub-figure (a) shows the share of the Catholic population in 1921 with the “Religious Border” (RB) demarcated by drawing a boundary around contiguous municipalities where less than 15% of the population was Catholic, while (b) shows four distance categories relative to the RB.

Alternative measures of the deportations or presence of minorities exhibit strong spatial overlap with the RB. Those include geocoded records of deportations during Operation Vistula (Misiło, 2012), Ukrainian population maps from 1939 (Kubijovyč, 1983)¹², and the distribution of Orthodox and Greek-Catholic sacral objects from the late 18(th) century (Institute for the Historical Geographic of the Church in Poland (KUL), 2022). This supports the validity of this treatment boundary. Figure A9 presents the spatial distribution of those validation datasets and binned regression discontinuity plots. While the potential underrepresentation of minorities in the 1921 census is a legitimate concern (Corrsin, 1998; Halavach, 2019), such bias would likely result in an underestimation of the actual effects, as it would understate exposure levels.

5.3.3 Empirical Setup

The previously discussed deportations provide a channel for explaining the establishment of collectivization, and their geographic distribution allows for the implementation of a spatial regression discontinuity design (Cattaneo et al., 2019; Lee & Lemieux, 2010). I estimate

¹²This data was not collected for the voivodeship of Lublin in the interwar period.

models using bandwidths of ± 40 km and ± 20 km around the border, with 231 and 379 observations, respectively.

Crossing the border does not fully explain the likelihood of collectivization. Due to this imperfect treatment compliance, I am implementing a fuzzy regression discontinuity design. This means that not all municipalities south-east of the border experienced collectivization, and vice versa. However, crossing the border is associated with a significant increase in collectivization.

I am implementing this strategy using two-stage least squares estimates. The first stage estimates which municipalities received collectivization due to their location southeast of the RB, and the second stage estimates the causal effect of collectivization. This identification strategy is similar to designs employed in the literature (Eugster et al., 2017; Guzi et al., 2021; Testa, 2021). I therefore propose the following first stage:

First Stage:

$$Collectivization_i = \alpha + \pi Z_i + f(g_i) + \theta X_i' + \delta_s + \nu_i \quad (4)$$

Second Stage:

$$Outcome_i = \beta + \gamma \widehat{Collectivization}_i + f(g_i) + \theta X_i' + \delta_s + \varepsilon_i + \eta \quad (5)$$

where $collectivization_i$ is the share of collectivized land in 1973, Z_i is the instrumental variable, i.e. the borderland dummy, X_i' is a vector of municipality characteristics, such as mean agricultural suitability, population density, terrain ruggedness, and urban status. Segment fixed effects δ_s (based on border segments of approximately 200 km) are included to account for local unobserved heterogeneity. This specification is estimated for each outcome using standard errors clustered at the segment level. $f(g_i)$ denotes the one or two-dimensional location as follows:

$$f(g_i) = \begin{cases} \text{distance}_i + \text{distance}_i^2, & \text{(1D RDD)} \\ \text{lon}_i + \text{lat}_i + \text{lon}_i^2 + \text{lat}_i^2 + (\text{lat}_i \times \text{lon}_i), & \text{(2D RDD)} \end{cases} \quad (6)$$

In the one-dimensional (1D) RDD, $f(g_i)$ is a polynomial in the distance of a centroid of a municipality to the RB, $dist_i$, whereas in the two-dimensional (2D) specification it is a second-order polynomial in longitude and latitude of a centroid, following Gelman and Imbens (2019) to avoid overfitting with higher-order polynomials.

Table A.20 reports the first-stage results for the FRDD. The estimates confirm that the (outside-)Borderland dummy is significantly and negatively associated with the share of

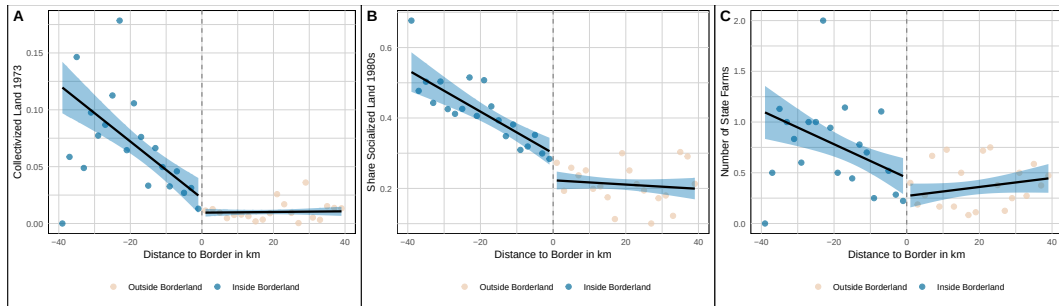
collectivized land, and the consistently high F-statistics indicate a strong first stage.

I also conduct density tests for manipulation at the boundary (McCrary, 2008) and test for false discontinuities by shifting the cutoff line. These checks, shown in Figure A10 and Figure A11, further support the credibility of the RDD design.

5.3.4 Covariate Balance and Treatment

The first important step is to demonstrate that collectivization exhibits a clear discontinuity at the defined boundary. As shown in column (1) of row 1 in Table A.2, crossing the religious border (RB) into the borderlands is associated with a strong and statistically significant increase in the share of collectivized land. Figure 7 provides visual confirmation of this pattern. Panel A displays the discontinuity for the main measure of collectivization, while Panels B and C illustrate similar patterns for alternative indicators: the proportion of municipal land under state administration in the 1980s and the number of state farms, respectively.

Figure 7: RDD Plots: Measures collectivization



Note: This figure presents regression discontinuity plots illustrating the relationship between distance to the “Religious Border” and measures of collectivization, without the inclusion of control variables. Each subfigure displays the binned data into 40 groups based on distance to the border, with observations on either side of the border fitted with separate linear regressions. The dashed vertical line at 0 represents the border, and the color coding distinguishes municipalities within the borderland territory (“Inside Borderland”) from those outside it (“Outside Borderland”). The colored area represents the 95% confidence intervals around the fitted regression lines.

The key identifying assumption underlying the regression discontinuity design (RDD) is that municipalities on either side of the Religious Border (RB) had similar relevant pre-treatment characteristics. To assess this, I estimate RDD models using a broad set of historical and geographic variables as the dependent variables. Table A.2 presents results for both the one- and two-dimensional specifications with a 40 km bandwidth. All regressions include the full set of controls and segment fixed effects, omitting the tested covariate when it serves as the outcome variable.

The covariate regressions reveal that crossing the RB into the borderland is associated with a statistically and substantively significant decrease in the share of Catholics, and an increase

in the share of Orthodox, confirming the presence of a strong discontinuity in the underlying instrument. There is a small, barely significant discontinuity in population density and the share of arable land. Interestingly, the other significant (albeit barely) variable is the vote share for the Socialists and election turnout in the 1928 elections. Crossing the RB is associated with reduced vote shares for the Socialists and lower turnout.

Data limitations make it impossible to observe pre-war sectoral composition. Instead, I am using the proportion of agricultural land as an indicator of agricultural intensity. The results suggest that the agricultural structure before the deportations was broadly comparable on both sides of the (RB), as there was no significant discontinuity in the proportion of agricultural land, agricultural suitability, or agricultural land per capita. In Figure A12, I provide visual evidence that supports these findings: aside from ethnic-religious composition, other pre-treatment outcomes exhibit smooth trends across the border once controls and segment fixed effects are applied.

These findings support the assumptions underlying the FRDD by showing that the border shows a significant discontinuity in collectivization while not displaying relevant discontinuities in the pre-collectivization period.

5.4. Results

5.4.1 Formal Civil Society

The results of the OLS regression analysis for formal civil society, as well as the second-stage results from the 2SLS regressions, are presented in Table 2.

Table 2: Collectivization and Civil Society

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k (1)	Cooperatives (% of registered entities) (2)	Trade Union presence (Dummy) (3)
Baseline OLS Regressions			
Collectivized Land (OLS)	1.695*** (0.174)	1.335*** (0.357)	3.556*** (1.073)
Mean Dep. Var.	32.046	9.792	45.833
Observations	611	611	610
Adjusted R ²	0.069	0.250	0.032
2SLS Regressions			
Collectivized Land (IV)	3.796*** (1.066)	1.640* (0.869)	9.275*** (3.182)
AR 95% CI	[1.80, 5.92]	[0.08, 3.22]	[-0.13, 19.06]
Effective F-Statistic	83.309	83.309	82.9795
Mean Dep. Var.	32.046	9.792	45.833
Observations	606	606	605
Adjusted R ²	0.030	0.249	0.019
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary measures of formal civil society. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level. Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The OLS findings support the hypothesized positive relationship between collectivization and formal civil society. The results are consistently positive and highly statistically significant. The coefficients are also economically meaningful in magnitude. An increase of one standard deviation in collectivized land is associated with a 1.7 increase in the total number of associations and foundations per 10,000 inhabitants, relative to a mean of 32. There is also an associated increase of 1.3 percentage points in the proportion of cooperatives among the total number of registered entities in a municipality, relative to a mean of 9.8, and an increase of 3.6 percentage points in the likelihood of having a trade union, relative to a mean of 46.

Table 2 further presents the second-stage results from the 2SLS regressions. These estimates confirm that higher levels of collectivization are significantly associated with the indicators of formal civil society. Specifically, a one-standard-deviation increase in collectivized land is associated with an additional 3.8 organizations per 10,000 inhabitants, a 1.6 percentage-point increase in the share of cooperatives, and a 9.3 percentage-point increase in the likelihood of trade union presence. The reported 95% weak-instrument robust confidence intervals exclude negative values for all institutional measures (although they include 0 as the lower boundary of the CI for the presence of trade unions and the share of cooperatives), and the reported effective F-statistics exceed the conventional threshold of 10, reducing concerns about weak instruments.

In Appendix Figure A13, I present the plausibly exogenous sensitivity analysis for the estimated effect of collectivized land on the three measures of formal civil society, as outlined in Conley et al. (2012). The confidence interval remains strictly above zero for δ values up to ± 0.2 , indicating that the positive effect of collectivization remains significant even if the exclusion restriction is moderately violated.

The difference between the OLS and 2SLS coefficients implies that the OLS coefficients are biased downward. This can occur when collectivization is negatively correlated with unobserved factors that can positively affect civil society outcomes. One explanation would be that municipalities with a vibrant civic life before collectivization resisted it more strongly. These same civic traditions also contribute to stronger associational activity today. However, the collected data do not show any of these relationships, as collectivization is not associated with differences in interwar political or civil society outcomes. Another possible explanation is that the association of collectivization with better agricultural suitability (mean agricultural suitability (+), average temperature (+), ruggedness (-), altitude (-)) is driving those differences. Fertile areas may have historically been more agrarian, which could have had a conservative influence on civil society.

Further, Table 3 shows the FRDD results for both model specifications and bandwidths. All coefficients point in the direction previously described and remain fairly consistent in

Table 3: Collectivization and Civil Society (RDD)

	Associations/Foundations (1)	Cooperatives (2)	Trade Union (3)
Bandwidth: 40km			
Panel A: Polynomial in Distance to Border			
Collectivized Land	4.790** (1.853)	3.579*** (1.109)	8.434 (6.273)
R ²	0.073	0.210	0.053
Panel B: Polynomial in Latitude and Longitude			
Collectivized Land	8.159 (5.918)	6.563 (4.215)	1.700 (19.285)
R ²	-0.050	0.083	0.068
Observations	381	381	381
Mean outside	31.67	11.51	45.05
Year	2015	2015	2015
Geo. Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
Bandwidth: 20km			
Panel A: Polynomial in Distance to Border			
Collectivized Land	4.001** (1.648)	3.079*** (0.936)	5.764 (8.496)
R ²	0.116	0.293	0.102
Panel B: Polynomial in Latitude and Longitude			
Collectivized Land	0.997 (2.671)	2.774 (2.181)	-0.514 (12.303)
R ²	0.249	0.326	0.104
Observations	234	234	234
Mean outside	31.52	11.94	47.23
Year	2015	2015	2015
Geo. Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes

Notes: This table presents results from a fuzzy regression discontinuity design (FRDD) estimating the effect of entering the historical non-Catholic territory on the three formal social society outcomes. Each outcome is regressed on an indicator for being inside the historical Orthodox (non-Catholic) territory, instrumenting for the level of collectivized land. Panel A uses a quadratic polynomial in distance to the border (1D RDD); Panel B uses quadratic polynomials in latitude and longitude (2D RDD) as controls. All regressions include controls for population density (1984), agricultural suitability, terrain ruggedness, and urban status. All models include fixed effects for 200km border segments. Standard errors are clustered at the segment level. Results are presented separately for 40km and 20km bandwidths. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

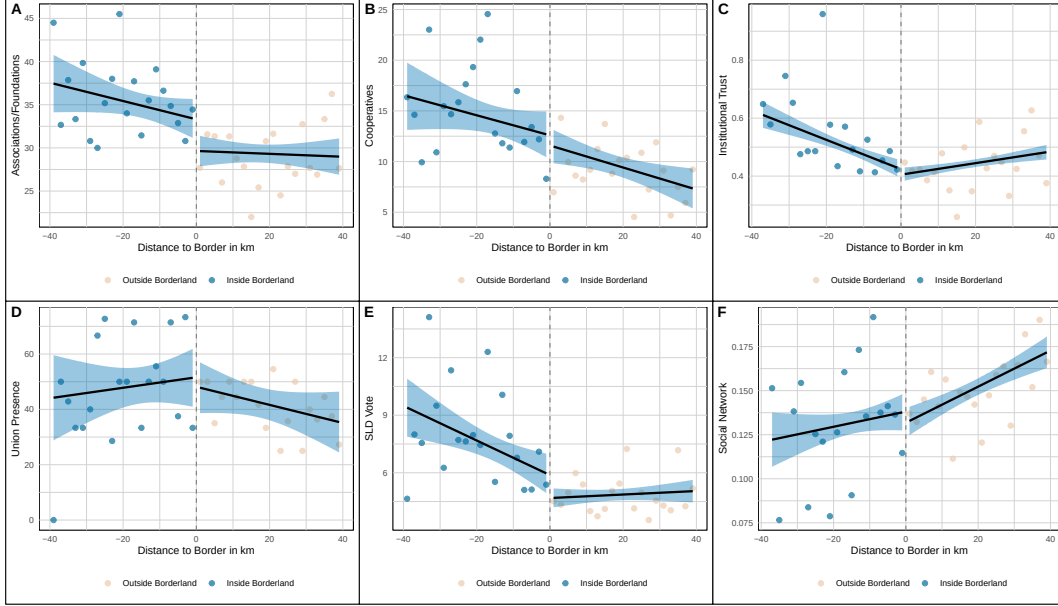
magnitude across the different bandwidths, although they generally exhibit lower levels of statistical significance. In the simple model with a polynomial in distance to the border and a bandwidth of 40 km, crossing the RB is associated with an increase of 4.8 associations and foundations per 10,000 inhabitants, a 3.6 percentage point increase in the share of cooperatives, and an 8.4 percentage point increase in the likelihood of having a labor union. Figure 8 provides visual evidence that further supports these results. It illustrates the discontinuities and changes in slope in institutional formal civil society measures.

These findings collectively provide compelling evidence that the previously reported correlations are robust and indicative of causal relationships.

5.4.2 Norms and Informal Civil Society

To test the impact of collectivization on informal civil society, I begin by analyzing the donation dataset. Table 4 presents the OLS and 2SLS results. Column (1) includes the donation dummy, indicating whether a municipality had an organization that received donations. Column (2) includes the receiving donation variable, measuring the proportion of organizations in a municipality that received donations. Column (3) includes a variable measuring the number

Figure 8: RDD Plots: Main Outcomes



Note: This figure presents regression discontinuity plots illustrating the relationship between distance to the “Religious Border” and the main outcomes, without the inclusion of control variables. Each subfigure displays the binned data into 40 groups based on distance to the border, with observations on either side of the border fitted with separate linear regressions. The dashed vertical line at 0 represents the border, and the color coding distinguishes municipalities within Ukrainian territory (“Inside Borderland”) from those outside it (“Outside Borderland”). The colored area represents the 95% confidence intervals around the fitted regression lines.

of donations per 10,000 inhabitants in a municipality. While consistent negative coefficients appear in columns (1) and (2), the OLS and 2SLS results consistently show no significant or meaningful relationship between collectivization and donation behavior. I report the RDD results in Table A.3. These results confirm this, showing a general absence of a strong relationship between collectivization and donation behavior.

Subsequently, I analyze the DIAGNOZA survey data. Table 5 presents the OLS and 2SLS regressions, while Table A.6 presents the RDD results. Collectivization appears to have had a lasting institutional impact, increasing institutional trust without clearly affecting informal social capital or civic engagement. RDD evidence reinforces the initial finding that collectivized areas exhibit higher institutional trust (though not significant) and a lower *social interactions* index.

Overall, the results suggest that collectivization fostered a more state-oriented form of normativity without significant changes to local, participatory ties.

Table 4: Collectivization and Donations

	<i>Dependent variable:</i>		
	Donation Dummy (1)	% Orgas. receiving Donation (2)	Donations per 10k (3)
Baseline OLS Regressions			
Collectivized Land (OLS)	−0.028 (0.020)	−0.001 (0.001)	0.352 (0.893)
Mean Dep. Var.	0.554	0.036	15.949
Observations	611	611	611
Adjusted R ²	0.102	0.112	0.085
2SLS Regressions			
Collectivized Land (IV)	−0.001 (0.050)	−0.002 (0.003)	2.725 (2.700)
AR 95% CI	[−0.09, 0.09]	[−0.01, 0.01]	[−8.77, 14.38]
Effective F-Statistic	83.309	83.309	83.309
Mean Dep. Var.	0.554	0.036	15.949
Observations	606	606	606
Adjusted R ²	0.098	0.114	0.083
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary donations behavior. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

Table 5: Collectivization and Social Norms (DIAGNOZA)

	<i>Dependent variable:</i>			
	'Community Involvement' (1)	'Institutional Trust' (2)	'Social Network' (3)	'Social Interactions' (4)
Baseline OLS Regressions				
Collectivized Land	−0.009 (0.006)	0.022*** (0.008)	−0.005* (0.003)	−0.004 (0.003)
Mean Dep. Var.	0.164	0.467	0.139	0.121
N Municipalities	392	392	392	392
Observations	3,897	3,943	3,917	3,866
Adjusted R ²	0.051	0.060	0.065	0.158
2SLS Regressions				
Collectivized Land	0.007 (0.022)	0.055** (0.022)	0.002 (0.005)	0.001 (0.008)
Mean Dep. Var.	0.164	0.467	0.139	0.121
N Municipalities	392	392	392	392
AR 95% CI	[−0.01, 0.03]	[0.03, 0.08]	[−0.01, 0.01]	[−0.01, 0.01]
Effective F-Statistic	9.2126	9.2776	9.2311	9.083
Observations	3,894	3,940	3,914	3,863
Adjusted R ²	0.048	0.051	0.061	0.155
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Ind. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on social norms and behavior using the Polish DIAGNOZA Survey. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urban dummy, and voivodeship fixed effects. The regressions further include individual controls for education, income, gender, birth cohort, migration background, and urban/rural status within a municipality. Standard errors are clustered at the municipality level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

5.4.3 Political Preferences

Finally, I am analyzing political preferences. Table 6 presents the OLS and 2SLS regressions, while Table A.9 presents the RDD results.

Table 6: Collectivization and Political Outcomes

	Parliament (Sejm) Elections 2011				
	Dependent variable:				
	SLD (1)	PSL (2)	PiS (3)	PO (4)	Turnout (5)
Baseline OLS Regressions					
Collectivized Land (OLS)	0.976*** (0.175)	1.378*** (0.254)	-3.422*** (0.245)	0.773*** (0.290)	-1.039*** (0.391)
Mean Dep. Var.	6.164	19.194	43.669	19.234	42.866
Observations	611	611	611	611	611
Adjusted R ²	0.223	0.466	0.381	0.404	0.355
2SLS Regressions					
Collectivized Land (IV)	1.273* (0.658)	0.422 (0.950)	-5.372*** (0.812)	2.595** (1.078)	-1.470 (1.023)
AR 95% CI	[0.62, 1.95]	[-1.29, 2.07]	[-7.19, -3.68]	[1.18, 4.13]	[-2.39, -0.58]
Effective F-Statistic	83.309	83.309	83.309	83.309	83.309
Mean Dep. Var.	6.164	19.194	43.669	19.234	42.866
Observations	606	606	606	606	606
Adjusted R ²	0.217	0.461	0.377	0.380	0.358
Region FE	Yes	Yes	Yes	Yes	Yes
Muni. Controls	Yes	Yes	Yes	Yes	Yes

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary social capital outcomes. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson-Rubin procedure at the 95% level. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Collectivization is associated with persistent political differences: historically collectivized regions tend to favor left-leaning (SLD) or centrist (PO) parties and demonstrate lower support for conservative (PiS) parties, as well as slightly lower voting participation. This aligns with the idea that socialist legacies have shaped more state-oriented and less mobilized political attitudes.

Although the main political outcomes are from 2011, I use the relative organizational stability of the SLD party throughout modern democratic Poland to test for differences in the relationship over time. Figure A14 displays the IV estimates for the previously reported regression, using SLD election outcomes from 1991 to 2023 for both local and parliamentary elections. The figure clearly shows that the previously described positive relationship for 2011 was already evident in 1991 and does not depend on the year or election type.

Together, these results suggest that collectivization is associated with long-lasting changes in political attitudes towards more leftist and central preferences.

5.5. Whole Country Analysis

The main analysis focuses on a subregion in south-eastern Poland, taking advantage of its specific historical circumstances to apply various identification strategies and estimate the impact of collectivization on civil and political outcomes. This regional focus helps to avoid issues that could be caused by confounding factors in western and northern Poland, where the resettlement of large numbers of Poles and border changes occurred following World War II. However, to test the generalisability of the observed relationships beyond this subregion, I

replicate the analysis with a broader sample covering the whole of contemporary Poland.

In this *whole country sample*, I employ an alternative measure of exposure to collectivization: a binary indicator for the historical presence of a state farm, as introduced by Wroński (2023). This indicator is based on an official government list that identifies municipalities classified as post-state farm (post-PGR) areas.¹³ The independent variables remain consistent with the baseline specification. However, the control variables are limited to contemporary economic, demographic, and geographic indicators because historical controls are either unavailable or inconsistent across the entire territory.

Table A.4 presents the results for formal civil society. Panel (a) shows the baseline OLS estimates for the original sample, which are the same as those in Table 2. Panel (b) applies an alternative empirical setup to the baseline sample, and Panel (c) reports estimates for the full national sample. The coefficients for formal civil society outcomes remain positive and statistically significant across all three setups. Only the coefficient for trade union presence, while similar in size in panel (c), becomes insignificant in panels (b) and (c).

Figure A15 shows the link between collectivization and left-wing political preferences in all national elections since 1991. This association remains stable over time and was already statistically significant in the earliest available year (1991), suggesting a persistent effect.

To assess the stability of the estimated coefficients in the national sample, I perform two robustness checks and visualize the results using the number of associations and foundations per 10,000 inhabitants, and the 2011 SLD vote share, as dependent variables. First, I excluded one voivodeship at a time. Second, I ran 5,000 Monte Carlo-style regressions, randomly excluding 50 municipalities each time. The resulting coefficient distributions are shown in Figure A16 and Figure A17 for the SLD vote share. Both exercises confirm the robustness and stability of the estimated effect.

Taken together, this supplementary analysis provides compelling evidence that regional historical circumstances do not affect the relationship between collectivization and civic and political outcomes. The main findings can be generalized to the whole of Poland.

5.6. Robustness

To ensure the validity of the baseline findings, I conduct a comprehensive set of robustness checks. These tests examine how sensitive the results are to different model specifications, measurement choices, and sample definitions. A detailed discussion of each test is available in the Appendix.

First, to address concerns about spatial dependence, I estimate spatial lag and spatial

¹³This list was originally compiled for a national grant program and appears to be overly inclusive, as it classifies some large urban municipalities as post-PGR territories.

error models and additionally report Conley standard errors at multiple distance thresholds. As shown in Appendix B.1, the results remain stable in sign, magnitude, and statistical significance across all spatial specifications.

Second, I examine the potential impact of selection on unobservables by following the methodology proposed by Oster (2019). The estimates reported in Appendix B.2 indicate that omitted variable bias is unlikely to account for the observed effects.

Third, I provide evidence that the results are robust to alternative definitions of the independent variable. Using different measures of collectivization, such as the land share of state farms or the number of state farms per municipality, I find consistent and significant positive effects on institutional civic outcomes (Appendix B.3).

Fourth, I extend the baseline specification by adding various sets of control variables, including indicators of economic development, agricultural structure, and educational outcomes. As shown in Appendix B.6, the inclusion of these covariates does not alter the main results.

Fifth, I conduct an outlier analysis using Cook’s distance to identify and exclude influential observations. The estimates reported in Appendix B.4 demonstrate that the main results are not driven by outliers.

Sixth, I perform a series of subsample analyses to assess heterogeneity in the treatment effects. As presented in Appendix B.5, the results remain robust when restricting the sample to rural municipalities or to areas with more homogeneous interwar religious composition.

Seventh, I re-estimate the baseline regressions using a simpler version of the instrument and discuss the results in Appendix B.7.

Eighth, I decompose collectivization into components explained by land reform and deportations. The similar explanatory power of both components supports the interpretation that collectivization is driving the results, regardless of how it was achieved (Appendix B.8).

Ninth, I rerun the baseline regression without excluding municipalities with more than 50,000 inhabitants and report the nearly unchanged results in Table A.23.

Overall, these robustness checks support the conclusion that the estimated relationship between collectivization and institutional civic outcomes is not driven by model specification, variable construction, or sample composition.

6. MECHANISMS

This paper provides evidence that the historical experience of collectivization shaped long-term social and political norms and preferences. It created a civil society that is more institutionally and hierarchically oriented, with stronger state dependence and left-leaning political preferences. While the effects are already evident in the early 1990s, even before the

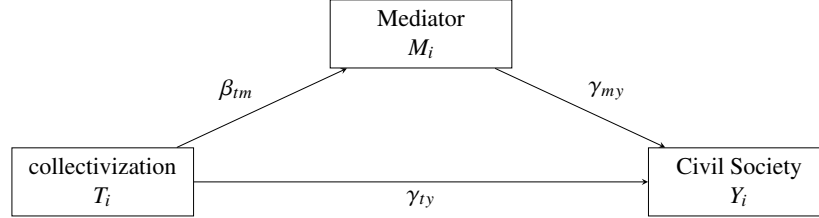
start of economic transition, they remain visible 30 years later, indicating strong persistence. In this section, I aim to provide evidence on which channels these effects operate and on the mechanisms behind their persistence. I will provide evidence that collectivized places showed a higher density of social and community institutions during the time of socialism and were affected by spatial reconfiguration, i.e., more agglomerated, denser housing environments. I argue that the two mechanisms are important drivers of the presented results. At the same time, I provide tentative evidence that selective migration and the transition shock are unlikely drivers behind the effects.

State farms maintained housing units where employees lived in close proximity, provided extensive social activities, and included institutions such as schools, kindergartens, and cultural and sports centers (Adamowicz, 2003). These daily experiences shaped the identity of its members and created networks and relationships that persisted even after the existence of the farm (Budzyński, 2020). Collectivization created distinct social spheres and served as a small welfare state for workers (Błąd, 2022). This also impacted neighboring farmers and villages that could profit from the provided infrastructure and supply of activities. Employees gained access to free holidays and often used the existing infrastructure to organize events (Buchowski, 2003). Workers developed a specific identity and a sense of ownership of state property Błąd (2022). This hybridization of exclusive benefits with strong state dependency created a distinct culture, also referred to as “homo PGRus” Błąd (2022). While this culture and identity shaped preferences, the direction beforehand is not unambiguous. Higher employee turnover and a lack of workplace attachment also led to lower integration among former employees (Borowski, 2013; Sakson, 2003). While collectivization is inherently a bundled treatment, I try to disentangle its components by distinctly testing for the presence of institutions and increased residential proximity.

Additionally, a final mechanism that constitutes an inherent part of collective agriculture itself and is thereby impossible to measure separately, is the mutual reinforcement of social capital and cooperative movements (Borzaga & Sforzi, 2014; Saz-Gil et al., 2021). The literature on agricultural cooperatives highlights the positive relationship with social capital. Democratic cooperatives build social capital at the local level and lay the foundations for the development of additional cooperatives. In their theoretical foundation of this relationship, Saz-Gil et al. (2021) describes that cooperatives facilitate collaboration with other cooperatives, entities, and local actors. This generates values and skills that then contribute to greater trust among the parties involved. It further encourages cooperation across different and heterogeneous networks and social groups. While collective institutions in Poland were different from voluntary cooperatives, some basic features were the same. At the same time, collective institutions in Poland lacked key features of democratic cooperatives, such as demo-

cratic management and often joint ownership. Cooperation, diversity, institutionalization, and collective needs could have been important factors in explaining differences in institutional trust and in the ability and interest of civil society organizations to operate in an institutional way.

Figure 9: Graphical illustration of the mediation analysis



To test the two proposed mechanisms, I conduct a formal mediation analysis as proposed in Imai et al. (2011). Following the implementation in Huesler (2025), I provide an illustration of the mediation analysis in Figure 9 and estimate it using the following two equations:

Mediator Equation (Effect of collectivization on Mediator)

$$Mediator_i = \beta_0 + \beta_{tm}collectivization_i + \theta X'_i + \delta_r + \varepsilon_i \quad (7)$$

Outcome Equation (Civil Society on Mediator and collectivization)

$$Y_i = \gamma_0 + \gamma_{ty}collectivization_i + \gamma_{my}Mediator_i + \theta X'_i + \delta_r + \varepsilon_i \quad (8)$$

These models are based on the same sample as the baseline regressions and include the same vector of controls X'_i , and region fixed effects δ_r . I run the mediation analysis using the *mediation* package provided by Tingley et al. (2014), with robust standard errors obtained via 2,000 bootstrap simulations. The output consists of the direct effect (ADE) of collectivization on civil society, the indirect mediated effect (ACME), the total effect of collectivization on civil society, and the proportion of the total effect explained by the mediated channel. I report the ACME, ADE, total effect, and proportion explained, along with the results of the first and second stages of the mediation analysis.

6.1. Institutions and Social Life

First, I test whether collectivization is associated with a stronger presence of social activities and institutions. Although data on membership or social participation during collectivization are unavailable, I digitized data from the 1974 Statistical Yearbook, which contains information on various institutions, including the number of cooperatives, community cen-

ters, cinemas, pharmacies, and post offices. Unfortunately, this data is not available for the Lublin region, reducing the dataset to around 407 observations. All institutional measures are calculated as the number of institutions per 10,000 inhabitants in the 1970s.

Table 7: Mediation of Collectivization through Socialist Institutions

	Mediator:			
	Community Centres (1)	Cinemas (2)	Pharmacies (3)	Post Offices (4)
Mediator Equation: Mediator on Collectivization				
Collectivized Land	0.413*** (0.059)	0.352*** (0.049)	0.205*** (0.007)	0.152* (0.084)
Outcome Equation: Associations on Collectivization and Mediator				
Collectivized Land	1.718*** (0.401)	1.502*** (0.321)	1.557*** (0.396)	1.291** (0.501)
Mediator	0.334 (0.272)	1.009*** (0.314)	1.460*** (0.200)	3.704*** (0.382)
Mediation Analysis Coefficients				
ACME	0.138	0.355	0.299**	0.563
ADE	1.718**	1.502*	1.557*	1.291*
Total Effect	1.856**	1.856**	1.856**	1.854**
Prop. Mediated	0.074	0.191	0.161*	0.304

Note: Entries report results from a causal mediation analysis examining the extent to which collectivization influenced the density of associations and foundations through different socialist-era institutional channels. The first stage presents estimates of the effect of collectivized land on each mediator. The second stage reports coefficients from regressions of associations/foundations per 10,000 residents on both the mediator and collectivized land, holding constant the full set of controls. The mediation section reports: (i) the Average Causal Mediation Effect (ACME), capturing the indirect effect operating through the mediator; (ii) the Average Direct Effect (ADE), representing the portion of the effect not passing through the mediator; (iii) the total effect; and (iv) the proportion of the total effect explained by the mediation channel. Standard errors for the first- and second-stage regressions are clustered at the voivodeship level, while uncertainty for mediation effects is obtained from nonparametric bootstrap simulations. Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 7 presents the results of the mediation analysis, which uses the number of associations and foundations per 10,000 inhabitants as the primary measure of formal civil society. The first-stage mediator regression shows that collectivization is significantly correlated with all four measures of socialist institutions. When both collectivization and mediators are included in the outcome equation, their coefficients are positive and statistically significant. However, the results reveal a rather weak mediation effect of institutions, as the average causal mediation effect (ACME) is not significant for most of the mediators. The direct effect of collectivization on the measure of formal civil society (ADE), equivalent to the coefficient in the outcome equation, is significant for all four measures. The similarity between the ADE and the total effect implies that only a small proportion of the impact of collectivization on formal civil society is mediated through socialist institutions. Additionally, Table A.7 shows the OLS and IV estimates for the four measures of socialist institutions and collectivization. The analysis shows that significance decreases with IV estimations.

This analysis provides tentative evidence of a stronger historical institutional presence in regions that experienced collectivization, suggesting that the effect of collectivization on formal civil society is partially mediated by these historical institutions. However, the presence of institutions alone is not conclusive, since their impact can depend heavily on population

density and agglomeration in the surrounding area, as described above.

6.2. Agglomeration and Density

Secondly, I examine how collectivization reshaped the agglomeration and living density of rural areas. Former state farms are known for their disruptive architecture. Instead of small individual farms, state farms were dominated by buildings blocs. The denser housing compared to scattered individual farms meant more exposure to neighbors, colleagues, and strangers. Recent research suggests that the type of village, or agglomeration in general, can have a significant impact on the social structures of its inhabitants. Studying the development of villages in northern Germany, Hager and Krakowski (2024) show that, compared to linear villages, circular villages fostered social cohesion among their residents by increasing equality and visibility.

I examine the relationship between collectivization and spatial organization using two datasets. First, a dataset of over 11 million building locations in Poland from the 1970s and 1980s, provided by Szubert et al. (2024). I use the exact geolocations of a building, assign it to a municipality, and calculate measures of housing density and spatial distribution. First, I calculate the average nearest neighbor ratio (ANN R) for each municipality. This ratio is calculated by taking the average distance of each building to its closest neighbor and comparing it with the average expected distance under complete spatial randomness. A lower ratio implies stronger clustering of houses. Secondly, I calculate Ripley's L-based clustering index to measure the number of neighbors within a given radius relative to complete spatial randomness. Radii of 100, 200, 300, and 500 meters are averaged to produce a single metric. Higher values of this metric imply greater clustering across medium spatial scales. Finally, using data from the Central Statistical Office of Poland, I calculate the density of settlements, villages, and cities, as well as the average number of dwellings per house, to distinguish between individual houses and housing blocks.

Table 8 presents the results of the mediation analysis, using the four agglomeration and housing density measures. The mediator equation shows that collectivization is not associated with changes in location density. At the same time, however, it is statistically significantly associated with a lower ANN R measure, a higher clustering coefficient, and a higher number of dwellings per building. These results suggest that, while collectivization did not change the number of locations, it reconfigured them towards more clustered and denser locations. Table A.8 presents the OLS and 2SLS results for the mediator equation, demonstrating the consistency and stability of the coefficients.

The mediation analysis reveals a statistically significant ACME for the three clustering and density measures, as well as significant differences between the ADE and the total effect.

Table 8: Mediation of Collectivization through Socialist Institutions

	Mediator:			
	Location Density (1)	ANNR (2)	Clustering (3)	Dwellings/Building (4)
Mediator Equation: Mediator on Collectivization				
Collectivized Land	−0.001 (0.001)	−0.016*** (0.002)	33.105*** (7.779)	0.038*** (0.007)
Outcome Equation: Associations on Collectivization and Mediator				
Collectivized Land	1.698*** (0.166)	1.070*** (0.293)	0.944** (0.375)	1.542*** (0.175)
Mediator	18.877 (29.834)	−39.230** (16.902)	0.023*** (0.008)	4.058 (3.764)
Mediation Analysis Coefficients				
ACME	−0.014	0.625***	0.751***	0.153**
ADE	1.698***	1.070**	0.944*	1.542***
Total Effect	1.684***	1.695***	1.695***	1.695***
Prop. Mediated	−0.009	0.369***	0.443***	0.090**

Note: Entries report results from a causal mediation analysis examining the extent to which collectivization influenced the density of associations and foundations through different socialist-era institutional channels. The first stage presents estimates of the effect of collectivized land on each mediator. The second stage reports coefficients from regressions of associations/foundations per 10,000 residents on both the mediator and collectivized land, holding constant the full set of controls. The mediation section reports: (i) the Average Causal Mediation Effect (ACME), capturing the indirect effect operating through the mediator; (ii) the Average Direct Effect (ADE), representing the portion of the effect not passing through the mediator; (iii) the total effect; and (iv) the proportion of the total effect explained by the mediation channel. Standard errors for the first- and second-stage regressions are clustered at the voivodeship level, while uncertainty for mediation effects is obtained from nonparametric bootstrap simulations. Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

These findings confirm that changes in housing and agglomeration patterns represent a key mechanism through which collectivization impacted civil society.

6.3. Alternative Channels

6.3.1 Migration and Population Development

When interpreting the observed relationship between collectivization and civic outcomes, it is important to consider the possibility of confounding factors related to migration and selection. Specifically, there is a possibility that individuals with stronger cooperative preferences or pro-socialist attitudes may have self-selected into collectivized areas, which could bias the estimated effects. Furthermore, systematic migration patterns following post-war deportations and resettlement could violate the exclusion restriction of the instrumental variable strategy. These issues have been well-documented in the literature on the long-term effects of land reform and forced migration (Lehmann, 2009).

To address this issue, I first examine long-term population trends in municipalities that experienced different levels of collectivization, land reform, and exposure to wartime deportations. Using historical population data, I then reconstruct municipal population trajectories from 1921 onwards. Figure A18 presents the average log-transformed population levels (panels A–C) and population density (panels D–F) for municipalities that are classified as: (i) above or below the median in terms of collectivization share in 1973; (ii) above or below the median

in terms of exposure to land reform; and (iii) within or outside the borderland region that was affected by deportations.

Panels A and D show that, although municipalities with high levels of collectivization experienced greater population declines during wartime, they subsequently underwent similar population growth. From the 1980s onwards, the population levels and density of these municipalities were slightly higher.

Panels B and E illustrate the trends according to land reform exposure. Throughout the period, the population trajectories remain largely parallel and statistically indistinguishable, with areas with low land reform experiencing slightly stronger growth. This suggests there are no significant demographic differences between high and low land reform areas.

Panels C and F show the trends in borderland and non-borderland areas. As expected, deportation reduced the population in affected areas during WWII. While some post-war recovery occurred, these municipalities remained smaller in terms of population, which is consistent with previous findings that certain regions never regained their pre-war population levels (Lehmann, 2009). However, the population development after WWII occurred relatively similarly for both groups.

Taken together, these findings suggest that population dynamics in collectivized areas diverged over time, but only after WWII and only within those areas, rather than in land reform or borderland comparisons. Furthermore, the lack of differences prior to WWII lends credibility to the identification strategy and suggests that other demographic factors are unlikely to account for the primary findings.

Secondly, I consider whether individuals with specific political or cooperative tendencies may have migrated to collectivized areas. Although detailed data on the origins of individuals is unavailable, several historical sources suggest limited mobility and selective migration. Lehmann (2009) documents that post-war repopulation in rural areas such as Bieszczady was slow and largely local. Most settlers came from impoverished rural households in south-eastern Poland, with only a small number of external migrants, including political refugees from Greece and Soviet Ukraine (Biernacka, 1973; Misiło, 2012).

Archival evidence supports the idea of localized resettlement. In the Kraków Voivodeship, for example, local people without land received 1,555 out of 1,591 post-Ukrainian farms, while incoming settlers received the remainder.¹⁴ Similarly, only 17% of the 67,532 Ukrainian farms in Rzeszów were resettled by 1948, primarily by local residents.¹⁵

Additional support comes from the DIAGNOZA survey, which covers 380 municipalities in the study region. As Figure A19 shows, the proportion of residents with Kresy ancestry does

¹⁴“Osadnictwo na gospodarstwach poukraińskich poniżej 100 ew. 50 ha.” Sprawozdania statystyczne zbiorcze, Urząd Wojewódzki w Krakowie. Sygn. 2/162/0/11.8/2599.

¹⁵Sprawozdania statystyczne zbiorcze, Urząd Wojewódzki w Rzeszowie. Sygn. 2/162/0/11.8/2603.

not differ significantly between municipalities with high and low levels of collectivization. This further suggests that historical migration patterns are unlikely to affect the main results.

In summary, both quantitative and qualitative evidence suggest that neither large-scale selective migration nor pro-socialist self-selection into collectivized areas is a likely explanation for the estimated effects. These findings also lend support to the validity of the exclusion restriction in the instrumental variables (IV) strategy.

6.3.2 Transition Shock

The collapse of collective agriculture in Poland began in the early 1990s with the introduction of rapid market reforms. The Balcerowicz Plan involved the implementation of economic *shock therapy*, resulting in the swift privatization of state-run enterprises. Collectivized agriculture was particularly affected: by 1991, around 2 million people, including approximately 500,000 state farm employees and their families, experienced the transition. The social and economic consequences were often severe and disruptive (Feltynowski et al., 2015; Tarkowska, 1998, 2002). However, it is important to note that the transition period negatively affected private and individual farms, too. This section examines whether the legacy of collectivization interacted with the post-socialist transformation, and whether long-term economic outcomes can explain the observed patterns in civic engagement.

First, I examine the localized impact of the 1990s transformation. Two consequences of economic transition that have been widely discussed are rising unemployment and increased out-migration (Błąd, 2022; Tarkowska, 2002). To measure unemployment, I use administrative data on individuals registered as unemployed from households with individual agricultural holdings or allotments. I normalize this figure by the number of household members aged 15 and over in similar agricultural households. I construct a dummy variable that indicates whether the unemployment rate of a municipality exceeds the mean. I capture migration by calculating the average yearly net migration between 1995 and 1999 and normalizing this figure by the municipal population in 1998. A dummy variable equals one if this value is negative.

Figure A20 shows that municipalities with negative net migration are associated with slightly higher collectivization, while unemployment levels do not differ. This confirms that although collectivized areas were hit harder by the transition, the differences were modest, as transition shocks were not unique to them but occurred elsewhere with slightly lower intensity.

Table A.11 shows the results of the baseline OLS regressions, including the two measures of the transition shock: the unemployment rate and average net migration. The coefficient of collectivized land remains highly significant for all regressions, albeit with a slightly reduced magnitude. The two proxies for the transition shock are consistently linked to lower

associational and cooperative development. This pattern suggests that, although socialist collectivism provided communities with the institutional and cultural resources necessary for collective action, economic disruption during the transition to a market economy led to the decline of these resources in the most affected areas.

To assess the association between historical collectivization and persistent differences in local economic performance, I examine five contemporary indicators: the unemployment rate, the average gross wage, night-time luminosity, the number of social benefit recipients, and municipal expenditure per capita. As shown in Table A.12, the regressions reveal no consistent significant association between collectivization and any of these outcomes.

These results suggest that collectivization is not systematically associated with long-term economic underperformance. Furthermore, adjusting for contemporary economic conditions does not significantly alter the magnitude or significance of the primary effects.

7. CONCLUSION

This paper investigated the long-term political and economic impact of collective farming in Poland. Poland is a unique case for studying the impact of collectivization, as it is among the few countries in the former Soviet bloc that experienced only partial collectivization of its agriculture. The main empirical challenge in identifying the effect of collectivization on social and political outcomes lies in the potential endogeneity of successful collectivization. For identification, this paper builds on the idea that collectivization was more successful in areas where the state had more “abandoned” land to govern and had to deal less with fragmented smallholder agriculture. For this, I use two separate identification strategies: the deportation of non-Polish minorities around World War II, and the expropriation of large land owners in the 1944 land reform. Both of those policies made land more readily available to the state for governance and the successful establishment of collective agriculture.

This paper shows three main findings on the long-term effects of collectivization. First, collectivization is associated with a more hierarchy-oriented institutionalized form of civil society. Places that were historically collectivized have higher NGO density, labor union presence, and a higher share of active cooperatives. Second, former collectivization is associated with more center and left-leaning political preferences, as expressed, e.g., by voting results for the communist successor party SLD. Finally, collectivization is associated with increased trust in institutions. Further, I provide evidence that residential densification and exposure to more historical socialist institutions could be important mechanisms behind this effect. The results are robust throughout both identification strategies and a wide range of robustness tests and sensitivity analysis.

The results of this paper provide evidence that the socialist experience in the rural sphere did not necessarily destroy social capital, but changed it. Places with greater exposure to socialism developed a type of institutionalized civil society characterized by hierarchy, dependency, and potentially lower levels of interpersonal contact and grassroots activism.

While this paper provides the first quantitative analysis of the social and political legacies of collectivization in Poland, it is limited by certain aspects. The data availability allows me to measure collectivization only at specific points in time, rather than showing dynamic development over time. Further, showing results after the transition period risks differences emerging during that time. Finally, as collectivized agriculture often had a very local impact, a municipality as a unit of observation might still not be the perfect way to measure the exposure. Future research could fill those gaps by conducting survey interviews, including particular questions on employment and exposure to socialist institutions in Poland. Further, the heterogeneity of effects by social groups and gender should be considered. Future research could also be study how civic infrastructure changed and adapted during the transition period and the privatization of collective agriculture.

This paper, for the first time, established a quantitative evaluation of collectivization and social and political development in Poland after the transition period. These findings show how important institutions can be for the development of civic life. They also have important implications for how those changed norms and preferences persist in institutional change.

Beyond its empirical contribution, this paper provides new historical data at a local level and offers tools for further research into the long-term relationship between institutional design, civic capacity, and political behavior. Understanding these dynamics is crucial for explaining the sharp differences in the vitality of civil institutions and the resilience of civic cultures across societies.

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SUPPLEMENTARY MATERIAL

A. INTERWAR DATA AND POLISH MUNICIPALITY CROSSWALK

Working with interwar data in Poland presents several challenges. The first issue lies in the inconsistent definition of “places”, the basic unit of observation in censuses and other statistical sources. In the Lublin, Holy Cross, and Kielce regions, data are reported at the municipal level, whereas in the Lwów and Kraków regions, they are recorded at the level of settlements or villages. As a result, the initial step in data standardization involved assigning these localities to their corresponding historical municipalities.

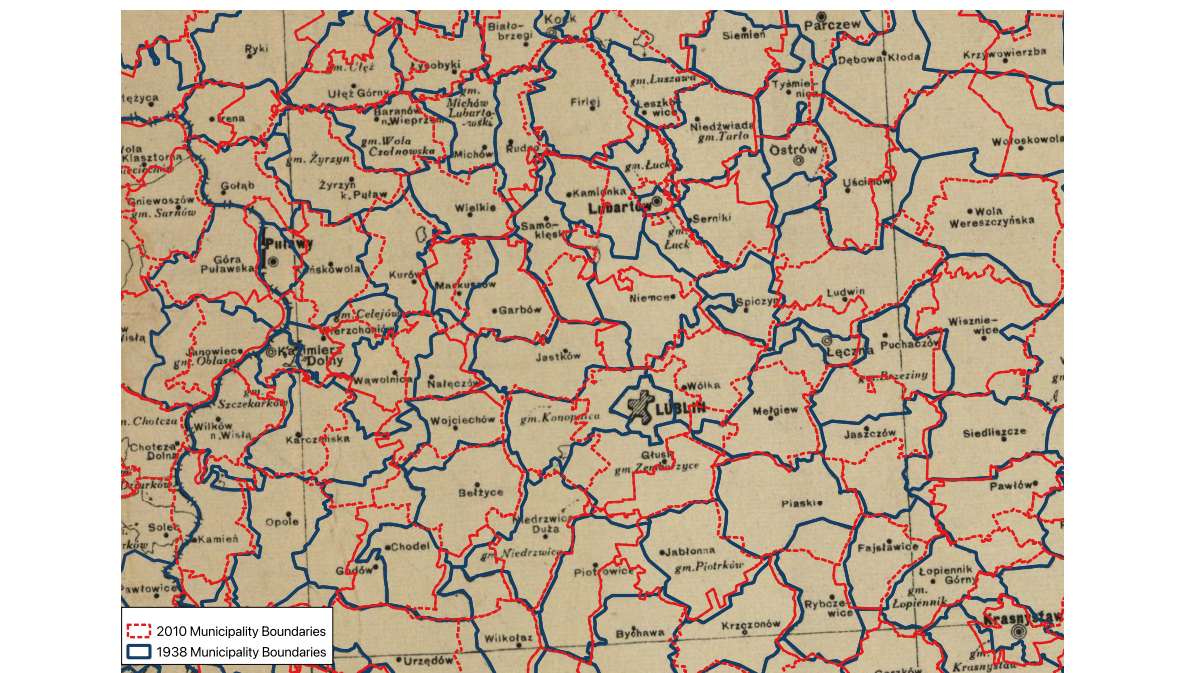
For the Lwów region, this task was facilitated by the online database “Eastern Borderlands Places”, developed by Ewa Kamińska and Adam Kamiński (<https://www.kami.net.pl/kresy/>). Their project lists 54,962 localities from ten eastern Polish regions, including their historical municipality (gmina), county, and Roman or Greek Catholic parish affiliation. Based on this dataset, 2,115 locations were matched for the year 1921 and 1,643 for 1932. For the Kraków region, each locality had to be manually searched, geocoded, and linked to historical parishes, resulting in the assignment of 1,962 locations for 1921 and 1,910 for 1932. Once matched, the data were aggregated to the level of historical municipalities.

The second major challenge concerns the substantial administrative changes that occurred throughout the 20th century, which make it impossible to directly align historical municipality data with present-day municipal boundaries. To address this, I created the first shapefile of interwar municipal boundaries in Poland as part of this project. A detailed administrative map of Poland as of April 1, 1938, obtained from the Polish National Library, was manually georeferenced. Municipal boundaries were vectorized and converted into a shapefile, allowing for spatial alignment of the 1921 and 1931 census data and other sources to 1938 historical municipalities. Figure 10 shows a part of the 1938 administrative map with vectorized municipality borders for 1938 and 2010.

Because additional administrative changes occurred between 1921 and 1938, in cases where a direct match was not feasible, I used historical legal records to track boundary modifications. Variables were assigned proportionally, based on the area affected by a division, amalgamation, or alteration of municipal borders.¹⁶

The final step involved developing a custom algorithm to calculate the spatial overlap between historical municipalities and contemporary ones. This geospatial routine compares municipality boundaries from 1938 with those from 2010. It reads and validates both shapefiles, reprojects them to a common coordinate system, calculates polygon areas, and computes

¹⁶Most legal texts governing administrative changes during the interwar period are available through the OpenLEX legal database: <https://sip.lex.pl/akty-prawne/>.



Note: This figure shows the administrative boundaries in the Lublin region of Poland. The red dashed lines indicate 2010 municipality boundaries, while the blue lines show 1938 municipality boundaries manually vectorized from a historical administrative map.

intersections. The overlapping areas are used to calculate what percentage of each 1938 municipality falls within the borders of a 2010 municipality. These percentages are saved in a CSV file.

Using this crosswalk, I assigned historical municipalities to their modern counterparts based on area-weighted overlap. The values of historical variables were multiplied by the percentage of each overlap and then aggregated to the current municipal level. This approach provides the most accurate possible linkage between interwar data and the current administrative structure, allowing consistent analysis across the 1921–2023 period for the entire study region. The procedure is currently being expanded to cover all regions of interwar Poland.

B. SENSITIVITY ANALYSIS

B.1. Spatial Autocorrelation

A potential concern when estimating regional treatment effects is violating the assumption of spatial independence. As Conley and Kelly (2025) suggests, researchers often underestimate standard errors in studies of historical persistence due to spatial autocorrelation, i.e., the

correlation of outcomes across neighboring units. To address this issue, I have implemented two robustness checks that account for spatial dependence, in line with recent methodological recommendations and procedures (Drelichman et al., 2021; Hager & Krakowski, 2022).

First, I re-estimate the baseline OLS models using Conley standard errors, which account for spatially correlated residuals across municipalities within specified distance thresholds. Table A.13 reports the results for thresholds of 15, 30, 45, and 60 km. Although the standard errors differ slightly with distance, all the key coefficients remain statistically significant and stable in magnitude. This suggests that spatial correlation in the residuals does not influence the main results.

Secondly, I estimate spatial autoregressive models using a contiguity-based spatial weight matrix. Specifically, I implement a spatial error model (SEM), which captures spatial dependence in the error term, and a spatial lag model (SLM), which incorporates spatial dependence in the dependent variable. Table A.14 reports the results from these models alongside the baseline ordinary least squares (OLS) estimates. While there are minor differences in significance levels and coefficient sizes, the direction and magnitude of the effects remain consistent across the different models.

Excluding municipalities with more than 50,000 inhabitants from the main sample means that a small number of municipalities without contiguous neighbors are dropped from the spatial models. Re-estimating the models with the full set of municipalities, including large urban areas, produces similar results and does not alter the overall conclusions.

Overall, the results of the Conley and spatial regression models confirm that spatial autocorrelation does not introduce bias into the estimated relationship between collectivization and civic outcomes. These findings remain consistent when considering alternative specifications that explicitly account for spatial dependence.

B.2. Robustness to Selection on Unobservables

Table A.15 reports the results of the Oster (2019) test for selection on unobservables, as applied to baseline regressions examining the relationship between collectivization and contemporary formal civil society. For each regression, I additionally report: (i) the uncontrolled coefficient (i.e. with no covariates); (ii) the bias-adjusted lower bound estimate of the treatment effect (β), assuming $R^2_{\max} = 1.3 \cdot R^2$; and (iii) the δ statistic, which indicates the relative importance of selection on unobservables versus observables in generating the estimated treatment effect (see (Bugge & Nafziger, 2021; Oster, 2019)).

A value of $|\delta| = 1$ means that the unobservables would have to be as strongly correlated with the treatment and the outcome as the included covariates in order to fully account for the observed effect. Values of $|\delta| > 1$ suggest that unobservables must be more strongly

correlated than observables to drive the coefficient to zero. Negative values of δ suggest that selection on observables and unobservables operates in opposite directions (Gorman et al., 2021; Ivlevs, 2021).

For all statistically significant baseline outcomes, I show that $|\delta|$ is consistently greater than 1 and that the magnitude of the bias-adjusted β values remains close to that of the original estimates. These results imply that omitted variable bias is unlikely to solely drive the effects of collectivization, and the effects remain robust to plausible forms of unobserved selection.

B.3. Alternative Measures

To demonstrate that the results are not influenced by a specific definition or measurement of collectivization, Table A.16 shows the variation in the estimates for different measures of collectivization. To ensure comparability, I scaled all independent variables. All regressions show a significant, positive relationship of similar magnitude.

B.4. Outlier Analysis

To ensure that the results are not driven by influential observations, I re-estimated the baseline models using smaller sample sizes. The results are presented in Table A.17. For each regression, I compute Cook's distance and apply two commonly used exclusion criteria to identify potential outliers: (1) observations with a Cook's distance greater than three times the mean and (2) observations with a Cook's distance exceeding $\frac{4}{N}$, where N is the sample size.

Depending on the specification and method, applying these criteria can reduce the sample size by up to 10%. Although removing outliers results in small variations in coefficient magnitudes, the overall direction, size, and statistical significance of the estimates remain stable. This provides reassurance that the results are not driven by a small number of highly influential cases and that the main findings are robust in the presence of outliers.

B.5. Subsample Analysis

To explore potential heterogeneity in the effects, I re-estimated the baseline regressions across different subsamples, as shown in Table A.18. Column (1) reports the results for the full sample. Columns (2) and (3) exclude all urban municipalities and municipalities with less than 50% of the population identifying as Catholic in the interwar period, respectively, while Column (4) removes municipalities that are closer than 15km to the Polish national border. These restrictions reduce the sample size to 531, 569, and 421 observations, respectively.

Excluding urban municipalities does not affect the significance of the results, although it does slightly alter the magnitude of some coefficients. This aligns with expectations, given that collectivization was primarily a rural phenomenon with less relevance in urban contexts. Restricting the analysis to municipalities without an interwar Catholic majority and with low post-war population turnover aims to sharpen the results by limiting potentially confounding factors. While these restrictions lead to a reduction in the statistical significance of the coefficients associated with formal civil society, the magnitude and direction of these coefficients remain similar.

Overall, the results are consistent with the baseline findings: collectivized land is still positively and significantly associated with formal civic society. These patterns suggest that the main relationships are robust across different subsamples, but they may be more pronounced in contexts that are more homogeneous demographically and historically.

B.6. Additional Controls

Table [A.19](#) reports the results of the baseline regression with the sequential inclusion of additional control variables, in order to test the robustness of the main findings. This ensures that the estimated relationship between collectivization and contemporary civic outcomes is not confounded by omitted variables relating to agricultural structure, economic development, or education.

Column (1) shows the bivariate regression with no controls. Column (2) adds the full set of baseline controls, including region fixed effects. In column (3), I include county (powiat) fixed effects to account for more localized unobserved heterogeneity. Column (4) adds a set of contemporary agricultural controls, including the number of tractors per farm in 2010, the proportion of agricultural land in good condition in 2010, the proportion of total land used for agriculture in 2012, the proportion of agricultural employment among all employment in 2010, farm density, and the proportion of farms larger than 10 hectares.

Column (5) includes economic controls that capture present-day municipal economic conditions. These are: municipal expenditure per capita (2011); the share of foreign firms (2009); the average gross salary (2018); the unemployment rate (2010); the average night-time light luminosity (1995); the population density (2010); and the number of social benefit recipients (2010).

In column (6), I control for variation in educational outcomes. This includes the number of public secondary and primary schools per square kilometer, the proportion of residents with higher education qualifications, the average class size in primary schools, municipal education spending per capita, and average results from the national exams taken by 9th- and 6th-grade students.

Across all model specifications, the significance and magnitude of the coefficients of collectivized land remain relatively consistent. These results reinforce the idea that researchers cannot explain the observed relationships through contemporary differences in agricultural structure, local economic conditions, or educational attainment.

B.7. Alternative Instrument Definition

As an alternative to the previously defined land reform instrument, I use a simpler definition. I divide the dataset into observations above and beyond the median share of land affected by the reform. This alternative instrument measures the impact of land reform more directly. Table A.20 reports the first stage of the alternative land reform dummy instrument approach. In table A.21, I present the OLS results and the new 2SLS estimations using the alternative instrument. The coefficients remain positive and similar in magnitude, albeit with reduced significance. These differences and reduced significance imply that, while the pure land reform measure confirms the relationship, it is significantly biased, as discussed previously. This confirms the previously discussed usage and motivation of the land reform instrument.

B.8. Decomposition of collectivization

In this paper, I use two relatively independent historical events to explain the subsequent process of collectivization: the 1944 land reform and the borderland deportations between 1944 and 1947. Both are significant factors in explaining collectivization. To provide further evidence that it is collectivization itself that matters, rather than the manner in which land was collectivized, I decompose the variation in collectivization into the part that is explained by the land reform instrument, which is used in the IV regressions, and the borderland dummy, which is used in the FRDD regressions. This is achieved by removing the effect of the land reform instrument from the borderland dummy and from the measure of collectivization, before regressing the two residuals to determine the proportion of collectivization explained by the land reform net of the borderland dummy. This isolates the unique variation in collectivization attributable to the land reform dummy. I do the same for the borderland dummy.

Table A.22 presents the results of this decomposition exercise. Rerunning the baseline regression with both collectivization components shows that, for the main measure of formal civil society, both components explain the number of associations and foundations per 10,000 inhabitants to a similar extent, even though the deportation component is less significant. The same can be said of the other measures of formal civil society, which vary in significance and magnitude. This reassures the interpretation that I measure the effect of collectivization, as its impact seems similar whether it was accomplished through one means or another.

C. APPENDIX TABLES

Table A.1: Descriptive Statistics for Main Variables

variable	description	source	n	mean	median	sd	min	max
assoc_foundations_per_10k	Associations/Foundations per 10k (2015)	GUS Local Data Bank	625	32.05	31.00	11.64	11.00	120.00
cooperatives_share_legal_forms	Cooperatives (% of registered entities) (2015)	GUS Local Data Bank	625	9.79	6.82	9.30	0.00	66.67
union_presence	Trade Union Presence Dummy (2015)	Charnysh (2019)	624	45.83	0.00	49.87	0.00	100.00
SLD_2011	Share SLD (2011)	National Electoral Commission	625	6.16	5.26	3.87	1.10	34.65
PSL_2011	Share PSL (2011)	National Electoral Commission	625	19.19	16.84	11.74	1.29	76.55
PIS_2011	Share PIS (2011)	National Electoral Commission	625	43.67	42.95	11.44	14.27	76.93
PO_2011	Share PO (2011)	National Electoral Commission	625	19.23	17.01	9.71	1.73	54.80
turnout_2011	Election Turnout (2011)	National Electoral Commission	625	42.87	42.87	5.86	29.00	61.73
Share_Rel_Rym	Share of Roman Catholics in 1931	1921 Polish Census	621	0.82	0.93	0.22	0.03	1.00
Share_Rel_Ort_alt	Share of Orthodox in 1931	1921 Polish Census	621	0.10	0.00	0.19	0.00	0.92
Share_Rel_Jew	Share of Jewish population in 1931	1921 Polish Census	621	0.07	0.04	0.09	0.00	0.74
Pop_density_31	Population density in 1931	1931 Polish Census	621	101.67	89.00	59.80	9.05	493.93
House_density_31	Housing density in 1931	1931 Polish Census	621	16.81	14.71	8.73	1.46	92.71
Share_AgriArea_31	Share of agricultural area in 1931	1931 Polish Census	621	0.65	0.69	0.17	0.02	0.97
Share_AgriArable_31	Share of arable land in 1931	1931 Polish Census	621	0.51	0.53	0.16	0.01	0.89
SexShare_21	Share of females in 1921	1921 Polish Census	621	0.93	0.92	0.25	0.43	5.70
altitude	Mean elevation (meters)	Own Calculation	625	278.17	235.31	147.34	120.22	1159.08
meansuit	Mean land suitability for agriculture	GAEZ Database	625	43.26	39.56	15.67	2.77	85.62
TRI_Worldmean	Terrain ruggedness index (global)	Shaver et al. (2019)	625	0.07	0.04	0.07	0.01	0.44
expro_peragripop_50s	Land Reform Instrument	Own Calculation	619	0.04	0.02	0.08	-0.00	0.86
Share_reform_1944	Share Land Expropriated in 1944 Reform	Epsztein et al. (2024)	623	0.12	0.08	0.13	0.00	0.95
Share_socialist_land_73	Share Socialized Land 1973	Statistical Yearbooks 1984	617	0.03	0.01	0.05	0.00	0.50
PGR_n_73	Number of State Farms 1973	Statistical Yearbooks 1974	617	0.51	0.00	0.77	0.00	4.00
PGRhpp	State Farm h per Person	Statistical Yearbooks 1984	617	0.04	0.00	0.14	0.00	2.12
unique_PGR_count_dummy	PGR Dummy	Wroński (2023)	625	0.47	0.00	0.50	0.00	1.00

Table A.2: Covariates at the Religious Border

	<i>Dependent variable:</i>					
	Share Socialized Land	Share: Catholic	Share: Orthodox	Share: Jewish	Log Pop Density	Log House Density
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Borderland (linear in distance)	0.049*** (0.009)	-0.358*** (0.035)	0.320*** (0.044)	0.026*** (0.007)	-0.150 (0.106)	-0.131 (0.110)
Inside Borderland (longitude + latitude)	0.020*** (0.006)	-0.219*** (0.026)	0.183*** (0.040)	0.029* (0.015)	-0.169*** (0.073)	-0.161* (0.083)
Year	1973	1921	1921	1931	1931	1931
Mean for outside Borderland	0.010	0.920	0.015	0.063	4.533	2.757
Observations	383	380	380	380	380	380
R ²	0.382	0.713	0.684	0.535	0.463	0.499
	Share Agri. land	Share Arable Land	Sex Share 21	Altitude	Agri. Suitability	Ruggedness
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Borderland (linear in distance)	-0.025 (0.026)	-0.073*** (0.026)	0.006 (0.008)	25.098 (19.405)	-4.553 (3.842)	0.011 (0.010)
Inside Borderland (longitude + latitude)	-0.033 (0.028)	-0.073*** (0.027)	-0.008 (0.010)	1.356 (13.478)	-5.646** (2.567)	0.014 (0.011)
Year	1931	1931	1921	-	-	-
Mean for outside Borderland	0.654	0.526	0.913	288.276	42.405	0.078
Observations	380	380	380	384	384	384
R ²	0.367	0.384	0.144	0.862	0.570	0.829
	Flowing Water	Standing Water	Precipitation	Temperature	Agricultural Land PC	Total Area
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Borderland (linear in distance)	0.001 (0.001)	0.001 (0.001)	18.448 (13.483)	-0.148 (0.140)	0.001 (0.001)	30.026** (13.131)
Inside Borderland (longitude + latitude)	0.002 (0.002)	0.002 (0.002)	-8.591 (7.079)	0.005 (0.071)	0.001 (0.0005)	22.002 (13.808)
Year	-	-	-	-	1931	-
Mean for outside Borderland	0.008	0.002	665.047	7.354	0.008	103.318
Observations	383	383	381	384	380	380
R ²	0.190	0.061	0.976	0.646	0.310	0.133
	Share Votes PPS	Share Votes PSL	Election Turnout	Share Land Reform	Cooperation Presence 1936	Cooperation Turnover 1936
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Borderland (linear in distance)	-0.025 (0.015)	-0.038** (0.016)	-0.057*** (0.017)	-0.006 (0.025)	-0.005 (0.058)	-2.117* (1.154)
Inside Borderland (longitude + latitude)	-0.011 (0.018)	0.011 (0.029)	-0.024 (0.016)	-0.030 (0.020)	0.079 (0.108)	-1.118 (1.466)
Year	1928	1928	1928	1944	1936	1936
Mean for outside Borderland	0.126	0.107	0.817	0.121	0.304	3.297
Observations	377	377	377	383	384	384
R ²	0.286	0.470	0.317	0.114	0.368	0.099
Bandwidth	40km	40km	40km	40km	40km	40km
Number Segments	7	7	7	7	7	7
Segment FE and Controls	Yes	Yes	Yes	Yes	Yes	Yes

Comment: This table presents covariate balance tests using a fuzzy regression discontinuity design (RDD) around the historical religious border in southeastern Poland. The dependent variables include demographic, geographic, environmental, political, and land-related characteristics measured prior to treatment (mostly from 1921–1944). Each covariate is regressed on a treatment indicator for being inside the historical non-Catholic (Orthodox) territory. Panel A reports coefficients from a specification including a quadratic polynomial in distance to the border (1D), while Panel B includes a quadratic in latitude and longitude and their interaction (2D). All regressions control for baseline geographic features (e.g., terrain ruggedness, altitude, agricultural suitability), population density in 1984, and include fixed effects for 100km segments along the border. Standard errors are clustered at the segment level. The sample is restricted to municipalities within 40km of the religious border.

Significance levels: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.3: Collectivization and Donations (RDD)

	Donation Dummy (1)	% Orgas. receiving Donation (2)	Donations per 10k (3)
Bandwidth: 40km			
Panel A: Polynomial in Distance to Border			
Collectivized Land	-0.109* (0.057)	-0.007 (0.007)	-16.922* (9.770)
R ²	0.146	0.182	0.124
Panel B: Polynomial in Latitude and Longitude			
Collectivized Land	-0.0004 (0.262)	-0.010 (0.031)	-39.765 (35.525)
R ²	0.180	0.178	0.004
Observations	381	381	381
Mean outside	0.57	0.04	17.64
Year	2015	2015	2015
Geo. Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
Bandwidth: 20km			
Panel A: Polynomial in Distance to Border			
Collectivized Land	-0.056 (0.052)	-0.001 (0.005)	-5.201 (4.125)
R ²	0.206	0.223	0.107
Panel B: Polynomial in Latitude and Longitude			
Collectivized Land	-0.046 (0.109)	-0.007 (0.013)	-11.669 (12.323)
R ²	0.206	0.217	0.060
Observations	234	234	234
Mean outside	0.55	0.04	11.56
Year	2015	2015	2015
Geo. Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes

Notes: This table presents results from a fuzzy regression discontinuity design (FRDD) estimating the effect of entering the historical non-Catholic territory on donations behavior. Each outcome is regressed on an indicator for being inside the historical Orthodox (non-Catholic) territory, instrumenting for the level of collectivized land. Panel A uses a quadratic polynomial in distance to the border (1D RDD); Panel B uses quadratic polynomials in latitude and longitude (2D RDD) as controls. All regressions include controls for population density (1984), agricultural suitability, terrain ruggedness, and urban status. All models include fixed effects for 200km border segments. Standard errors are clustered at the segment level. Results are presented separately for 40km and 20km bandwidths.

Significance levels: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.4: Collectivization and Civil Society (Whole Country Analysis)

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k	Cooperatives (% of registered entities)	Trade Union presence (Dummy)
Panel a) Baseline Regression - Study Area			
Collectivized Land	1.695*** (0.174)	1.335*** (0.357)	3.556*** (1.073)
Mean Dependent Variable	32.046	9.792	45.833
Observations	611	611	610
Adjusted R ²	0.069	0.250	0.032
Panel b) Alternative Regression - Study Area			
PGR Dummy	1.669** (0.686)	2.649* (1.437)	-1.879 (2.795)
Mean Dependent Variable	32.046	9.792	45.833
Observations	625	625	624
Adjusted R ²	0.004	0.019	-0.001
Panel c) Alternative Regression - Whole Poland			
PGR Dummy	1.409*** (0.493)	1.340*** (0.353)	4.899 (3.291)
Mean Dependent Variable	31.545	8.060	52.615
Observations	2,480	2,480	2,480
Adjusted R ²	0.106	0.268	0.024

Note: This table presents regression estimates of the relationship between collectivization and civil society outcomes. Panel (a) shows baseline results for the southeastern study area using the standardized share of collectivized land in 1973 as the independent variable, and the standard set of controls (interwar demographics, geographic conditions, and voivodeship fixed effects). Panel (b) applies an alternative specification to the same study area, using a dummy for the presence of a state farm (PGR) as the main explanatory variable (see (Wroński, 2023)), and includes an extended set of controls: presence of railway infrastructure, nighttime luminosity, GPS-based altitude, log population and unemployment, population density, historical partition dummies, and geographic coordinates. Panel (c) extends this alternative specification to the full territory of Poland. All regressions include voivodeship fixed effects, and standard errors are clustered at the voivodeship level. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.5: First Stage Regressions, FRDD

	<i>Dependent variable:</i>			
	Collectivized			
	(1)	(2)	(3)	(4)
Outside Borderland Dummy	-1.015*** (0.112)	-1.100*** (0.121)	-0.974*** (0.116)	-0.947*** (0.112)
Baseline Controls	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
Region FE	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>
Additional Controls	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>
First-stage partial F-statistic	81.95	83.15	71.15	71.12
Observations	384	379	384	379
R ²	0.177	0.222	0.183	0.373
Adjusted R ²	0.174	0.203	0.175	0.351

Comment: This table reports first-stage regressions where the outcome is the standardized share of collectivized land in 1973, and a dummy that takes the value of 0 if a municipality is outside the 'borderlands'. Columns vary by inclusion of historical covariates and region (voivodeship) fixed effects. Control variables include the interwar share of Jewish population, the share of agricultural land, population and housing density (1931), agricultural suitability, terrain ruggedness, altitude, and urban status. Additional controls include the share of Catholic and Orthodox population, and the presence and per capita turnover of interwar cooperatives. Voivodeship fixed effects account for regional heterogeneity. All variables are standardized to allow for direct comparison of coefficient magnitudes. Partial F-statistic testing the joint significance of the excluded instrument in the first-stage regression. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.6: Collectivization and Social Norms (DIAGNOZA)

	'Community Involvement' (1)	'Institutional Trust' (2)	'Social Network' (3)	'Social Interactions' (4)
Bandwidth: 40km				
Panel A: Polynomial in Distance to Border				
Collectivized Land	-0.016 (0.015)	0.037 (0.026)	-0.013* (0.008)	-0.018** (0.009)
R ²	0.053	0.069	0.070	0.150
Panel B: Polynomial in Latitude and Longitude				
Collectivized Land	-0.012 (0.034)	0.028 (0.056)	-0.002 (0.010)	-0.023** (0.011)
R ²	0.054	0.067	0.070	0.139
Observations	2,665	2,696	2,675	2,642
Mean outside	0.17	0.46	0.14	0.13
Year	2015	2015	2015	2015
Geo. Controls	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes
Bandwidth: 20km				
Panel A: Polynomial in Distance to Border				
Collectivized Land	-0.025 (0.027)	0.046 (0.039)	-0.010 (0.006)	-0.018** (0.007)
R ²	0.057	0.061	0.071	0.154
Panel B: Polynomial in Latitude and Longitude				
Collectivized Land	-0.031 (0.036)	0.038 (0.038)	-0.012 (0.013)	-0.020 (0.014)
R ²	0.068	0.064	0.078	0.154
Observations	1,648	1,671	1,655	1,639
Mean outside	0.17	0.44	0.14	0.12
Year	2015	2015	2015	2015
Geo. Controls	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes

Notes: This table presents results from a fuzzy regression discontinuity design (FRDD) estimating the effect of entering the historical non-Catholic territory on social norms using the DIAGNOZA Polish social survey wave of 2015. Each outcome is regressed on an indicator for being inside the historical Orthodox (non-Catholic) territory, instrumenting for the level of collectivized land. Panel A uses a quadratic polynomial in distance to the border (1D RDD); Panel B uses quadratic polynomials in latitude and longitude (2D RDD) as controls. All regressions include controls for population density (1984), agricultural suitability, terrain ruggedness, and urban status. All models include fixed effects for 200km border segments. Standard errors are clustered at the segment level. Results are presented separately for 40km and 20km bandwidths. Significance levels: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.7: Collectivization and Institutions in Socialism

	<i>Dependent variable:</i>			
	Community Centres (1)	Cinemas (2)	Pharmacies (3)	Post Offices (4)
Baseline OLS Regressions				
Collectivized Land (OLS)	0.361*** (0.052)	0.307*** (0.043)	0.179*** (0.006)	0.133* (0.073)
Mean Dep. Var.	6.434	0.941	2.245	3.199
Observations	412	412	412	410
Adjusted R ²	0.159	0.162	0.108	0.186
2SLS Regressions				
Collectivized Land (IV)	-0.304 (0.257)	0.439** (0.181)	0.186 (0.256)	0.429 (0.555)
AR 95% CI	[-1.65, 0.95]	[0.20, 0.70]	[-0.24, 0.61]	[0.05, 0.84]
Effective F-Statistic	72.1685	72.1685	72.1685	72.4163
Mean Dep. Var.	6.434	0.941	2.245	3.199
Observations	407	407	407	405
Adjusted R ²	0.151	0.142	0.094	0.135
Region FE	Yes	Yes	Yes	Yes
Muni. Controls	Yes	Yes	Yes	Yes

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on the presence of cultural and other institutions in 1973. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson-Rubin procedure at the 95% level.

Table A.8: Collectivization and Spatial Structure

	<i>Dependent variable:</i>			
	Location Density (1)	ANNR (2)	Clustering (3)	Dwellings/Building (4)
Baseline OLS Regressions				
Collectivized Land (OLS)	−0.001 (0.001)	−0.016*** (0.002)	33.105*** (7.779)	0.038*** (0.007)
Mean Dep. Var.	0.151	0.338	351.071	1.189
Observations	610	611	611	611
Adjusted R ²	0.504	0.643	0.502	0.596
2SLS Regressions				
Collectivized Land (IV)	0.0004 (0.004)	−0.033*** (0.012)	55.179** (21.997)	0.054*** (0.010)
AR 95% CI	[−0.01, 0.01]	[−0.05, −0.02]	[32.91, 78.87]	[−0.00, 0.11]
Effective F-Statistic	83.4873	83.309	83.309	83.309
Mean Dep. Var.	0.151	0.338	351.071	1.189
Observations	605	606	606	606
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary and historical measures of settlement structure and spatial morphology. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

Table A.9: Collectivization and Political Outcomes (RDD)

Parliament (Sejm) Elections 2011					
	SLD (1)	PSL (2)	PIS (3)	PO (4)	Turnout (5)
Bandwidth: 40km					
Panel A: Polynomial in Distance to Border					
Collectivized Land	2.458*** (0.773)	1.521 (0.992)	-8.447*** (1.159)	4.108*** (1.021)	-3.082*** (0.908)
R ²	0.013	0.436	0.210	0.305	0.273
Panel B: Polynomial in Latitude and Longitude					
Collectivized Land	3.173*** (0.945)	1.742 (4.438)	-14.373* (8.267)	7.937 (6.481)	-2.918 (3.703)
R ²	0.003	0.437	-0.297	-0.049	0.298
Observations	381	381	381	381	381
Mean outside	5.84	17.91	46.42	18.08	43.12
Year	2011	2011	2011	2011	2011
Geo. Controls	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes
Bandwidth: 20km					
Panel A: Polynomial in Distance to Border					
Collectivized Land	2.112*** (0.410)	0.799 (1.302)	-5.933*** (1.236)	2.902** (1.204)	-2.256*** (0.614)
R ²	0.066	0.442	0.353	0.404	0.310
Panel B: Polynomial in Latitude and Longitude					
Collectivized Land	0.798 (0.542)	0.653 (1.697)	-4.705* (2.679)	2.727 (2.236)	-1.393 (1.410)
R ²	0.205	0.455	0.415	0.421	0.378
Observations	234	234	234	234	234
Mean outside	5.63	17.36	47.87	17.39	43.23
Year	2011	2011	2011	2011	2011
Geo. Controls	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes

Notes: This table presents results from a fuzzy regression discontinuity design (FRDD) estimating the effect of entering the historical non-Catholic territory on political preferences and behavior in the 2011 sejm elections in Poland. Each outcome is regressed on an indicator for being inside the historical Orthodox (non-Catholic) territory, instrumenting for the level of collectivized land. Panel A uses a quadratic polynomial in distance to the border (1D RDD); Panel B uses quadratic polynomials in latitude and longitude (2D RDD) as controls. All regressions include controls for population density (1984), agricultural suitability, terrain ruggedness, and urban status. All models include fixed effects for 200km border segments. Standard errors are clustered at the segment level. Results are presented separately for 40km and 20km bandwidths.

Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.10: Collectivization and Population Development

	<i>Dependent variable: Population Growth</i>					
	1921–1931 (1)	1931–1950 (2)	1950–1984 (3)	1984–2010 (4)	1921–2010 (5)	1950–2010 (6)
	Baseline OLS Regressions					
Collectivized Land (OLS)	0.015*** (0.006)	–0.157*** (0.012)	0.047*** (0.017)	–0.025* (0.015)	–0.116*** (0.017)	0.019** (0.009)
Mean Dep. Var.	0.127	–0.199	0.125	0.152	0.202	0.278
Observations	611	605	603	609	611	605
Adjusted R ²	0.347	0.304	0.440	0.188	0.428	0.374
	2SLS Regressions					
Collectivized Land (IV)	0.029*** (0.009)	–0.242*** (0.043)	0.122*** (0.033)	–0.003 (0.050)	–0.107 (0.107)	0.120* (0.073)
AR 95% CI	[0.02, 0.04]	[–0.31, –0.18]	[0.07, 0.18]	[–0.06, 0.06]	[–0.20, –0.01]	[0.04, 0.21]
Effective F-Statistic	83.309	85.6178	85.6861	83.3488	83.309	85.6178
Mean Dep. Var.	0.127	–0.199	0.125	0.152	0.202	0.278
Observations	606	604	602	604	606	604
Adjusted R ²	0.325	0.281	0.420	0.186	0.436	0.348
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on different measures of population development, calculated as the logarithmic population change between both stated dates. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

Table A.11: Impact of Collectivization and Transition

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k (1)	Cooperatives (% of registered entities) (2)	Trade Union presence (Dummy) (3)
Collectivized Land	1.307*** (0.269)	0.690*** (0.129)	2.956** (1.224)
Unemployment Rate 1996	–0.059*** (0.008)	–0.090*** (0.012)	–0.031 (0.063)
Average Net Migration 1990s	–0.418*** (0.075)	–0.100 (0.102)	0.588 (1.056)
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Mean Dependent Variable	32.046	9.792	45.833
Observations	590	590	590
Adjusted R ²	0.089	0.360	0.031

Note: This table reports OLS regressions of contemporary measures of social capital on the standardized share of socialized land in 1973, the unemployment rate in 1996 and the average net migration for the 1990s. The specification follows the baseline model and includes controls for (i) the interwar share of Jewish population, the share of agricultural land, population and housing density, (ii) geographic features such as terrain ruggedness, mean agricultural suitability, and altitude, and (iii) an urban dummy. Region fixed effects are included. Standard errors are clustered at the regional (voivodeship) level. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.12: Collectivization and Economic Performance

	<i>Dependent variable:</i>				
	Unemployment Rate (1)	Average Brutto Sallary (2)	Luminosity (3)	Social Beneficiaries p10k (4)	Municipal Expenditures pc (5)
	Baseline OLS Regressions				
Collectivized Land (OLS)	0.366*** (0.120)	–7.117 (32.445)	–0.180 (0.151)	93.100*** (35.392)	26.641 (24.284)
Mean Dep. Var.	5.345	3443.083	5.098	1312.906	2971.788
Observations	611	611	602	611	611
Adjusted R ²	0.209	0.226	0.728	0.219	0.058
	2SLS Regressions				
Collectivized Land (IV)	0.603 (0.527)	76.173 (47.364)	0.186 (0.632)	155.313 (171.822)	–58.849 (164.578)
AR 95% CI	[0.25, 0.98]	[15.92, 142.01]	[–0.56, 0.96]	[40.27, 274.36]	[–293.02, 169.42]
Mean Dep. Var.	5.345	3443.083	5.098	1312.906	2971.788
Observations	606	606	597	606	606
Adjusted R ²	0.188	0.202	0.726	0.209	0.055
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary measures of economic performance and development. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

Table A.13: Collectivization and Civil Society (Baseline), Conley Standard Errors

	<i>Distance Cutoff:</i>			
	15km	30km	45km	60km
Associations/Foundations	1.719*** (0.433)	1.719*** (0.496)	1.719*** (0.527)	1.719*** (0.538)
Cooperatives	1.373*** (0.491)	1.373*** (0.495)	1.373*** (0.523)	1.373*** (0.543)
Trade Union	3.687* (2.188)	3.687* (2.110)	3.687* (2.037)	3.687* (1.907)
Segment FE and Controls	Yes	Yes	Yes	Yes

Comment: This table reports varying Conley standard errors to account for spatial autocorrelation for the administrative outcomes presented in the baseline specification (Table 2). Each regression replicates the baseline model, which includes the standardized share of socialized land in 1984 as the main explanatory variable, along with interwar demographic controls (e.g., share of Jewish population, share of agricultural land), geographical variables (e.g., terrain ruggedness, agricultural suitability, altitude), an urban dummy, and Voivodeship fixed effects. The Conley standard errors are computed using the `conleyreg` command in R with spatial coordinates (longitude and latitude) of municipality centroids, and different distance cutoffs—15 km, 30 km, 45 km, and 60 km—are applied to capture the potential spatial correlation structure in the error terms. Each column shows estimates from the same regression equation but adjusts the spatial bandwidth used in the error correction.

Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.14: Impact of Collectivization on Social Capital (Baseline), Spatial Models

	<i>Dependent variable:</i>								
	Associations/Foundations per 10k			Cooperatives (% of registered entities)			Trade Union presence (Dummy)		
	<i>OLS</i>	<i>spatial error</i>	<i>spatial autoregressive</i>	<i>OLS</i>	<i>spatial error</i>	<i>spatial autoregressive</i>	<i>OLS</i>	<i>spatial error</i>	<i>spatial autoregressive</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Collectivized Land	1.712*** (0.498)	1.697*** (0.539)	1.714*** (0.486)	1.376*** (0.356)	1.135*** (0.384)	1.229*** (0.342)	3.740* (2.164)	3.824* (2.054)	3.748* (2.139)
Constant	18.220*** (3.688)	24.758*** (4.510)	15.186*** (3.760)	9.951*** (2.633)	9.005*** (3.134)	6.603** (2.608)	32.973** (16.019)	32.779** (14.940)	33.255** (16.036)
Fixed effects	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	606	606	606	606	606	606	606	606	606

Note: This table presents estimates from three specifications: (i) a baseline ordinary least squares (OLS) model, (ii) a spatial error model (SEM), which accounts for spatial autocorrelation in the regression residuals, and (iii) a spatial lag model (SAR), which incorporates spatial dependence in the dependent variable itself. The models are estimated using a contiguity-based spatial weights matrix derived from municipal boundaries. Municipalities with more than 50,000 inhabitants are excluded from the analysis to maintain comparability across units. As a result, municipalities with no contiguous neighbors are also dropped from the spatial models. All specifications include regional fixed effects and a consistent set of baseline controls, including (i) interwar demographic and agricultural variables, (ii) geographical characteristics (terrain ruggedness, altitude, and land suitability), and (iii) an urban-rural indicator.

Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.15: Test of Selection on Unobservables - Oster (2019)

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k	Cooperatives (% of registered entities)	Trade Union presence (Dummy)
	(1)	(2)	(3)
Collectivized Land	1.695*** (0.174)	1.335*** (0.357)	3.556*** (1.073)
Oster: β (R2 Max)	1.796	1.159	4.033
Oster: β (No Controls)	1.472	1.75	2.291
Oster: δ ($\beta = 0$)	129.925	4.8	-9.516
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Indiv. Controls	—	—	<i>Yes</i>
Mean Dep. Var.	32.05	9.79	45.83
Observations	611	611	610
Adjusted R ²	0.069	0.250	0.032

Comment: This table reports Oster (2019) bounds for the six civic society outcomes. Estimates of β (R2 Max) show the coefficient on collectivization under the assumption that selection on unobservables is as strong as observables ($\delta = 1$). β ($\beta = 0$) shows the strength of selection needed to explain away the baseline result. Administrative regressions include interwar demographics, geography, and voivodeship fixed effects. Survey regressions additionally include individual-level covariates. Standard errors clustered at the region or municipality level.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.16: Collectivization and Civil Society (Baseline), Variation of Independent Variable

	<i>Dependent variable:</i>					
	Associations/Foundations per 10k					
	(1)	(2)	(3)	(4)	(5)	(6)
Socialised Land	1.715*** (0.176)					
Alt. Socialized Land		3.561*** (1.048)				
Socialised Agri.			3.182*** (1.124)			
Number Social. Farms				1.344*** (0.295)		
PGR Land PC					1.718*** (0.397)	
Share Land PGRs						1.548*** (0.120)
Constant	18.240*** (4.562)	13.445** (5.769)	17.175*** (3.767)	20.052*** (4.628)	17.845*** (4.605)	18.442*** (4.526)
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year	1973	1984	1984	1974	1973	1973
Mean Dependent Variable	32.046	32.046	32.046	32.046	32.046	32.046
Observations	611	617	617	611	611	611
Adjusted R ²	0.069	0.112	0.115	0.062	0.069	0.065

Note: This table investigates the robustness of the baseline relationship between collectivization and contemporary civil society outcomes using alternative measures of collectivization. The dependent variable is the number of civic organizations per 10,000 inhabitants in 2010. Independent variables include various historical proxies for collectivized agriculture, such as land shares, numbers of socialized farms, and indicators of state farm presence. All models include a consistent set of controls: interwar religious composition, agricultural land share, historical population and housing density, terrain ruggedness, agricultural suitability, altitude, and an urban dummy. Regional fixed effects are included. Standard errors are clustered at the regional (voivodeship) level. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.17: Collectivization and Civil Society (Baseline), Outlier Analysis

	<i>Full Sample</i>	<i>Reduced $3 \times \text{mean}(CD)$</i>	<i>Reduced $CD > (\frac{4}{N})$</i>
<i>Dependent variable:</i>			
Associations/Foundations per 10k			
	(1)	(2)	(3)
Collectivized Land	1.695*** (0.174)	1.684*** (0.624)	1.462*** (0.311)
Observations	611	571	581
Adjusted R ²	0.069	0.098	0.061
Cooperatives (% of registered entities)			
	(1)	(2)	(3)
Collectivized Land	1.335*** (0.357)	1.717*** (0.619)	1.117*** (0.120)
Observations	611	574	597
Adjusted R ²	0.250	0.288	0.243
Trade Union presence (Dummy)			
	(1)	(2)	(3)
Collectivized Land	3.556*** (1.073)	4.864* (2.566)	2.761** (1.349)
Observations	610	580	599
Adjusted R ²	0.032	0.075	0.026
FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: This table replicates the baseline OLS regressions, examining the robustness of the results to influential observations. Each column corresponds to a different sample selection based on Cook's Distance (CD): the full sample, a sample excluding observations with CD greater than three times the mean, and a sample excluding those with CD exceeding $\frac{4}{N}$. All models include the same specification and control set as in the baseline: municipality-level controls (interwar demographics, agricultural land share, population and housing density), geographic controls (terrain ruggedness, agricultural suitability, altitude), an urban dummy, and region fixed effects. For survey-based outcomes, individual-level controls are also included. Standard errors are clustered at the region (voivodeship) level for administrative outcomes and at the municipality level for survey outcomes.

Significance levels are * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.18: Collectivization and Civil Society (Baseline), Subsample Analysis

	<i>Full Set</i>	<i>Rural</i>	<i>Catholic</i>	<i>No Border</i>
<i>Dependent variable:</i>				
Associations/Foundations per 10k				
	(1)	(2)	(3)	(4)
Collectivized Land	1.695*** (0.174)	1.444*** (0.233)	1.740 (1.146)	1.967** (0.916)
Region FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	611	531	569	530
Cooperatives (% of registered entities)				
	(1)	(2)	(3)	(4)
Collectivized Land	1.335*** (0.357)	1.287*** (0.284)	2.464*** (0.869)	3.004*** (1.090)
Region FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	611	531	569	530
Trade Union presence (Dummy)				
	(1)	(2)	(3)	(4)
Collectivized Land	3.556*** (1.073)	3.219*** (1.195)	6.191* (3.450)	7.286*** (2.660)
Region FE	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes
Observations	610	531	569	530
FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note: This table reports baseline OLS estimates, using selected subsamples to test the stability of the relationship between collectivization and the civil society indicators. Each column represents a different subset of the data: (1) the full sample, (2) rural municipalities only, (3) municipalities with high interwar Catholic population (*ShareCatholic* > 0.85), and (4) municipalities with centroids more than 15km away from the Polish national border. All models replicate the baseline specification, including demographic, land use, and geographic controls as well as region fixed effects. Survey-based regressions include individual-level covariates, and standard errors are clustered at the region (voivodeship) level for administrative data and at the municipality level for survey data. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.19: Collectivization and Civil Society (Baseline), Additional Controls

<i>Dependent variable:</i>						
Associations/Foundations per 10k						
	(1)	(2)	(3)	(4)	(5)	(6)
Collectivized Land	1.472*** (0.460)	1.695*** (0.174)	1.147** (0.551)	0.408 (0.485)	1.675*** (0.285)	0.983*** (0.124)
Observations	617	611	604	572	590	600
R ²	0.016	0.088	0.368	0.256	0.138	0.183
Cooperatives (% of registered entities)						
	(1)	(2)	(3)	(4)	(5)	(6)
Collectivized Land	1.750*** (0.364)	1.335*** (0.357)	0.905* (0.492)	0.849*** (0.289)	1.166*** (0.442)	0.906*** (0.220)
Observations	617	611	604	572	590	600
R ²	0.036	0.266	0.475	0.350	0.373	0.326
Trade Union presence (Dummy)						
	(1)	(2)	(3)	(4)	(5)	(6)
Collectivized Land	2.291 (1.988)	3.556*** (1.073)	2.076 (2.339)	3.275*** (0.785)	2.021 (1.315)	3.292*** (0.837)
Observations	616	610	604	572	590	600
R ²	0.002	0.052	0.161	0.064	0.072	0.058
Baseline Controls	No	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	Yes	Yes	Yes	Yes
County FE	No	No	Yes	No	No	No
Agricultural Controls	No	No	No	Yes	No	No
Economic Controls	No	No	No	No	Yes	No
Education Controls	No	No	No	No	No	Yes

Note: This table reports the robustness of the baseline estimates presented in Table 2 to the inclusion of additional control variables. Each column sequentially adds different sets of controls to the baseline specification, which regresses contemporary social capital outcomes on the standardized share of socialized agricultural land in 1984. Column (1) presents the unadjusted bivariate relationship. Column (2) includes the full set of baseline municipal-level and regional controls. Column (3) further adds county fixed effects. Columns (4) to (6) sequentially include additional sets of covariates: agricultural characteristics (e.g., farm structure), economic indicators (e.g., income, employment, firm presence), and educational variables (e.g., school density, exam performance). The outcome variables are the same as in the baseline specification. Standard errors are clustered at the region (voivodeship) or county level as indicated for the administrative data and at the municipality level for individual level data. Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.20: Alternative Instrument First Stage Regressions

	<i>Dependent variable:</i>				
	Collectivized Land				
	(1)	(2)	(3)	(4)	(5)
Land Reform Dummy	0.409*** (0.080)	0.353*** (0.084)	0.394*** (0.080)	0.332*** (0.080)	0.313*** (0.065)
Baseline Controls	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>
Region FE	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Additional Controls	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>
First-stage partial F-statistic	26.14	17.74	24.21	17.32	22.89
Observations	615	611	615	611	611
R ²	0.041	0.065	0.067	0.173	0.448
Adjusted R ²	0.039	0.051	0.061	0.155	0.433

Comment: This table reports first-stage regressions where the outcome is the standardized share of collectivized land in 1973, and the main explanatory variable is a dummy indicating over median impact of the land reform, a simpler version of the instrument. Columns vary by inclusion of historical covariates and region (voivodeship) fixed effects. Control variables include the interwar share of Jewish population, the share of agricultural land, population and housing density (1931), agricultural suitability, terrain ruggedness, altitude, and urban status. Additional controls include the share of Catholic and Orthodox population, and the presence and per capita turnover of interwar cooperatives. Voivodeship fixed effects account for regional heterogeneity. All variables are standardized to allow for direct comparison of coefficient magnitudes. Robust first-stage F-statistic for the instrument are reported.
Significance levels are * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.21: Alternative Instrument Collectivization and Civil Society

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k (1)	Cooperatives (% of registered entities) (2)	Trade Union presence (Dummy) (3)
Baseline OLS Regressions			
Collectivized Land (OLS)	1.695*** (0.174)	1.335*** (0.357)	3.556*** (1.073)
Mean Dep. Var.	32.046	9.792	45.833
Observations	611	611	610
Adjusted R ²	0.069	0.250	0.032
2SLS Regressions			
Collectivized Land (IV)	11.269** (5.086)	1.009 (1.628)	17.565 (16.680)
AR 95% CI	[5.33, 22.85]	[-3.71, 5.53]	[-7.53, 50.78]
Effective F-Statistic	21.9142	21.9142	23.4363
Mean Dep. Var.	32.046	9.792	45.833
Observations	611	611	610
Adjusted R ²	-0.534	0.248	-0.039
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary measures of formal civil society. The instrument is a dummy indicating over median impact of the land reform, a simpler version of the instrument. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

Table A.22: Collectivization and Civil Society, Decomposed Components

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k (1)	Cooperatives (% of registered entities) (2)	Trade Union presence (Dummy) (3)
Baseline OLS Regressions			
Collectivization due to Deportation	3.265*** (0.867)	1.723 (1.155)	1.682 (3.191)
Collectivization due to Land Reform	1.812*** (0.434)	0.796* (0.465)	4.171*** (0.956)
Mean Dep. Var.	32.046	9.792	45.833
Observations	606	606	605
Adjusted R ²	0.106	0.256	0.030
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS estimates of the effect of decomposed collectivization, into a part explained by the land reform instrument and a part explained by the borderland dummy. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level.

Table A.23: Collectivization and Civil Society, Full Sample

	<i>Dependent variable:</i>		
	Associations/Foundations per 10k (1)	Cooperatives (% of registered entities) (2)	Trade Union presence (Dummy) (3)
Baseline OLS Regressions			
Share_socialist_land_73_z	1.610*** (0.192)	1.298*** (0.298)	3.446*** (1.121)
Mean Dep. Var.	32.097	9.437	45.814
Observations	643	643	642
Adjusted R ²	0.080	0.267	0.036
2SLS Regressions			
Collectivized Land (IV)	3.845*** (1.111)	1.766* (0.901)	9.341*** (3.598)
AR 95% CI	[1.84, 6.00]	[0.21, 3.35]	[-0.23, 19.31]
Effective F-Statistic	67.9113	67.9113	67.6142
Mean Dep. Var.	32.097	9.437	45.814
Observations	638	638	637
Adjusted R ²	0.040	0.265	0.023
Region FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Muni. Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Note: This table reports baseline OLS and two-stage least squares (2SLS) estimates of the effect of collectivization, measured as the standardized share of socialized land in 1973, on contemporary measures of formal civil society. The instrument is the number of land reform expropriations per agricultural population in the 1950s. All regressions include historical municipal-level controls, geographic variables, an urbanization measure, and voivodeship fixed effects. Standard errors are clustered at the voivodeship level. Reported confidence intervals are based on the Anderson–Rubin procedure at the 95% level.

D. APPENDIX FIGURES

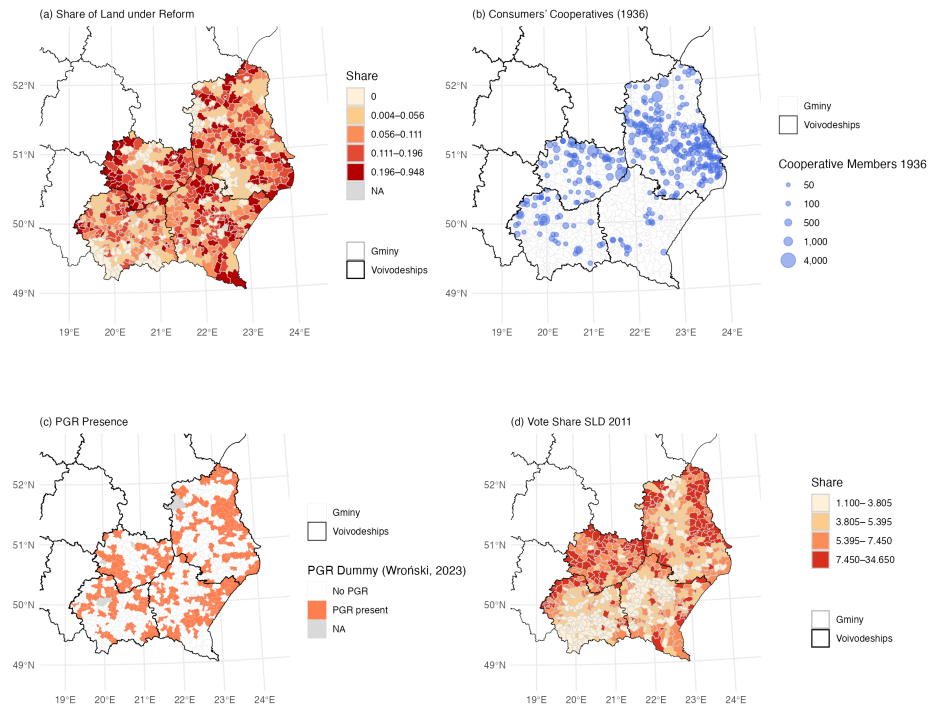
Figure A1: Example Page from the 1974 Statistical Yearbooks for Rzeszów Region

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darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa gospo- darstwa		gospodźstwa	

Figure A2: Example Page from the 1921 Census for Lwów Region

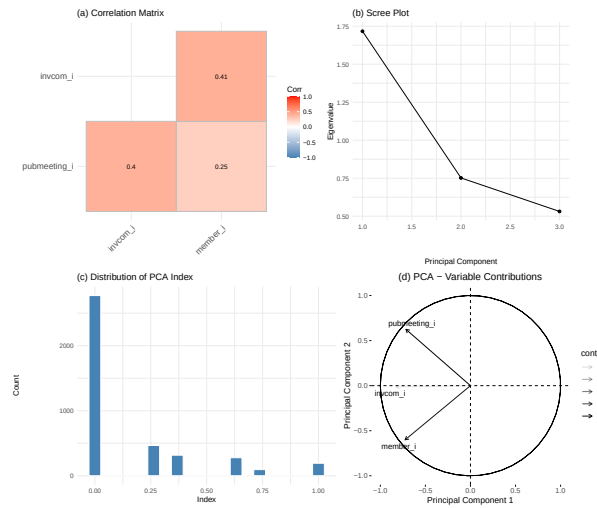
1. Powiat Bóbrka.																		
M i a s t a, G m i n y, Obszary dworskie	Ludność obecna w dniu 30 września 1921 r. (bez objętej spisem wojskowym)																	
	Budynki	W tej liczbie było wyznania																
	z przetr.	inne re-	Ogół-	Męż-	Ko-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-	grze-
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Pow. Bóbrka	1136	3	8597	4069	4528	2916	2944	22	3	2710	—	2	5651	2199	3	726	18	—
I. Miasta:	635	1	4391	2034	2357	1330	1564	16	1	1480	—	—	3023	1165	1	197	5	—
1. Bóbrka, m to	501	1	4206	2035	2171	1586	1380	6	1	1230	—	2	2628	1034	2	529	13	—
2. Chodorów, m ko,	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
II. Gminy:	12107	18	71277	34810	36467	12975	54312	98	21	3868	3	—	20747	49291	45	1185	9	—
1. Bakowce	86	1	521	266	255	89	422	—	1	9	—	—	129	392	—	—	—	—
2. Bartoszew	56	—	332	166	166	2	326	—	—	4	—	—	18	438	—	—	—	—
3. Borodziejce	269	—	1055	530	525	97	885	—	—	73	—	—	166	881	—	8	—	—
4. Bortniki	69	—	375	189	186	21	344	—	—	10	—	—	21	344	—	10	—	—
5. Bonusów	193	—	1261	627	634	184	1065	—	—	12	—	—	541	711	—	9	—	—
6. Borynka	101	—	631	311	320	145	485	—	—	—	—	—	222	408	—	—	—	—
7. Bryńce Cerkiewne	149	—	941	461	480	424	510	—	—	7	—	—	647	294	—	—	—	—
8. Bryńce Zagórne	385	—	2376	1142	1234	1117	816	3	—	440	—	—	1413	786	3	174	—	—
9. Brzozdów, m ko	127	—	813	372	441	134	652	—	—	27	—	—	167	646	—	—	—	—
10. Budków	135	—	803	406	397	13	748	—	—	42	—	—	18	748	—	37	—	—
11. Bukawina	439	—	2609	1268	1371	971	1603	—	—	95	—	—	1153	1488	—	28	—	—
12. Chłobowice Wielkie	107	—	535	272	263	200	305	—	—	30	—	—	265	270	—	—	—	—
13. Chodorów	125	—	762	384	378	74	688	—	—	—	—	—	243	519	—	—	—	—
14. Czarłorja	71	—	365	170	195	48	304	—	—	13	—	—	26	323	—	13	—	—
15. Czeremchów	58	—	359	168	191	69	290	—	—	—	—	—	333	26	—	—	—	—
16. Czyżyc	162	—	884	422	462	44	793	—	—	47	—	—	95	789	—	—	—	—
17. Demidów, wies	104	—	551	226	225	91	297	—	—	23	—	—	38	69	—	—	—	—
18. Dobrowiany	8	—	177	86	91	24	86	—	—	—	—	—	—	—	—	—	—	—
19. Drohowycze	105	—	644	334	310	74	548	—	—	20	—	—	114	528	—	2	—	—
20. Duliby	73	2	505	243	262	18	487	—	—	—	—	—	18	487	—	—	—	—
21. Dziwielniki	166	—	1133	561	572	17	1089	—	—	27	—	—	182	591	—	—	—	—
22. Dziwielniki	142	—	916	452	464	50	835	—	—	30	—	—	325	591	—	—	—	—
23. Dziwielniki	353	—	1972	928	1044	79	1776	—	—	116	—	—	93	1788	—	91	—	—
24. Ernsdorf	13	1	114	56	58	107	7	—	—	—	—	—	97	5	12	—	—	—
25. Horodysławice	56	—	330	162	168	11	311	—	—	7	—	—	12	311	—	7	—	—
26. Horodysławice	241	—	1368	650	718	7	1293	—	—	68	—	—	7	1293	—	68	—	—
27. Horodysławice Cetnarskie	125	—	708	364	344	16	685	—	—	7	—	—	19	682	—	7	—	—
28. Horodysławice Krolewskie	144	—	813	396	417	13	780	—	—	20	—	—	113	700	—	—	—	—
29. Hrusiatycze	162	—	991	473	518	447	538	—	—	6	—	—	459	532	—	—	—	—
30. Hrusiatycze	142	—	802	396	416	27	748	—	—	27	—	—	178	606	—	18	—	—
31. Hrynów	174	—	924	455	469	76	809	—	—	39	—	—	123	801	—	—	—	—

Figure A3: Choropleth Maps



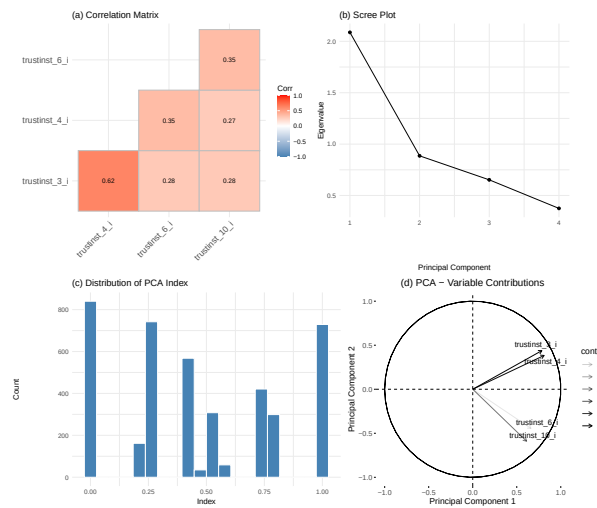
Note: This figure illustrates the spatial distribution of four relevant variables in the study region located in south-east Poland. The level of analysis is at the municipality level for the year 2010. Sub-figure (a) shows the share of total municipality land subject to the land reform in 1944, (b) the distribution and strength of consumer cooperatives in 1936, (c) the PGR presence dummy following Wroński (2023), and (d) the distribution of SLD voting results in the 2011 elections.

Figure A4: Construction Community Involvement Index



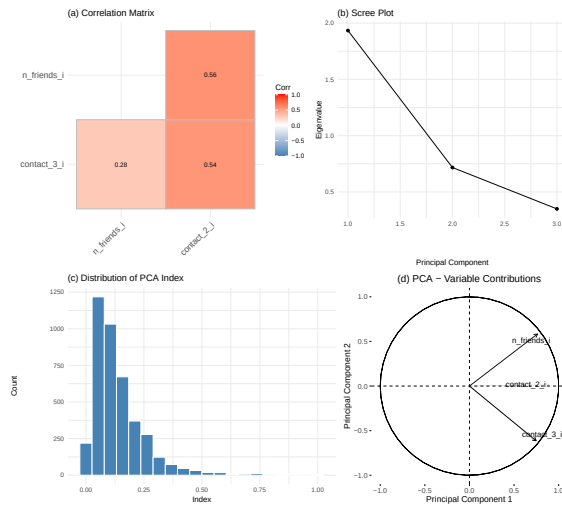
Note: Panels (a-d) summarize the PCA used to derive the index from three survey items: Community involvement, public meeting attendance, and organizational membership. Panel (a) shows correlations among inputs, (b) the eigenvalue scree plot, (c) the index distribution, and (d) variable contributions to the first two components.

Figure A5: Construction Institutional Trust Index



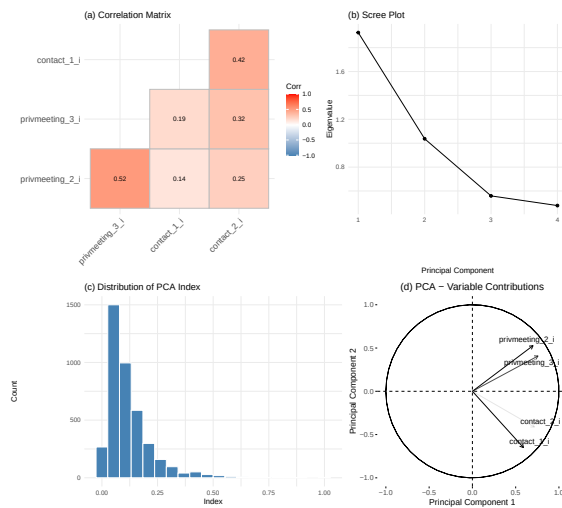
Note: Panels (a-d) summarize the PCA used to derive the index from four survey items: trust in the Sejm, the President, the police, and the courts. Panel (a) shows correlations among inputs, (b) the eigenvalue scree plot, (c) the index distribution, and (d) variable contributions to the first two components.

Figure A6: Construction Social Network Index



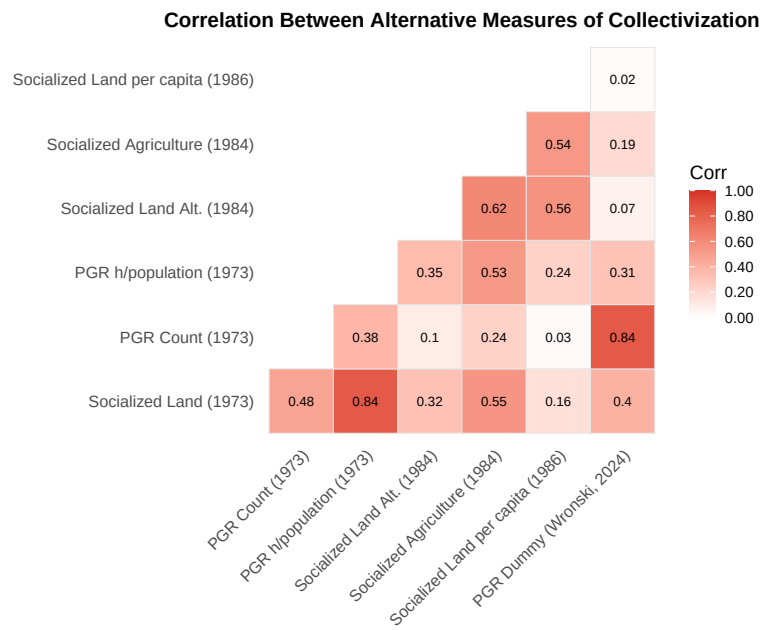
Note: Panels (a–d) summarize the PCA based on three survey questions capturing the size and breadth of individuals' personal networks: the number of friends, the number of friends contacted regularly, and the number of acquaintances contacted regularly. Panel (a) shows correlations among inputs, (b) the eigenvalue scree plot, (c) the index distribution, and (d) variable contributions to the first two components.

Figure A7: Construction Social Interaction Index



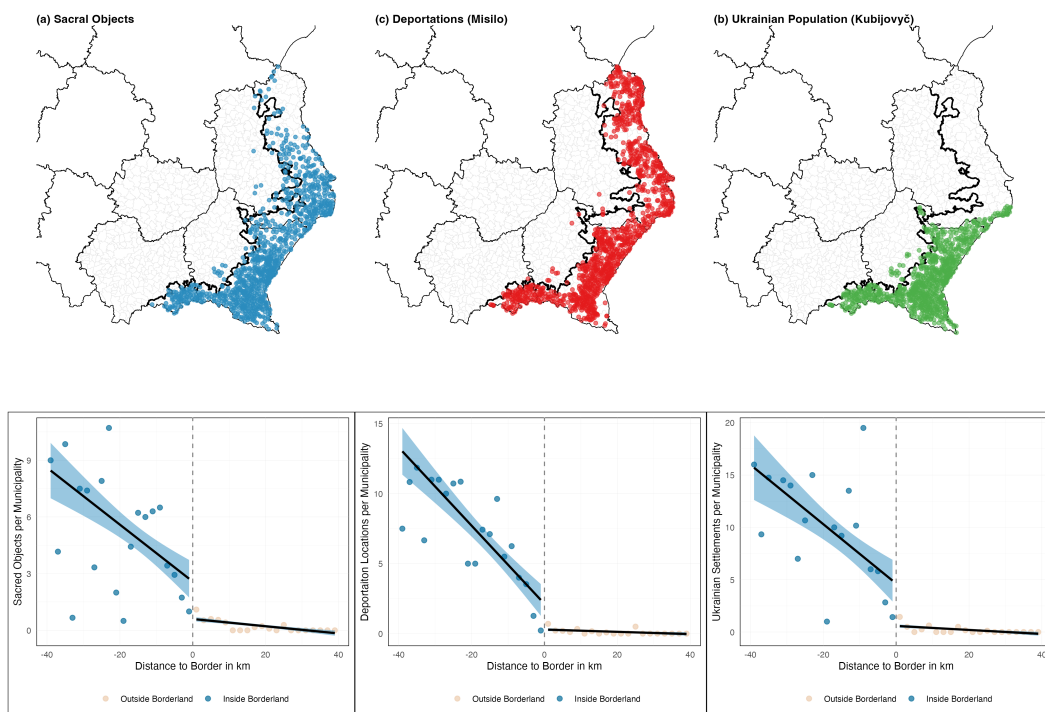
Note: Panels (a–d) illustrate the PCA based on four indicators of individuals' social activity: frequency of visits to restaurants, cafés, or pubs; frequency of meetings with friends; and the number of close family members and friends contacted regularly. Panel (a) shows correlations among inputs, (b) the eigenvalue scree plot, (c) the index distribution, and (d) variable contributions to the first two components.

Figure A8: Correlation Plot Measures collectivization



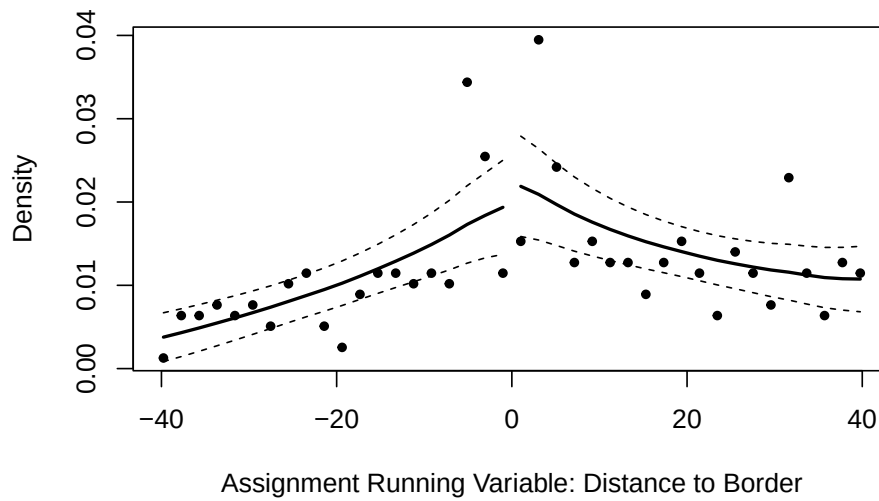
Note: This figure displays pairwise correlations between alternative measures of collectivization across municipalities in the study region. All indicators capture the intensity or presence of state-led agricultural socialization, measured through different data sources and years. Darker shades indicate stronger positive correlations, suggesting that the measures broadly capture a consistent underlying concept of collectivization.

Figure A9: RB Border Validation Plots



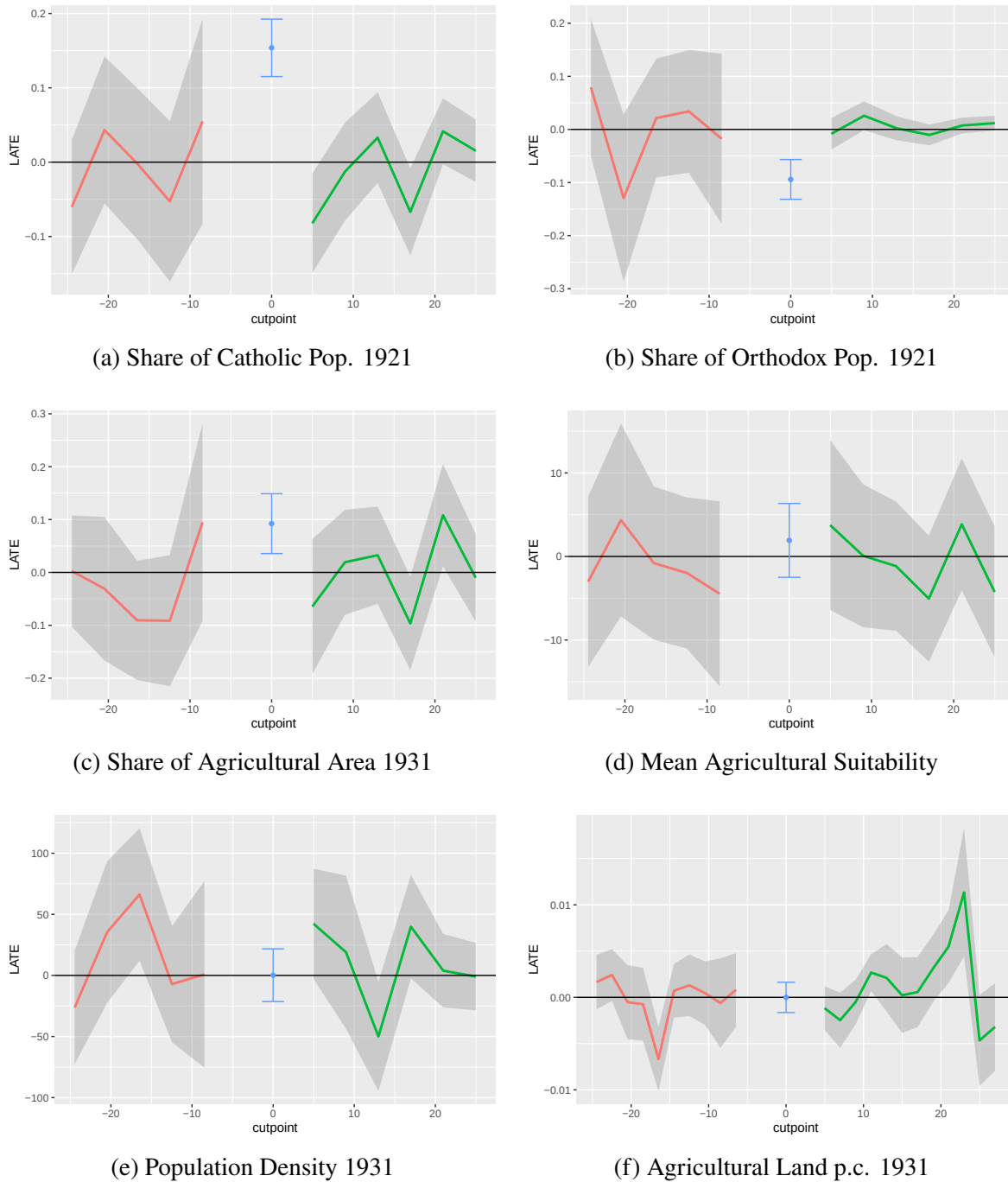
Note: This figure visualizes the spatial distribution of Greek Catholic and Orthodox churches, prewar Ukrainian settlements, and 1947 deportation sites relative to the internal religious border. The lower panels show binned regression discontinuity plots of the number of observations per municipality against distance to the border, illustrating sharp declines in these features when moving from the non-borderland into the borderland region.

Figure A10: McCrary (2008) Density Test for Sorting



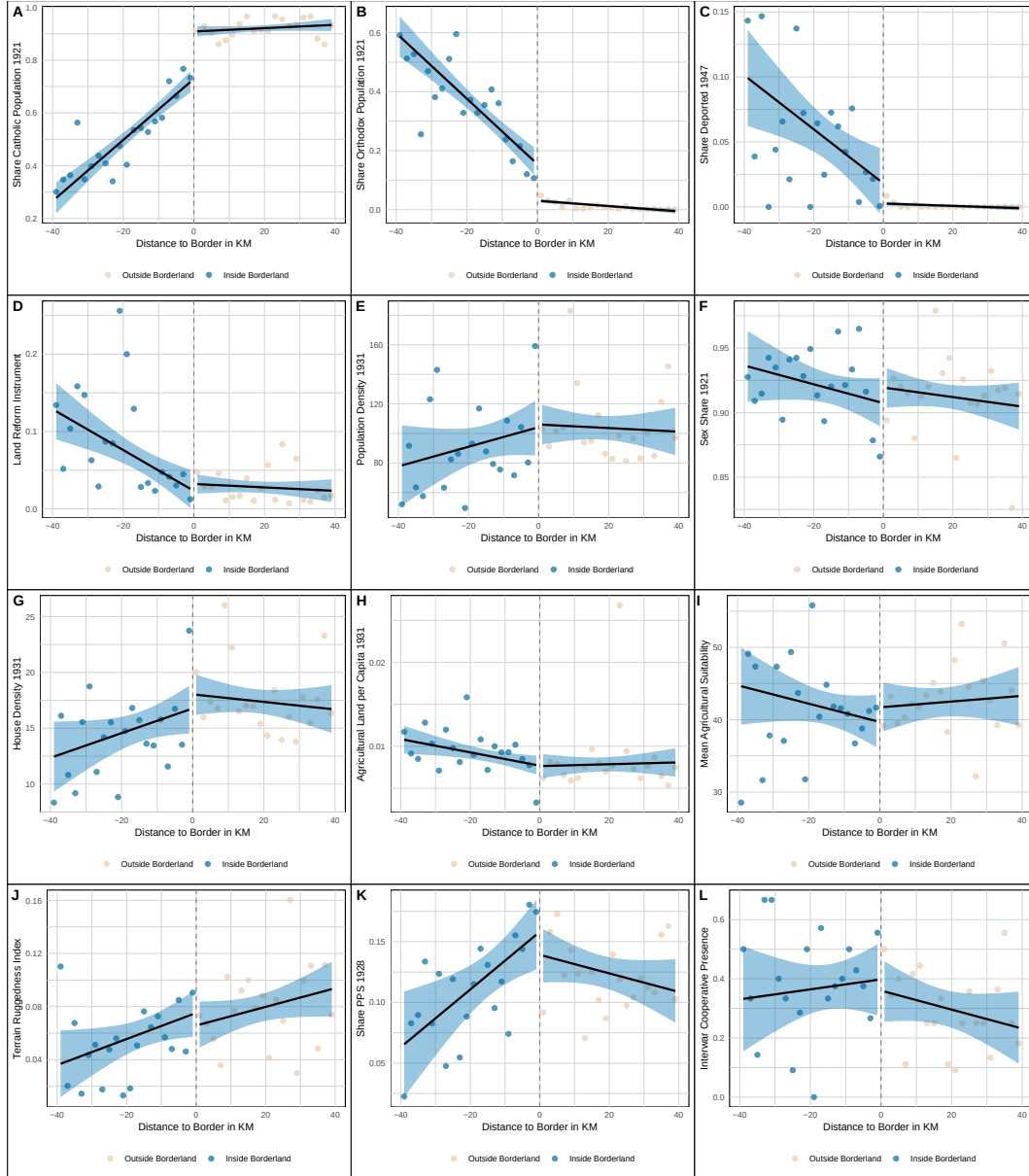
Note: This figure presents a density test using the McCrary (2008) density test, with the assignment running variable being the distance to the border. The test is performed with a cutpoint at zero, indicating the border. The plot displays the density of observations on both sides of the border, allowing for an examination of any potential discontinuities. The analysis was conducted in R using the 'DCdensity' function.

Figure A11: Density Plots the Impact of Fake Cutpoints on interwar Outcomes



Note: This figure presents placebo tests for various outcomes using the `plotPlacebo` function in R, with a 95% confidence level. The subfigures display the estimated discontinuities across multiple placebo outcomes: the share of the Catholic population in 1921 (A), the share of the Orthodox population in 1921 (B), agricultural area in 1931 (C), mean agricultural suitability (D), population density in 1931 (E), and agricultural land per capita in 1931 (F). The purpose of these tests is to verify the robustness of the discontinuity estimates by checking for spurious effects.

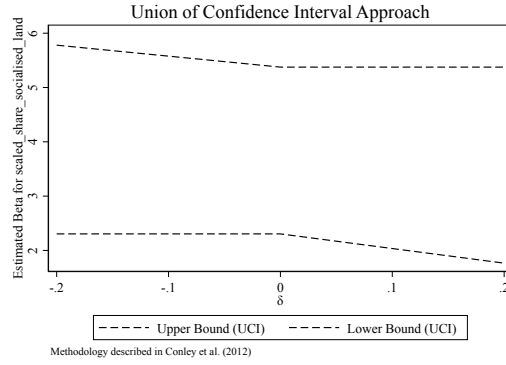
Figure A12: RDD Plots Interwar Outcomes



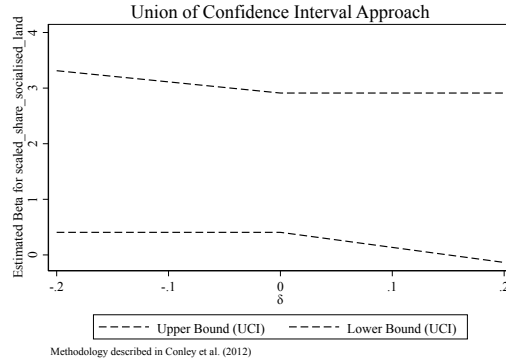
Note: This figure presents regression discontinuity plots illustrating the relationship between distance to the “Religious Border” and outcome variables during the inter-war period, without the inclusion of control variables. Each subfigure displays the binned data into 40 groups based on distance to the border, with observations on either side of the border fitted with separate linear regressions. The dashed vertical line at 0 represents the border, and the color coding distinguishes municipalities within the borderland territory (“Inside Borderland”) from those outside it (“Outside Borderland”). The colored area represents the 95% confidence intervals around the fitted regression lines.

Figure A13: Boundaries on 2SLS Estimates under Plausible Exogeneity

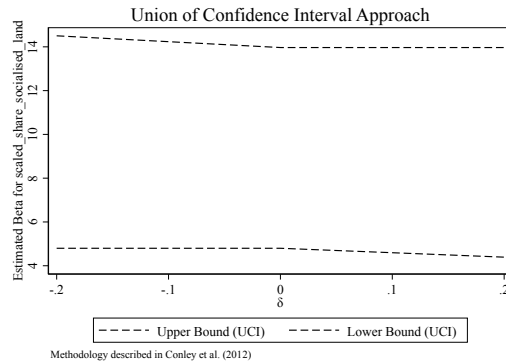
(a) Results for Associations/Foundations per 10k



(b) Results for Cooperatives (% of registered entities)

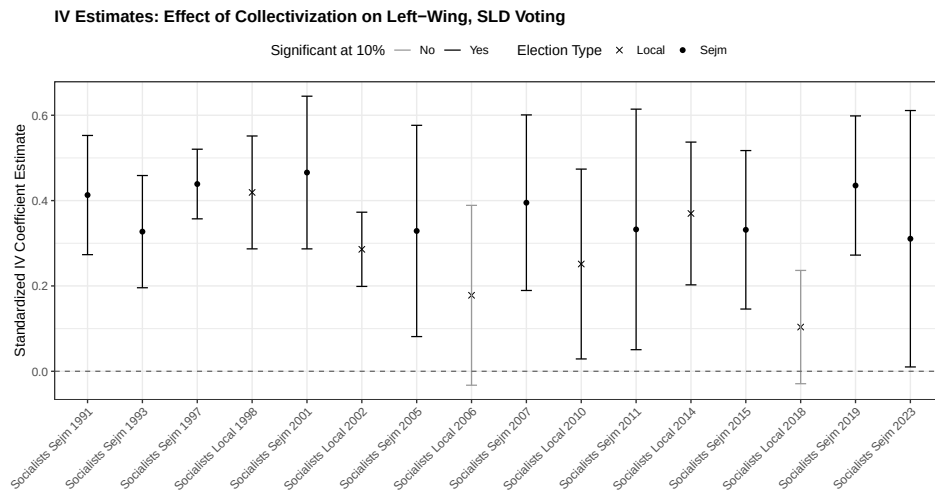


(c) Results for Trade Union presence (Dummy)



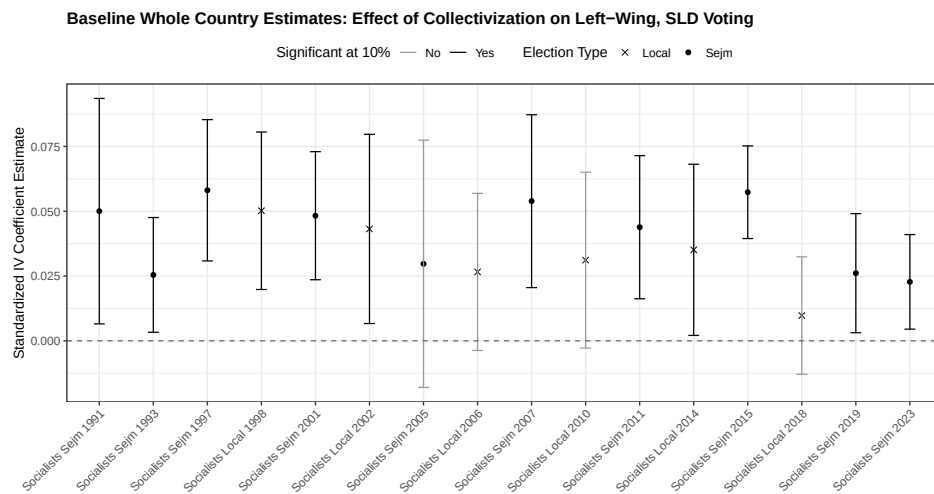
Note: This figure presents plausible exogeneity union of confidence interval (UCI) plots based on the methodology of Conley et al. (2012) using the `plausexog` procedure in Stata. Each panel corresponds to one of the three outcomes analysed in the 2SLS regressions (see Table 2). The x-axis reflects assumed values of the direct effect of the instrument (scaled expropriated land per agricultural population in the 1950s), while the shaded regions indicate 90% confidence interval bounds for δ ($-0.2, 0.2$) for the estimated effect of collectivization (scaled share of socialized land in 1973). All models include the same covariates and regional fixed effects as in the main IV specifications and cluster standard errors at the voivodeship level. The plots assess how sensitive the IV estimates are to potential violations of the exclusion restriction.

Figure A14: 2SLS Regression: SLD Voting 1991-2023



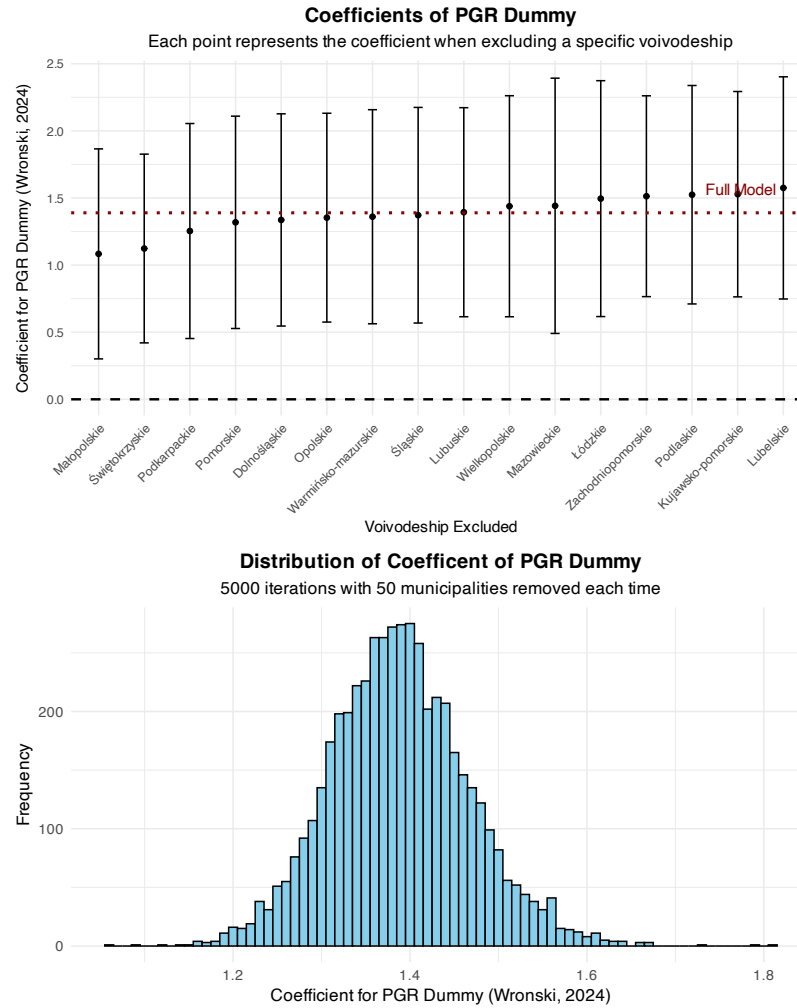
Note: This figure presents two-stage least squares (2SLS) estimates of the effect of collectivization (measured as the share of socialized land in 1973) on support for the Socialist Left (SLD) in both national (Sejm) and local elections over time. Each point represents the standardized coefficient from an individual IV regression, using the number of expropriated properties per agricultural population in the 1950s as an instrument for collectivization intensity. All specifications control for historical demographic and geographic covariates, including religious composition (Share Jewish), agricultural land share, population and housing density (1931), agricultural suitability, terrain ruggedness, altitude, urban status, and voivodeship fixed effects. Confidence intervals reflect ± 1.64 standard errors clustered at the voivodeship level, corresponding to a 10% significance threshold. Black error bars denote statistically significant effects at the 10% level. Circles represent Sejm election estimates, while crosses indicate local election results.

Figure A15: Baseline Whole Country Regression: SLD Voting 1991-2023



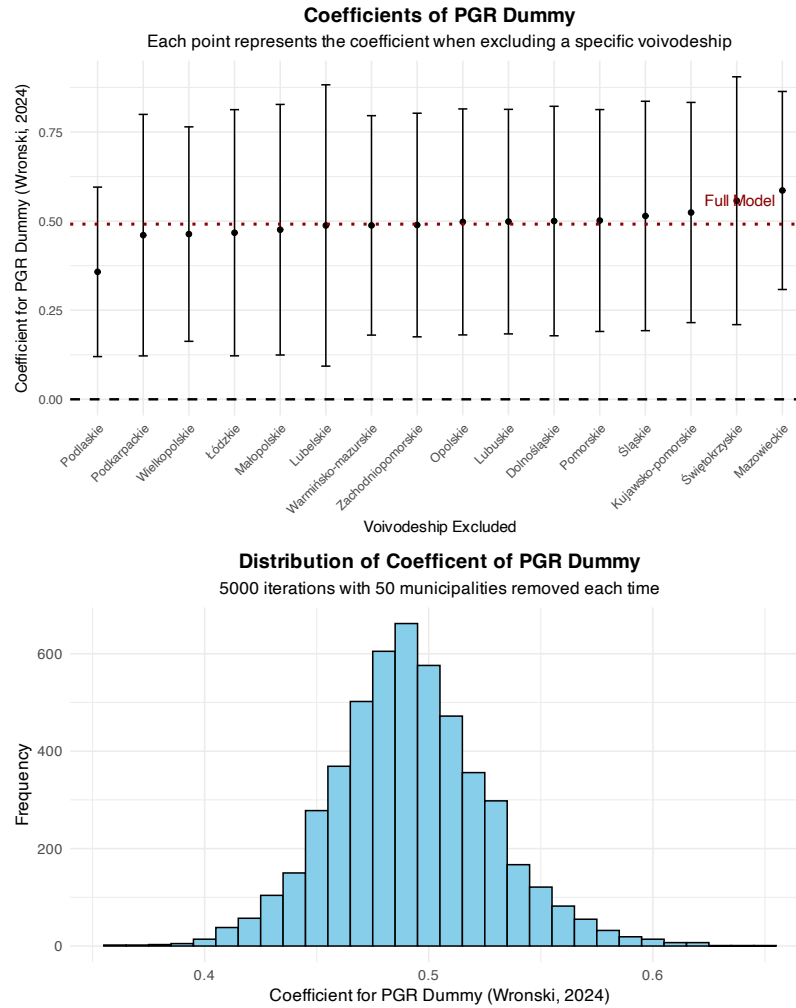
Note: This figure presents the baseline estimates of the effect of collectivization (measured by a State Farm Dummy) on support for the Socialist Left (SLD) in both national (Sejm) and local elections over time. Each point represents the standardized coefficient from an individual OLS regression. All specifications control for contemporary economic, demographic and geographic covariates, including railway density, luminosity, altitude, historical partitions, log population, population density, log unemployment, longitude, latitude, and voivodeship fixed effects. Confidence intervals reflect ± 1.64 standard errors clustered at the voivodeship level, corresponding to a 10% significance threshold. Black error bars denote statistically significant effects at the 10% level. Circles represent Sejm election estimates, while crosses indicate local election results.

Figure A16: Coefficient Stability Associations and Foundations



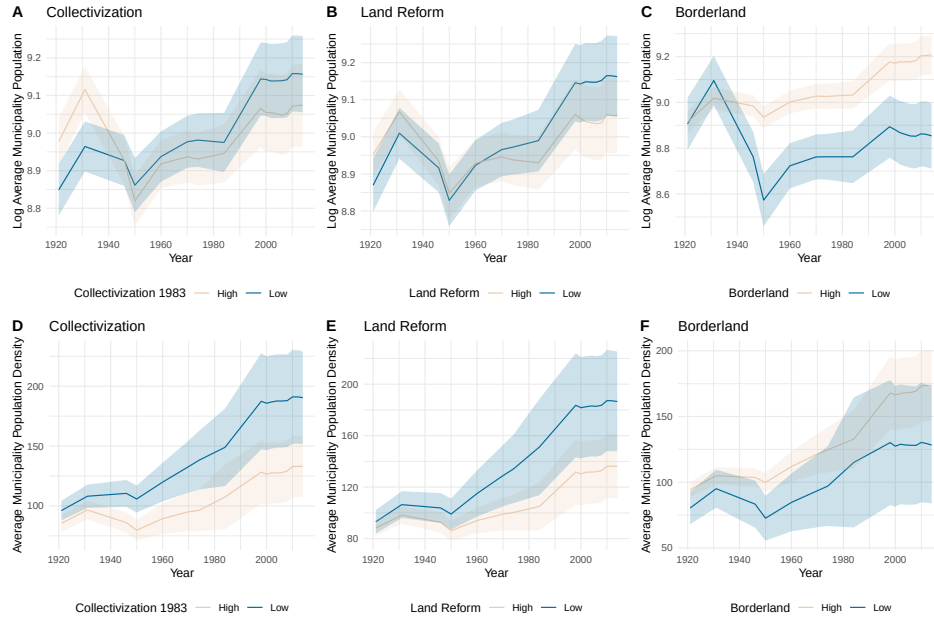
Note: The upper figure displays the estimated coefficients of the PGR Dummy variable with the whole country sample from the alternative regression setup where each voivodship is systematically excluded one at a time. The independent variable is the the number of Associations and Foundations per 10k inhabitants. Each point represents the coefficient obtained after excluding a specific voivodship, accompanied by error bars indicating the 90% confidence intervals. The red dotted line denotes the coefficient from the full model, which includes all voivodships, serving as a benchmark. The black dashed line at zero facilitates the assessment of the direction and significance of the coefficients relative to a null effect. The lower figure presents a histogram of the PGR Dummy coefficients derived from 5000 iterations of the alternative regression, each omitting 50 randomly selected municipalities. The sky blue bars represent the frequency of coefficient estimates within specified bins.

Figure A17: Coefficient Stability SLD Vote Share



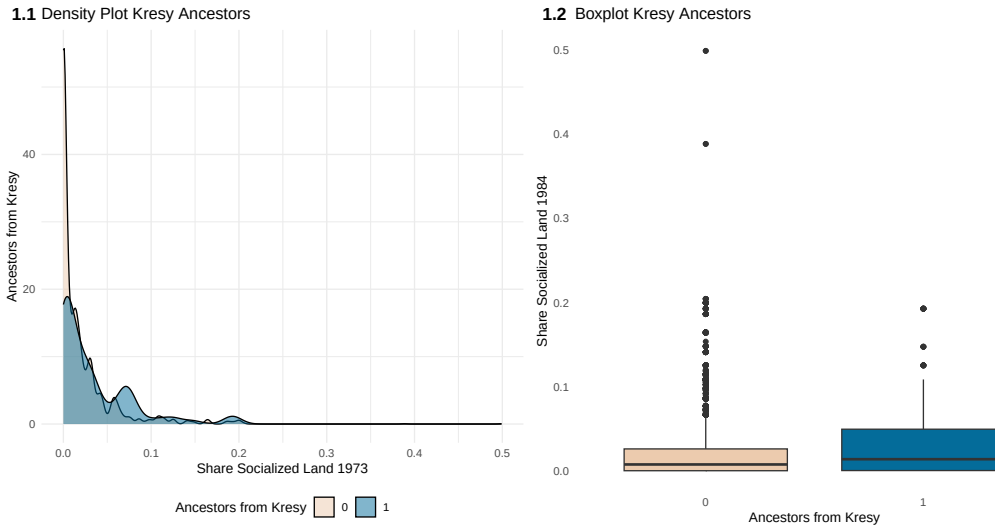
Note: The upper figure displays the estimated coefficients of the PGR Dummy variable with the whole country sample from the alternative regression setup where each voivodeship is systematically excluded one at a time. The independent variable is the election result for the SLD Party in the 2011 Sejm elections. Each point represents the coefficient obtained after excluding a specific voivodeship, accompanied by error bars indicating the 90% confidence intervals. The red dotted line denotes the coefficient from the full model, which includes all voivodeships, serving as a benchmark. The black dashed line at zero facilitates the assessment of the direction and significance of the coefficients relative to a null effect. The lower figure presents a histogram of the PGR Dummy coefficients derived from 5000 iterations of the alternative regression, each omitting 50 randomly selected municipalities. The sky blue bars represent the frequency of coefficient estimates within specified bins.

Figure A18: Population Development 1921-2023



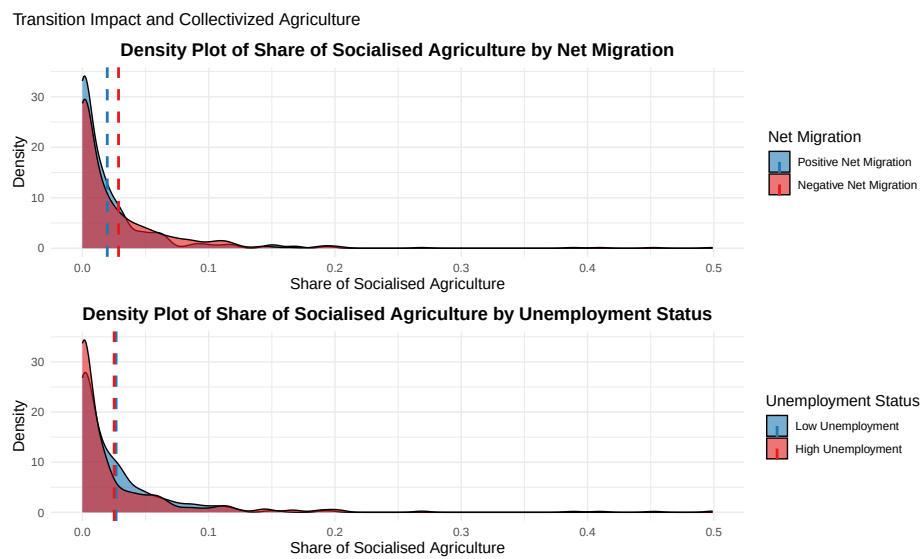
Note: This figure shows the temporal evolution of population measures across municipalities, classified into *high* and *low* based on three factors: the intensity of collectivization, the 1944 land reform, and deportations or population loss. Municipalities are classified as *high* if they exceed the median of a variable and *low* otherwise. Subfigures A, B, and C display the log average municipality population and C, E, and F the average municipality population density, with shaded areas representing 99% confidence intervals.

Figure A19: Kresy Ancestors and collectivization



Note: These figures examine the relationship between having ancestors from Kresy and the share of socialized land in 1973. The first figure (Density Plot) shows the distribution of the share of socialized land, with the data divided by whether individuals have ancestors from Kresy. The second figure (Boxplot) compares the share of socialized land across individuals with and without Kresy ancestors. The color coding distinguishes between those with and without Kresy ancestry, and the analysis highlights the observed differences in socialized land distribution.

Figure A20: Balance Plot: collectivization and Transition Impact



Note: This figure shows density distributions of the share of collectivized agricultural land by (top) 1990s net migration status (Positive vs. Negative) and (bottom) 1996 unemployment status (Low vs. High). Dashed lines represent the mean share for each group.

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