Violent Backlash to Political Reform: Evidence from Anti-Jewish Pogroms in the 1905 Russian Revolution

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Abstract

Local violence often accompanies momentous political change, as feelings of political threat intersect with preexisting prejudices to endanger groups popularly associated with reform. We examine the relationship between such violence and settlement characteristics in the context of the 1905 Russian Revolution, which triggered numerous anti-Jewish pogroms. Counter to an extensive literature that emphasizes the contribution to conflict of ethno-religious polarization, we show that the sharp increase in pogroms after October 1905, when publication of the October Manifesto and accompanying anti-Semitic propaganda increased feelings of political threat among many non-Jews, was smaller in settlements with relatively large Jewish populations. We demonstrate that this empirical pattern can be rationalized with an elaborated version of the Esteban-Ray (2008) model of diversity and conflict when, as with the October Manifesto, political reform systematically alters the distribution of benefits across groups.

Word count: 11,055

O, even now its eyes from me demand accounting,
For these the tales the spider is recounting,
Tales that do puncture the brain, such tales that sever
Thy body, spirit, soul, from life, forever!

"In the City of Slaughter," Hayim Nahman Bialik

In October 1905, two momentous events occurred in the Russian Empire. One was wonderful and unexpected: the surrender by Tsar Nicholas II of absolute power over his subjects. The other was horrible and familiar to those who remembered the period after the assassination of Nicholas's grandfather, Tsar Alexandar II, in 1881: a plague of anti-Jewish pogroms, with thousands of casualties and untold material damage.

What happened in 1905 was a quintessential example of violent backlash to political reform. Revolutions, negotiated transitions, watershed elections, and other changes to *de jure* political power produce losers and winners, engendering feelings of political threat among those who backed the losing side. Accompanied by rumors and propaganda, such sentiments can activate preexisting prejudices, fueling mob violence, street fighting, and other disturbances (Snyder 2000; Horowitz 2001). Individuals with little connection to larger political struggles, but identifiable as belonging to ethnic or religious groups popularly associated with such change, are frequent victims. There are numerous examples, including Ku Klux Klan terror following the American Civil War, the (first) Troubles in Northern Ireland during and after the Irish War of Independence, the anti-Armenian pogrom in Baku during Gorbachev's reforms of the Soviet system, and right-wing violence in Colombia following electoral reforms and the adoption of a new constitution in the late 1980s and early 1990s.

As these examples illustrate, violent backlash to political reform often plays out at the local level (e.g., Fergusson, Querubin, Ruiz, and Vargas 2021). Within the general context of reform, what sort of communities are most vulnerable to violent backlash? Existing work suggests various possibilities. A natural hypothesis is that conflict should be more likely in the presence of ethno-religious diversity, which increases the perceived threat that groups

pose to one another. As Horowitz (1985) argues, and Esteban and Ray (1994, 1999) show formally, such threats are magnified when two opposing groups are of approximately equal size—that is, when society is polarized. Cross-country data substantiate the importance of ethno-religious polarization for conflict (e.g., Montalvo and Reynal-Querol 2005; Esteban, Mayoral, and Ray 2012), while providing less support for any relationship between conflict and the related concept of fractionalization (Fearon and Laitin 2003; Collier and Hoeffler 2004).[1] At the same time, precisely because conflict is more intense when societies are polarized, we might expect conflict *initiation* to be less likely when competing groups are of approximately equal size, as neither group is willing to bear the (potentially higher) cost of conflict (Esteban and Ray 2008). Moreover, to the extent that contact reduces prejudice, as Allport (1954) famously argues, reform may be less likely to activate feelings of political threat when societies are diverse.

Other perspectives suggest a simpler relationship between population size and violence. Historians frequently emphasize that violence is more or less likely when some group is large; we provide examples from our empirical context below. The logic of such arguments often relates to the visibility of the targeted group, an idea that Solomon (2023) explores systematically for the Kristallnacht pogrom in Nazi Germany. Grosfeld, Sakalli, and Zhuravskaya (2020) similarly present evidence that anti-Jewish pogroms were more likely (in Imperial Russia) when political turmoil and economic shocks intersected in the presence of large Jewish communities, though in their setting this is driven by the predominance of Jews in certain middleman occupations. Kopstein and Wittenberg (2018), in turn, build on Blalock (1967) to argue that pogroms in the eastern Polish borderlands in 1941 were more likely where large Jewish communities posed a threat to the political control of non-Jews (see also Kopstein and Wittenberg 2011). Such perceptions of a common threat against a numerous out-group may be encouraged by the tendency of affectively similar groups to coalesce around a com-

[1]With two competing groups, the difference is semantic: polarization is proportional to fractionalization.

mon identity as more dissimilar groups increase in size (Fouka and Tabellini 2022; see also Adida, Laitin, and Valfort 2016).

Although little of this work deals directly with political reform, much of the literature emphasizing a simpler relationship between population size and violence shares an important characteristic with accounts of violent backlash: the inherently asymmetric nature of conflict. With reform, one group suddenly finds itself disadvantaged, relative to the status quo ante. That group, and not the other, decides whether to initiate conflict to try to reverse reform. Whether the aggrieved group does so plausibly depends on the size of the other group, and thus its likelihood of winning.

We consider asymmetric conflict following political reform in the context of the 1905 Russian Revolution, which triggered anti-Jewish pogroms across the Pale of Settlement, the western region of the Russian Empire to which Jewish settlement was generally restricted. Our research design exploits the profound changes to Russia's political institutions promised by the October Manifesto, Tsar Nicholas II's response to the Revolution that ended centuries of absolute autocracy and guaranteed civil and political rights. The Manifesto—issued "suddenly, with no preliminary notice or preparation" (Surh 2024, p. 44)—was a major concession to Russia's liberal and radical movements, in which Jews were prominent, and many traditional supporters of the monarchy blamed Jews for backing the Tsar into a corner. Following publication of the Manifesto, there was a marked increase in pogrom incidence, as anti-Semitic propaganda and a history of Jewish participation in radical politics encouraged supporters of the autocracy to target Jews as the presumed instigators of reform.

Using newly digitized data on the religious composition of all Jewish settlements in the Pale, and exploiting geolocated data on these settlements and on pogrom incidence from Spitzer (2021), we study the role that population heterogeneity played in encouraging or discouraging pogroms after publication of the October Manifesto. Our identification strategy is difference-in-differences: we examine the change in monthly pogrom incidence after October 1905 in settlements with relatively low and high a) Jewish share, or b) polarization.

The latter variable is measured as $n(1-n)$, with n the share of the local population that is non-Jewish. The former variable takes values that span the possible range, allowing us to distinguish between the (differential, pre- versus post-treatment) effect on pogrom incidence of Jewish share and that of polarization. To support the assumption of (strong) parallel trends in the absence of treatment, we account for weather shocks, potential diffusion across settlements, differential trends at the provincial level, and various settlement-level characteristics.

Figure 1 illustrates both our design and our main results. The sharp increase in pogroms in November 1905, following publication of the October Manifesto, is much smaller in settlements with comparatively large Jewish communities. In contrast, the change in pogrom incidence after the October Manifesto is no higher or lower in more polarized settlements.

This strong, negative relationship between Jewish population share and violent backlash to the October Manifesto is robust to the inclusion of the controls discussed above. We additionally demonstrate that any unobserved confounding would need to be much stronger than observed differential trends by population, which, themselves, are strongly associated with pogrom incidence. Among numerous changes to specification and sample, we also show robustness to controlling for mobilization patterns during the Russo-Japanese War, for prior pogrom incidence, and for differential trends by a host of settlement-level characteristics: proximity to provincial capitals and railroads, Jewish occupational patterns and their interaction with weather shocks, size of the local industrial economy, prior pogrom incidence, presence of the Jewish Labour Bund, presence of police, and distance to troops.

Why was the increase in the incidence of pogroms after the October Manifesto smaller in settlements with relatively large Jewish populations? To answer this question, we return to the discussion above of asymmetric responses to reform. We do so in the context of Esteban and Ray's (2008) model of conflict initiation and intensity, which we elaborate to allow for both systematic (national) and idiosyncratic (local) contributions to the status quo distribution of benefits. Political reform is properly understood as a shock to the systematic

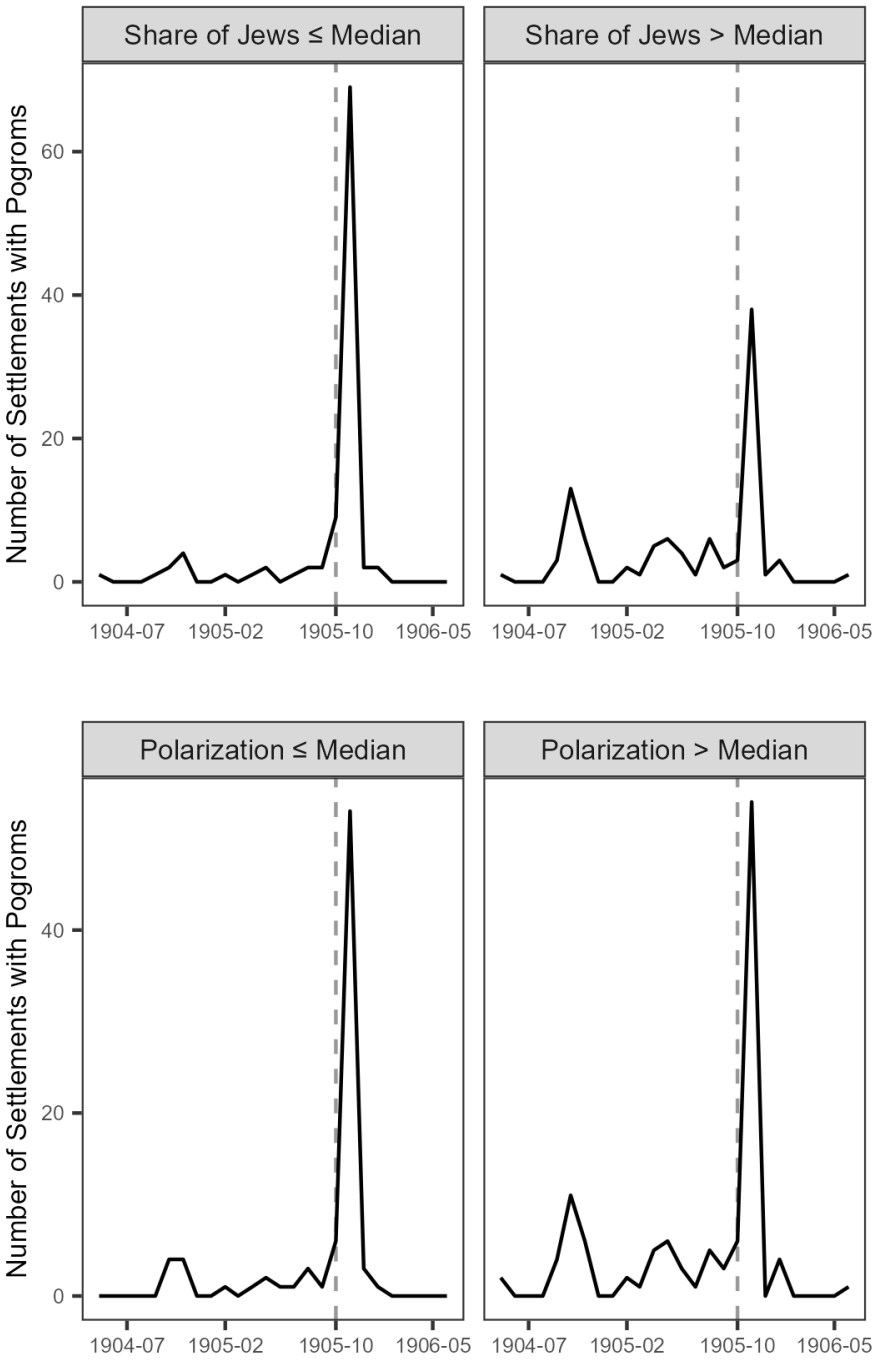

Figure 1: Population Share of Jews and Pogrom Incidence (top) versus Polarization and Pogrom Incidence (bottom).

contribution—in our context, a leveling of the playing field between Jews and non-Jews. We show that the differential probability of conflict is increasing in the population share of the

group disadvantaged by reform if there is little or no open conflict under the status quo. The costs of conflict with a relatively larger group dissuade those adversely affected by the reform from initiating violence. Our empirical context broadly reflects the assumptions and conclusions of this analysis.

Taken together, our empirical and theoretical analyses suggest a new way of thinking about conflict. Violent backlash to political reform occurs when one group perceives a disadvantage relative to another. Under reasonable assumptions, the probability that the group disadvantaged by reform can regain its prior position through force is increasing in its population share; so is its expected payoff from starting such a conflict (alternatively, the costs of engaging in such conflict are lower). Without invalidating the relationship between population characteristics and conflict that may exist in other settings, our work thus demonstrates that violent backlash to political reform is less likely when the group more likely to benefit from reform is relatively large.

Our study builds on various literatures. Prominent among these is empirical and theoretical scholarship on the relationship between ethno-religious diversity and conflict, some of which we reference above. As discussed, our empirical setting is distinctive in that we ask how a shock to the status quo distribution of benefits propagates through communities with varying shares of titular and minority groups. The associated design exploits settlement-level data on violence and religious composition, further distinguishing our analysis from much of the existing literature, which exploits variation at the country (or, in Guarnieri 2025, country-ethnicity) level. Among the exceptions to this general characterization, our historical context brackets the coalition politics central to the seminal work of Wilkinson (2004) and within-settlement residential patterns examined by Kasara (2017)—for reasons of political context in the former case, because of data constraints in the latter. We share with Amodio and Chiovelli (2018) a focus on ethnic violence following political change, though with an emphasis on winners and losers from reform rather than on competition for power among members of a previously excluded community. We also draw inspiration from studies of non-

ethnic violence, as when we follow Aidt and Leon-Ablan (2021) and Aidt, Leon-Ablan, and Satchell (2021) in explicitly modeling diffusion to reflect the circulation of both information and perpetrators. Finally, as in Desierto and Koyama (2024), we relate religious violence to the size of population groups, though in their setting it is the size of the ruling coalition that determines whether persecution is state-sanctioned or local.

We also contribute to recent scholarship on the origins and consequences of anti-Jewish violence before the Holocaust. Some of this work is cited above. Other contributions include Anderson, Johnson, and Koyama (2015), Finley and Koyama (2018), Becker and Pascali (2019), and Johnson and Koyama (2019), who examine the institutional determinants of pogroms and other persecutions at various points in medieval, Renaissance, and early modern European history. Voitländer and Voth (2012), in turn, trace the persistence of anti-Semitic violence from the medieval era to the 20th century, while Grosfeld, Rodyansky, and Zhuravskaya (2013) demonstrate the legacy of anti-Semitism, expressed in part through anti-Jewish pogroms, for contemporary market attitudes. Not least, Spitzer (2021) examines the impact of pogroms in the late Russian Empire on Jewish migration to the United States, a theme explored more generally in the survey of Becker, Mukand, and Yotzov (2022).

The paper proceeds as follows. We first discuss the historical context of Jewish settlement in the Russian Empire and the events of the 1905 Russian Revolution. We then describe our data and empirical strategy. Following this, we present our results alongside numerous robustness checks. Finally, we discuss the manner in which existing perspectives on ethno-religious diversity and conflict are both helpful and misleading in understanding violent backlash to political reform, and we show how to ask the right question of such models.

1 Historical Context

The presence of a significant Jewish population in the western lands of the Russian Empire dated from the Partitions of Poland in the late eighteenth century, when Russia annexed territories in what had to that point been the Polish-Lithuanian Commonwealth. Over

previous centuries, the owners of private towns in the Commonwealth had invited Jews to settle in anticipation of economic benefits. Now in control, Russia decreed that Jewish residence would generally be restricted to its newly acquired lands, which also included the southern territories of "Novorossiya" and, from 1815, the Duchy of Warsaw. Together, this region constituted the so-called Pale of Settlement (*cherta osedlosti*). For Jews, freedom of movement and economic opportunity fluctuated over the nineteenth century, with a secular decline that marked the transition from a "golden age," shortly after the Partitions, to the impoverished *shtetls* of popular understanding (Petrovsky-Shtern 2014). In an environment of widespread anti-Semitism, the assassination of Tsar Alexander II sparked "pogroms" (the neologism accompanied the events) across southwestern Russia in 1881 and 1882. These, in turn, perversely encouraged the promulgation of the May Laws of 1882, which further restricted Jewish residency and economic rights.

The first years of the twentieth century saw significant and interconnected economic, social, and political crises in Imperial Russia. Russia stumbled into a war with Japan in 1904, which it proceeded to lose. The Russo-Japanese War, in turn, was a prime—though not the only—cause of the 1905 Russian Revolution, which followed two years of social upheaval in the cities and the countryside. In October 1905, following a general strike that included the economically critical railway sector, Tsar Nicholas II issued a manifesto establishing a national parliament (Duma), ceding some personal authority, and decreeing broad civil and political rights. The so-called Days of Freedom that followed saw widespread celebrations-cum-demonstrations against the autocratic regime. These events, in turn, spurred a reactionary response that, in many settlements of the Pale, took the form of anti-Jewish pogroms.

The "Easter" pogrom in Kishinev in April 1903 was the initial event in this large wave of anti-Jewish violence and rioting—the first since 1881–2. As documented in Table 1, this violent episode did not immediately presage a wider series of pogroms. Rather, the wave began slowly, with a large riot in Gomel (contemporary Belarus) in September 1903; the beginning of the main wave in May 1904; an increase in frequency in the fall of 1904,

Table 1: Anti-Jewish Pogroms in Russia, 1904–6

		Spitzer		Our sample	
Month	Year	Settlements	Pogroms	Settlements	Pogroms
5	1904	2	2	2	2
9	1904	6	6	4	4
10	1904	16	16	15	15
11	1904	11	11	10	10
2	1905	3	3	3	3
3	1905	1	1	1	1
4	1905	6	7	6	7
5	1905	11	13	8	10
6	1905	4	4	4	4
7	1905	2	2	2	2
8	1905	9	11	8	10
9	1905	4	4	4	4
10	1905	15	16	12	13
11	1905	204	264	107	160
12	1905	9	9	3	3
1	1906	7	7	5	5
6	1906	5	5	1	1
	Total	268	381	154	254

Note: "Spitzer" refers to data compiled by Yannay Spitzer for Spitzer (2021) and kindly provided by the author. Our sample includes settlements (and pogroms) in the Pale of Settlement that could be matched to the 1897 census data: see text for details. Some settlements experienced multiple pogroms.

as wartime conscription generated public anger against Jews, who were alleged to have collaborated with the Japanese (Lambroza 1992); a slowing in the winter of 1904–1905; and then growth in the spring and summer of 1905. There was then a massive surge in anti-Jewish pogroms following publication of the October Manifesto on October 17, 1905 (Julian calendar, corresponding to October 30 in our data, which follow the Gregorian calendar), with over 250 pogroms through the subsequent month. Following this surge, the wave ended in the middle of 1906. As Figure 2 illustrates, pogroms were distributed broadly across the Pale of Settlement, with some clustering in particular areas.

Many pogromists apparently acted with the conviction that Jews were responsible for the loss of Tsarist authority. Jews were popularly associated with revolutionary politics in

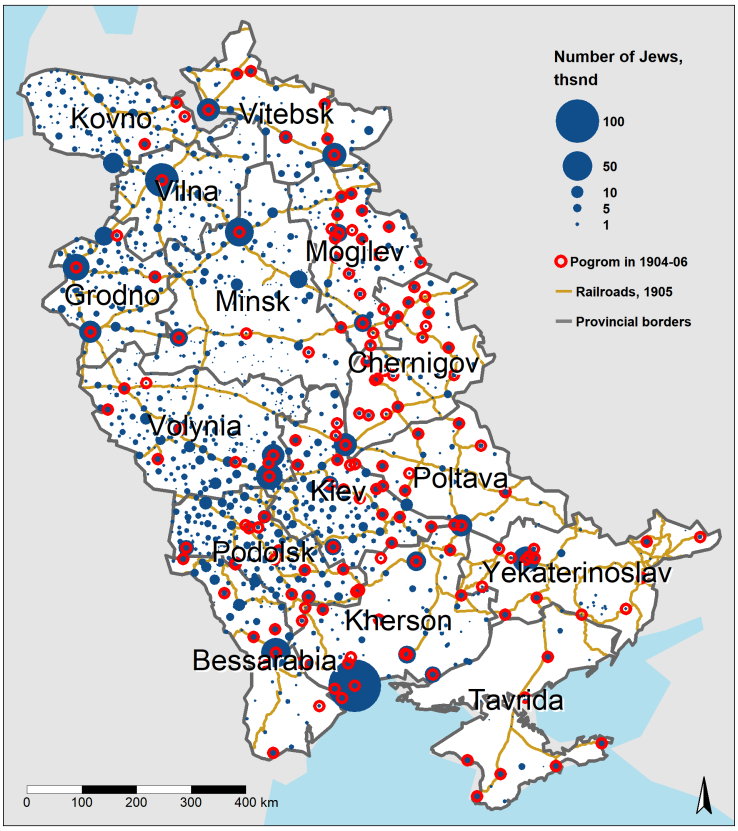

Figure 2: Jewish Communities and Pogroms in Russia, 1904–6. See text for additional information.

late Imperial Russia, and indeed Jews were active in opposition movements, including the Bund and various Zionist-socialist parties (Ascher 2008; Boix 2025): from 1903 to 1905, Jews represented more than 30 percent of political arrestees (Frankel 2009). Many Jews actively celebrated the October Manifesto, and as celebrations turned into demonstrations against the Tsar-Father (*Tsar-Batiushka*) still revered by many Russians, Jews and Jewish properties were targeted for violence (Ascher 2004). Typical was the reaction in Kyiv, where pogromists shouted, "There's your freedom, there's your constitution and revolution, there's your crown and portrait of our Tsar" (Hillis 2013, p. 167). Our own analysis suggests that political considerations played a role in nearly all pogroms documented by the Zionist Organization of Berlin, of which more below, although these motives typically intersected with the more

mundane desire to loot Jewish establishments and residences.[2]

Of course, even if many revolutionaries were Jews, most Jews were not revolutionaries. The confusion of one conditional probability for another was encouraged by anti-Semitic propaganda, with the implicit or explicit support of authorities.[3] ("The wildest news travels along the telegraph wires, sometimes bearing an official stamp," wrote Trotsky [1922/2016, p. 112].) Whatever the truth of depositions and official accounts produced after the pogroms, rumors of Jewish desecrations spread easily (Hillis 2013, pp. 164–67). Moreover, Jewish efforts at self-defense, prompted initially by the large pogroms in Kishinev and Gomel, fueled paranoia that Jews were arming to overthrow the state. The upshot was that "the principal belief animating 1905's pogroms identified Jews as an alien, disloyal threat, the chief promoters and beneficiaries of revolution" (Surh 2024, p.18).

Historians have emphasized the relative size of the Jewish population as an important determinant of anti-Semitic attitudes and violence during the 1905 Revolution, though not always in uniform fashion. Weinberg (2021, p. 86), for example, writes, "The large number of Jews [some 35% of the population] and their visible presence in the commercial and industrial life of the city contributed to resentment against Odessa's Jewish community." Surh (2024, p. 131) echoes this sentiment, arguing that the "high proportion of Jews [in Orsha, site of a pogrom in October 1905] possibly accounts for both a greater self-assurance and assertiveness felt by the Jewish community, which would have only increased the threat Orsha's Gentile

[2]We support this interpretation with the help of a GPT analysis of the reports in Motzkin (1910), as described in the Appendix. Hillis (2013, p. 169) cites an official list of "primary participants" in the Kyiv pogrom, which we obtained from the author. Among the 26 listed individuals, there were many members of the petty bourgeoisie (*meshchane*), alongside known criminals, whose participation was apparently more prominent later in the riot, and some peasants.

[3]Petersen (2002) suggests that "Perpetrators acting under the influence of Rage selectively use evidence and develop faulty or irrational beliefs."

population already felt from that level of Jewish ascendance." Steinberg (2017, p. 135) similarly asserts that, once the pogroms began, "Where Jews were a large part of a city's local population, right-wing violence reached extremes." In contrast, Lambroza (1992, p. 209) emphasizes the protection afforded by a comparatively large Jewish population, noting, "At Gomel local administrators were more responsive to Jews [than in Kishinev], possibly because Jews made up 50 percent of the population." Surh (2024, p. 27), in turn, suggests that the pogroms in Gomel and (later) Zhitomir "occurred in towns with sizeable, diverse, and well-organized Jewish communities that were clearly aware of the Kishinev events, and so, capable of contesting another massacre of Jews in their own locales." In the analysis to follow, we investigate such claims systematically.

2 Data

We explore the incidence of pogroms in Jewish settlements in the non-Polish provinces of the Pale of Settlement (henceforth "Pale of Settlement" or simply "Pale") from 1904 to 1906. Geocoded information on these settlements comes from Spitzer (2021), who uses published data from the 1897 census (Troinitskii 1905) and from the Communities Database of the genealogy website JewishGen (`jewishgen.org/communities`).[4] The settlements range in size from small villages to provincial capitals, and they include a range of formal designations (settlement types): *derevnia* (village), *selo* (church village), *mestechko* (small commercial town, roughly synonymous with the colloquial *shtetl*), *gorod* (city), and so forth. Settlements are nested in districts (*uezdy*), which in turn are nested in provinces (*gubernii*). In our empirical work, we classify settlements as *Urban* if they are provincial or district towns (gubernskii gorod, uezdnyi gorod, or similar), retain *Mestechko* (plural mestechki) as a distinct category,

[4]Spitzer (2021) defines a settlement as Jewish if either Troinitskii (1905) provides the number of Jewish residents or the settlement is included in the JewishGen Communities Database. The latter condition adds some 300 additional, typically smaller settlements to the data. We provide summary statistics in Table A1.

and classify all other settlements as *Rural*.

For settlements in the Russian empire with at least 500 inhabitants, Troinitskii (1905) provides information on the total population and on the number of residents belonging to each religious group constituting at least 10% of the settlement, with groups falling below that threshold categorized as "other." We digitize these data to define our sample (of which more below); to tally settlement-level *(Log) population*; and to derive the variables *Share of Jews*, which is the proportion of the settlement's population identified as Jewish, and *Share of Jews* × (*1 - Share of Jews*) (hereafter, often *Polarization*). As Figure 3 shows, the population share of Jews takes a wide range of values for every class of settlements, though *mestechki* tend to be more polarized. Moreover, as Figure 4 illustrates, there is substantial spatial variation in both Jewish share and polarization, even after conditioning on province fixed effects, total population, and indicators for settlement type. This variation, and in particular the fact that the variable Share of Jews spans nearly the full range of possible values, allows us to distinguish between any effect of Jewish population share and that of polarization: for Share of Jews less than 0.5, both this variable and Polarization move in the same direction, whereas for values greater than 0.5 the opposite is true.[5]

Our main sample thus comprises 1,370 geo-referenced settlements, including 26 settlements for which Troinitskii anomalously records a Jewish population share under 10% and 14 urban settlements for which the number of Jewish residents is not provided (because it was under 10%) but for which we are able to back out that quantity from published *uezd*-level data from the 1897 census. We exclude 25 Jewish settlements identified by Spitzer (2021) but with unknown geographic coordinates, as well as 145 smaller localities from JewishGen's Communities Database that are not included in Troinitskii (1905). Estimates of Jewish pop-

[5]The 1897 census additionally provides data on language use at the district (not settlement) level, which we depict alongside religious composition in Figure A3. The pairwise correlation between share of the district population speaking Yiddish and share identified as Jewish is 0.999.

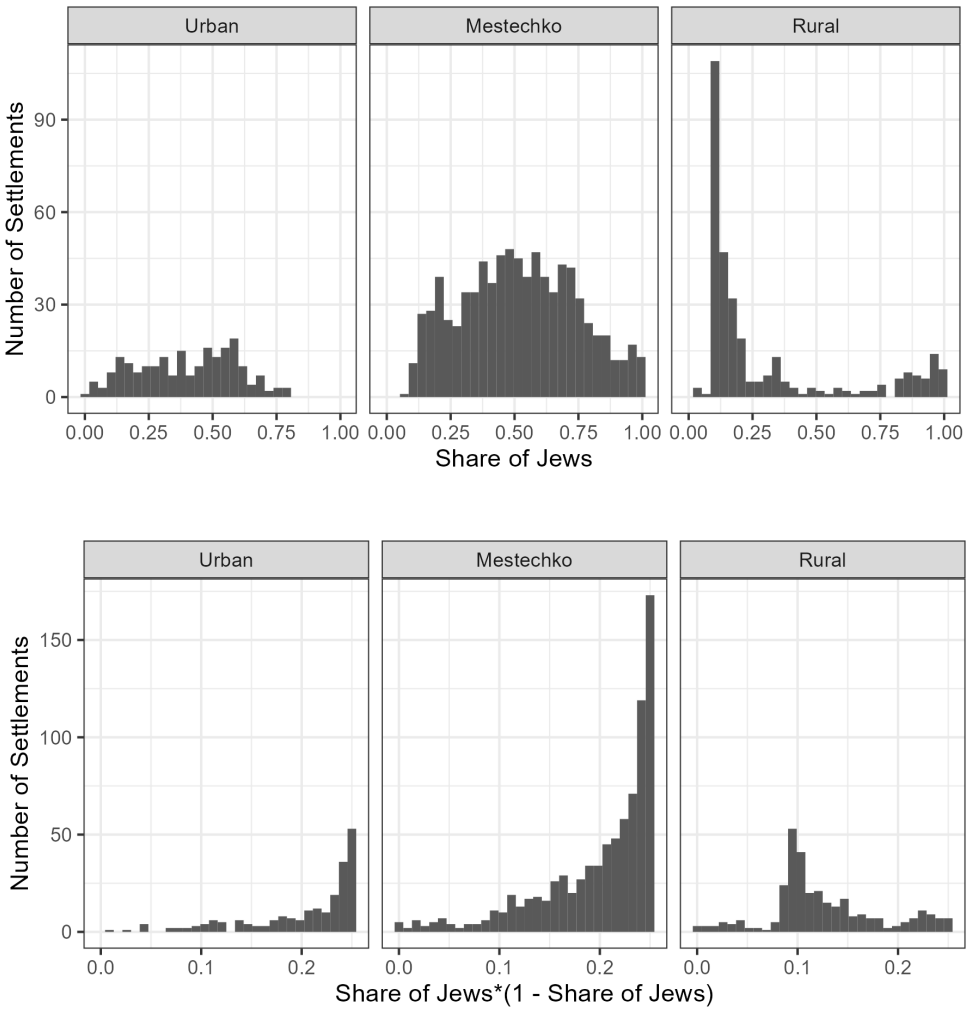

Figure 3: Population Share of Jews (Top) and Religious Polarization (Bottom), 1897. Of the 1370 settlements in our sample, 16% are urban, 61% are small commercial towns (*mestechki*), and 23% are rural.

ulation are available for only 39 out of these 170 communities; together, these accounted for just 0.2% of the Jewish population of the Pale in 1897 (Spitzer 2021). The remaining Jewish population in the Pale was distributed across small villages and hamlets or constitutes less than 10% of the population in larger settlements. In total, the Jewish population in our sample constituted approximately 83% of the Jewish population of the Pale.[6]

[6]As discussed below, we check the robustness of our results using an extended sample with an additional 73 settlements that are (i) identified by Spitzer (2021) as having Jewish communities, (ii) included in Troinitskii (1905), but (iii) have Jewish share under his 10%

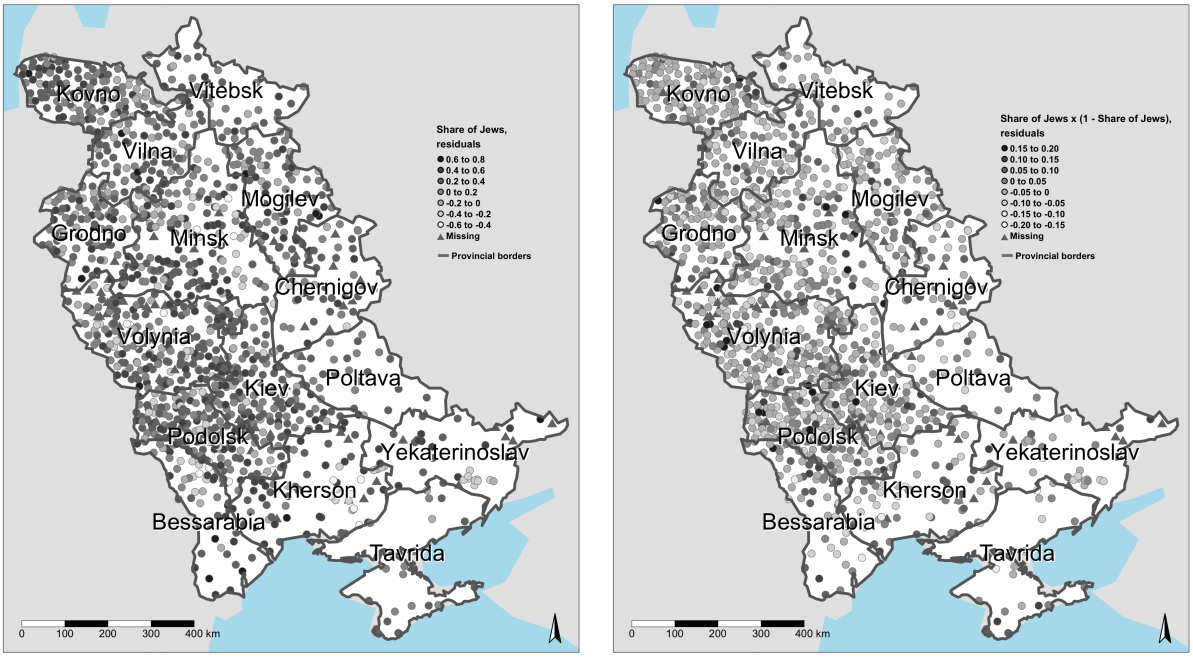

Figure 4: Population Share of Jews (Left) and Religious Polarization (Right), 1897. These figures depict residuals after regressing the two measures on province fixed effects, total settlement population, and indicators for settlement type.

Spitzer (2021) also provides geo-referenced data on pogroms, building on the work of surveyors from the Zionist Organization of Berlin (Motzkin 1910) and the 1906–7 edition of the *American Jewish Year Book* ("From Kisheneff to Bialystok").[7] As our outcome of interest, we define the indicator *Pogrom*, which for the unit of observation—settlement-month—takes a value of one if the data record at least one pogrom.[8] Spitzer's data list 381 pogroms in the

threshold. For these settlements, we impute number of Jews as the number of individuals in the residual "other" category.

[7]Figures A1 and A2 depict typical entries from these sources. Spitzer's data are more comprehensive for this wave of pogroms than those collected by Grosfeld, Rodnyansky, and Zhuravskaya (2013) and Grosfeld, Sakalli, and Zhuravskaya (2020), who do not use Motzkin (1910).

[8]We exclude five pogroms in 1903, including the Kishinev and Gomel pogroms discussed above, which served as precursors to the main wave that began in May 1904. Below, we

Pale of Settlement (excluding Poland) during this period, some of which are in settlements that are small, unidentified, non-geolocated, or otherwise excluded from our sample. After excluding such events, we observe 254 pogroms from May 1904 to June 1906, with some of the 154 affected settlements experiencing pogroms in multiple months (see Table 1). Below, we describe other variables used in our analysis.

3 Empirical strategy

Our empirical strategy is difference-in-differences. Our baseline specification is the two-way fixed effects (TWFE) regression

$$y_{spt} = \kappa \times \Pi_s \times Z_t + \mathbf{X}_{st}\beta + \phi_s + \alpha_t + \gamma_p \times Z_t + \epsilon_{spt}, \tag{1}$$

where Π_s is either $JewishShare_s$ or polarization, $JewishShare_s \times (1 - JewishShare_s)$, and Z_t is an indicator for months after October 1905. The outcome y_{spt} is the binary incidence of a pogrom in settlement s in province p during month $t = 1, 2, \ldots, 26$. The vector $\mathbf{X}_{st}$ is a list of time-varying covariates; in most specifications, these include (standardized) temperature and precipitation deviations from the long-run average.[9] We include settlement fixed effects ϕ_s and month fixed effects α_t. We also typically allow for differential trends at the provincial (*guberniia*) level, before versus after the October Manifesto, as captured by the interaction term $\gamma_p \times Z_t$. In some specifications, we additionally allow for differential trends by time-invariant characteristics (1897 census population and indicators for settlement type) as well as by temperature and precipitation deviations. The variable ϵ_{spt} is an idiosyncratic error term.

report robustness to extending the sample back to April 1903. After June 1906, there were almost no recorded pogroms in the Russian Empire until World War I.

[9]Broadly, these climate variables pick up economic shocks in what was a largely agrarian economy. Such shocks—or even the weather more directly—may have shaped the perceived costs or benefits of conflict for affected groups (Johnson and Koyama 2017; Grosfeld, Sakalli, and Zhuravskaya 2020).

Recent scholarship—unpublished, as of this writing—has explored the properties of this estimator in the context of a more general reevaluation of difference-in-differences designs. With a continuous treatment ($\Pi_s \times Z_t$), the TWFE estimate is contaminated with selection bias associated with treatment-effect heterogeneiety under the standard parallel-trends assumption. Callaway, Goodman-Bacon, and Sant'Anna (2024) demonstrate that this bias is absent under an alternative assumption, which they term "strong parallel trends," which amounts to parallel trends plus a limited form of treatment-effect homogeneity.[10] Under this assumption, the TWFE estimator recovers the weighted average of the average causal response (the causal effect of a marginal change in the "dose") at all possible doses. The weights are maximized at the expected value of the dose which, as Figure 3 illustrates, implies for our setting that the TWFE estimate leans on values of the treatment well represented in the empirical distribution.

To account for the spatial and temporal correlation of pogroms, we report Conley standard errors that assume a 50-km radius and two-period lag. In addition, in some specifications we include a spatial lag (of pogroms), $\mathbf{W}\mathbf{y}_t$, where $\mathbf{y}_t$ is the vector of pogrom incidence at time t for all settlements in the sample. The spatial weight matrix, $\mathbf{W}$, has zeroes along the diagonal and for $i \neq j$ takes a value of one if settlement j is within 50 km of settlement i and zero otherwise.[11]

[10] In particular, $ATT(d|d) = ATE(d)$, where ATT and ATE refer to the average treatment effect on the treated and average treatment effect, respectively, and d is the "dose" (here, $\Pi_s \times Z_t$). See also Xu, Zhao, and Ding (2024), who examine the two-group (i.e., discrete rather than continuous treatment), two-period version of what they call "factorial difference-in-differences."

[11] As our sample comprises settlements with substantial Jewish communities, we implicitly bracket the question of what happens when violence "reaches" settlements without potential victims, as in Klaŝnja and Novta (2016).

4 Results

As a preliminary step, we examine conditional correlations of pogrom incidence in the pre-treatment period. We collapse the data into a cross-section, where the outcome is the binary incidence of at least one pogrom between May 1904 and October 1905, that is, before the Manifesto. We include provincial fixed effects in all regressions. Table A2 demonstrates that Jewish population share is positively correlated with pogrom incidence prior to November 1905, though the magnitude is not large.[12] In contrast, as Table A3 shows, there is no robust relationship between polarization and pogrom incidence in the pre-treatment period.

Tables 2 and 3 present results from our difference-in-differences design. In Table 2, where we identify the effect of Jewish population share on (the change in) pogrom incidence, the treatment effect is everywhere negative, with significance at the 5% level or better. The saturation of models with controls somewhat reduces the magnitude of the estimated effect, but the qualitative result is robust to controlling for differential trends by settlement type, population, and temperature/precipitation deviations (Column 4), as well as to accounting for the spatial lag in the distribution of pogroms, with possibly different effects before and after the October Manifesto (Column 5). If we take the coefficient on the interaction equal to -0.008—roughly the average value across Columns 2–5—then an increase of one standard deviation in the share of Jews in a settlement implies a decrease in pogrom incidence of more than one-third its mean value.

The left panel of Figure 5 plots coefficients from the corresponding event study, where we interact *Jewish share* with indicators for pre- and post-treatment months, and otherwise follow the specification in Column 5 of Table 2. Pre-trends can be considered parallel:

[12]Using the estimates in Columns 4–8 of Table A2, an increase in Jewish share of one standard deviation (approximately 26 percentage points) is associated with an increase in the probability of a pogrom in any of the thirteen pre-treatment months of roughly 1.7 percentage points, or 8 percent of the outcome standard deviation.

Table 2: Share of Jews and Pogrom Incidence

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.0151***	−0.0091**	−0.0082**	−0.0086**	−0.0077**
	(0.0037)	(0.0039)	(0.0038)	(0.0039)	(0.0038)
Temperature deviation		0.0034***	0.0023**	0.0043***	0.0033***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation		0.0012	0.0005	0.0000	0.0001
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0388***		0.0233**
			(0.0066)		(0.0101)
Urban × Post–Oct 1905		0.0176***	0.0173***	0.0065	0.0062
		(0.0053)	(0.0052)	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905		0.0057**	0.0051**	0.0016	0.0009
		(0.0026)	(0.0025)	(0.0029)	(0.0028)
Log Population × Post–Oct 1905				0.0051***	0.0050**
				(0.0020)	(0.0019)
Temperature deviation × Post–Oct 1905				−0.0025	−0.0031
				(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0038	0.0002
				(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905					0.0241*
					(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. See text for additional details and variable definitions.

indeed, any noticeable deviations from zero in the effect of share of Jews before October 1905 are positive rather than negative. The negative effect of Jewish population share post-treatment is concentrated in the first month following publication of the October Manifesto, with a reversion to the pre-treatment baseline (or slightly greater than that) in the remaining sample period. For ease of presentation, we report results with a uniform treatment effect in the various robustness checks and alternative specifications reported below.

In contrast, the results in Table 3 demonstrate no robust relationship between ethno-religious polarization and pogrom incidence in our sample period. (As discussed above, we are able to distinguish between any effect of polarization and that of Jewish population share because the variable *Share of Jews* spans nearly the full range of possible values in our sample.) Across all specifications, the estimated treatment effect is small and insignificant. The

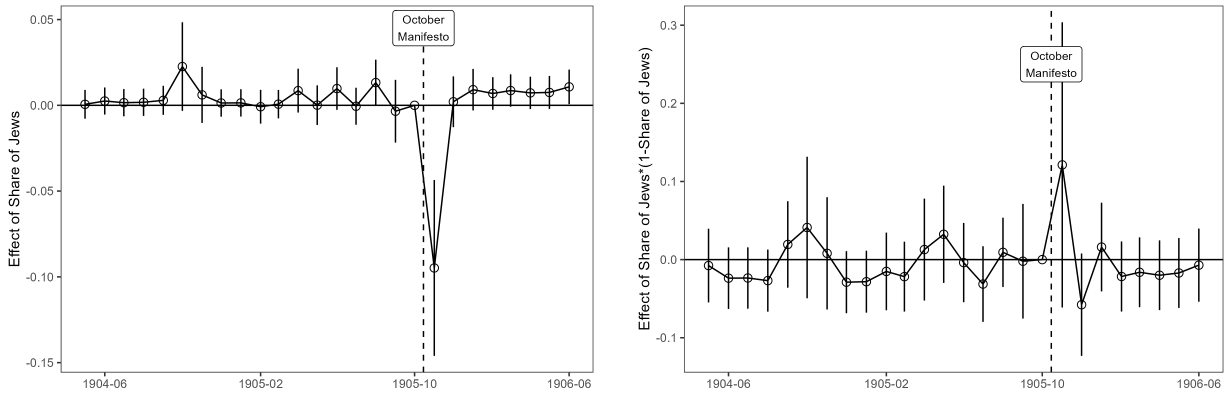

Figure 5: Event Studies: Share of Jews (left) and Religious Polarization (right). Other than time-varying treatment effects, the specification corresponds to Column 5 of Tables 2 and 3, respectively.

event study in the right panel of Figure 5 provides suggestive evidence of a positive effect of polarization in November 1905, but the estimated coefficient is statistically insignificant. The overall message is that there is no robust relationship between ethno-religious polarization and pogrom incidence in our sample period. In what follows, we therefore focus on Jewish population share rather than polarization.

Although the regressions in Table 2 control for a great deal of heterogeneity, including differential provincial trends, our results could nevertheless be biased by unobserved confounders. Figure 6 follows Cinelli and Hazlett (2020) in showing how much confounding would be necessary to overturn our results. Assuming that the interaction between population size and the timing of the October Manifesto is exogenous, even confounding three times as strong as that interaction would reduce the differential effect of the Jewish population share by less than half that estimated in Column 5 of Table 2.

To more systematically explore the robustness of the relationship between Jewish population share and the incidence of pogroms, we examine various changes to our specification suggested by the historiography of the 1905 Russian Revolution. A recurring motif in the literature on the 1905 Russian Revolution is the diffusion of violence across Jewish settlements. In Tables 2 and 3, we account for this possibility through the inclusion of a spatial

Table 3: Polarization and Pogrom Incidence

	(1)	(2)	(3)	(4)	(5)
Share of Jews × (1 - Share of Jews)	−0.0029	0.0047	0.0036	−0.0104	−0.0105
× Post–Oct 1905	(0.0132)	(0.0157)	(0.0153)	(0.0167)	(0.0160)
Temperature deviation		0.0034***	0.0023**	0.0043***	0.0033***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation		0.0012	0.0005	0.0000	0.0001
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0388***		0.0233**
			(0.0066)		(0.0101)
Urban × Post–Oct 1905		0.0162***	0.0161***	0.0059	0.0057
		(0.0054)	(0.0053)	(0.0053)	(0.0050)
Mestechko × Post–Oct 1905		0.0036	0.0033	0.0003	−0.0002
		(0.0026)	(0.0025)	(0.0028)	(0.0026)
Log Population × Post–Oct 1905				0.0053***	0.0052***
				(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905				−0.0024	−0.0030
				(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0039	0.0002
				(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905					0.0241*
					(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. See text for additional details and variable definitions.

lag, alone and in interaction with a post–October dummy, but we can also directly control for potential channels of contagion. Anti-Semitic propaganda was often published in provincial capitals, and both propaganda and pogromists traveled along Russia's rail system. In Table 4, we allow for differential trends by travel time to the provincial capital (measured either in hours or by an indicator that takes a value of one if travel time is greater than median) and by distance to the nearest railroad.[13] All three interactions work as anticipated, but their

[13]We measure travel time as the least-cost path to the provincial capital traveling afoot and/or by rail. Following Nurutdinov (2019, pp. 130–136), we assume the following effective speed of travel: 1.56 km per hour afoot, 35.20 km per hour by rail. Unlike in Nurutdinov (2019), we disregard train fares and omit water transportation. We assume the terrain to be flat. For calculations, we employ the R package `gdistance`. GIS data on railroads are from

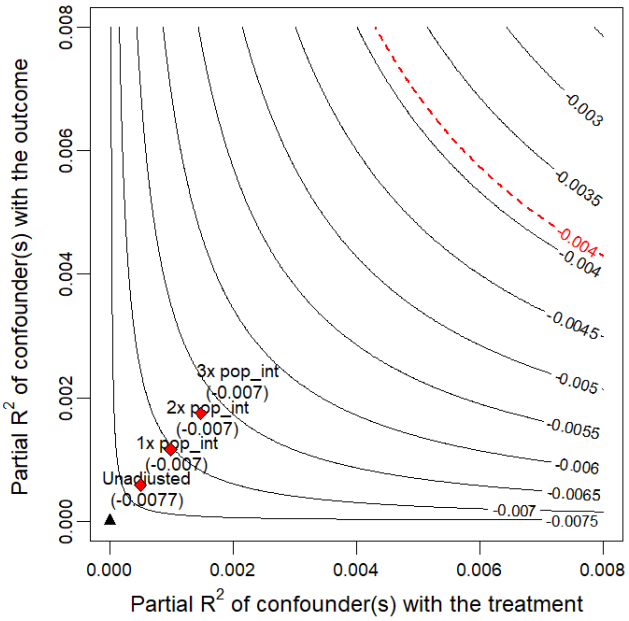

Figure 6: Sensitivity Analysis. The figure follows Cinelli and Hazlett (2020) in showing how much confounding would be necessary to overturn our results. Assuming that the interaction between population size and the timing of the October Manifesto is exogenous, even confounding three times as strong as that interaction would reduce the differential effect of Jewish population share by less than half that estimated in Column 5 of Table 2.

effect is essentially orthogonal to the treatment effect of Jewish population share.

Jews in Eastern Europe were the quintessential "middleman" minority, facilitating trade and finance to non-Jews—a role that may have alternately encouraged scapegoating and discouraged the splintering of economic relationships.[14] In Table 5, we interact the post-treatment indicator with the 1897 district-level share of Jews among creditors and grain traders, respectively, using data from Grosfeld, Sakalli, and Zhuravskaya (2020). Further, we follow Grosfeld, Sakalli, and Zhuravskaya (2020) in allowing for the possibility that occupational patterns are consequential for pogrom incidence only during periods that feature

Kofanov (2020).

[14]For the importance of inter-ethnic occupational complementarities in reducing ethnic violence, see, e.g., Jha (2013), Becker and Pascali (2019), and Jedwab, Johnson, and Koyama (2019).

Table 4: Provincial Capitals and Railroads (Robustness)

	(1)	(2)	(3)
Share of Jews × Post–Oct 1905	−0.0089**	−0.0086**	−0.0090**
	(0.0039)	(0.0039)	(0.0039)
Travel time to provincial capital × Post–Oct 1905	−0.1557*		
	(0.0842)		
Travel time to provincial capital > median × Post–Oct 1905		−0.0050**	
		(0.0020)	
Distance to railroad			−0.5072*
			(0.2702)
Distance to railroad × Post–Oct 1905			−0.1305**
			(0.0573)
Settlement fixed effects	✓	✓	✓
Month fixed effects	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. Due to an expanding network in this period, distance to railroad is time-varying in our sample. Travel time to provincial capital is defined using time in hours on road and rail between the unit of observation and the nearest provincial capital. All regressions include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations.

both economic shocks (proxied by temperature and precipitation deviations) and political turmoil (i.e., the Manifesto). Again, we find that any relationship between these variables and pogrom incidence is largely independent of the treatment effect of Jewish population share.

Table 6 follows Wynn (1992) in considering the possibility that the October Manifesto generated particular hostility among industrial workers, who had joined the general strike hoping for better working conditions rather than political reform. The inclusion of interactions between the post–October dummy and industrial employment/output does little to change our baseline estimates.[15] Table 7, in turn, accounts for the role of troop mobilization during the Russo-Japanese War, which, as discussed above, was coincident with the spread

[15]To define measures of industrial workers and (gross) output at the settlement level, we collect data at the establishment level on these measures from the Imperial Factory Census of 1903 (Ministry of Finance 1903) and hand-match the results to our settlements. See Gregg (2020) for additional information on that Census.

Table 5: Jewish Occupational Patterns (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)
Share of Jews × Post–Oct 1905	−0.0089**	−0.0077**	−0.0070*	−0.0092**	−0.0080**	−0.0068*
	(0.0039)	(0.0038)	(0.0037)	(0.0040)	(0.0038)	(0.0038)
Share of Jews among creditors ×	−0.0067	−0.0029	0.0225***			
Post–Oct 1905	(0.0052)	(0.0042)	(0.0053)			
Share of Jews among creditors ×			−0.0015			
Temperature deviation			(0.0011)			
Share of Jews among creditors ×			−0.0024**			
Precipitation deviation			(0.0012)			
Share of Jews among creditors ×			−0.0096**			
Temperature deviation × Post–Oct 1905			(0.0038)			
Share of Jews among creditors ×			−0.0284***			
Precipitation deviation × Post–Oct 1905			(0.0063)			
Share of Jews among grain traders ×				−0.0125	−0.0154	0.0005
Post–Oct 1905				(0.0253)	(0.0228)	(0.0231)
Share of Jews among grain traders ×						−0.0080
Temperature deviation						(0.0075)
Share of Jews among grain traders ×						−0.0059
Precipitation deviation						(0.0038)
Share of Jews among grain traders ×						0.0028
Temperature deviation × Post–Oct 1905						(0.0135)
Share of Jews among grain traders ×						−0.0571***
Precipitation deviation × Post–Oct 1905						(0.0210)
Settlement fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Columns 2, 3, 5, and 6 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

of conspiracy theories alleging Jewish collaboration with the Japanese. Anti-Jewish pogroms were indeed more likely during "partial" mobilizations, which were staggered across districts during the pre–Manifesto period, but there is no impact on the relationship between Jewish population share and pogrom incidence.[16]

[16]We collect these mobilization data from decrees published in the Complete Collection of Laws of the Russian Empire (*Polnoe sobranie zakonov Rossiiskoi Imperii* 1907–08). Our mobilization variable is an indicator that takes a value of one in any month in which a supplementary (beyond normal conscription) mobilization of reservists occurred in the surrounding district.

Table 6: Industrial Workers and Industrial Output (Robustness)

	(1)	(2)	(3)	(4)
Share of Jews × Post-Oct 1905	−0.0086**	−0.0084**	−0.0078**	−0.0075**
	(0.0040)	(0.0039)	(0.0038)	(0.0038)
Log industrial workers per capita	0.0031		−0.0117	
× Post–Oct 1905	(0.0258)		(0.0265)	
Log industrial output per capita		0.0012		0.0011
× Post–Oct 1905		(0.0008)		(0.0007)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Columns 3 and 4 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Table 7: Mobilization During Russo-Japanese War (Robustness)

	(1)	(2)
Share of Jews × Post–Oct 1905	−0.0087**	−0.0078**
	(0.0039)	(0.0038)
Partial mobilization in uezd	0.0069**	0.0053***
	(0.0027)	(0.0019)
Settlement fixed effects	✓	✓
Month fixed effects	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, Column 2 includes a spatial lag of the dependent variable and its interaction with post–Oct 1905.

In Table 8, we include a (time-varying) indicator for the prior incidence of a pogrom during the sample period to account for the possibility that settlements with larger Jewish communities were targeted first. The regression estimates support this conjecture, though as before there is little effect on our baseline results. Similarly, using data from Spitzer (2021),

Table 8: Past Pogroms in Current Wave and in 1881–82 (Robustness)

	(1)	(2)	(3)	(4)
Share of Jews × Post–Oct 1905	−0.0079**	−0.0071*	−0.0086**	−0.0077**
	(0.0040)	(0.0038)	(0.0039)	(0.0038)
Past pogrom in current wave	−0.0763***	−0.0722***		
	(0.0166)	(0.0160)		
Past pogrom in current wave × Post–Oct 1905	−0.0195	−0.0173		
	(0.0142)	(0.0138)		
Pogrom in 1881–1882 × Post–Oct 1905			0.0103	0.0048
			(0.0124)	(0.0115)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Columns 2 and 4 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

we allow for differential trends by presence of a pogrom in 1881–2, as, in principle, Jews might have moved after that wave to settlements with a lower propensity for violence. We find no such pattern, consistent with Spitzer's (2021) finding that Jewish emigration (from Russia) was not spurred by that first large wave of pogroms; again, our estimates of the main treatment effect are qualitatively unchanged.

Table 9 allows for differential trends according to the presence of the General Jewish Labour Bund, which was often central in organizing self-defense against pogroms (e.g., Lambroza 1992). Figure A4 shows that the presence of this group was driven predominantly by proximity to Vilna (contemporary Vilnius, Lithuania), where the Bund was founded. Interestingly, we see no differential effect on pogrom incidence of Bund presence, however measured, though it is worth noting that Zionist-socialist parties, for which we do not have systematic data at the settlement or district level, were seemingly active in the southern

Table 9: Presence of the Jewish Labour Bund (Robustness)

	(1)	(2)	(3)
Share of Jews × Post–Oct 1905	−0.0078**	−0.0082**	−0.0077**
	(0.0037)	(0.0037)	(0.0038)
Bund branch × Post–Oct 1905	0.0017		
	(0.0080)		
Log Bund members per 1,000 people × Post–Oct 1905		0.0025	
		(0.0027)	
Log distance to Bund branch × Post–Oct 1905			0.0000
			(0.0016)
Settlement fixed effects	✓	✓	✓
Month fixed effects	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, these models include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Pale, where the Bund had less of a foothold (Goldstein 1985).[17]

Finally, numerous historical accounts emphasize the active collaboration of local police in violence against Jews, with Imperial troops and sometimes the same police intervening to end a pogrom only after a customary three days of rioting (Surh 2024, p. 75). In Table 10, we regress interactions of the post–October indicator and newly digitized data on the presence of a police "office" and distance to Imperial troops.[18] Consistent with the historiography,

[17]We digitize data on the location of Bund branches from the document collection of Stepanskii, ed. (2010, pp. 391–392).

[18]We collect data on police presence from provincial Memorial Books (*pamiatnye knizhki*) and Address Calendars (*adres-kalendari*, various years, 1887–1904), from which we generate a settlement-level indicator for presence of an office of three types of police supervisors: *stanovoi pristav*, *politseiskii nadziratel'*, and *politseimeister*. We further extract the quartering location of troops in 1903 from Bolotov (1903). We define distance as the great circle distance (kms) from a given settlement to the nearest settlement where troops were stationed.

Table 10: Presence of Police Office and Distance to Troops (Robustness)

	(1)	(2)
Share of Jews × Post–Oct 1905	−0.0097**	−0.0089**
	(0.0040)	(0.0039)
Police office × Post–Oct 1905	0.0055**	0.0056**
	(0.0028)	(0.0028)
Distance to troops × Post–Oct 1905	−0.0000	−0.0000
	(0.0001)	(0.0001)
Settlement fixed effects	✓	✓
Month fixed effects	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, these models include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

settlements with police offices see a greater increase in the incidence of pogroms after the Manifesto, while distance to Imperial troops has no effect. The estimated coefficient on Jewish population share retains its significance and magnitude after conditioning on these differential trends.

Across all of these models, the estimated (differential) effect of Jewish population share is stable, negative, and precisely estimated. In the Appendix, we report results from various other exercises and robustness checks: including both Jewish population share and polarization in the same model (Table A4); examining the impact of Jewish population share across the range of shares in the sample (that is, "binning" regressions, Table A5—with some evidence that the negative effect of Jewish share is concentrated in the third quintile and higher); regressing pogrom incidence on a second-degree polynomial in Jewish share (Table A6—with a negative effect of Jewish share for all observed values of that variable, albeit with some loss of precision); collapsing the data to pre– and post–October periods (Table A7); operationalizing polarization (and fractionalization) with respect to Jewish share and

the shares of multiple non-Jewish religious groups (Table A8); operationalizing "polarization" as share of Jews × share Russian Orthodox (Table A9); re-running our models on samples that exclude provincial capitals (Table A10); imputing "Other" religion as Jewish share when that is less than 10 percent of the local population (Table A11); using rye and wheat prices as alternative proxies for weather shocks (Table A12); differentiating between villages with churches (*sela*), which may have been a locus for collective action, and other rural settlements (Table A13); and extending the sample to April 1903, the date of the first pogrom in Kishinev (Figure A5).[19] Throughout, the basic picture holds: the sharp increase in pogroms following publication of the October Manifesto was smaller in Jewish settlements with relatively large Jewish communities, with no analogous effect of polarization. In the following section, we offer a theoretical rationale for this result.

5 Understanding Violent Backlash to Political Reform

For purposes of understanding violent backlash to political reform, existing models of ethno-religious diversity and conflict are both helpful and misleading. They are helpful in explicitly accounting for the possibility that groups targeted for violence can fight back. As discussed above, the memory of pogroms in the early 1880s and the shock of Kishinev and Gomel, vividly depicted in Hayim Nahman Bialik's 1904 poem "The City of Slaughter," encouraged the organization of Jewish self-defense. Among the pithy comments that accompany some of the pogroms documented in the 1906–7 edition of the American Jewish Year Book (see Figure A2), "Self-Defense" is mentioned in roughly one-quarter (25 of 91; most of the 254 listed pogroms include no general remarks), with frequent reference also to "resistance." At times, Jewish organization was capable of imposing substantial losses on the pogromists. In the city of Zhitomir (contemporary Zhytomyr, Ukraine), for example, "Self-Defense [was] so

[19]The similarity of our results when we separately consider Eastern Orthodox, Roman Catholic, and so forth may reflect greater affinity of such groups to each other than to Jews, especially where the Jewish community was comparatively large (Fouka and Tabellini 2022).

active that [the] number of Christians killed exceed[ed] that of Jewish victims." Our GPT-assisted analysis of the far more detailed reports compiled by the Zionist Organization of Berlin, summarized in the Appendix, finds similar discussion of organized defense in roughly 60 percent of all entries.

Unfortunately, we lack narrative accounts for Jewish settlements where pogroms did not occur, but a reasonable conjecture is that the anticipation of resistance was sometimes capable of deterring violence. Consistent with this idea, Surh (2024) notes that self-defense sometimes followed a first pogrom, which may help to explain the lower incidence of pogroms in settlements that had already experienced one (see Table 8). One can, moreover, infer that self-defense may have helped to deter pogroms entirely by noting that it sometimes reduced their intensity. Such was the case, for example, in Yekaterinoslav (contemporary Dnipro, Ukraine), where self-defense "was not only taken into account by the murderers and looters, who were not at all inclined to serve as targets for the Jews' bullets, but also by the authorities... Through its mere existence, self-defense saved thousands of families from destruction and the city from complete devastation" (Motzkin 1910, Volume II, p. 190).

At the same time, existing models are misleading in that they implicitly consider environments in which any group can initiate conflict. The asymmetric nature of violent backlash to political reform reflects the asymmetry of reform itself: some groups are made better off, frequently at other groups' expense. Whether that translates into conflict plausibly depends on the relative size of the competing groups. In this context, the question is whether conflict is more or less likely in response to reform when, say, society is highly polarized or one group is large compared to another.

To explore these ideas in more detail, consider the model of conflict initiation and intensity of Esteban and Ray (2008), which builds on Esteban and Ray (1999). In this model, an arbitrary number of groups decide simultaneously and independently whether to initiate conflict. If any group does so, then members of each group decide on contributions of resources to the conflict—that is, they decide how much to fight. A group's probability

of winning is equal to the group's share of total resources expended on conflict. Members of the winning group implement their preferred policy, which provides a differential payoff normalized to one.

We examine the special case of the model in which there are two groups, $g = A, B$, with population shares n_g. Esteban and Ray (2008) show that when the cost of resource contributions is quadratic, the probability that group g wins a conflict is equal to its population share n_g, and the expected payoff of any member of group g is equal to $\frac{n_g(1+n_g)}{2}$.

Without loss of generality, let $n \equiv n_A$, so that $n_B = 1 - n$. Similarly, let γ_g be the weight placed on group g's preferred policy under the status quo, with $\gamma \equiv \gamma_A$, so that $\gamma_B = 1 - \gamma$. Then *neither* group wants to initiate conflict if

$$\gamma \geq \frac{n\,(1+n)}{2} \text{ and } 1 - \gamma \geq \frac{(1-n)\,(2-n)}{2},$$

or

$$\gamma \in \left[n - \frac{n(1-n)}{2}, n + \frac{n(1-n)}{2} \right]. \tag{2}$$

By inspection, the range of status quo policies such that neither group wants to initiate conflict is increasing in polarization $n\,(1-n)$.

Esteban and Ray conclude from this analysis that conflict *initiation* is less likely when polarization is high, given that conflict is more intense when societies are polarized. Implicit in this conclusion is the assumption that the status quo policy γ is distributed idiosyncratically across polities and that the relevant variation is in polarization. Across localities within a given polity, however, there is likely to be a systematic component to the status quo. Political reform represents a shock to that systematic component. In that context, we ask: Given the shock of reform, how does the incidence of conflict—of violent backlash—depend on the distribution of population across groups?

To answer this question, consider the following elaboration of the model in Esteban and Ray (2008). Let $\gamma = \theta + \epsilon$, where θ is the systematic (e.g., national) and ϵ the stochastic (e.g., local) contribution to the share of benefits for group A. Assume that the distribution

F of ϵ is differentiable and strictly increasing on some interval, with density f, and assume that the support of f is such that γ is bounded by 0 and 1. Then group A initiates conflict if

$$\theta + \epsilon < \frac{n\,(1+n)}{2},$$

which occurs with probability

$$F\left(\frac{n\,(1+n)}{2} - \theta\right).$$

Without loss of generality, let group A be the group disadvantaged by reform, such that θ_R (reform) is less than θ_{SQ} (status quo). Clearly, only group A is more likely under reform than under the status quo to initiate conflict. How does the differential probability that A starts a conflict depend on its population share n?

Proposition 1. *Consider a reform (R) that generates a systematic shock to the status quo (SQ) policy, with $\theta_R < \theta_{SQ}$. Then the differential probability that the group disadvantaged by reform starts a conflict is increasing in its population share n if and only if*

$$f\left(\frac{n\,(1+n)}{2} - \theta_R\right) > f\left(\frac{n\,(1+n)}{2} - \theta_{SQ}\right). \tag{3}$$

A straightforward implication of this proposition is that the differential probability of conflict is (weakly) increasing in the population share n of the group disadvantaged by reform if that group does not initiate conflict under the status quo, which (modeling polities as a continuum) implies $f\left(\frac{n(1+n)}{2} - \theta_{SQ}\right) = 0$.

Our empirical context broadly reflects the assumptions and conclusions of this analysis. There were few pogroms prior to the October Manifesto—the vast majority of settlements saw no conflict until November 1905. The Tsar's accommodation to revolutionary activity was to issue the Manifesto, which systematically disadvantaged conservative nationalists, Orthodox monarchists, and others threatened by increased civil and political rights, especially for Jews. The violent backlash that followed was more pronounced in settlements where Jews constituted a relatively small part of the local population.

Jews often organized to defend themselves after the reemergence of pogroms in 1903 and 1904. Having organized, Jews frequently fought back where pogroms occurred. That much is clear from the historical record. As mentioned, neither the Zionist Organization of Berlin nor the authors of the *American Jewish Year Book*, from whose records Spitzer's (2021) data are assembled, collected information on communities where pogroms did *not* occur, for this was not their task. Nor is it particularly helpful, beyond general impressions, to look at the presence of Jewish self-defense in the non-random sample of settlements with pogroms, as presumably Jews would have organized not only where they were numerous but also where idiosyncratic factors (expressed above as ϵ) implied a greater threat of violence.

What we can say is the following: Pogroms were systematically less likely in settlements with relatively large Jewish populations. It is natural to expect that, in such settlements, Jews would have been able to mount a stiffer defense against pogromists. In turn, where such a defense was anticipated, it is reasonable to anticipate that potential pogromists would have been more deterred from violence. These are the implications of our empirical analysis and our elaboration of the Esteban-Ray model. We reach these conclusions not through some post hoc theorizing but rather by asking a new question of existing theory.

A few additional notes are in order. First, taken at face value, the rational calculus implied by this discussion sits uncomfortably with the savage behavior of the pogromists. Yet reason, emotion, and prejudice all play a role in ethnic conflict. Surh (2024, p. 128), for example, writes of the "interaction and communication between 'higher' and 'lower' forms of pogrom participation"—of religious leaders and officers of the state, on the one hand, and drunk and rapacious crowd, on the other. The point of our theoretical analysis is simply to emphasize that Jews, when sufficiently numerous, were able to fight back against pogroms, and that this may have discouraged some of the more "rational" members of the non-Jewish community from speech and actions that could incite violence.

Second, this same theoretical framework arguably underpredicts conflict, in that there are settlements in our sample with Jewish population share close to one (see Figure 3), yet

we do not observe "pogroms" against non-Jews. In practice, it would have been exceedingly costly for Jews to initiate mob violence, even if they were so inclined. In addition, Jews as well as non-Jews would have experienced costs of conflict above and beyond the expenditure of resources assumed by the Esteban-Ray framework—physical casualties, loss of income, and more. Any "symmetric" cost of conflict widens the "peace interval" in Expression 2, while any "asymmetric" cost of initiating violence further moves one of the endpoints. Such an accommodation to verisimilitude leaves intact the argument in Proposition 1. Only the group disadvantaged by reform is more likely to initiate conflict after than before reform, with the differential probability of conflict increasing in the population share of the disadvantaged group under a condition that mirrors Condition 3.

Third, Esteban and Ray's "behavioral framework" (1999, p. 384), which we adopt above, assumes that the impact of individual contributions (towards conflict) on the welfare of other group members is fully internalized. In the Appendix, we relax this assumption. When free riding is allowed and the status quo is distributed idiosyncratically across polities, then, contra Esteban and Ray (2008), conflict initiation is more, not less, likely when polarization is high. At the same time, there is a straightforward analogue to Proposition 1, and the implication here survives, if political reform systematically alters the distribution of benefits across groups. Our rationalization of the empirical patterns we observe is thus robust to assumptions about the degree to which local institutions discouraged free riding.

Finally, the same theoretical framework can accommodate other determinants of conflict, such as those investigated in various robustness checks above. As Esteban and Ray (2008, p. 168) note, n can be interpreted broadly as "capturing all the factors that may influence the effectiveness of a given effort," including but not only population share. To see this, let $\tilde{n} : \mathbb{R} \times \mathbb{R}^k \to \mathbb{R}$ be a function defined by $(n, \Lambda) \mapsto \tilde{n}(n, \Lambda)$, where n is population share and Λ is a k-dimensional vector capturing other factors that determine the effectiveness of effort. Assume that $\tilde{n}$ is increasing in n, and order each component Λ_i of Λ such that $\tilde{n}$ is increasing in Λ_i. Then there is an analogue to Proposition 1 such that the differential probability of

conflict is increasing in n and each component of Λ if and only if

$$f\left(\frac{\tilde{n}\left(1+\tilde{n}\right)}{2}-\theta_R\right)>f\left(\frac{\tilde{n}\left(1+\tilde{n}\right)}{2}-\theta_{SQ}\right).$$

In our context, for example, if $\Lambda_i = -$(travel time to nearest railroad), then the differential probability that non-Jews initiate a pogrom is increasing in proximity to the nearest railroad, as suggested by various historical accounts and for which we find empirical support in Table 4.[20]

6 Conclusion

The idea that ethno-religious diversity is related to conflict has a long lineage, even if the particular relationship depends on how diversity is operationalized and the outcome in question. Our contribution is to examine an outcome not emphasized in the literature on diversity and conflict: How does the likelihood of violent backlash to political reform depend on the ethno-religious makeup of the communities affected by reform? In our study of anti-Jewish pogroms during the 1905 Russian revolution, we find robust evidence that backlash was less likely in settlements with relatively large Jewish populations. We argue that the key to understanding this pattern, and violent backlash more generally, is to recognize reform as a systematic shock to the status quo—one that the group disadvantaged by reform is less likely to contest when the other group is comparatively large, and thus has strength in numbers. Motivated by the re-emergence of pogroms in 1903 and 1904, as memorialized by the poem we cite in our epigraph, Jews across the Pale of Settlement organized self-defense in anticipation of violence. When that violence came, following publication of the October Manifesto across the Russian Empire, settlements with relatively large Jewish communities

[20]With additional structure on $\tilde{n}$, we could say more about how the relationship between population share and violent backlash to reform depends on the components of Λ—that is, we could say something about triple interactions—but the historiography does not generally suggest strong priors in this regard.

were seemingly better prepared, which helped deter attacks by conservative nationalists, Orthodox monarchists, and others who blamed Jews for reform.

Empirical study of a particular case raises natural questions about external validity. It would clearly be helpful to replicate our results in other settings—but one should be conscious of features of our environment that are not present everywhere. Although the Pale of Settlement was noted for its ethno-religious diversity, there was one divide that especially mattered: between Jews and non-Jews. Not every setting is characterized by this dichotomy (though the examples we cite in the introduction generally are). Jews, moreover, could not depend on protection by the state, such as might exist elsewhere. Indeed, as we show, the spike in pogroms following publication of the October Manifesto was greater in settlements with police "offices," reflecting the active participation of the police in some attacks. Our design, in other words, is situated in a particular region of the parameter space (Huber 2013): whether and to what extent our results generalize has implications for theory as well as empirical knowledge.

It is also worth emphasizing that we focus on local events in a much larger political context. Empirically, we do not take a stance on the "success" of the reforms associated with the Manifesto: the creation of national elections for a new parliamentary body (the Duma), the ceding of some Imperial powers to this body and other parts of government, and the formal expansion of civil rights. Many of these advances were subsequently counteracted, ignored, or ineffectively enforced (e.g., Ascher 2004; Steinberg 2017). For our purposes, it was the perception of change from the status quo at the time of the Manifesto that mattered, but the fact of pogroms and of Jewish resistance played a role in what followed (Surh 2024). The Fundamental Laws of April 1906, which reaffirmed supreme autocratic power, and the tsar's dissolution of the first Imperial Russian Duma three months later, represented victories for "reactionary nationalism" (Boix and Kofanov 2025). It was during this period that the wave of pogroms came to an end.

More broadly, our results speak to debates about modernization in diverse societies. The

goal of the October Manifesto was to short-circuit revolutionary activity by granting rights to subjects of the Tsar. An incidental consequence of this decision was to level the playing field between historically advantaged and disadvantaged groups. For supporters of the monarchy, the sight of Jews marching through the streets with placards denouncing the Tsar was a symbol of power lost. Reform, we have stressed, has losers as well as winners. When the line between the two coincides with ethno-religious boundaries, violence can result. In Imperial Russia, Jews who lived in settlements with few other Jews were the most vulnerable of the historically disadvantaged. They were the victims of violent backlash to political reform.

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Violent Backlash to Political Reform: Online Appendix

Contents

Conflict initiation and intensity with free riding

Esteban and Ray (2008, p. 384) write: "Our behavioral framework ignores free-rider problems within each group... [T]here is little we wish to add to this problem and so we assume that external effects within a group are fully internalized by group members." Here, we ask whether their conclusions, and ours, change when free riding is allowed.[1]

Consider the special case of Esteban and Ray (2008) in which there are two groups, $g = A, B$, with population shares n_g, the differential payoff from winning is normalized to one, and the cost of resource contributions is quadratic. For any individual i in group g, the expected payoff is

$$\frac{r_{ig} + \sum_{j \in g \setminus i} r_{jg}}{R} - \frac{(r_{ig})^2}{2}. \tag{A1}$$

The first term is the probability that group g wins, assumed equal to the share of total contributions R across both groups made by individuals in g, where R is also a function of r_{ig}. The second term is the cost of resource contributions for individual i in group g.

By inspection, Expression A1 is strictly concave in r_{ig}. The first-order condition is

$$\frac{1}{R} - \frac{r_{ig} + \sum_{k \in i \setminus g} r_{jg}}{R^2} = r_{ig}.$$

Imposing symmetry for members of A and B, respectively, gives

$$\frac{1}{R} - \frac{n_g r_g}{R^2} = r_g,$$

where r_g is the common contribution for members of group g. Multiplying through by $\frac{n_g}{R}$, and using $p_g = \frac{n_g r_g}{R}$, we have

$$\frac{n_g}{R^2}(1 - p_g) = p_g. \tag{A2}$$

With two groups, where $n \equiv n_A$ and $p \equiv p_A$, we can rewrite Equation A2 as

$$\frac{n(1-p)}{p} = \frac{(1-n)p}{1-p} = R^2. \tag{A3}$$

[1]We assume strategic but identical individuals, such that there is no meaningful collective-choice problem when deciding whether to initiate conflict.

Rearranging gives the probability that group A wins as a function of its population share n:

$$p = \frac{\sqrt{n}}{\sqrt{n} + \sqrt{1-n}}. \tag{A4}$$

As in Esteban and Ray (2008), where $p = n$, a group's probability of winning a conflict is increasing in its population share. Here, however, the relationship is concave for $p < \frac{1}{2}$ and convex for $p > \frac{1}{2}$.

From Equations A3 and A4, we can derive

$$R^2 = \sqrt{n\,(1-n)},$$

so that, using $p^2 = \left(\frac{nr_A}{R}\right)^2$ and $(1-p)^2 = \left[\frac{(1-n)r_B}{R}\right]^2$,

$$r_A^2 = \frac{\sqrt{1-n}}{\sqrt{n} + 2n\sqrt{1-n}} \quad \text{and } r_B^2 = \frac{\sqrt{n}}{\sqrt{1-n} + 2\sqrt{n}\,(1-n)}.$$

The expected utility for any individual in group A is therefore

$$p - \frac{r_A^2}{2} = \frac{\sqrt{n}}{\sqrt{n} + \sqrt{1-n}} - \frac{1}{2} \cdot \frac{\sqrt{1-n}}{\sqrt{n} + 2n\sqrt{1-n}}, \tag{A5}$$

which is increasing in n for all $n \in (0, 1)$. Similarly, the expected utility for any individual in group B is

$$(1-p) - \frac{r_B^2}{2} = \frac{\sqrt{1-n}}{\sqrt{n} + \sqrt{1-n}} - \frac{1}{2} \cdot \frac{\sqrt{n}}{\sqrt{1-n} + 2\sqrt{n}\,(1-n)}, \tag{A6}$$

Expression A5 is negative for all $n < n'$, where $n' \approx 0.3$, whereas Expression A6 is negative for all $n > n''$, where $n'' \approx 0.7$. Moreover, for $n \in [n', n'']$, the range of status quo policies such that neither group wants to initiate conflict,

$$\gamma \in \left(\frac{\sqrt{n}}{\sqrt{n} + \sqrt{1-n}} - \frac{1}{2} \cdot \frac{\sqrt{1-n}}{\sqrt{n} + 2n\sqrt{1-n}}, \frac{\sqrt{n}}{\sqrt{n} + \sqrt{1-n}} + \frac{1}{2} \cdot \frac{\sqrt{n}}{\sqrt{1-n} + 2\sqrt{n}\,(1-n)} \right)$$

is *smallest* at $n = 0.5$, that is, at maximal polarization. In other words, if we relax the assumption of fully internalized within-group benefits but continue to assume (as implied by Esteban and Ray 2008) that the status quo γ is distributed idiosyncratically across polities, then conflict initiation is less likely when polarization is low, not high.

Nonetheless, the qualitative effect of a *systematic* shock to the status quo is the same as in the main manuscript. To see this, assume, as in the extension to Esteban and Ray (2008) discussed in the main text, that $\gamma = \theta + \epsilon$, where θ is the systematic and ϵ the idiosyncratic contribution to the share of benefits for group A. Using Equation A5, the probability that group A initiates conflict is

$$F\left(\frac{\sqrt{n}}{\sqrt{n}+\sqrt{1-n}} - \frac{1}{2}\cdot\frac{\sqrt{1-n}}{\sqrt{n}+2n\sqrt{1-n}} - \theta\right).$$

The following proposition is a straightforward analogue to Proposition 1.

Proposition A1. *Consider a reform (R) that generates a systematic shock to the status quo (SQ) policy, with $\theta_R < \theta_{SQ}$. Then the differential probability that the group disadvantaged by reform starts a conflict is increasing in its population share n if and only if*

$$f\left(\frac{\sqrt{n}}{\sqrt{n}+\sqrt{1-n}} - \frac{1}{2}\cdot\frac{\sqrt{1-n}}{\sqrt{n}+2n\sqrt{1-n}} - \theta_R\right) >$$
$$f\left(\frac{\sqrt{n}}{\sqrt{n}+\sqrt{1-n}} - \frac{1}{2}\cdot\frac{\sqrt{1-n}}{\sqrt{n}+2n\sqrt{1-n}} - \theta_{SQ}\right).$$

As with Proposition 1, an implication of this proposition is that the differential probability of conflict is (weakly) increasing in the population share n of the group disadvantaged by reform if there is no conflict under the status quo, given that the expression $\frac{\sqrt{n}}{\sqrt{n}+\sqrt{1-n}} - \frac{1}{2}\cdot\frac{\sqrt{1-n}}{\sqrt{n}+2n\sqrt{1-n}}$ is increasing in n.

Qualitative evidence

To help contextualize our theoretical model and structure the empirical analysis, we explored many sources of qualitative evidence on the wave of anti-Semitic violence in Imperial Russia from 1903 to 1906. Our goal was to develop a more detailed picture of the causes and perpetrators of the pogroms. We were initially interested in two dimensions of inquiry: First, were the pogroms driven by political grievances and backlash to reform (as understood and/or explicitly announced in the Manifesto), or were other explanations paramount? Second, who perpetrated the violence: local residents or individuals from outside the locality? We subsequently examined the presence of Jewish "self-defense" among observed pogroms.

We directly examined a large number of primary and secondary sources, some of which are cited in the main manuscript. In addition, we experimented with using the large language model GPT-4o from Open AI to query the narrative descriptions (in German) of 93 individual pogroms compiled by the Zionist Organization of Berlin (Motzkin 1910). As discussed, this collection of documents is one of the key sources used by Spitzer (2021) to geolocate and otherwise characterize pogroms during this period.[2] We then checked the results of this exercise against a more traditional hand-coding, by a German-speaking research assistant, of 21 randomly sampled narratives from the same corpus.[3]

To begin, we used GPT-4o to generate detailed (one-paragraph) summaries, to describe the causes of pogroms and the identity of perpetrators, and to construct a simple categorization of causes and perpetrators.[4] To do so, we sequentially processed the original texts (in German) through the OpenAI API with the following prompts:

[2]Figure A1 depicts the beginning of one such narrative.

[3]The hand-coding applies to perpetrators and causes, not to self-defense.

[4]We present results from runs in which we direct GPT-4o to describe and categorize events based on the original texts, though in principle one can use the previously generated summaries for the same purpose. Doing so produces slightly different results.

Summary: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please provide a brief summary of the event (in English!). Be careful to answer with only one paragraph in English!

Description of causes: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please briefly describe the main causes of the pogrom (in English). Be careful to answer with only one paragraph in English!

Description of perpetrators: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please briefly describe the perpetrators of the pogrom (in English). Be careful to answer with only one paragraph in English!

Categorization of causes: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please decide if the cause of the pogrom is something political, material grievance, both political and material, other, or not stated. Only answer "political" if the cause of the pogrom is primarily political, "material" if the cause is primarily material grievances, "both" if the cause is both political and material, "other" if the primary cause is neither political nor material, or "unknown" if there is no information on the cause. Be careful to answer with only one word!

Categorization of perpetrators: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please decide if the perpetrators of the pogrom are locals, outsiders, both locals and outsiders, or it is not stated. Only answer "locals" if the perpetrators were locals, "outsiders" if the perpetrators were outsiders, "both" if the perpetrators were both locals and outsiders, or "unknown" if there is no information on the perpetrators. Be careful to answer with only one word!

We ran this protocol three times for all 93 incidents, averaging the resulting distributions across runs for the categorization prompts.[5] The averages across runs are as follows:

Cause	**Share of events**
Political	0.24
Both political and material	0.67
Material	0.03
Unknown	0.06

Identity of Perpetrators	**Share of events**
Locals	0.35
Both locals and outsiders	0.59
Outsiders	0.03
Unknown	0.04

These results can be interpreted in light of the two-fold structure of many events, which can be extracted from further reading of the original texts as well as from the summaries and descriptions of causes and perpetrators generated by GPT-4o. Pogroms mostly start with politically motivated violence by locals (often workers), in rare cases incited or fueled by instigators from the nearest large city. The direct trigger is typically a demonstration in support of the October Manifesto, which results in counterrevolutionary violence. The

[5]To compare the distributions from hand-coding and from GPT-4o, we use χ^2 and Fisher's exact tests. Although there is some disagreement across runs for individual texts, the resulting frequency distributions are broadly similar: for causes, the χ^2 and Fisher's exact tests return p-values of 0.55 and 0.48, respectively, whereas for perpetrators the p-values are 0.99 and 0.98. Comparing the three GPT-coded distributions of causes to that from the hand-coding (due to the small sample size, we report results from Fisher's test only) returns a p-value for the overall test of differences of 0.03, whereas the p-values for the pairwise tests—hand coded vs. one GPT-coded—range from 0.25 to 0.00. The difference in distributions stems from the frequent coding of events with several groups of perpetrators as having a "political" root cause by the human coder and "both" political and material causes by GTP-4o. For the identity of perpetrators, the p-value for the overall test is 0.98, whereas that for each of the pairwise tests is 0.75.

modal pogrom then turns into a looting event, often with peasants from nearby villages joining in.[6]

We subsequently used GPT-4o to describe and categorize the 93 narratives in Motzkin (1910) according to their discussion of "self-defense":

Description of self-defense: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please tell me if there is any mention of the Jewish self-defense. Be careful to answer briefly in English!

Categorization of self-defense: You will be given a part of a document in German, describing a Jewish pogrom from the First Russian Revolution. Please tell me if the Jewish self-defense is mentioned. Be careful to just answer "Yes" if there was self-defense or "No" if there wasn't.

Averaged across three runs,[7] the resulting categorization is as follows, suggesting that most Jewish communities organized some form of self-defense. Analysis of the original texts, summaries, and descriptions, however, reveals huge variation in the scope of this activity, from preemptive measures and (partly) successful armed deterrence to less coordinated and (fully) unsuccessful efforts.

Self-defense mentioned	**Share of events**
Yes	0.64
No	0.37

[6]There is a single case of "hooligans" arriving by train (to the village of Birsula) to start the pogrom themselves.

[7]The results are nearly identical across the three runs, with a p-value for both the χ^2 and Fisher's tests of 0.99.

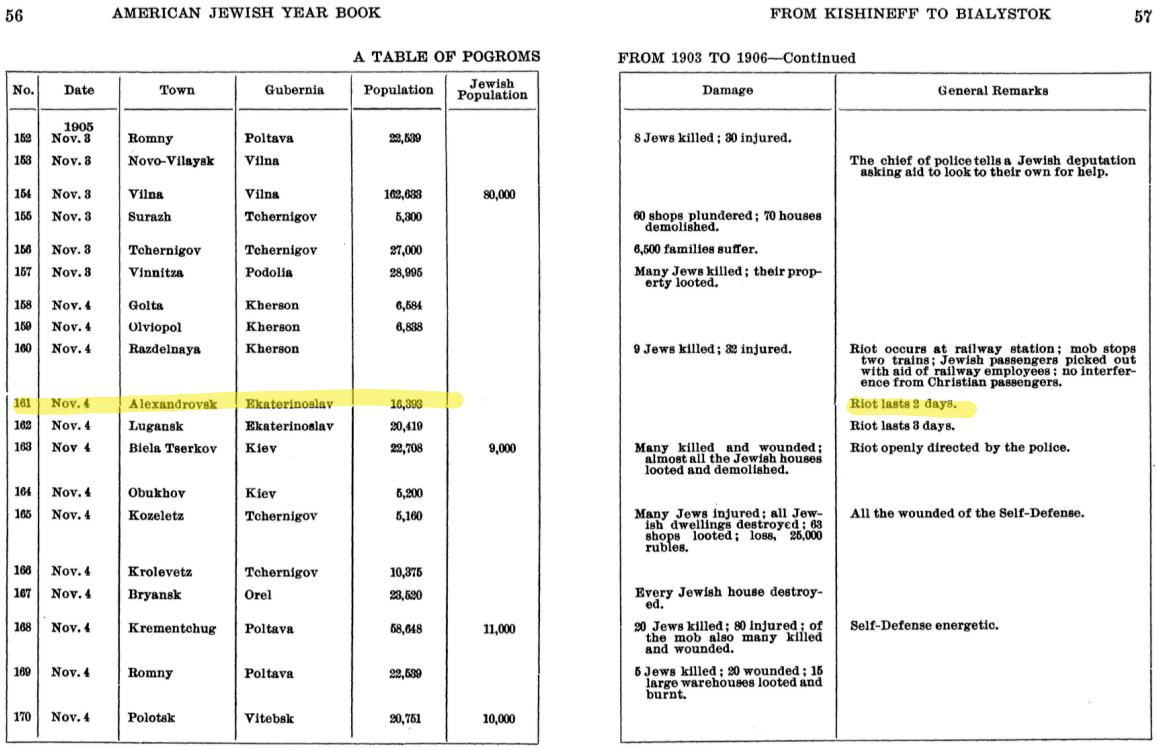
Additional figures

Alexandrowsk

Gesamtbevölkerung (1897) 18 849, Juden 5267.

Der Pogrom von Alexandrowsk wurde von den dortigen reaktionären Organisationen, dem sogenannten Schwarzen Hundert, angestiftet und zum Teil durchgeführt. Zwar existierten diese Organisationen vor dem Pogrom nur de facto, ihre formale und legale Existenz begann erst später. Doch gehen wir kaum fehl, wenn wir annehmen, dass all die Elemente, aus denen diese reaktionären Gruppen bestehen, bereits vor dem Pogrom eine lose Organisation besessen haben. Darauf weist ihr planmässiges koordiniertes Handeln vor dem Ausbruch und während des Pogroms und die Fülle der stets denselben Charakter tragenden antisemitischen und reaktionären Flugblätter hin, die teils vor und meist nach dem Pogrom erschienen sind. Diese Flugblätter sind bald vom „Verband echt russischer Leute", bald vom „Monarchistischen Verband des 17. Oktober", bald vom „Russischen Volksbund" unterzeichnet. Der Ursprung ist aber wahrscheinlich stets der-

Figure A1: The beginning of a typical entry in Motzkin (1910), the primary source for the pogrom data in Spitzer (2021) and an example of the inputs in our LLM exercise.



56 AMERICAN JEWISH YEAR BOOK

A TABLE OF POGROMS

No.	Date	Town	Gubernia	Population	Jewish Population
	1905				
152	Nov. 3	Romny	Poltava	22,539	
153	Nov. 3	Novo-Vilaysk	Vilna		
154	Nov. 3	Vilna	Vilna	162,633	80,000
155	Nov. 3	Surazh	Tchernigov	5,300	
156	Nov. 3	Tchernigov	Tchernigov	27,000	
157	Nov. 3	Vinnitza	Podolia	28,995	
158	Nov. 4	Golta	Kherson	6,584	
159	Nov. 4	Olviopol	Kherson	6,838	
160	Nov. 4	Razdelnaya	Kherson		
161	Nov. 4	Alexandrovsk	Ekaterinoslav	16,393	
162	Nov. 4	Lugansk	Ekaterinoslav	20,419	
163	Nov 4	Biela Tserkov	Kiev	22,708	9,000
164	Nov. 4	Obukhov	Kiev	5,200	
165	Nov. 4	Kozeletz	Tchernigov	5,160	
166	Nov. 4	Krolevetz	Tchernigov	10,375	
167	Nov. 4	Bryansk	Orel	23,520	
168	Nov. 4	Krementchug	Poltava	58,648	11,000
169	Nov. 4	Romny	Poltava	22,539	
170	Nov. 4	Polotsk	Vitebsk	20,751	10,000

FROM KISHINEFF TO BIALYSTOK 57

FROM 1903 TO 1906—Continued

Damage	General Remarks
8 Jews killed; 30 injured.	
	The chief of police tells a Jewish deputation asking aid to look to their own for help.
60 shops plundered; 70 houses demolished.	
6,500 families suffer.	
Many Jews killed; their property looted.	
9 Jews killed; 32 injured.	Riot occurs at railway station; mob stops two trains; Jewish passengers picked out with aid of railway employees; no interference from Christian passengers.
	Riot lasts 2 days.
	Riot lasts 3 days.
Many killed and wounded; almost all the Jewish houses looted and demolished.	Riot openly directed by the police.
Many Jews injured; all Jewish dwellings destroyed; 63 shops looted; loss, 25,000 rubles.	All the wounded of the Self-Defense.
Every Jewish house destroyed.	
20 Jews killed; 80 injured; of the mob also many killed and wounded.	Self-Defense energetic.
5 Jews killed; 20 wounded; 15 large warehouses looted and burnt.	

Figure A2: Two typical pages in "From Kishineff to Bialystok" (*American Jewish Year Book*, 1906–07), the secondary source for the pogrom data in Spitzer (2021). The highlighted case is the pogrom narrated in the entry of Figure A1.

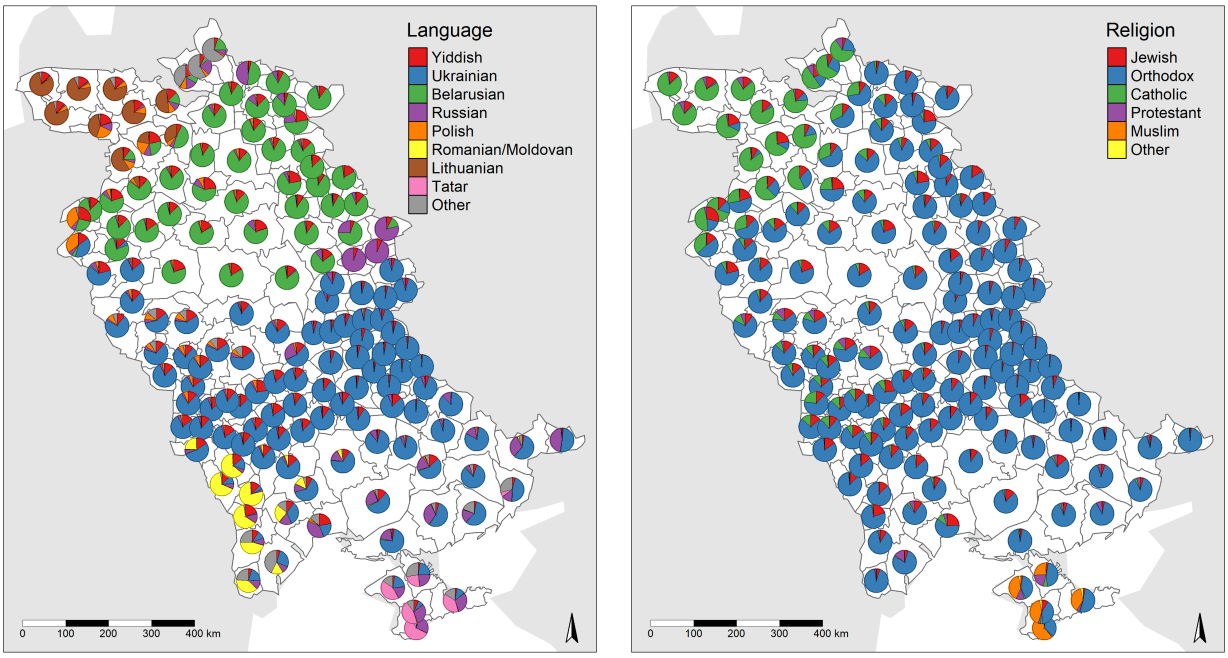


Figure A3: District-level population composition in the Pale of Settlement for ethnolinguistic (left) and religious (right) groups in 1897. "Orthodox" includes Old Believers.

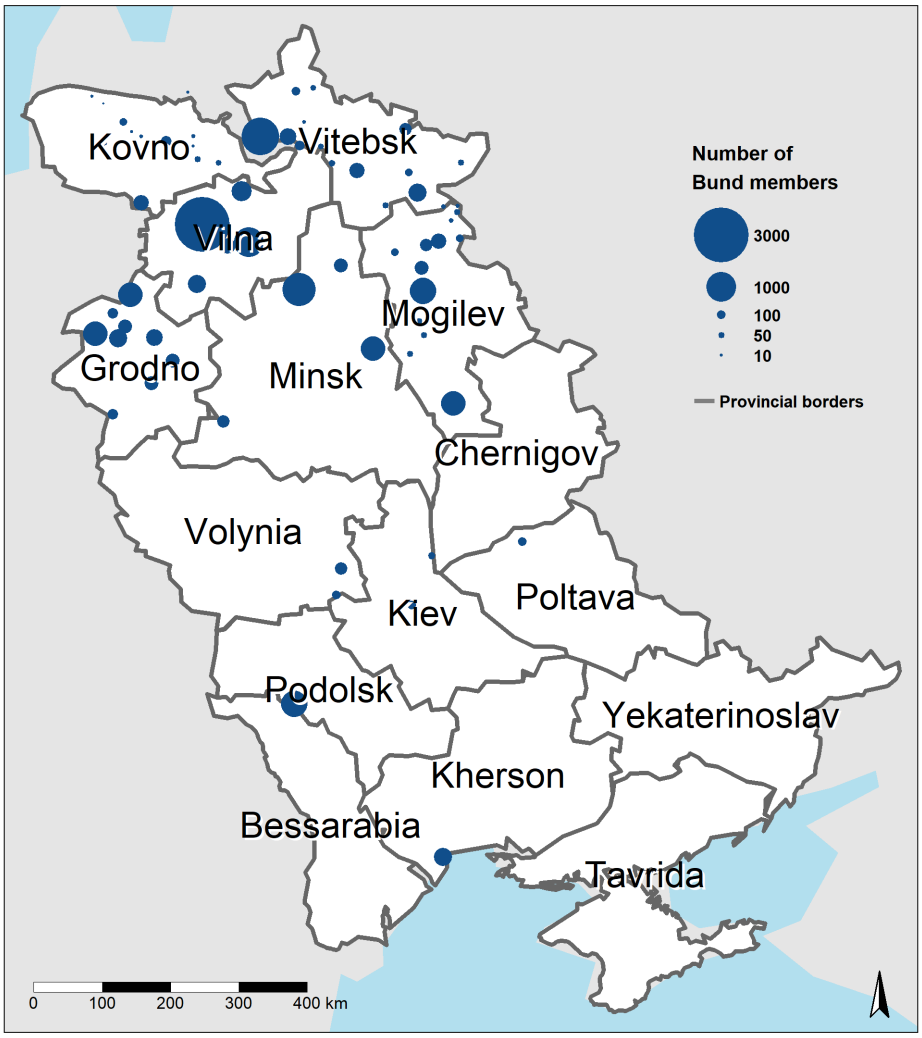


Figure A4: Bund branches, 1904. These data are drawn from the collection of Stepanskii, ed. (2010, pp. 391–392).

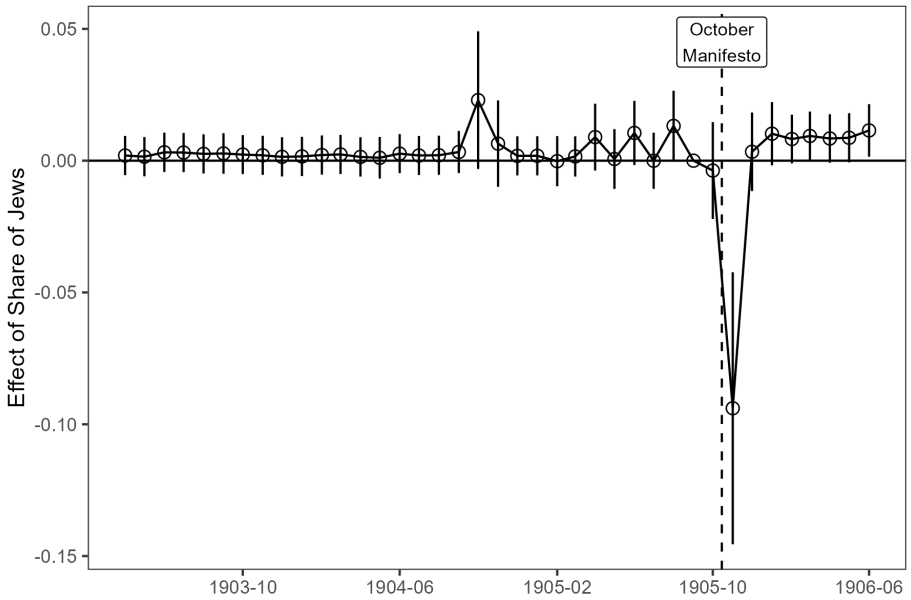


Figure A5: Event Study: Share of Jews, Extended Sample (April 1903–June 1906).

Additional tables

Table A1: Summary Statistics

Variable	N	Mean	SD	Min	Max
Main Variables					
Pogrom	35620	0.005	0.074	0	1
Temperature deviation	35620	-0.018	0.938	-2.640	3.799
Precipitation deviation	35620	0.291	1.176	-1.805	7.562
Share of Jews	1370	0.451	0.255	0.005	1.000
Share of Jews × (1 - Share of Jews)	1370	0.182	0.065	0.000	0.250
Urban	1370	0.156	0.363	0	1
Mestechko	1370	0.610	0.488	0	1
Log population	1370	7.798	1.066	6.107	12.909
Variables Specific to Certain Tables					
Distance to railroad	35620	0.019	0.018	0.000	0.104
Partial mobilization	35620	0.074	0.261	0	1
Travel time to provincial capital	1370	0.016	0.011	0.000	0.073
Travel time to provincial capital > median	1370	0.511	0.500	0	1
Log industrial workers per capita	1370	0.009	0.036	0.000	0.793
Log industrial output per capita	1370	0.918	1.582	0.000	7.355
Pogrom in 1881–1882	1370	0.023	0.151	0	1
Bund branch	1370	0.050	0.219	0	1
Log Bund members per 1000 people	1370	0.131	0.605	0.000	4.833
Log distance to Bund branch	1370	3.989	1.227	0.000	6.263
Police office	1370	0.377	0.485	0	1
Distance to troops	1370	31.181	20.847	0.000	114.512
Share of Jews among creditors	149	0.609	0.319	0.000	1.000
Share of Jews among grain traders	149	0.906	0.157	0.176	1.000
Variables Used in Appendix Tables					
Share of Jews with 0s imputed from Other	1443	0.431	0.263	0.004	1.000
Religious fractionalization	1370	0.411	0.148	0.000	0.718
Religious polarization	1370	0.727	0.232	0.000	0.998
Share of Jews × Share Orthodox	1370	0.123	0.087	0.000	0.249
Selo	1370	0.104	0.305	0	1
Rye price	45	0.687	0.082	0.530	0.910
Wheat price	45	0.828	0.059	0.690	0.970

Table A2: Correlates of Pogrom Incidence, Pre–November 1905 (Jewish Share)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of Jews	0.0397*	0.0355*	0.0353*	0.0683***	0.0692***	0.0682***	0.0682***	0.0681***
	(0.0208)	(0.0214)	(0.0214)	(0.0237)	(0.0237)	(0.0238)	(0.0251)	(0.0251)
Log population		0.0759***	0.0753***	0.0647***	0.0650***	0.0643***	0.0644***	0.0645***
		(0.0097)	(0.0097)	(0.0100)	(0.0100)	(0.0097)	(0.0097)	(0.0097)
Temperature deviation			−0.0004	−0.0008	−0.0009	−0.0011	−0.0013	−0.0013
			(0.0035)	(0.0035)	(0.0034)	(0.0034)	(0.0034)	(0.0034)
Precipitation deviation			−0.0031*	−0.0037**	−0.0032*	−0.0030	−0.0030	−0.0030
			(0.0019)	(0.0018)	(0.0018)	(0.0019)	(0.0019)	(0.0019)
Urban				0.0455*	0.0435*	0.0434*	0.0411	0.0409
				(0.0262)	(0.0262)	(0.0262)	(0.0264)	(0.0264)
Mestechko				−0.0545***	−0.0553***	−0.0550***	−0.0566***	−0.0567***
				(0.0140)	(0.0140)	(0.0141)	(0.0142)	(0.0142)
W × pogroms					0.0120	0.0108	0.0109	0.0110
					(0.0076)	(0.0078)	(0.0078)	(0.0080)
Distance to railroad						0.5270	0.5585	0.5562
						(0.9590)	(0.9580)	(0.9578)
Travel time to province capital						−1.2157	−1.2551	−1.2541
						(1.4549)	(1.4545)	(1.4544)
Share Catholic							0.0006	0.0008
							(0.0273)	(0.0274)
Share Protestant							−0.0949**	−0.0944**
							(0.0410)	(0.0408)
Log workers per capita								−0.0161
								(0.0952)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
R^2	0.002	0.159	0.16	0.184	0.187	0.188	0.188	0.188
Adj R^2	0.002	0.149	0.149	0.172	0.174	0.174	0.173	0.173
Province fixed effects		✓	✓	✓	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. See text for additional details and variable definitions.

Table A3: Correlates of Pogrom Incidence, Pre–November 1905 (Polarization)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of Jews	0.2697***	−0.1521	−0.1502	−0.0710	−0.0594	−0.0619	−0.0458	−0.0458
× (1 - Share of Jews)	(0.0776)	(0.0930)	(0.0926)	(0.0993)	(0.0962)	(0.0966)	(0.0969)	(0.0969)
Log population		0.0802***	0.0797***	0.0654***	0.0655***	0.0647***	0.0641***	0.0643***
		(0.0105)	(0.0104)	(0.0103)	(0.0103)	(0.0100)	(0.0100)	(0.0100)
Temperature deviation			−0.0004	−0.0009	−0.0010	−0.0013	−0.0014	−0.0014
			(0.0036)	(0.0035)	(0.0034)	(0.0034)	(0.0035)	(0.0035)
Precipitation deviation			−0.0031	−0.0037**	−0.0032*	−0.0030	−0.0031	−0.0031
			(0.0019)	(0.0019)	(0.0018)	(0.0019)	(0.0019)	(0.0019)
Urban				0.0574**	0.0552**	0.0550**	0.0523*	0.0518*
				(0.0268)	(0.0267)	(0.0268)	(0.0270)	(0.0270)
Mestechko				−0.0370***	−0.0382***	−0.0380***	−0.0413***	−0.0415***
				(0.0137)	(0.0136)	(0.0139)	(0.0142)	(0.0143)
W × pogroms					0.0116	0.0102	0.0102	0.0104
					(0.0076)	(0.0078)	(0.0078)	(0.0079)
Distance to railroad						0.5882	0.6686	0.6633
						(0.9489)	(0.9433)	(0.9430)
Travel time to province capital						−1.3669	−1.5007	−1.4977
						(1.4391)	(1.4268)	(1.4267)
Share Catholic							−0.0309	−0.0303
							(0.0253)	(0.0253)
Share Protestant							−0.0925**	−0.0915**
							(0.0415)	(0.0414)
Log workers per capita								−0.0349
								(0.0969)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
R^2	0.007	0.159	0.16	0.179	0.182	0.183	0.183	0.183
Adj R^2	0.006	0.149	0.149	0.166	0.169	0.169	0.168	0.168
Province fixed effects		✓	✓	✓	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. See text for additional details and variable definitions.

Table A4: Share of Jews, Polarization, and Pogrom Incidence

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.0152***	−0.0091**	−0.0082**	−0.0090**	−0.0081**
	(0.0036)	(0.0042)	(0.0040)	(0.0042)	(0.0040)
Share of Jews × (1 - Share of Jews) × Post–Oct 1905	0.0028	0.0005	−0.0002	−0.0145	−0.0143
	(0.0128)	(0.0167)	(0.0162)	(0.0178)	(0.0170)
Temperature deviation		0.0034***	0.0023**	0.0043***	0.0033***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation		0.0012	0.0005	0.0000	0.0001
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0388***		0.0233**
			(0.0066)		(0.0101)
Urban × Post–Oct 1905		0.0175***	0.0173***	0.0072	0.0069
		(0.0056)	(0.0055)	(0.0054)	(0.0052)
Mestechko × Post–Oct 1905		0.0056*	0.0051*	0.0023	0.0016
		(0.0032)	(0.0031)	(0.0033)	(0.0031)
Log Population × Post–Oct 1905				0.0053***	0.0052***
				(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905				−0.0026	−0.0032
				(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0038	0.0001
				(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905					0.0241*
					(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models include both Jewish population share and polarization to check whether the former is simply proxying for (part of the variation in) the latter. The results suggest that is not the case: the treatment effects with both Jewish population share and polarization are very similar to those in the baseline model.

Table A5: Binning Regressions

	(1)	(2)	(3)	(4)	(5)
Share of Jews, 2nd Quintile	0.0034	−0.0010	0.0001	−0.0009	0.0001
× Post–Oct 1905	(0.0033)	(0.0037)	(0.0036)	(0.0037)	(0.0036)
Share of Jews, 3rd Quintile	−0.0056*	−0.0058	−0.0052	−0.0071*	−0.0064*
× Post–Oct 1905	(0.0031)	(0.0039)	(0.0038)	(0.0040)	(0.0038)
Share of Jews, 4th Quintile	−0.0041	−0.0027	−0.0020	−0.0042	−0.0033
× Post–Oct 1905	(0.0033)	(0.0041)	(0.0039)	(0.0041)	(0.0039)
Share of Jews, 5th Quintile	−0.0087***	−0.0064*	−0.0054	−0.0062*	−0.0052
× Post–Oct 1905	(0.0028)	(0.0036)	(0.0034)	(0.0035)	(0.0034)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models estimate binning regressions to examine the association between Jewish population share and increase in pogrom incidence (after the Manifesto) across the distribution of Jewish share. Columns 2–5 include temperature and precipitation deviations and interactions of post–Oct 1905 with indicators for settlement type. Columns 4 and 5 additionally include interactions of post–Oct 1905 with population and temperature and precipitation deviations, while Columns 3 and 5 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905, respectively. Consistent with the observation that the effect of Jewish share is distinguishable from that for polarization only for Jewish share greater than 0.5, the results show that the negative effect of Jewish share is driven by the difference between the third through fifth quintiles and the first and second quintiles.

Table A6: Second-Degree Polynomial in Share of Jews

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.0124	−0.0086	−0.0084	−0.0235	−0.0223
	(0.0142)	(0.0193)	(0.0187)	(0.0204)	(0.0195)
(Share of Jews)^2 × Post–Oct 1905	−0.0028	−0.0005	0.0002	0.0145	0.0143
	(0.0128)	(0.0167)	(0.0162)	(0.0178)	(0.0170)
Temperature deviation		0.0034***	0.0023**	0.0043***	0.0033***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation		0.0012	0.0005	0.0000	0.0001
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0388***		0.0233**
			(0.0066)		(0.0101)
Urban × Post–Oct 1905		0.0175***	0.0173***	0.0072	0.0069
		(0.0056)	(0.0055)	(0.0054)	(0.0052)
Mestechko × Post–Oct 1905		0.0056*	0.0051*	0.0023	0.0016
		(0.0032)	(0.0031)	(0.0033)	(0.0031)
Log Population × Post–Oct 1905				0.0053***	0.0052***
				(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905				−0.0026	−0.0032
				(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0038	0.0001
				(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905					0.0241*
					(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effect		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models include a second-degree polynomial in Jewish share to allow for the possibility that pogrom incidence is nonmonotonically related to Jewish share through some functional form other than "polarization." The results provide no evidence for that conjecture.

Table A7: Collapsed Pre- and Post-Periods

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.1454***	−0.0975***	−0.0975***	−0.0988***	−0.0977***
	(0.0158)	(0.0238)	(0.0239)	(0.0249)	(0.0249)
Post–Oct 1905	0.1020***	0.0580***	0.0581***	0.0738***	0.0765***
	(0.0052)	(0.0045)	(0.0045)	(0.0045)	(0.0045)
Temperature deviation		−0.0465**	−0.0465**	−0.0335	−0.0364
		(0.0212)	(0.0212)	(0.0251)	(0.0254)
Precipitation deviation		0.0067	0.0066	−0.0137	−0.0119
		(0.0176)	(0.0177)	(0.0226)	(0.0230)
W × pogroms			0.0002		0.0036
			(0.0045)		(0.0083)
Urban × Post–Oct 1905		−0.0005	−0.0005	0.0115	0.0107
		(0.0260)	(0.0260)	(0.0321)	(0.0322)
Mestechko × Post–Oct 1905		0.0305*	0.0305*	0.0351	0.0350
		(0.0159)	(0.0159)	(0.0220)	(0.0220)
Log Population × Post–Oct 1905				−0.0053	−0.0052
				(0.0047)	(0.0048)
Temperature deviation × Post–Oct 1905				−0.0269	−0.0250
				(0.0214)	(0.0214)
Precipitation deviation × Post–Oct 1905				0.0415	0.0406
				(0.0296)	(0.0306)
W × pogroms × Post–Oct 1905					−0.0070
					(0.0109)
Settlement fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models collapse the monthly panel dataset to two time periods: up to and including October 1905 and after October 1905. The estimated treatment effects are little affected.

Table A8: Polarization and fractionalization with disaggregated non-Jews

	(1)	(2)	(3)	(4)
Share of Jews × Post–Oct 1905		−0.0081*		−0.0076*
		(0.0043)		(0.0043)
Religious fractionalization × Post–Oct 1905	0.0005	−0.0029		
	(0.0066)	(0.0075)		
Religious polarization × Post–Oct 1905			0.0024	0.0004
			(0.0040)	(0.0046)
Temperature deviation	0.0033***	0.0033***	0.0033***	0.0033***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation	0.0001	0.0001	0.0001	0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
W × pogroms	0.0233**	0.0233**	0.0233**	0.0233**
	(0.0101)	(0.0101)	(0.0101)	(0.0101)
Urban × Post–Oct 1905	0.0052	0.0064	0.0049	0.0061
	(0.0050)	(0.0052)	(0.0050)	(0.0052)
Mestechko × Post–Oct 1905	−0.0007	0.0011	−0.0011	0.0008
	(0.0025)	(0.0030)	(0.0026)	(0.0031)
Log Population × Post–Oct 1905	0.0050**	0.0051**	0.0049**	0.0049**
	(0.0020)	(0.0020)	(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905	−0.0030	−0.0031	−0.0030	−0.0031
	(0.0027)	(0.0027)	(0.0027)	(0.0027)
Precipitation deviation × Post–Oct 1905	0.0002	0.0002	0.0002	0.0002
	(0.0022)	(0.0022)	(0.0022)	(0.0022)
W × pogroms × Post–Oct 1905	0.0241*	0.0241*	0.0241*	0.0241*
	(0.0135)	(0.0135)	(0.0135)	(0.0135)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models operationalize fractionalization and polarization (distinct concepts when there are more than two groups) from population shares of six religious groups: Jewish, Orthodox, Orthodox Old Believer, Protestant, Catholic, Muslim, and "Other." Variation in these variables is unrelated to the increase in pogroms after the Manifesto, and the treatment effect with Jewish share is essentially unaffected.

Table A9: Polarization Calculated as Share of Jews × Share Orthodox

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Share Orthodox	0.0407***	0.0179	0.0152	0.0074	0.0058
× Post–Oct 1905	(0.0105)	(0.0128)	(0.0120)	(0.0134)	(0.0124)
Temperature deviation		0.0034***	0.0023**	0.0043***	0.0033***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation		0.0012	0.0005	0.0000	0.0001
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0388***		0.0233**
			(0.0066)		(0.0101)
Urban × Post–Oct 1905		0.0153***	0.0153***	0.0052	0.0050
		(0.0052)	(0.0050)	(0.0051)	(0.0049)
Mestechko × Post–Oct 1905		0.0028	0.0026	−0.0005	−0.0010
		(0.0023)	(0.0022)	(0.0026)	(0.0024)
Log Population × Post–Oct 1905				0.0050**	0.0049**
				(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905				−0.0024	−0.0030
				(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0039	0.0002
				(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905					0.0241*
					(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These models operationalize "polarization" as Jewish population share × Orthodox population share, excluding other religious groups from the calculation, under the assumption that Orthodox Christians were most affected by the loss of authority by the Russian Orthodox Tsar. The estimated treatment effect is little affected.

Table A10: Sample Excluding Provincial Capitals

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.0148***	−0.0094**	−0.0087**	−0.0089**	−0.0081**
	(0.0036)	(0.0039)	(0.0038)	(0.0039)	(0.0037)
Temperature deviation		0.0027**	0.0016	0.0032***	0.0023**
		(0.0011)	(0.0010)	(0.0011)	(0.0010)
Precipitation deviation		0.0014*	0.0007	0.0000	0.0001
		(0.0007)	(0.0006)	(0.0004)	(0.0003)
W × pogroms			0.0363***		0.0199**
			(0.0062)		(0.0081)
Urban × Post–Oct 1905		0.0183***	0.0181***	0.0069	0.0065
		(0.0051)	(0.0050)	(0.0052)	(0.0050)
Mestechko × Post–Oct 1905		0.0063**	0.0058**	0.0018	0.0011
		(0.0025)	(0.0024)	(0.0028)	(0.0027)
Log Population × Post–Oct 1905				0.0057***	0.0056***
				(0.0018)	(0.0018)
Temperature deviation × Post–Oct 1905				−0.0011	−0.0018
				(0.0030)	(0.0026)
Precipitation deviation × Post–Oct 1905				0.0045*	0.0010
				(0.0024)	(0.0021)
W × pogroms × Post–Oct 1905					0.0253**
					(0.0120)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. The sample for the regressions in this table excludes settlements that are also the capitals of the fifteen Imperial provinces (*gubernii*) in the Pale of Settlement. The estimated treatment effect is little affected.

Table A11: Jewish Share Imputed from "Other"

	(1)	(2)	(3)	(4)	(5)
Share of Jews × Post–Oct 1905	−0.0152***	−0.0092**	−0.0083**	−0.0085**	−0.0076**
	(0.0035)	(0.0038)	(0.0037)	(0.0038)	(0.0037)
Temperature deviation		0.0036***	0.0026**	0.0046***	0.0037***
		(0.0011)	(0.0010)	(0.0012)	(0.0011)
Precipitation deviation		0.0011	0.0004	−0.0001	−0.0000
		(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms			0.0390***		0.0228**
			(0.0065)		(0.0097)
Urban × Post–Oct 1905		0.0177***	0.0176***	0.0071	0.0071
		(0.0053)	(0.0052)	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905		0.0060**	0.0058**	0.0020	0.0018
		(0.0025)	(0.0024)	(0.0027)	(0.0026)
Log Population × Post–Oct 1905				0.0050***	0.0049***
				(0.0019)	(0.0019)
Temperature deviation × Post–Oct 1905				−0.0031	−0.0036
				(0.0030)	(0.0027)
Precipitation deviation × Post–Oct 1905				0.0038	0.0001
				(0.0025)	(0.0021)
W × pogroms × Post–Oct 1905					0.0252*
					(0.0131)
Settlement fixed effects	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905		✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. The sample for the regressions in this table includes 73 settlements in which Jewish population share is imputed as the share of "Other" religious groups. The estimated treatment effect is little affected.

Table A12: Rye and Wheat Prices as Proxy for Weather Shocks

	(1)	(2)	(3)	(4)	(5)	(6)
Share of Jews × Post–Oct 1905	−0.0093**	−0.0090**	−0.0077**	−0.0093**	−0.0090**	−0.0077**
	(0.0040)	(0.0039)	(0.0038)	(0.0040)	(0.0040)	(0.0038)
Rye price	0.0332	0.0049	0.0088			
	(0.0371)	(0.0205)	(0.0186)			
Wheat price				0.1352***	−0.0043	0.0025
				(0.0507)	(0.0320)	(0.0286)
W x pogroms			0.0236**			0.0236**
			(0.0100)			(0.0100)
Urban × Post–Oct 1905	0.0175***	0.0062	0.0062	0.0175***	0.0062	0.0062
	(0.0053)	(0.0053)	(0.0051)	(0.0053)	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905	0.0055**	0.0014	0.0009	0.0055**	0.0014	0.0009
	(0.0026)	(0.0029)	(0.0028)	(0.0026)	(0.0029)	(0.0028)
Log Population × Post-October 1905		0.0051***	0.0050**		0.0051***	0.0050**
		(0.0020)	(0.0019)		(0.0020)	(0.0019)
Rye price × Post–Oct 1905		0.1016	−0.0428			
		(0.1228)	(0.1073)			
Wheat price × Post–Oct 1905					0.2019***	0.0475
					(0.0778)	(0.0691)
W x pogroms × Post–Oct 1905			0.0240*			0.0232*
			(0.0135)			(0.0136)
Settlement fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. These regressions substitute rye and wheat prices, defined at the provincial level, for the temperature and precipitation deviations used in the baseline models. The estimated treatment effect is little affected. Source: Mironov, Boris Nikolaevich, 1985, *Khlebnye tseny v Rossii za dva stoletiia (XVIII–XIX v.)*, Leningrad: Nauka, Leningradskoye otdeleniie.

Table A13: Rural Settlements With and Without Churches

	(1)	(2)	(3)	(4)
Share of Jews × Post–Oct 1905	−0.0092**	−0.0086**	−0.0092**	−0.0085**
	(0.0040)	(0.0038)	(0.0039)	(0.0038)
Temperature deviation	0.0034***	0.0023**	0.0043***	0.0033***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation	0.0012	0.0005	0.0000	0.0001
	(0.0008)	(0.0007)	(0.0004)	(0.0004)
W × pogroms		0.0388***		0.0233**
		(0.0066)		(0.0101)
Urban × Post–Oct 1905	0.0174***	0.0167***	0.0053	0.0045
	(0.0056)	(0.0054)	(0.0058)	(0.0055)
Mestechko × Post–Oct 1905	0.0054*	0.0045	0.0004	−0.0007
	(0.0030)	(0.0029)	(0.0035)	(0.0033)
Selo × Post–Oct 1905	−0.0005	−0.0015	−0.0026	−0.0035
	(0.0033)	(0.0031)	(0.0034)	(0.0032)
Log Population × Post–Oct 1905			0.0052***	0.0051***
			(0.0020)	(0.0020)
Temperature deviation × Post–Oct 1905			−0.0026	−0.0032
			(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905			0.0038	0.0002
			(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905				0.0241*
				(0.0135)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effect × Post–Oct 1905	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. These models include an interaction between *Selo* (church village) and post–October 1905, leaving *Derevniia* (village) × post–October 1905 as the excluded category. The estimated treatment effect is very similar to that in the baseline models.

Full regression tables (all covariates)

This section presents the complete regression output for all main specifications reported in the paper (Tables 4–10). Each table includes **all** covariates.

Table B4: Provincial Capitals and Railroads (Robustness)

	(1)	(2)	(3)
Share of Jews × Post–Oct 1905	−0.0089**	−0.0086**	−0.0090**
	(0.0039)	(0.0039)	(0.0039)
Travel time to provincial capital, hrs × Post–Oct 1905	−0.1557*		
	(0.0842)		
Travel time to province capital > median × Post–Oct 1905		−0.0050**	
		(0.0020)	
Distance to railroad			−0.5072*
			(0.2702)
Distance to railroad × Post–Oct 1905			−0.1305**
			(0.0573)
Temperature deviation	0.0042***	0.0042***	0.0043***
	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation	0.0000	0.0000	−0.0000
	(0.0004)	(0.0004)	(0.0004)
Urban × Post–Oct 1905	0.0069	0.0071	0.0072
	(0.0053)	(0.0052)	(0.0052)
Mestechko × Post–Oct 1905	0.0019	0.0022	0.0022
	(0.0029)	(0.0029)	(0.0029)
Log Population × Post–Oct 1905	0.0048**	0.0046**	0.0048**
	(0.0019)	(0.0019)	(0.0019)
Temperature deviation × Post–Oct 1905	−0.0024	−0.0025	−0.0025
	(0.0031)	(0.0031)	(0.0031)
Precipitation deviation × Post–Oct 1905	0.0039	0.0039	0.0039
	(0.0025)	(0.0025)	(0.0025)
Settlement fixed effects	✓	✓	✓
Month fixed effects	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. Due to an expanding network in this period, distance to railroad is time-varying in our sample. Travel time to provincial capital is defined using time in hours on road and rail between the unit of observation and the nearest provincial capital. All regressions include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations.

Table B5: Jewish Occupational Patterns (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)
Share of Jews × Post–Oct 1905	−0.0089**	−0.0077**	−0.0070*	−0.0092**	−0.0080**	−0.0068*
	(0.0039)	(0.0038)	(0.0037)	(0.0040)	(0.0038)	(0.0038)
Sh. Jews among creditors × Post–Oct 1905	−0.0067	−0.0029	0.0225***			
	(0.0052)	(0.0042)	(0.0053)			
Sh. Jews among creditors × Temperature deviation			−0.0015			
			(0.0011)			
Sh. Jews among creditors × Precipitation deviation			−0.0024**			
			(0.0012)			
Sh. Jews among creditors × Temperature dev. × Post–Oct 1905			−0.0096**			
			(0.0038)			
Sh. Jews among creditors × Precipitation dev. × Post–Oct 1905			−0.0284***			
			(0.0063)			
Sh. Jews among grain traders × Post–Oct 1905				−0.0125	−0.0154	0.0005
				(0.0253)	(0.0228)	(0.0231)
Sh. Jews among grain traders × Temperature deviation						−0.0080
						(0.0075)
Sh. Jews among grain traders × Precipitation deviation						−0.0059
						(0.0038)
Sh. Jews among grain traders × Temperature dev. × Post–Oct 1905						0.0028
						(0.0135)
Sh. Jews among grain traders × Precipitation dev. × Post–Oct 1905						−0.0571***
						(0.0210)
Temperature deviation			0.0040***			0.0105
			(0.0015)			(0.0074)
Precipitation deviation			0.0017			0.0057
			(0.0010)			(0.0037)
W × pogroms		0.0238**	0.0235**		0.0238**	0.0235**
		(0.0101)	(0.0101)		(0.0101)	(0.0101)
Urban × Post–Oct 1905	0.0060	0.0063	0.0060	0.0064	0.0063	0.0063
	(0.0054)	(0.0051)	(0.0051)	(0.0054)	(0.0051)	(0.0051)
Mestechko × Post–Oct 1905	0.0011	0.0007	−0.0002	0.0014	0.0009	0.0007
	(0.0029)	(0.0028)	(0.0028)	(0.0029)	(0.0028)	(0.0028)
Log Population × Post–Oct 1905	0.0052***	0.0049**	0.0047**	0.0051***	0.0049**	0.0047**
	(0.0020)	(0.0019)	(0.0019)	(0.0020)	(0.0019)	(0.0019)
Temperature deviation × Post–Oct 1905			0.0034			−0.0056
			(0.0042)			(0.0132)
Precipitation deviation × Post–Oct 1905			0.0192***			0.0541***
			(0.0053)			(0.0201)
W × pogroms × Post–Oct 1905		0.0236*	0.0204		0.0238*	0.0233*
		(0.0135)	(0.0135)		(0.0135)	(0.0135)
Settlement fixed effects	✓	✓	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post-Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, Column 2 includes a spatial lag of the dependent variable and its interaction with post-Oct 1905.

Table B6: Industrial Workers and Industrial Output (Robustness)

	(1)	(2)	(3)	(4)
Share of Jews × Post–Oct 1905	−0.0086**	−0.0084**	−0.0078**	−0.0075**
	(0.0040)	(0.0039)	(0.0038)	(0.0038)
Log industrial workers per capita × Post–Oct 1905	0.0031		−0.0117	
	(0.0258)		(0.0265)	
Log industrial output per capita × Post–Oct 1905		0.0012		0.0011
		(0.0008)		(0.0007)
Temperature deviation	0.0043***	0.0043***	0.0033***	0.0033***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation	0.0000	0.0000	0.0001	0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
W × pogroms			0.0233**	0.0233**
			(0.0101)	(0.0101)
Urban × Post–Oct 1905	0.0066	0.0069	0.0060	0.0065
	(0.0052)	(0.0052)	(0.0050)	(0.0050)
Mestechko × Post–Oct 1905	0.0016	0.0019	0.0008	0.0011
	(0.0029)	(0.0029)	(0.0027)	(0.0028)
Log Population × Post–Oct 1905	0.0051***	0.0043**	0.0050***	0.0043**
	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Temperature deviation × Post–Oct 1905	−0.0025	−0.0026	−0.0032	−0.0032
	(0.0031)	(0.0031)	(0.0027)	(0.0027)
Precipitation deviation × Post–Oct 1905	0.0038	0.0038	0.0002	0.0002
	(0.0025)	(0.0025)	(0.0022)	(0.0022)
W × pogroms × Post–Oct 1905			0.0241*	0.0240*
			(0.0136)	(0.0135)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Columns 3 and 4 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Table B7: Mobilization during Russo-Japanese War (Robustness)

	(1)	(2)
Share of Jews × Post-Oct 1905	−0.0087**	−0.0078**
	(0.0039)	(0.0038)
Partial mobilization in uezd	0.0069**	0.0053***
	(0.0027)	(0.0019)
Temperature deviation	0.0043***	0.0033***
	(0.0011)	(0.0011)
Precipitation deviation	0.0001	0.0001
	(0.0004)	(0.0004)
W × pogroms		0.0228**
		(0.0100)
Urban × Post–Oct 1905	0.0064	0.0061
	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905	0.0015	0.0008
	(0.0029)	(0.0028)
Log Population × Post–Oct 1905	0.0051***	0.0050***
	(0.0020)	(0.0019)
Temperature deviation × Post–Oct 1905	−0.0026	−0.0032
	(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905	0.0038	0.0001
	(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905		0.0246*
		(0.0134)
Settlement fixed effects	✓	✓
Month fixed effects	✓	✓
Province fixed effects × Post-Oct 1905	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, Column 2 includes a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Table B8: Past Pogroms in Current Wave and in 1881–82 (Robustness)

	(1)	(2)	(3)	(4)
Share Jews × Post–Oct 1905	−0.0079**	−0.0071*	−0.0086**	−0.0077**
	(0.0040)	(0.0038)	(0.0039)	(0.0038)
Past pogrom in current wave	−0.0763***	−0.0722***		
	(0.0166)	(0.0160)		
Past pogrom in current wave × Post–Oct 1905	−0.0195	−0.0173		
	(0.0142)	(0.0138)		
Pogrom in 1881–1882 × Post–Oct 1905			0.0103	0.0048
			(0.0124)	(0.0115)
Temperature deviation	0.0046***	0.0037***	0.0043***	0.0033***
	(0.0012)	(0.0011)	(0.0012)	(0.0011)
Precipitation deviation	0.0000	0.0001	0.0000	0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
W × pogroms		0.0215**		0.0233**
		(0.0095)		(0.0101)
Urban × Post–Oct 1905	0.0128**	0.0120**	0.0066	0.0062
	(0.0056)	(0.0054)	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905	−0.0015	−0.0020	0.0016	0.0009
	(0.0030)	(0.0028)	(0.0029)	(0.0028)
Log Population × Post–Oct 1905	0.0135***	0.0128***	0.0050**	0.0049**
	(0.0023)	(0.0022)	(0.0020)	(0.0019)
Temperature deviation × Post–Oct 1905	−0.0023	−0.0029	−0.0026	−0.0032
	(0.0030)	(0.0027)	(0.0031)	(0.0027)
Precipitation deviation × Post–Oct 1905	0.0038	0.0004	0.0038	0.0002
	(0.0024)	(0.0021)	(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905		0.0230*		0.0241*
		(0.0130)		(0.0135)
Settlement fixed effects	✓	✓	✓	✓
Month fixed effects	✓	✓	✓	✓
Province fixed effect × Post–Oct 1905	✓	✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Columns 2 and 4 additionally include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Table B9: Presence of the Jewish Labour Bund (Robustness)

	(1)	(2)	(3)
Share of Jews × Post–Oct 1905	−0.0078**	−0.0082**	−0.0077**
	(0.0037)	(0.0037)	(0.0038)
Bund branch × Post–Oct 1905	0.0017		
	(0.0080)		
Log Bund members per 1,000 people × Post–Oct 1905		0.0025	
		(0.0027)	
Log distance to Bund branch × Post–Oct 1905			0.0000
			(0.0016)
Temperature deviation	0.0033***	0.0033***	0.0033***
	(0.0011)	(0.0011)	(0.0011)
Precipitation deviation	0.0001	0.0001	0.0001
	(0.0004)	(0.0004)	(0.0004)
W × pogroms	0.0233**	0.0233**	0.0233**
	(0.0101)	(0.0101)	(0.0101)
Urban × Post–Oct 1905	0.0062	0.0061	0.0062
	(0.0051)	(0.0051)	(0.0051)
Mestechko × Post–Oct 1905	0.0010	0.0014	0.0009
	(0.0027)	(0.0027)	(0.0028)
Log Population × Post–Oct 1905	0.0048***	0.0045**	0.0050***
	(0.0019)	(0.0019)	(0.0019)
Temperature deviation × Post–Oct 1905	−0.0031	−0.0031	−0.0031
	(0.0027)	(0.0027)	(0.0027)
Precipitation deviation × Post–Oct 1905	0.0002	0.0002	0.0002
	(0.0022)	(0.0022)	(0.0022)
W × pogroms × Post–Oct 1905	0.0241*	0.0241*	0.0241*
	(0.0135)	(0.0135)	(0.0135)
Settlement fixed effects	✓	✓	✓
Month fixed effects	✓	✓	✓
Province fixed effects × Post–Oct 1905	✓	✓	✓

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, these models include a spatial lag of the dependent variable and its interaction with post–Oct 1905.

Table B10: Presence of Police Office and Distance to Troops (Robustness)

	(1)	(2)
Share Jews × Post–Oct 1905	−0.0097**	−0.0089**
	(0.0040)	(0.0039)
Police office × Post–Oct 1905	0.0055**	0.0056**
	(0.0028)	(0.0028)
Distance to troops × Post–Oct 1905	−0.0000	−0.0000
	(0.0001)	(0.0001)
Temperature deviation	0.0043***	0.0033***
	(0.0011)	(0.0011)
Precipitation deviation	0.0000	0.0001
	(0.0004)	(0.0004)
W × pogroms		0.0233**
		(0.0101)
Urban × Post–Oct 1905	0.0043	0.0042
	(0.0053)	(0.0051)
Mestechko × Post–Oct 1905	0.0010	0.0004
	(0.0029)	(0.0027)
Log Population × Post–Oct 1905	0.0038*	0.0037*
	(0.0021)	(0.0021)
Temperature deviation × Post–Oct 1905	−0.0026	−0.0033
	(0.0031)	(0.0028)
Precipitation deviation × Post–Oct 1905	0.0038	0.0001
	(0.0025)	(0.0022)
W × pogroms × Post–Oct 1905		0.0240*
		(0.0135)
Settlement fixed effects	✓	✓
Month fixed effects	✓	✓
Province fixed effect × Post–Oct 1905	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. All regressions in this table include temperature and precipitation deviations, along with interactions of post–Oct 1905 with indicators for settlement type, population variables, and these temperature and precipitation deviations. Additionally, these models include a spatial lag of the dependent variable and its interaction with post–Oct 1905.