Repressed Memories:
State Terror and the Street Politics of Memorialization *

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Abstract

Why do some victims of state repression become memorialized, while others do not? Public "places of memory," like monuments, museums and street signs, are contested political spaces, where efforts to expose and confront historical traumas clash with efforts to advance and legitimate political power. Street-level data on Stalin's Great Terror and contemporary public memorials in Moscow show that memorials to victims are most likely to appear — and are hardest to remove — in locations where repression was initially more severe. Where the cumulative death toll from repression is higher (e.g. where Soviet authorities charged multiple individuals from the same residential building or workplace for the same, usually fictitious, offense), there are generally more memorials to victims. However, the strength of this "severity effect" is not uniform. It varies by victims' ethnicity, political affiliation, and the local presence of state security services today. Larger acts of violence are harder to conceal. Yet memorialization depends not only on the supply of victims, but also on victims' identities, and the proximity of historical repression to contemporary bastions of power.

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Most victims of state repression — the use of violence and intimidation to maintain political power — are publicly unknown. By various estimates, governments killed tens of millions of their own citizens over the last century.[1] Yet for every Fred Hampton, Jina Amini and Alexey Navalny, there are countless others who disappear into the dark of the state repressive apparatus, with no statues or commemorative plaques to remind us of their existence. Why are some victims publicly memorialized, but others are not?

Public "places of memory," like monuments, museums, and even street signs, are contested political spaces, where efforts to expose and confront historical traumas sometimes clash with efforts to advance and legitimate political power (Forest and Johnson, 2002). Political actors create and manipulate these physical structures to forge collective memories (Halbwachs, 1980), establish normative standards (Cosgrove, 1998), communicate power relations (Ross, 2009), and construct new identities around symbolic events and ideas (Gellner, 1983; Anderson, 1991). A growing empirical literature in political science and economics has shown that the creation and removal of these symbolic sites can have tangible consequences for public behavior and attitudes, influencing outcomes like electoral turnout and vote shares (Villamil and Balcells, 2021; Rozenas and Vlasenko, 2022; Turkoglu, Ditlmann and Firestone, 2023), racial resentment (Rahnama, 2023), support for restorative justice (Balcells, Palanza and Voytas, 2022), migration choices (Ferlenga, 2023), labor market differentials (Williams, 2021), and housing prices (Green et al., 2022).

Despite scholarly recognition that "places of memory" can meaningfully shape politics and society, we remain limited in our understanding of why some memorials exist while others do not. Most of the studies seeking to unpack this question have focused on the memorialization process itself, rather than on the specific historical events or figures being memorialized. For example, researchers have shown that the fate of monuments can reflect contemporary struggles for "symbolic capital" among elites (Forest and Johnson, 2002), the partisan affiliation of local officials (Núñez and Dinas, 2023), the demographics and political preferences of local residents (Benjamin et al., 2020), and macro-level structural factors like democracy and regime type (Forest and Johnson, 2011). Temporally, these sources of variation emerge well after the historical events being memorialized, and may themselves be consequences of these initial events. For example, if political violence compels

[1] Rummel (1994); Anderton (2016)

those threatened by it to leave, we should not be surprised if the remaining residents — some of whom may have been complicit in the violence — oppose memorializing the victims.

What such analyses — particularly quantitative ones — usually overlook is how the "hard facts" of historical events (i.e. who did what to whom, when and where) shape the contestation of memorialization.[2] Acts of state violence vary across many dimensions, including scale, location, and selection of victims. No quantitative study, to our knowledge, has examined how this variation might shape which victims become more publicly visible.

Our theoretical point of departure is that some acts of violence are too big to hide. Memorials to victims are most likely to appear — and least likely to be denied or removed — where repression was initially more severe, in terms of cumulative human cost.[3] However, the strength of this "severity effect" depends on *who* is being memorialized and *where*. Memorialization more closely tracks the historical severity of repression where the costs of recognizing a victim are low, relative to the costs of suppressing the victim's memory. This dynamic favors the memorialization of certain categories of victims over others (e.g., ethnic in-groups vs. out-groups), even where the severity of repression is the same. We derive these predictions from a simple theoretical model of contested memorialization. We test them with street-level data on Stalin's Great Terror and public memorials in Moscow.

Specifically, we take advantage of the empirical opportunity presented by the *Last Address* (*Posledniy Adres*) memorial project, which since 2014 has installed hundreds of commemorative markers on buildings where victims of the Great Terror resided prior to their execution. Modeled after the *Stumbling Block* (*Stolperstein*) project commemorating Holocaust victims in Berlin, *Last Address* is a nongovernmental organization that receives petitions from private citizens to memorialize specific victims. To install the plaques on public streets, *Last Address* exploits a legal loophole, bypassing municipal authorities and securing approval directly from the owners of building facades (Veselov, 2018). The owners may approve the request (in which case *Last Address* installs the plaque), or they may deny or indefinitely delay it. In some cases, unknown parties remove the plaques after installation. This project provides an unprecedented chance to study "grass-roots" memorialization

[2] For qualitative studies of memory activism in this context, see Smith (1996, 2019).

[3] We define "severity" as the cumulative human cost of repression in a discrete geographic area (e.g. number of persons killed or arrested per building or city block).

of repression victims in an autocratic state, at a micro level.

Using declassified street maps from the Soviet secret police (National Commissariat of Internal Affairs, or NKVD) and detailed data on where the victims of the Great Terror lived prior to their arrest, we digitally reconstruct Moscow's urban landscape in the 1930s. We use these data to compare the distribution of *Last Address* memorials (and efforts to deny or remove them) to the number of potential victims to be memorialized at each address. Multiple estimation strategies at the levels of city blocks and individual victims, including small-area fixed effects, regression discontinuity design, and spatial autoregressive models, confirm that the number of co-arrestees at the same address (or same workplace) is a strong predictor of whether an individual's name appears on a commemorative marker. This result holds when we compare victims of the same nationality, occupation, class, party, sex and age, who lived in the same type of building in the same part of town.

While there are generally more memorials where there was more violence, the supply of victims alone cannot explain variation in memorialization. Some victims face higher barriers to recognition than others. For example, victims from locally underrepresented groups (e.g., ethnic minorities, foreign-born) may have fewer advocates in the local community. Victims politically affiliated with the repressive regime (e.g. Communist Party members) may receive low priority due to perceived culpability. Actors' willingness to advocate for (or against) memorialization also depends on the local distribution of political power (Forest and Johnson, 2011; Rozenas and Vlasenko, 2022; Núñez and Dinas, 2023). We find, for instance, that the effect of past repression is more muted on city blocks that host the offices of state security agencies and law enforcement — which may deter family members from requesting memorials, incentivize property owners to deny them, or both. This restrictive local political opportunity structure can dampen the severity effect.

We focus our inquiry on Moscow for several reasons. First are the analytical advantages of studying a single administrative area, where we can hold constant many potential confounding factors — particularly the type of repression being examined (arrests under Article 58 of the Soviet Russian criminal code, on "counter-revolutionary activity") and local laws and regulations governing the installation of monuments. Second is the inherent importance of Moscow as Russia's capital city and most populous federal subject — as Forest and Johnson (2002) note, memorialization dynamics there can have national visibility and resonance. Third, Moscow presents a "hard case" for this type of memorialization. *Last Address* operates in an autocratic political environment, where authorities have taken multiple legislative and administrative steps to redeem the public image of Josef Stalin and control public debate around the Great Terror. In a 2019 survey by the independent Levada Center polling firm, 70% of Russians agreed that Stalin played a positive role in the country's history, and a plurality (46%) agreed that the human costs of his reign were "justified." In 2024, the General Prosecutor's office announced that it will reconsider past decisions to rehabilitate victims of Soviet repression, while the chairman of Russia's Presidential Council on Human Rights criticized *Last Address* for "rubbing murder in people's faces." If grass-roots memorialization can proceed against these headwinds, we can expect similar dynamics in less prohibitive political settings.

Our study contributes to several strands of scholarship. To the literature on historical legacies of violence and exploitation (Acharya, Blackwell and Sen, 2016; Lupu and Peisakhin, 2017), it casts light on memorialization as a mechanism of intergenerational transmission (Menon, 2023). We show that remembrance is not automatic, and explain why some historical events might resonate more than others. To the growing quantitative literature on "symbolic politics" (Balcells, Palanza and Voytas, 2022; Rozenas and Vlasenko, 2022), and particularly its subset on the manipulation of public symbols (Forest and Johnson, 2011; Johnson, Tipler and Camarillo, 2019; Núñez and Dinas, 2023), we contribute new evidence on an unprecedented micro-scale, showing that the placement and removal of memorials reflect an interaction between contemporary struggles for power, and the attributes of the historical events being memorialized.

Finally, our explanation for why some violent events cast a longer shadow than others should be of general interest to quantitative scholars of conflict (Davenport, 2009) and political communication (Shaver et al., 2022), who have sought to explain how the intensity (Weidmann, 2016), location and timing of violence (Hammond and Weidmann, 2014) affect its public visibility, and its inclusion in social science datasets (Eck, 2012). As we show here, higher-casualty events are indeed more visible — to journalists, data scientists, and the public, decades after they occur — but there are important exceptions to this pattern.

1 The Dynamics of Contested Memorialization

The scope of our study is on memorials to individual victims of state violence. This excludes collective memorials to participants of historical events (e.g. battles, massacres, famines), or members of groups (e.g. veterans, victims of massacres and famines) — unless those memorials recognize specific individuals by name. Individualized memorialization requires a more granular level of information than collective memorialization. Beyond basic personally identifiable information (e.g. name, date and place of birth), individualized memorialization typically requires documentary evidence (e.g. arrest orders, court records, personnel files) to establish one's status as a "victim," "veteran" or other memorialized category. In the case of state repression, such memorialization requires knowing not just that arrests took place, but also who was arrested and where, and presenting the paperwork to prove it.

We conceive of memorials to repression victims as products of two countervailing forces: efforts to publicly recognize specific individuals, and efforts to suppress this recognition. The agents of (counter-)memorialization need not have a personal connection to the victim — family members, activists, government officials, and many others can participate in this process. While their motivations may vary across specific cases (e.g. some may wish to honor a grandparent, others may seek to hold governments accountable, or advance a broader social narrative), actors on each side share an intermediate objective of publicly installing (or denying) an individual's memorial. This contested memorialization unfolds across small community units (e.g. city blocks, apartment buildings), differentiated by their historical exposure to repression, and the relative strength of efforts by activists on the two sides. We summarize these dynamics qualitatively below, and formally in Appendix A0.

The outcome we are seeking to explain is the number of historical markers to victims (e.g, memorial plaques) that exist in a given place and time. This number can be as low as zero, and as high as the cumulative number of repression victims who once resided in that location (*severity level*).[4] The number of markers fluctuates over time, increasing in the relative strength of efforts to recognize victims (*recognition rate*), and decreasing in the relative strength of efforts to suppress recognition (*suppression rate*). In practice,

[4]We assume there cannot be more markers than victims. The local severity of repression determines an upper bound for memorialization, similar to the concept of "carrying capacity" in population ecology.

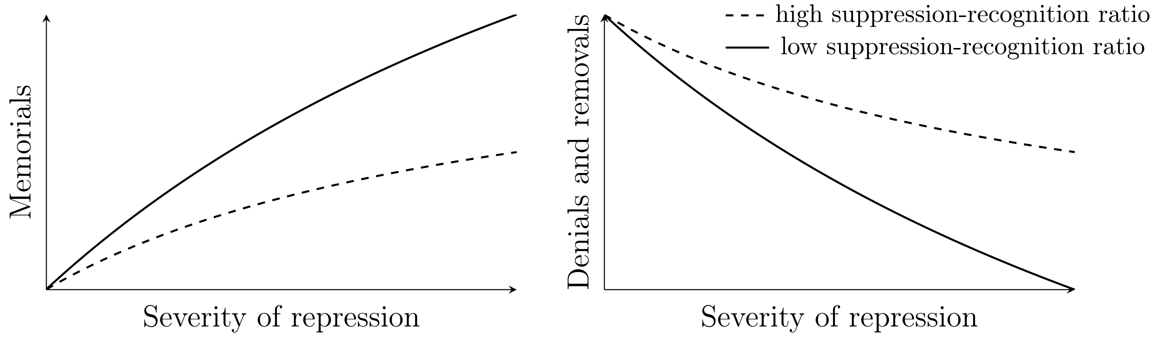
recognition may take the form of petitioning for the installation of a memorial plaque, and mobilizing the administrative, legal and logistical resources needed to see this process through (e.g. gathering documents, negotiating with local stakeholders, developing and installing the marker). Suppression may take the form of denying petitions, physically removing markers, or placing pressure on other local actors to do so.

Over time, this process converges to one of two equilibria: one where the number of markers remains stably above zero ("partial remembrance"), and one where no historical markers can durably exist ("complete erasure"). In any location where at least one victim had been repressed, memorials will become permanent only if recognition outpaces suppression. Otherwise, all memorials will eventually disappear. However, this erasure is not instantaneous, and some memorials do not fade easily into the dark.

A formal analysis of these equilibria (Appendix A0) yields three empirical predictions. First, there will be more memorials to victims in locations with greater exposure to repression — net of the strategies proponents and opponents of memorialization adopt. Second, the elimination of memorials will be slower in locations with more exposure to repression. At any given point in time, we should expect more memorials — and a lower share of denials and removals — where there are more victims to be memorialized. Third, and crucially, the impact of past repression is not uniform. If it were, the distribution of memorials would simply mirror the distribution of victims. Yet there is variation in how closely the volume of memorials follows the historical severity of repression. Where the suppression rate is high relative to the recognition rate, the severity effect becomes more muzzled.

Figure 1 illustrates these predictions graphically.[5] As the severity of repression rises, (a) the expected number of memorials to victims increases, and (b) the expected share of denials and removals decreases. The slope of each curve depends on whether suppression can keep pace with recognition. Where it cannot (low suppression-to-recognition ratio, solid lines), memorialization is more responsive to the local severity of historical violence. Where the suppression-to-recognition ratio is higher (dashed line), both curves flatten out, with fewer memorials — and a higher share of them removed — for the same number of victims.

[5]See Appendix A0 for derivations and details.



(a) Number of memorials at time t (b) Percent denied or removed by time t

Figure 1: **Expected patterns of memorialization**. See Appendix A0 for full details on model specification, proofs, and parameter values used in numerical integration.

What drives the suppression-to-recognition ratio? We cannot observe this parameter directly, but can reasonably expect it to correlate with the costs of recognizing a particular victim in a particular place. Some individual cases are costlier to pursue than others, and resources spent memorializing one victim usually cannot be spent memorializing others. Because resources are limited, activists must be selective in their efforts. Administrative costs may be higher for certain victims, like foreign-born persons for whom documentation is more scarce, and lower for victims more deeply embedded in local social networks (e.g., with multiple ancestors and acquaintances still living in the area). Grass-roots pressure to memorialize may also be stronger in the latter case, if the community members who knew the victims wrote memoirs, petitioned for rehabilitation, and transmitted memories to new generations.[6] These vectors of pressure may be weaker for victims from numerically under-represented groups, like ethnic and religious minorities, with fewer community members advocating on their behalf. Some victims may be reputationally costly to recognize, like repressed members of the security services or former ruling party, due to perceptions of complicity or guilt. Others may be costly not to recognize, due to community pressure.

Opponents of memorialization face similar considerations in deciding how aggressively to push back. The cost of suppression may be lower for certain victims (e.g. foreigners and other socially-isolated persons), and higher for others (e.g. well-known public figures).

[6] We are grateful to Kathleen Smith for this insight.

Opposition may be easier to mobilize against memorials perceived as transgressive against dominant norms or narratives, or honoring victims from marginalized social groups. The cost of suppression is lower still if memory activists can be deterred from making a petition in the first place, through a credible fear of retribution. For example, the local presence of state security services and law enforcement can contribute to a restrictive political opportunity structure, where efforts at collective action are more easily monitored, interrupted and punished. Looking ahead, memory activists may expect memorials to provoke more effective obstruction and punitive action in such areas, and shift their efforts elsewhere.

The number of historical markers in a given place and time reflects (a) the local severity of historical repression, and (b) the case-specific and location-specific incentives facing contemporary memory activists and their opponents. This argument advances existing scholarship on memorialization, which has conceptualized this process as part of an underlying political struggle between elected officials (Núñez and Dinas, 2023), their constituents (Benjamin et al., 2020), and other interested parties (Forest and Johnson, 2002). Our theory places this political struggle in the context of the historical events being memorialized, and shows how the historical severity of repression interacts with the (highly variable) desire of local political actors to promote or challenge memorialization.

2 The Great Terror and Its Victims

To see if our theoretical predictions align with empirical reality, we use novel individual- and street-level data on memorials to Stalin-era repression victims in Moscow.

2.1 Background

Between the October Revolution of 1917 and the communist regime's collapse in December 1991, the Soviet Union executed, arrested, exiled or otherwise punished 12.5 to 13.7 million of its citizens for suspected political dissent (Zhemkova, 2017). This includes some 3.8 million people charged on an individual basis for alleged "counter-revolutionary" activity, and millions of victims of collective punishment, like famine, mass deportation, counter-insurgency operations, and other government-caused deaths. The vast majority of this repression occurred under the rule of Josef Stalin (1923-1953), with a peak in 1937-1938 during a series of campaigns collectively known as the Great Terror. The Main Directorate of State Security (GUGB) within the People's Commissariat for Internal Affairs (NKVD) was the secret police agency that planned and implemented the Great Terror, on orders from the Central Executive Committee (TsIK) of the Communist Party. The agency's mission was to preserve and protect the Soviet regime, in part by investigating, arresting, punishing and deterring those who "threaten the Soviet order" (Gregory, 2009, pp. 5-6).

Every layer of Soviet society fell under the secret police microscope at some point, but authorities consistently branded several categories of citizens as "socially malign." These included individuals suspected of collaborating with foreign governments (e.g. ethnic minorities, people who studied or traveled abroad), perceived political rivals (e.g. military officers, bureaucrats, Trotskyites), "class enemies" (e.g. wealthy farmers, clergy, academics), and "social parasites" (e.g. criminals, sex workers, long-term unemployed). The document that kicked the Great Terror into high gear was NKVD Order No. 00447 ("On the operation to repress former kulaks, criminals and other anti-Soviet elements") from July 30, 1937. Order 00447 called for the "extirpation of anti-Soviet elements" on a national scale, and issued quotas for executions and prison sentences to each regional NKVD directorate.

Ultimate responsibility for identifying, investigating, detaining and interrogating suspects, and carrying out sentences, rested with NKVD branches at the district (*rayon*) level (RO UNKVD). There was, on average, one RO for every 60,000-70,000 citizens (Vatlin, 2004, p. 7), including one branch in each of Moscow's 23 city districts. While RO's were under intense pressure to complete their work at a fast pace, they had discretion in implementing orders. Cases under Order 00447 almost always followed — at least on paper — a standard investigative procedure, with a separate criminal case opened and specific charges filed for each arrest. However, individualized accusations did not imply selective targeting, and individualized charges were usually little more than pretext, as part of a prosecutorial strategy optimized to expedite conviction (Junge, Bonvech and Binner, 2009, p. 55).

In broad terms, the NKVD looked for signs of "counter-revolutionary activity," but what counted as "counter-revolutionary activity" was open to interpretation. Article 58 of the 1926 criminal code defined this term as "any action directed at the overthrow, sabotage or weakening of the power of worker-peasant Soviets ... or weakening of the foreign security of the USSR and main economic, political and national achievements of the proletarian revolution" (VTsIK, 1926). This definition was broad enough to politicize ordinary criminal offenses, and to criminalize everyday administrative incompetence, negligence and mismanagement (Gregory, 2009, p. 121). Under Article 58-12, a failure to report counterrevolutionary activity was also a form of counterrevolutionary activity.

Evidence of the commission of a crime was not necessary to convict under Article 58. To keep pace with the scale of operations in 1937-1938, the NKVD modified its administrative procedures and norms, in three ways. First, investigative efforts shifted away from the collection of material evidence, and toward the extraction (usually by torture) of signed confessions. By Soviet law, a signed confession was sufficient evidence for conviction, and effectively the only piece of information needed to complete an investigation. Second, the NKVD prioritized espionage and conspiracy cases, which carried a lower evidentiary bar due to "state secrets" that by law could not be openly articulated in charging documents. Third, the NKVD increasingly relied on group arrests, processing multiple managers from the same factory, or multiple residents from the same building in a single case. These events occurred in clusters of about 10 arrests each, as RO's used lists of workers from local factories, farms and other enterprises to assemble — and then neutralize — entirely fictitious "counterrevolutionary-diversionary groups" (GARF 10035/2/23854-23857).

In one such group arrest, the RO UNKVD in Kuntsevo charged five stablehands from the town public works department with membership in an alleged "terrorist group," on the basis that horse care is evidence of counterrevolutionary leanings. This argument succeeded in obtaining a guilty verdict from a special collegium of the Moscow oblast court (GARF 10035/23043, cited in Vatlin, 2004, p. 27). All five were executed.

These mass killings allowed ROs to meet their quotas sooner, but they made state violence transparently indiscriminate. The type of information the NKVD previously used to obtain an arrest warrant (e.g. denunciations, performance reviews, evidence of foreign contacts) was now collected after the arrest, and back-dated (Vatlin, 2004, p. 34). In some cases, NKVD asked citizens to sign blank denunciation documents, promising to add specific accusations later (Vatlin, 2004, p. 49). In other cases, NKVD officers invented fictitious "informants" and "witnesses" from whole cloth (Vatlin, 2004, p. 52). These practices created a widespread perception that repression was mostly arbitrary (Conquest, 2008, 434).

In 2014, a group of Russian dissident journalists and human rights activists launched a grass-roots project, *Last Address* (*Posledniy Adres*), to memorialize the individual victims of Soviet repression. Inspired by the German *Stumbling Block* (*Stolperstein*) project, *Last Address* sought to place commemorative plaques listing individuals' names, professions, dates of birth, detention, death, and rehabilitation on the facades of the buildings where they last lived before their arrests (Zabalueva, 2019, 184). Anyone can petition for the installation of a commemorative plaque. Applicants pay for the cost of the plaque, while volunteers with *Last Address* seek consent from the owners of the facade. The project started in Moscow and St. Petersburg, and has since expanded to dozens of Russian cities.

The *Last Address* project is distinctive for three reasons. First, unlike state-supported memorial projects in Russia, *Last Address* circumvents municipal authorities by exploiting a loophole in Russian law, by which the only consent needed to install an "informational" plaque on a building is that of the facade's owner (Veselov, 2018). This relative lack of government involvement makes *Last Address* a rare "grass roots" effort, in a country where memorialization projects are almost always state-directed. Second, *Last Address* is unique in its focus on the remembrance of individual victims in separate, geographically dispersed locations, following the motto "One name. One life. One sign." This sets the project apart from collective monuments, like Moscow's "Wall of Grief" (Smith, 2019), which depersonalize the memory of state terror and focus instead on its massive scope (Zabalueva, 2019, 185). Third, the timing of the *Last Address* project — launched in the wake of Russia's 2014 invasion of Ukraine, and intensifying crackdown on dissent — leaves little doubt about the future fate of this project. In the context of our theory, the system appears headed toward a "complete erasure" equilibrium. This leaves a small and closing window of opportunity to investigate a "hard case," where opponents of memorialization have a clear upper hand in the local balance of political power. If our theoretical expectations find empirical support here, we can expect similar patterns in less politically restrictive environments.

2.2 Data

Testing our theoretical predictions requires linking contemporary data on memorials to historical data on repression victims, and estimating the impact of the latter on the former.

We do so at two levels of analysis: (1) city blocks, and (2) individuals. A block-level analysis enables us to situate individuals within a common set of spatial units, and to evaluate how memorialization co-varies not only with the number of victims per block, but with victims as a (rough) percentage of local residents. An individual-level analysis enables us to address ecological inference concerns, and account for differences in memorialization across professions, ethnicities, age groups, sexes, and other individual-level characteristics.

Because many decades of urban development separate Stalin-era repression from contemporary memorialization, we use historical sources to reconstruct Moscow as it existed at the time of the Great Terror. Our primary data source is a tactical map of Moscow in 1938 from the NKVD's Main Directorate for Geodesic Surveying and Cartography (Krasil'nikov, 1938). The map's resolution (300 meters to one centimeter, or 1:30,000) provides sufficient topographic detail to navigate every street corner and alleyway in the Soviet Union's largest city. The map also includes information on trolley, bus, light rail, ferry and metro stops, cultural sites, parks, gardens and city district boundaries in 1938. Importantly for our needs, the map reflects the NKVD's own information set — this very same map hung on the walls of RO NKVD branches when they were planning and conducting operations.

We georeferenced the NKVD map and vectorized the polygons representing city blocks. Overall, there are 5,400 city blocks in this dataset, including 1,646 (30%) in neighboring settlements that had not (yet) been incorporated into the city proper (e.g. Davydkovo, Kuntsevo). We classified the blocks by zoning with information from Memorial's "Topography of Terror" (topos.memo.ru) project and supplementary sources. We identified 4,897 (91%) blocks with residential buildings, including 3,305 (88%) within city limits.

Our data source for exposure to repression is *Memorial*'s "Victims of State Terror in Moscow" database (mos.memo.ru), which contains the names, residential addresses and biographical information for 11,035 Moscow residents executed by the secret police between 1921 and 1953, including 9,526 in 1936-1938. The *Memorial* database represents the population of cases from which *Last Address* petitions are drawn, due to organizational links between the projects, and *Last Address*' focus on victims who were executed, not incarcerated.[7] We geocoded victims' residential addresses at time of their arrest.

[7]Until its liquidation in 2021, *Memorial* was an organizational partner of *Last Address*. *Last Address* still uses the *Memorial* dataset in its work, to (1) factually validate petitions, and (2) in cases when

Figure 2a shows 5,400 city blocks in Moscow, as rendered on the digitized 1938 NKVD map of the city. Figure 2b shows the last known street addresses of 11,035 local residents, whom the NKVD executed between 1936 and 1938. Most of the NKVD's victims lived in the city's historic center, inside the so-called Garden Ring — one of Moscow's several concentric ring roads. This is where the city's population was densest, prior to Moscow's expansion and the mass construction of apartment blocks in the 1950s and 1960s. Most residents lived in low-rise communal flats, with two or more families sharing one apartment.

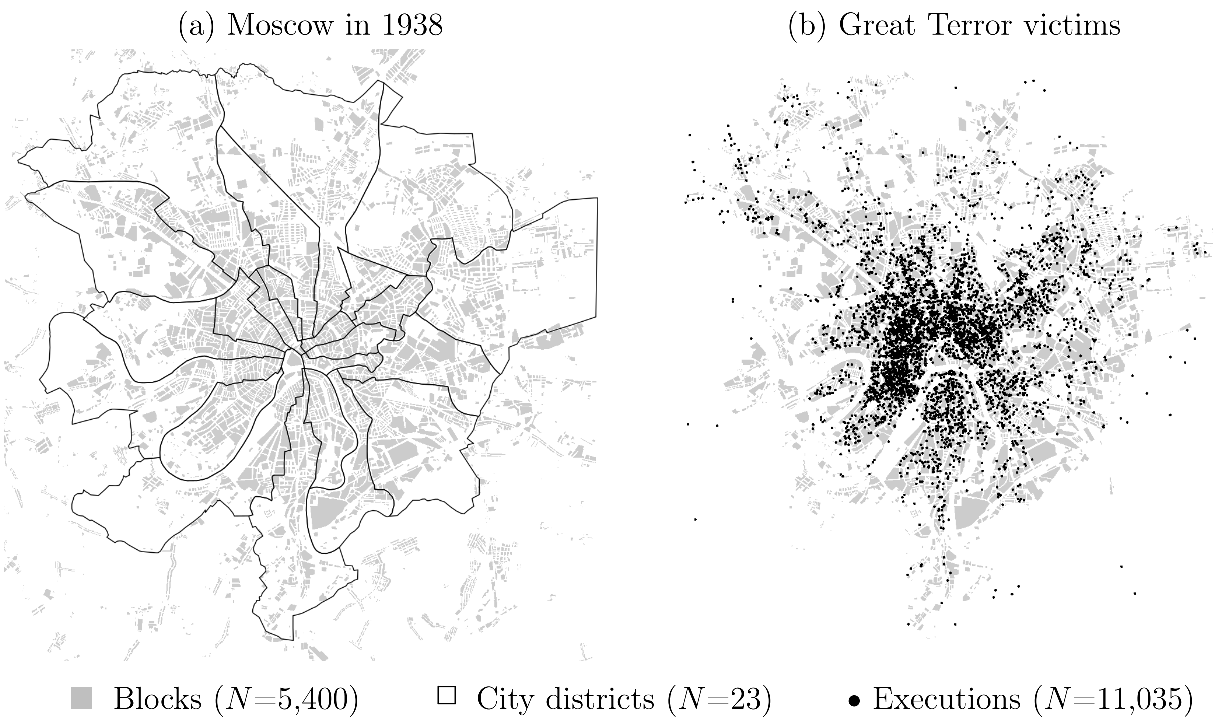
We extracted data on memorials from the *Last Address* website (poslednyadres.ru), which contains information on the name, address, date, geographic coordinates, and status (requested, installed, denied) of commemorative plaques in Moscow, among other cities. We supplemented this information with press reports of illegal plaque removals. Within Moscow's 1938 city limits, we identified 1,292 petitions to install plaques, 610 (47%) of which resulted in approval and installation, and the remainder of which resulted in a denial (17, 1%), removal (39, 3%) or no response from facade owners (626, 48%). Because formal denials and physical removals are less common than simply ignoring petitions, we combine the latter three bins into a general "denial/removal" category for our analyses.

To account for additional variation in repression and memorialization, we supplemented these data with information on the borders of Moscow's city districts (*rayony*). The district boundaries (Krasil'nikov, 1938), which remained in place from 1936 to 1960, reflect the territorial-jurisdictional organization of RO NKVD branches. They also allow us to link our data to district-level population counts from the Soviet Census (Central Statistical Directorate of USSR, 1939). Because official block-level population statistics are unavailable, we disaggregated district population counts through dasymetric spatial interpolation (Mennis, 2003), which employs ancillary data to obtain filtered area-weighted local estimates.[8]

donations arrive without naming a specific person, to select individuals for memorialization.

[8]Dasymetric interpolation loosens the uniformity assumption of traditional area-weighted interpolation, by excluding non-residential blocks, parks, roadways, and other uninhabitable areas from local estimates.

Figure 2: **Spatial distribution of data**. Each polygon in (a) represents a city block. Each point in (b) represents the last known address of a citizen executed by the NKVD.



To account for the local administrative costs of repression, we collected data on the locations of RO NKVD branches and other organs of state security (Krasil'nikov 1938, topos.memo.ru). As the RO's raced to meet their repression targets, the need to follow bureaucratic procedures constrained their actions — at least nominally. These procedures had been greatly simplified by the late 1930s, but officers still had to hand-deliver sensitive documents, interface with prosecutors and party officials, physically find and apprehend suspects, and transport them to local holding facilities for processing and interrogation.

We identified 32 physical NKVD facilities in Moscow, including a branch in each city district, several detention centers and other administrative buildings. These facilities tended to be located close to the nearest prosecutor's office and Communist party office. Across the city, the average "intra-Troika distance" (i.e. distance from residential block to nearest NKVD branch, plus the distance from that NKVD branch to its nearest prosecutor and party offices) was two kilometers. These travel and coordination costs were predictive of the local scale of repression. In blocks with a below-mean "intra-Troika distance" (i.e. under two kilometers), the NKVD executed 4.9 people, on average. In blocks with an above-mean distance, they executed 1 person, on average. Muscovites' chances of surviving the Terror depended, in part, on how costly it was for security services to reach and process them.

3 Memorialization and the Severity of Repression

We test our theory in two steps. We first test the two "severity" predictions, which expect more commemorative markers — and lower rates of denial and removal — in locations more heavily exposed to repression. In Section 4, we test the "non-uniformity" prediction, which expects the strength of the severity effect to depend on victim identity and location.

3.1 Variation Across City Blocks

We begin with a "big picture" look at memorialization, by examining variation across the full population of residential city blocks that existed in Moscow during the Great Terror. Our block-level analyses revolve around the following core model specification:

$$y_i = g^{-1}\left(\gamma \cdot \log(\text{Repression}_i) + \beta' \mathbf{X}_i + \text{District}_{k[i]} + \text{Zoning}_i + f(\text{Long}_i, \text{Lat}_i) + \epsilon_i\right) \quad (1)$$

where y_i is the memorialization outcome in block i (e.g. logged number of petitions for commemorative markers, percent denied or removed) and Repression_i is the number of block residents whom the NKVD executed in the 1930s. $\mathbf{X}_i$ contains location-specific covariates capturing the logistical costs of repression, including the distance from i to the nearest NKVD branch, and from that NKVD branch to its nearest prosecutor and party offices ("intra-Troika distance"). To account for differences across RO NKVD jurisdictional lines, we include fixed effects for the city district k in which block i was located in 1936-1938. Because memorialization may face different obstacles on mixed-use city blocks, where residential properties share space with commercial, cultural, or government facilities, we include fixed effects for zoning. To capture local, within-district geographic trends, we include a spatial spline, $f(\text{Long}_i, \text{Lat}_i)$. $g(\cdot)$ is a link function.

Table 1 reports coefficient estimates for the block-level models. The first two columns correspond to linear regression models, where the outcomes are (1) the number of petitions per city block and (2) the percent of these petitions that resulted in denials or removals. These models use an identity link function with log-transformed outcomes (to reduce skewness). The third column corresponds to a Binomial model with a logit link, where the outcome is re-scaled as the proportion of petitions that resulted in denial or removal.[9] Because measurement of proportional variables is more precise where the denominator is large, we weight observations by estimated block population size (see Appendix A1).

The estimates in Table 1 align with theoretical expectations. According to columns 1 and 2, for each percentage-point increase in repression, there will be a 0.3 percentage point rise in petitions on the same city block, and a 10.6 percentage point decline in the share of these petitions that result in denial or removal. Column 3 further reports that doubling exposure to repression is associated with a 46 percentage point decline in the odds of denial or removal (i.e., coefficient implies a change in odds by a factor of $2^{-0.88} = 0.54$).

Outcome	Petitions	Denied/Removed (%)	
Model	1. Linear	2. Linear	3. Binomial
Estimate	0.3	-10.56	-0.88
Std. error	(0.04)**	(2.35)**	(0.22)**
Rayon FE	✓	✓	✓
Zoning FE	✓	✓	✓
Adj. R^2	0.54	0.31	
Pseudo R^2			0.48
RMSE	16.51	1283.51	0.25
N	3305	1191	1191

Estimates from Linear and Binomial fixed effect regression models. Treatment is number of city block residents executed (logged). Outcome is log-transformed in Linear model, rescaled as proportion between 0 and 1 in Binomial model. Robust standard errors in parentheses, clustered by rayon. All models include spatial spline and block-level covariates. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table 1: **Severity of repression and memorialization**.

[9] We estimate models 2 and 3 on a subsample of city blocks with at least one petition.

These results withstand multiple robustness tests and supplementary analyses (Appendix A2), including (a) conditional and spatially autoregressive models, to further account for non-independence of observations and to test whether proximity to early markers inspire others in the neighborhood to apply, (b) a fuzzy regression discontinuity design that exploits exogenous variation in repression levels across the boundaries of neighboring NKVD jurisdictions, and (c) re-estimation with a per-capita measure of repression. In all cases, estimates retain their signs and levels of significance.

3.2 Variation Across Individual Victims

Zooming in for a closer look, we examine variation in memorialization across individual victims. These analyses employ the following specification:

$$y_j = g^{-1}\left(\gamma \cdot \log(\text{Repression}_j) + \beta'\mathbf{X}_j + \text{District}_{k[j]} + \text{Zoning}_{i[j]} + \text{Nationality}_j + \text{Industry}_j + \epsilon_j\right) \quad (2)$$

where y_j is the memorialization outcome for victim j (petition, denied or removed) and Repression_j is the number of other victims who shared an address ("repression at home") or an employer ("repression at work") with victim j.[10] $\mathbf{X}_j$ includes basic biographic information like j's sex, age, party membership, association with the clergy, military, and whether j held a managerial post at their place of work. To account for differential rates of memorialization and repression across socio-economic groups, we include fixed effects for j's nationality and industry of employment.[11] As before, we include fixed effects for district and zoning.

Individual-level estimates align with theoretical expectations. Figure 3 reports predicted probabilities of petition and denial/removal, as a function of repression levels at j's home address.[12] As Figure 3a illustrates, the probability of a petition is 0.05 for "solitary" victims (i.e. zero neighbors executed), and 0.15 for those with 242 victimized neighbors (the maximum observed number in the data). The magnitude of the statistical relationship is larger for denials and removals. In Figure 3b, the probability of denial or removal is 0.82

[10] We fit separate models for repression in the two contexts (domestic and workplace).

[11] We used industry classifications from the All-Union Classifier of Economy Branches (OKONKh).

[12] Full set of coefficient estimates is in Appendix A3.

for “solitary” victims and 0.10 for those with the maximum number of executed neighbors.

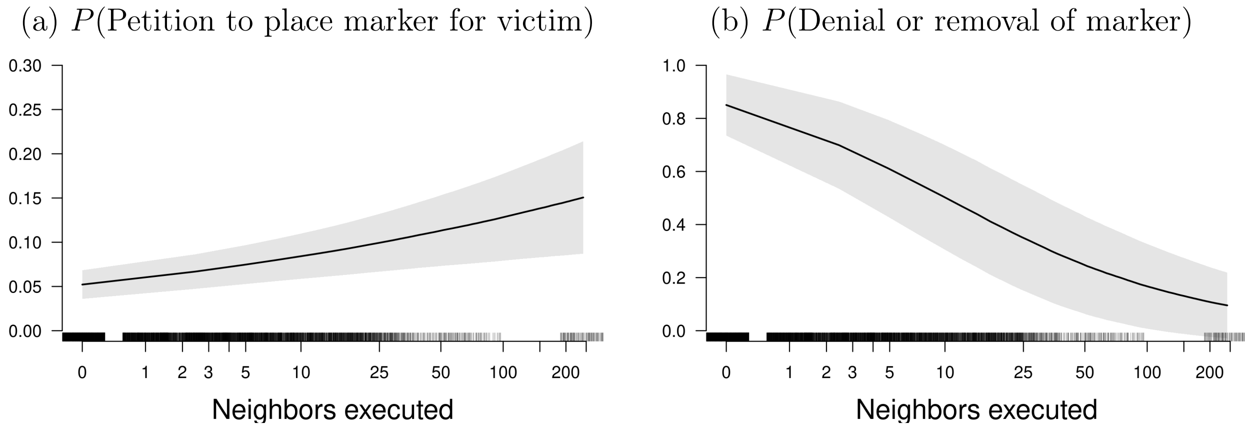


Figure 3: **Repression at home and victim’s memorialization**. Black lines are predicted probabilities from the individual-level model in equation (2); grey regions are bootstrapped 95% confidence intervals. Horizontal axis on logarithmic scale.

The NKVD conducted group arrests not only in residential buildings, but also in the workplace. Figure 4 presents a separate set of model predictions, showing how one’s chances of memorialization vary with the severity of repression against one’s co-workers.[13] These patterns are consistent with those in Figure 3. Victims of mass workplace arrests have a significantly higher predicted probability of petition than “solitary” victims (0.29 for the maximum of 96 co-workers executed and 0.04 for 0 co-workers executed). The impact on denials and removals is weaker than for residential repression, but still negative.

[13]“Co-workers” are individuals with a common employer, per Memorial.

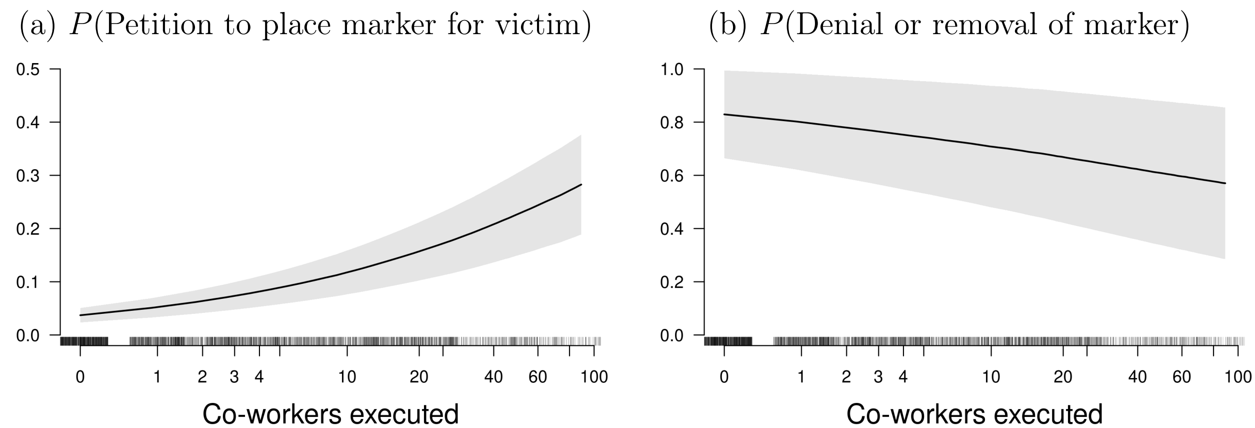


Figure 4: **Repression at work and memorialization**. See note under Figure 3 for details.

4 Obstacles to Memorialization

Our theoretical argument holds that the historical severity of repression will impact memorialization dynamics more strongly where recognition outpaces suppression, and more weakly where suppression and recognition approach parity. We cannot observe these parameters directly, but can consider how the estimated severity effect varies across hypothetical scenarios where the suppression-to-recognition ratio is likely to be relatively high or low. First, we might expect this ratio to be higher (and the severity effect to be weaker) for victims from ethnic and religious out-groups, potentially due to under-representation among memorialization activists. Second, the ratio may be higher for victims politically affiliated with the repressive regime (i.e. Communist Party members), whom citizens may perceive as targets of an internal purge, rather than chance victims of indiscriminate state violence. Third, the ratio should be higher in communities where the political opportunity structure favors opponents of memorialization — where the presence of state security services or other government agencies deters petitions and incentivizes denials and removals.

4.1 Victim Identity

The Great Terror disproportionately targeted minorities. While ethnic Russians represented 87% of Moscow's population in the 1939 census, they account for 44% of the city's repression victims during the Great Terror. The remaining victims include Jews (19%), Latvians (10%), Poles (8%), Germans (4%), Ukrainians (3%), Belarusians (3%), Hungarians, Armenians, Estonians, Lithuanians, Chinese (1% each), and representatives of 56 other groups (less than 1% each).[14] 22% were foreign-born.[15] Past studies have found higher support for memorials where memorialized individuals' identities are more aligned with those of the local population (Benjamin et al., 2020). In line with past research, we expect the suppression-to-recognition ratio to be higher — and the severity of repression to have a weaker impact on petitions, denials and removals — for non-Russian victims.

To test this possibility, we expanded the individual-level model specification in equation (2) to include the interaction term $\log(\text{Repression}_j) \times \mathbb{1}\{\text{Nationality}_j = \text{“Russian”}\}$, where Repression_j is the number of repression victims who shared an address with victim j and the second term is an indicator equal to 1 if j's nationality is Russian and 0 otherwise.

Figure 5 reports simulations from this expanded model, for Russian (solid line) and non-Russian victims (dashed line). Figure 5a confirms that the severity effect is stronger for ethnic Russians. The probability of a petition is 0.05 for "solitary" Russian victims and 0.20 for Russian victims with the maximum observed number of victimized neighbors. For non-Russian victims, the fitted curve is lower and flatter, rising from 0.02 to 0.04. Figure 5b reveals a similar pattern for denials and removals. For Russians this probability drops from 0.89 to 0.05; for non-Russians this curve is flatter and higher, ranging from 0.91 to 0.43. Memorials to non-Russian victims are less common and less durable, and their chances of memorialization are less sensitive to the severity of local repression. We find similar patters for foreign-born victims of the Great Terror (Appendix A3).

[14] Statistics from Memorial's *Victims of State Terror in Moscow* database.

[15] We define "foreign born" individuals as those born outside the original (1922) borders of the USSR.

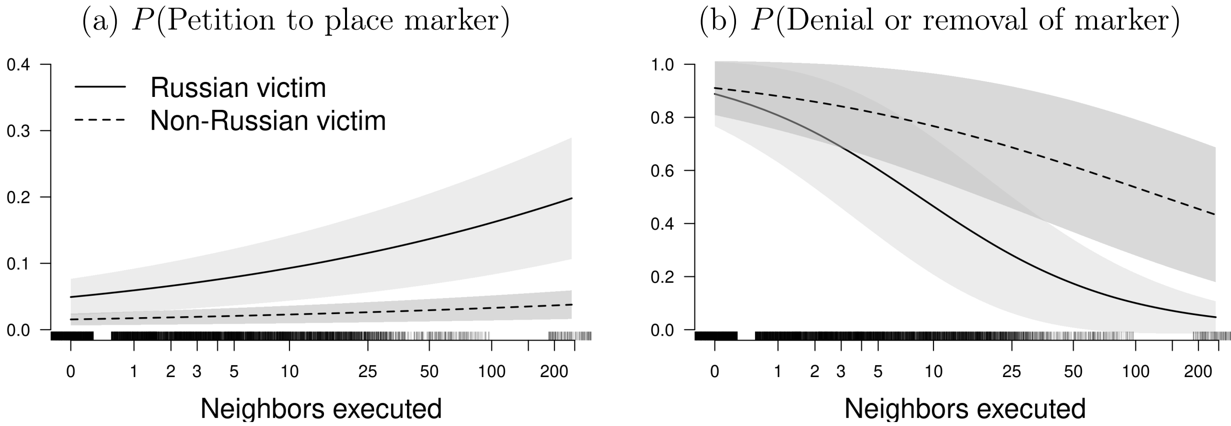


Figure 5: **Ethnicity and victim's probability of memorialization**. Solid and dashed lines represent point estimates for ethnically Russian and non-Russian victims, respectively; grey regions are bootstrapped 95% confidence intervals from 1000 simulations.

4.2 Victim Political Affiliation

The Great Terror originated as an internal party purge, targeting potential political rivals to Stalin within the All-Union Communist Party (Bolsheviks) (VKP(b)). However, most victims in Moscow (55%) had no known party affiliation. Past research has consistently shown that individuals respond differently to violence that they perceive as selective (i.e. conditional on the target's behavior) versus indiscriminate (i.e. applied regardless of target's behavior) — with the latter case provoking a stronger attitudinal backlash (Lyall, Blair and Imai, 2013; Benmelech, Berrebi and Klor, 2015). While most criminal charges against VKP(b) members were fabricated, just as they were for others, activists may see some of these victims as political insiders (targeted "selectively"), not as ordinary citizens (targeted indiscriminately).[16] We expect the suppression-to-recognition ratio to be higher — and the severity effect to be weaker — for victims who were members of the VKP(b).

The data generally align with this expectation. Figure 6 reports simulation results from an expansion of the individual-level model (2), interacting repression of a victim's neighbors

[16] *Last Address* explicitly rejects petitions for individuals who played an active role in repression. Installation of a marker requires: (1) formal rehabilitation of the victim, and (2) "absence of documentary evidence that the repressed person was an active organizer of mass political repression."

with victim's VKP(b) membership.[17] Party members' probability of petition is generally lower and less responsive to the local severity of repression, rising from 0.06 (solitary victims) to 0.09 (maximum), compared to 0.04 to 0.25 for non-members. The predicted probability of denial or removal for VKP(b) members is also less sensitive to repression severity — ranging from 0.81 to 0.29, compared to 0.87 to 0.05 for non-members. We find similar patterns with an expanded measure of party affiliation, which includes VKP(b) candidates and members of the party's youth wing (Appendix A3).

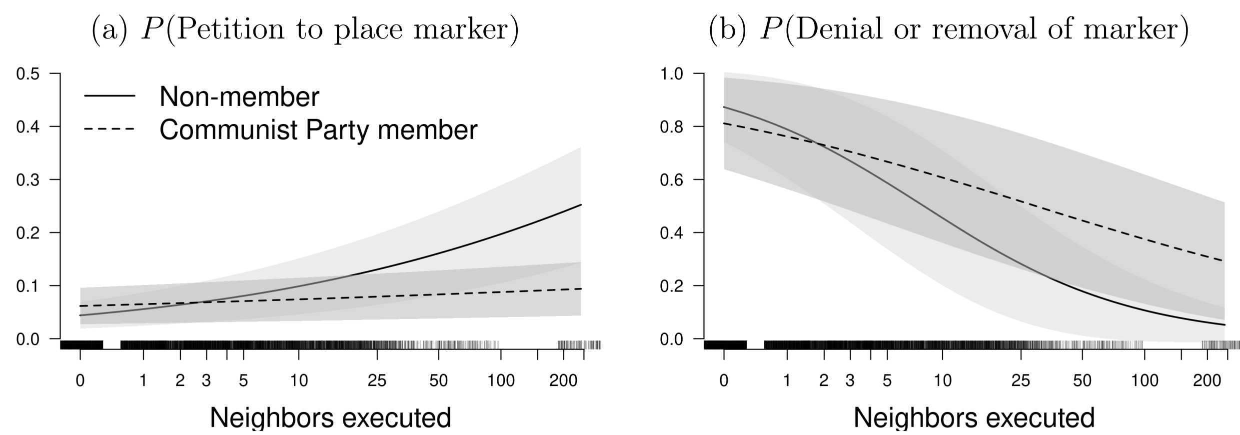


Figure 6: **Party membership and victim's memorialization**. Solid and dashed lines represent point estimates for victims without and with VKP(b) membership.

4.3 Local Political Opportunity Structure

A third potential barrier to memorializing victims is a fear of retribution — against those who write petitions requesting such memorials, and against those who are reluctant to deny or remove them. Past research on social movements and repression has sought to identify conditions — "political opportunity structures" — that constrain or facilitate collective action (Kitschelt, 1986; McAdam, 1982, 1986). While definitions of political opportunity structures vary, a common thread is the perceived deterrent capacity of the state, and particularly its perceived potential for renewed repression (Gleditsch and Ruggeri, 2010;

[17] Formally, the interaction term is $\log(\text{Repression}_j) \times \text{PartyMember}_j$, where PartyMember_j is equal to 1 if j was a VKP(b) member at the time of arrest, and 0 otherwise.

Rozenas and Zhukov, 2019). While much of the literature has focused on macro-level variation in this retributive threat over time and space, our research question necessitates a focus on local sources of variation, like the physical presence or geographic proximity of government agencies. This includes state security services, law enforcement, and any other public administration entities capable of imposing political, economic or legal pressure on citizens. We expect the suppression-to-recognition ratio to be higher — and the severity effect to be weaker — where such agencies are visibly present.

We used Bureau van Dijk's Orbis database to identify entities with industry codes corresponding to state security services (NACE codes 8422-8424). There are 579 such entities within the city of Moscow, which were active in the time period overlapping with the *Last Address* project. This includes 282 entities marked as "public order and safety" (e.g. Federal Security Service, Ministry of Internal Affairs, and local branches), 195 judicial entities (e.g. courts, Ministry of Justice), and 102 defense entities (e.g. military units, recruitment stations). We matched these entities to city blocks by address, and expanded the model in equation (1) to include the interaction $\log(\text{Repression}_i) \times \text{StateSecurity}_i$, where StateSecurity_i is equal to 1 if at least one such entity is currently located on city block i.

The simulation results in Figure 7 show that the presence of public order and safety institutions suppresses the local severity effect. Consistent with our theory, the historical severity of local repression increases the predicted probability of petitions more for victims who resided on blocks without government agencies (solid line), than on blocks with at least one state security agency (dashed line). The heterogeneity is less pronounced for denials and removals, although the dashed line is flatter. We find similar results when we expand the set of government agencies to include courts and the military (Appendix A3).

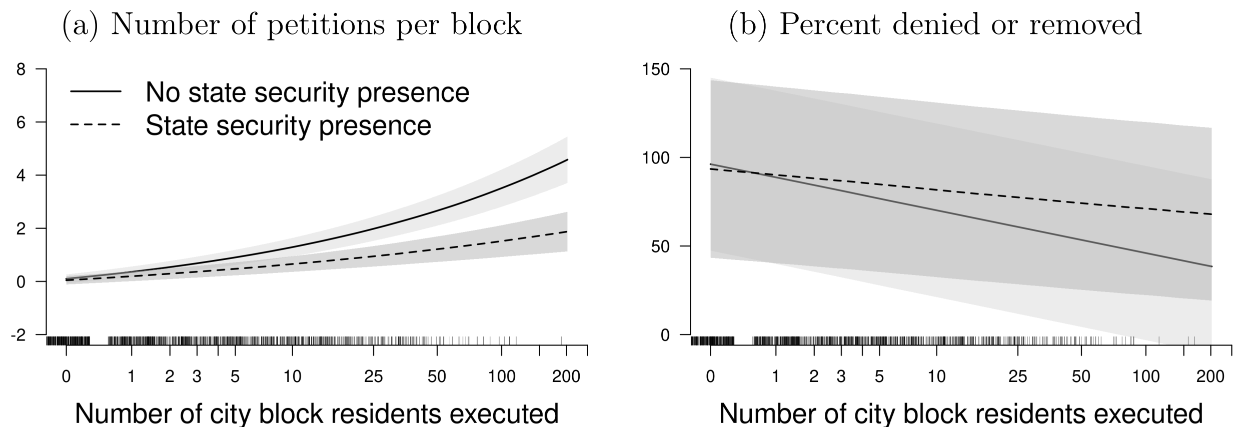


Figure 7: **State security agency presence and memorialization**. Solid and dashed lines represent point estimates for city blocks with no vs. at least one state security agency, respectively; grey regions are bootstrapped 95% confidence intervals from 1000 simulations.

5 Repressed Memories

Are there more memorials where there are more people and events to be memorialized? In the case of repression memorials in Moscow, the answer is "it depends."

Some acts of state violence are too big to hide. Micro-level data on the memorialization of Stalin's Great Terror suggest that memorials to individual victims are more likely to appear, and less likely to disappear, in locations where the NKVD executed more people from the same address or workplace. Our theoretical model shows that this pattern holds irrespective of the relative power of contemporary political actors to advance or suppress memorials. It should hold even where opponents of memorialization are on track to prevail and ultimately eliminate all memorials to victims. The path to this "complete erasure" equilibrium is longer and costlier where the set of individuals to potentially be memorialized is large. Our empirical analysis indicates that this may be the case in Moscow today.

At the same time, this "severity effect" does not extend to all victims equally. The effect is stronger for ethnic Russians and native-born persons than for victims from minority groups and foreign-born individuals. It is similarly weaker for victims who were Communist Party members and in locations where a local state security presence may deter petitions.

We interpret this heterogeneity as indicative of selective allocation of limited resources by memory activists and their opponents, prioritizing cases that are less costly to pursue.

Beyond these inequities, our findings suggest that efforts to expedite and reduce the administrative costs of repression (for example, by arresting multiple individuals from the same factory or building for the same fictitious crime) can have the unintended effect of making victims harder to forget. For example, the NKVD executed 20 residents of 37 Pokrovka street. These victims included one ethnic Pole, two Ukrainians, six Jews and 11 Russians, ranging in age from 47 to 60. All but one were male. The main thing these victims had in common, besides their address and age group, was that half of them worked in the same industry, including five at the same cooperative association (Artel' "Tekhnokhimik"). Their cases bear all the hallmarks of the NKVD's mass arrest strategy — the "Tekhnokhimik" workers were prosecuted together, and four of them were executed on the same day, March 3, 1938. The remaining worker, the only one in a management position, survived slightly longer, until June 3, 1938. As of today, this building has received five petitions for commemorative plaques, with no denials or removals (so far).

To take another example, the NKVD executed 23 people from 15 Chaplygina street — all males aged 47 to 65, with a similar ethnic breakdown. These victims included 10 workers from the same industry and five from the same enterprise (Artel' "Poligraftrud") — all of whom were processed together and executed on the same day, February 28, 1938. At the time of writing, the building has received three petitions, with no denials or removals.

In each instance, at least one of the petitions was to commemorate a victim from the group cases of "Tekhnokhimik" and "Poligraftrud," and the remainder commemorated other residents of the building. Yet a closer look suggests that very few of these executions were independent, one-off events. Besides the five "Technokhimik" workers, three victims at 37 Pokrovka street were "Poligraftrud" employees, executed on the same day as their co-workers from 15 Chaplygina. Another two victims in each building worked for a third cooperative, Artel' "Khimkraska." The NKVD executed one "Khimkraska" worker on February 28 (same day as the "Poligraftrud" workers from 15 Chaplygina) and another on March 7 (same day as the "Tekhnokhimik" workers from 37 Pokrovka). These examples illustrate the NKVD's efforts to draw connections between cases (usually through residential or workplace association), to simplify paperwork, expedite sentencing, and meet quotas.

While street-level evidence from Moscow strongly supports the view that larger-scale state violence casts a longer, more indelible shadow in a city's collective memory, our analysis also raises new questions, which future research will need to more directly confront. First and foremost is the question of generalizability. The same factors that make Moscow stand out — its capital city status, the scale of its historical repression, its increasingly inhospitable political environment, the unique (and fleeting) opportunity presented by *Last Address* — make broader conclusions more difficult to draw. While we can assert with some confidence that Moscow is a "hard case" due to the political barriers facing memorialization there, how far our results travel beyond its streets is an open empirical question.

Second, there is much we still do not know about the data-generating process that drives repression, particularly as regards the interdependence of individual cases. Our paper did not seek to model this process directly, given our focus on consequences rather than drivers of repression. Yet the NKVD's mass arrest strategy, by design, sought to forge connections between cases, creating networks of interdependence that may carry over to the memorialization process. Our results are robust to specifications that account for autocorrelation between geographically proximate locations and fixed differences across jurisdictions, but the structure of interdependence may be more complex than these models assume.

Third, perpetrators can be subjects of memorialization, too. Alongside the *Last Address* project, Russia has seen concerted state and private efforts to rehabilitate the image of Josef Stalin and the NKVD, in part through the installation of monuments. In the context of our theory, we can view these efforts as a more aggressive version of counter-memorialization, which can potentially help us uncover equilibria beyond "remembrance" and "erasure."

A related question is that of purges within the security services themselves, which blur the line between perpetrators and victims. For example, the NKVD executed 19 people from 20 Pokrovka street (just a few blocks from 37 Pokrovka). Of these, at least 18 were NKVD officers, seven of whom were executed together on August 25, 1938. The same strategy of group arrests that applied to the repression of civilians extended to internal purges. Whether the same logic of memorialization applies here as to other victims is less clear. Despite the high toll, 20 Pokrovka has received no petitions and hosts no plaques. Commemorating these individuals requires first acknowledging their status as victims, which neither the critics nor the apologists of Stalin's Great Terror seem eager to do.

References

Acharya, Avidit, Matthew Blackwell and Maya Sen. 2016. "The political legacy of American slavery." *The Journal of Politics* 78(3):621–641. doi: 10.2139/ssrn.2538616.

All-Russian Central Executive Committee. 1926. "Ugolovnyi kodeks RSFSR [RSFSR criminal code].".
URL: *https://docs.cntd.ru/document/901757374*

Anderson, Benedict. 1991. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. rev. ed. London: Verso.

Anderton, Charles H. 2016. Economic Aspects of Genocide, Mass Killings, and Their Prevention. Oxford University Press.

Balcells, Laia, Valeria Palanza and Elsa Voytas. 2022. "Do transitional justice museums persuade visitors? Evidence from a field experiment." *The Journal of Politics* 84(1):496–510.

Benjamin, Andrea, Ray Block, Jared Clemons, Chryl Laird and Julian Wamble. 2020. "Set in stone? Predicting confederate monument removal." *PS: Political Science & Politics* 53(2):237–242.

Benmelech, Efraim, Claude Berrebi and Esteban F. Klor. 2015. "Counter-Suicide-Terrorism: Evidence from House Demolitions." *Journal of Politics* 77(1):27–43.

Central Statistical Directorate of USSR. 1939. *Vsesoyuznaya perepis' naseleniya 1939 goda*. Moscow: Central Statistical Directorate of USSR.

Conquest, Robert. 2008. *The Great Terror: A Reassessment*. Oxford University Press.
URL: *https://books.google.com/books?id=ubXQSk2qfXMC*

Cosgrove, Denis E. 1998. *Social formation and symbolic landscape*. Univ of Wisconsin Press.

Davenport, Christian. 2009. *Media bias, perspective, and state repression: The Black Panther Party*. Cambridge University Press.

Eck, Kristine. 2012. "In data we trust? A comparison of UCDP GED and ACLED conflict events datasets." *Cooperation and Conflict* 47(1):124–141.

Ferlenga, Francesco. 2023. "Symbols of oppression. The role of Confederate monuments in the Great Migration.".

Forest, Benjamin and Juliet Johnson. 2002. "Unraveling the threads of history: Soviet–Era monuments and Post–Soviet national identity in Moscow." *Annals of the Association of American Geographers* 92(3):524–547.

Forest, Benjamin and Juliet Johnson. 2011. "Monumental politics: regime type and public memory in post-communist states." *Post-Soviet Affairs* 27(3):269–288.

Gellner, Ernest. 1983. *Nations and Nationalism.* Cornell University Press.

Gleditsch, Kristian Skrede and Andrea Ruggeri. 2010. "Political opportunity structures, democracy, and civil war." *Journal of Peace Research* 47(3):299–310.

Green, T Clifton, Russell Jame, Jaemin Lee and Jaeyeon Lee. 2022. "Confederate Memorials and the Housing Market.".

Gregory, Paul R. 2009. *Terror by Quota: State Security from Lenin to Stalin.* Yale University Press.

Halbwachs, Maurice. 1980. *The Collective Memory.* Harper and Row.

Hammond, Jesse and Nils B Weidmann. 2014. "Using machine-coded event data for the micro-level study of political violence." *Research & Politics* 1(2):1–8.

Johnson, Tyler, Kathleen Tipler and Tyler Camarillo. 2019. "Monumental decisions: How direct democracy shapes attitudes in the conflict over confederate memorials." *PS: Political Science & Politics* 52(4):620–624.

Junge, Mark, B. Bonvech and Rolf Binner. 2009. *Stalinizm v sovetskoy provintsii [Stalinism in Soviet pronvinces].* ROSSPEN.

Kitschelt, Herbert P. 1986. "Political opportunity structures and political protest: Anti-nuclear movements in four democracies." *British journal of political science* 16(1):57–85.

Krasil'nikov, K.P., ed. 1938. *Plan Moskvy i okrestnostey [Plan of Moscow and Surroundings].* 2nd Cartographic Factory, Main Directorate for Geodesic Surveying and Cartography NKVD USSR.

Lupu, Noam and Leonid Peisakhin. 2017. "The legacy of political violence across generations." *American Journal of Political Science* 61(4):836–851. doi: 10.1111/ajps.12327.

Lyall, Jason, Graeme Blair and Kosuke Imai. 2013. "Explaining support for combatants during wartime: A survey experiment in Afghanistan." *American Political Science Review* 107(04):679–705.

McAdam, Doug. 1982. *Political process and the development of black insurgency, 1930-1970.* University of Chicago Press.

McAdam, Doug. 1986. "Recruitment to High-Risk Activism: The Case of Freedom Summer." *American Journal of Sociology* 92(1):64–90.

Mennis, Jeremy. 2003. "Generating surface models of population using dasymetric mapping." *The Professional Geographer* 55(1):31–42.

Menon, Anil. 2023. "The political legacy of forced migration: Evidence from post-WWII Germany." *Comparative Political Studies* 56(9):1398–1432.

Núñez, Ana Ruipérez and Elias Dinas. 2023. "Mean Streets: Power, ideology and the politics of memory." *Political Geography* 103:102840.

Rahnama, Roxanne. 2023. "Monumental Changes: Confederate Symbol Removals and Racial Attitudes in the United States.".

Ross, Marc Howard. 2009. "Cultural Contestation and the Symbolic Landscape." *Culture and Belonging in Divided Societies. Philadelphia: University of Pennsylvania* pp. 1–26.

Rozenas, Arturas and Anastasiia Vlasenko. 2022. "The real consequences of symbolic politics: breaking the soviet past in Ukraine." *The Journal of Politics* 84(3):1263–1277.

Rozenas, Arturas and Yuri Zhukov. 2019. "Mass Repression and Political Loyalty: Evidence from Stalin's 'Terror by Hunger'." *American Political Science Review* 113(2):569–583.

Rummel, Rudolph J. 1994. *Death by Government.* New Brunswick, N.J.: Transaction Publishers.

Shaver, Andrew, Kately Arriaga, Anne Blackburn, Daniel de Kadt, Bryn Farrington, Joe

Felter, Caterina Hyneman, Alexandra Leal Silva, Talia Lorch, Jack McLean et al. 2022. "News media reporting patterns and our biased understanding of global unrest.".

Smith, Kathleen E. 1996. *Remembering Stalin's victims: popular memory and the end of the USSR*. Cornell University Press.

Smith, Kathleen E. 2019. "A monument for our times? Commemorating victims of repression in Putin's Russia." *Europe-Asia Studies* 71(8):1314–1344.

Turkoglu, Oguzhan, Ruth Ditlmann and Berenike Firestone. 2023. "Commemorating local victims of past atrocities and far-right support over time." *Proceedings of the National Academy of Sciences* 120(28):e2221158120.
URL: *https://www.pnas.org/doi/abs/10.1073/pnas.2221158120*

Vatlin, A.Yu. 2004. *Terror rayonnogo masshtaba [District-level terror]*. ROSSPEN.

Veselov, Fedor. 2018. The Politics of Memory in Russia: Historical Policy vs Alternative Memory Project PhD thesis Central European University.

Villamil, Francisco and Laia Balcells. 2021. "Do TJ policies cause backlash? Evidence from street name changes in Spain." *Research & Politics* 8(4):20531680211058550.

Weidmann, Nils B. 2016. "A closer look at reporting bias in conflict event data." *American Journal of Political Science* 60(1):206–218.

Williams, Jhacova A. 2021. Confederate streets and black-white labor market differentials. In *AEA Papers and Proceedings*. Vol. 111 American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203 pp. 27–31.

Zabalueva, Olga. 2019. (Re) constructing identity through the past: the memories of Stalinist purges in Moscow. In *'Creating the City. Identity, Memory and Participation'at Malmö University 9-10 February, 2017*. Institute for studies in Malmö's history, Malmö University pp. 179–193.

Zhemkova, E. 2017. "Masshtaby sovetskogo politicheskogo terrora [The scale of Soviet political terror].".
URL: *https://www.memo.ru/media/uploads/2017/08/22/masshtaby-sovetskogo-politicheskogo-terrora.pdf*

Appendices: "Repressed Memories"

Contents

A0. Theoretical Appendix

The following is a formalization of the theoretical argument in the main text. Suppose that there are Y_t historical markers on a city block at time t (e.g. memorial plaques to victims). The number of markers can be as low as 0 and as high as κ, the total number of terror victims who resided on that block (*severity level*). We assume there cannot be more markers than victims.

As actors petition to memorialize victims, the number of markers grows at a *recognition rate* of $\rho \in (0, \infty)$. Opponents of memorialization deny petitions and remove markers, resulting in a *suppression rate* of $\theta \in [0, \rho]$. The following equation specifies the change in Y over time, as a function of recognition (ρ), suppression (θ), and severity (κ):

$$\frac{dY}{dt} = \rho Y_t \left(1 - \frac{Y_t}{\kappa}\right) - \theta Y_t \tag{1}$$

This expression assumes a logistic rate of growth in markers. This rate of growth is highest where relatively few victims have been memorialized, and tapers off as this proportion rises $\left(\frac{Y_t}{\kappa} \to 1\right)$.

Over time, this process converges to one of two equilibria: one where the number of historical markers falls to zero ($Y_{eq} = 0$, "complete erasure"), and one where the number of markers is above zero but no larger than κ ($0 < Y_{eq} \leq \kappa$, "partial remembrance").

Proposition 1. *$\forall\ \kappa > 0$, $\exists\ Y_{eq} : Y_{eq} > 0$ if $\rho > \theta$ and $Y_{eq} = 0$ if $\rho = \theta$.*

Proof. Define an equilibrium of equation (1) as a fixed point satisfying $\frac{dY}{dt} = 0$. Setting equation (1) equal to zero and solving for Y, we obtain:

$$Y_{eq} = \kappa \left(1 - \frac{\theta}{\rho}\right) \tag{2}$$

This equilibrium exists (i.e. yields non-negative values of Y_{eq}) for all $\kappa \geq 0$, $\rho > 0$ and $0 \leq \theta < \rho$. The expression in (2) will be equal to zero if either (a) no victims had resided on the block, $\kappa = 0$, or (b) the suppression rate matches the recognition rate, $\rho = \theta$. In order for a non-zero number of markers to remain in equilibrium ($Y_{eq} > 0$), both of the following must be true: (a) at least one victim must have resided on the block, $\kappa > 0$, and (b) the recognition rate must exceed the suppression rate, $\rho > \theta$. □

In any city block where at least one resident had been repressed, memorials to victims will become permanent ($Y_{eq} > 0$) only if the recognition rate exceeds the suppression rate ($\rho >$

θ). Otherwise, memorials — if they do exist — will be only temporary, gradually yielding to a complete erasure of victims' public memories ($Y_{eq} = 0$). This second scenario is plausible in an autocratic context, where the regime and its supporters unrelentingly suppress politically inconvenient memorials as they appear. This outcome, however, is not instantaneous, and there are places where memorials do not fade easily into the dark.

We now turn our attention to how exposure to repression (κ) affects memorialization both in equilibrium, and on the way to the equilibrium.

Predictions. *As the number of victims increases, (1) the observed number of historical markers increases, but (2) the share of markers removed by each point in time decreases.*

Proof. We first derive these results for the "partial remembrance" equilibrium. To show that the equilibrium number of markers is increasing in exposure, we take the derivative of (2) with respect to κ, $\frac{dY_{eq}}{d\kappa} = 1 - \frac{\theta}{\rho}$. This expression — marginal effect of κ on Y_{eq} — is positive, increasing in recognition (ρ) and decreasing in suppression (θ).

To further show that this result holds at any point in time, we rearrange equation (1) as an initial value problem:

$$Y_t = \frac{\kappa Y_0(\rho - \theta)}{\rho Y_0 - e^{-t(\rho-\theta)}(\rho Y_0 - \kappa(\rho - \theta))} \tag{3}$$

where Y_0 is the number of historical markers at time 0. The derivative of this expression with respect to κ $\left(\frac{dY_t}{d\kappa} = \frac{\rho Y_0^2(\rho-\theta)e^{t(\rho-\theta)}\left(e^{t(\rho-\theta)}-1\right)}{\left(\theta\kappa-\rho\left(\kappa+Y_0\left(e^{t(\rho-\theta)}-1\right)\right)\right)^2}\right)$ is positive as long as $\rho > \theta \geq 0$.

To show that $\frac{dY_t}{d\kappa} > 0$ even on the path to the "complete erasure" equilibrium, we can consider a special case where $\theta = \rho = 1$. The differential equation in (1) simplifies to $\frac{dY}{dt} = -\frac{Y_t^2}{\kappa}$, and the initial value problem becomes $Y_t = \frac{\kappa Y_0}{\kappa + tY_0}$. Taking the derivative with respect to κ, we obtain $\frac{dY_t}{d\kappa} = \frac{tY_0^2}{(\kappa+tY_0)^2}$, which is positive for all $Y_0 > 0$.

To additionally show that fewer markers will be removed in places with a high number of victims, we investigate the dynamics of memorialization at different values of κ using numerical integration. In so doing, we consider the same "complete erasure" scenario as before ($\theta = \rho = 1$), where opponents are determined to deny or remove all markers, and where the eventual outcome is an equilibrium with zero memorials.

Figure A0.1 reports the proportion of memorials removed by an arbitrary point in time ($t = 100$), for every value of κ between 0 and 1000. Where κ is closer to zero, almost all memorials will have been removed by this time. As κ rises, the proportion declines.

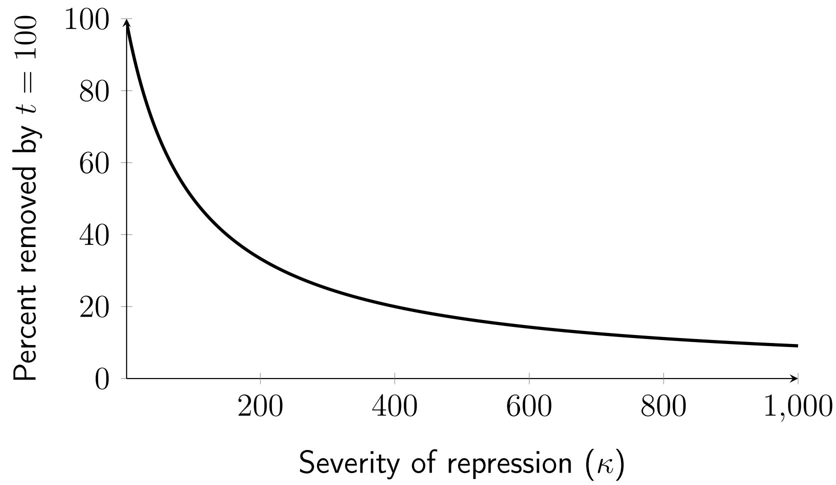
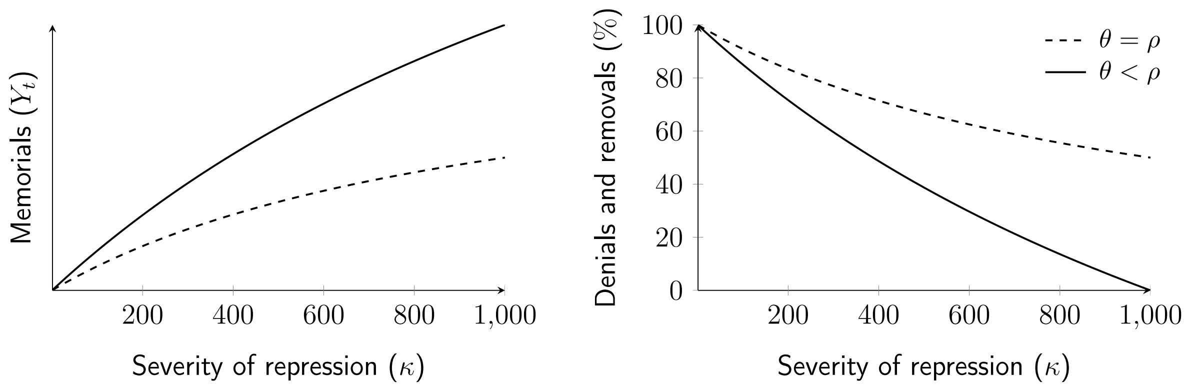


Figure A0.1: **Fewer cumulative removals where there are more victims**. Values reported are $\mathbb{E}\left[100 \cdot \left(\frac{Y_0 - Y_t}{Y_0}\right) \mid \rho = \theta = 1, Y_0 = 1, \kappa\right]$, obtained through numerical integration of differential equation (1) over time interval $(0, 100)$, iterated across $1 \leq \kappa \leq 1000$.

Because the system proceeds toward a "complete erasure" equilibrium as $t \to \infty$, the curve in Figure A0.1 will gradually flatten to a horizontal line at 100%. However, convergence is slower at higher values of κ, even under total suppression ($\theta = \rho$). For example, if we define "convergence" as $|\Delta Y_t| < 0.00001$, a system with $\kappa = 1$ (all else as in Figure A0.1) converges at $Y_t = 0$ at $t = 316$, but a system with $\kappa = 1000$ won't converge until $t = 9001$. □

Figure A0.2 reproduces the predictions in Figure 1 in the main text, with additional details on numerical integreation. For the "high suppression-to-recognition ratio" case (dashed line), $\theta = \rho = 1$, as in Figure A0.1. For the "low suppression-to-recognition ratio" case (solid line), $\theta = 0.999, \rho = 1$. All other parameters were at the same values as those in Figure A0.1.

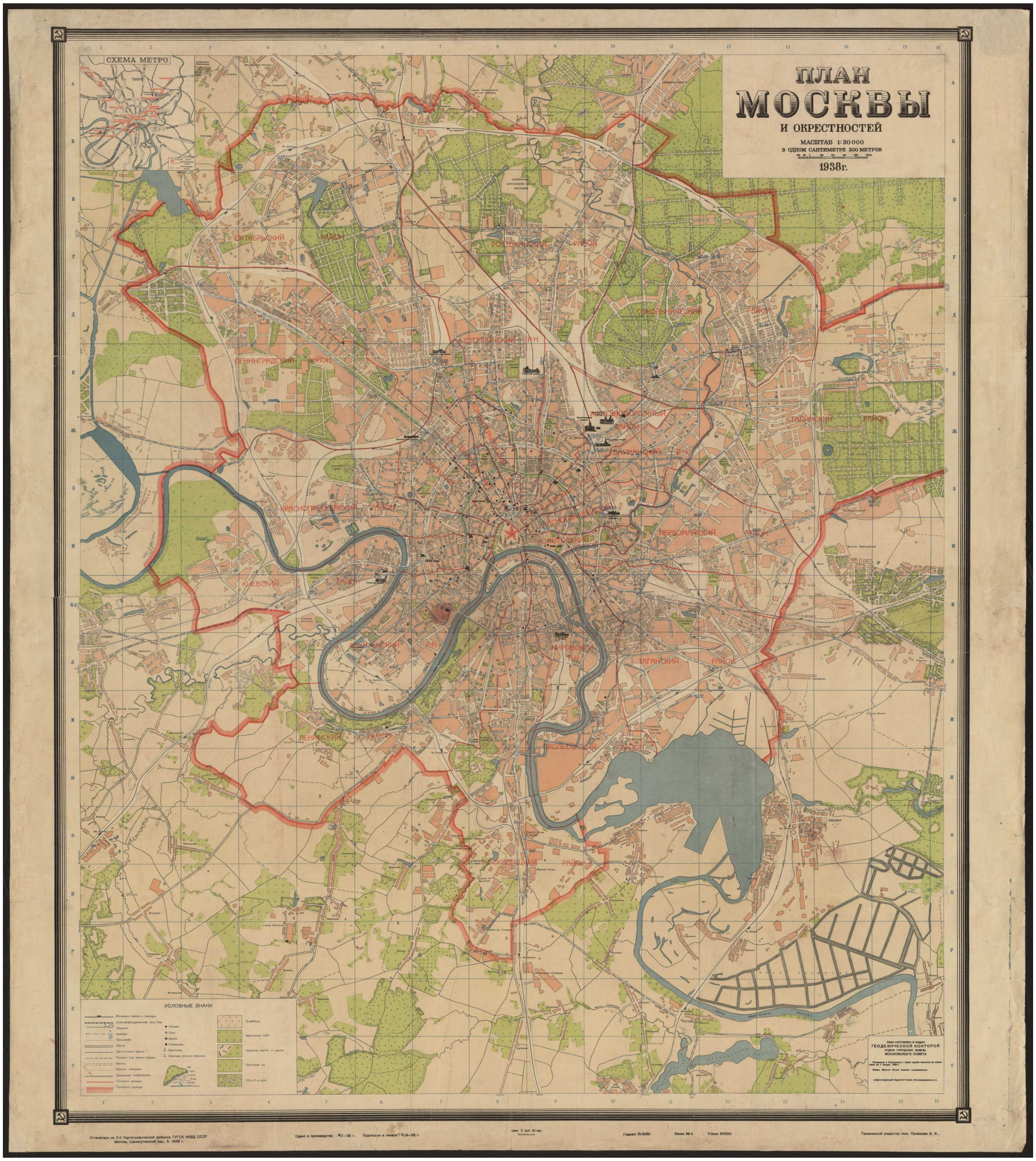


(a) Number of memorials at time $t = 1000$

(b) Percent denied or removed by time $t = 1000$

Figure A0.2: **Interaction between severity and the suppression-recognition ratio**. Values obtained through numerical integration of differential equation (1) over time interval $(0, 1000)$, iterated across $1 \leq \kappa \leq 1000$. Quantities reported in panel (a) are $\mathbb{E}\left[Y_t \middle| \rho = 1, \theta = 0.999, Y_0 = 1, \kappa\right]$ (solid line) and $\mathbb{E}\left[Y_t \middle| \rho = \theta = 1, Y_0 = 1, \kappa\right]$ (dashed line). Panel (b) reports $\mathbb{E}\left[100 \cdot \left(\frac{Y_0 - Y_t}{Y_0}\right) \mid \rho = 1, \theta = 0.999, Y_0 = 1, \kappa\right]$ (solid) and $\mathbb{E}\left[100 \cdot \left(\frac{Y_0 - Y_t}{Y_0}\right) \mid \rho = \theta = 1, Y_0 = 1, \kappa\right]$ (dashed).

Figure A1.3: Scan of map from Krasil'nikov (1938)



The following discussion provides supplementary information on our primary source for block-level data on Moscow, and the procedures we used to prepare it for analysis. Figure A1.3 shows a scan of the tactical map of Moscow from the NKVD's Main Directorate for Geodesic Surveying and Cartography (Krasil'nikov, 1938). The original resolution of the map is 1:30,000 (i.e. 300 meters on Earth to one centimeter on paper). We supplemented this data source with Memorial's "Victims of State Terror in Moscow" database (mos.memo.ru) and "Topography of Terror" (topos.memo.ru). For the former, we scraped the victims' records from the website and geocoded their residential street addresses at time of arrest. For the latter, we scraped the `json` geometries used for the online map interface, along with relevant metadata.

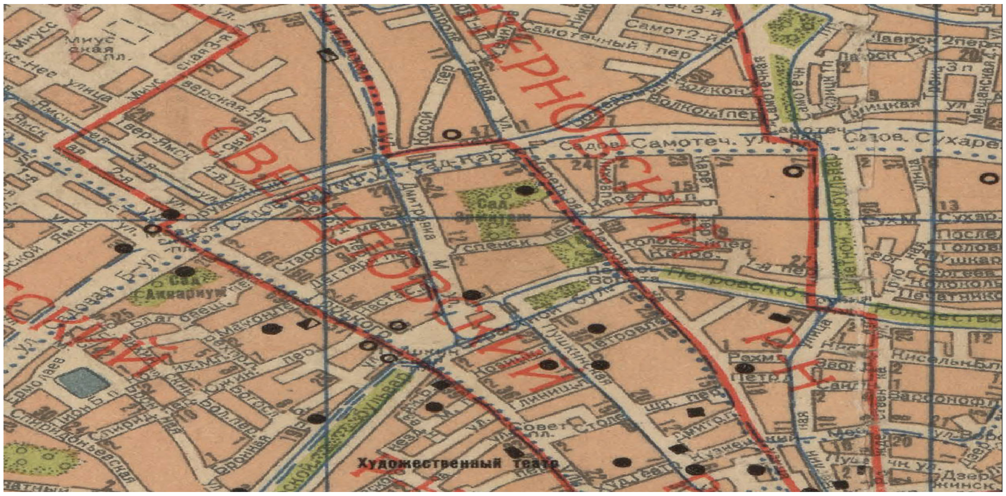
The NKVD map contains detailed, street-level geometries. We georeferenced the map image using intersections of graticule lines, and key landmarks and street intersection (Figure A1.4a). We then vectorized, through image tracing, the polygons representing city blocks (Figure A1.4b). Overall, there are 5,400 city blocks in this dataset, including 1646 (30%) in neighboring parts of Pidmoskov'ya that had not yet been incorporated into the city proper. By overlaying these polygons with Memorial data, we are able to see how many people the NKVD arrested and executed from each block (dots in Figure A1.4c). Our geocoded Memorial "Victims of State Terror in Moscow" dataset contains names, residential addresses and biographical information for 11,035 Moscow residents executed by the secret police.

Following the same vectorization procedure, we used the NKVD map to extract the borders of Moscow's city districts as they existed in 1936-1960. These boundaries appear in black in Figure A1.5. In addition to exploiting border discontinuities across RO NKVD jurisdictional boundaries, this last feature allows us to link our block-level data to district-level population counts from the 1939 Soviet Census (Central Statistical Directorate of USSR, 1939). Doing so permits us to measure NKVD executions not only as raw event counts per block, but also as a (rough) percentage of local residents. Because the 1926 census used different, older district boundaries, which were no longer valid after 1936, we used the 1939 census figures (but see Wheatcroft 1990). We then used the district-level counts to estimate block-level population via dasymetric mapping (i.e. excluding non-residential blocks, parks, and other places where people did not live) (Mennis, 2003). Figure A1.6 shows the distribution of this population measure, with darker shades representing city blocks with higher estimated population counts.

To make dasymetric mapping feasible, we classified the city blocks by zoning/land use, with information from Memorial's "Topography of Terror" (topos.memo.ru) and various supplementary sources. Zoning information allows us to (a) exclude non-residential areas from dasymetric interpolation, (b) include mixed-use zoning fixed effects for the residential blocks in our regression models, and (c) calculate measures like "intra-Troika distance."

Figure A1.4: Close-up of area around Pushkin Square

(a) Georeferenced image



(b) Vectorized city blocks

(c) Geocoded addresses of people executed by NKVD

Figure A1.5: Moscow city districts, 1938-1960 (from Krasil'nikov 1938)

Figure A1.6: Block-level population estimates, derived from 1939 Soviet Census

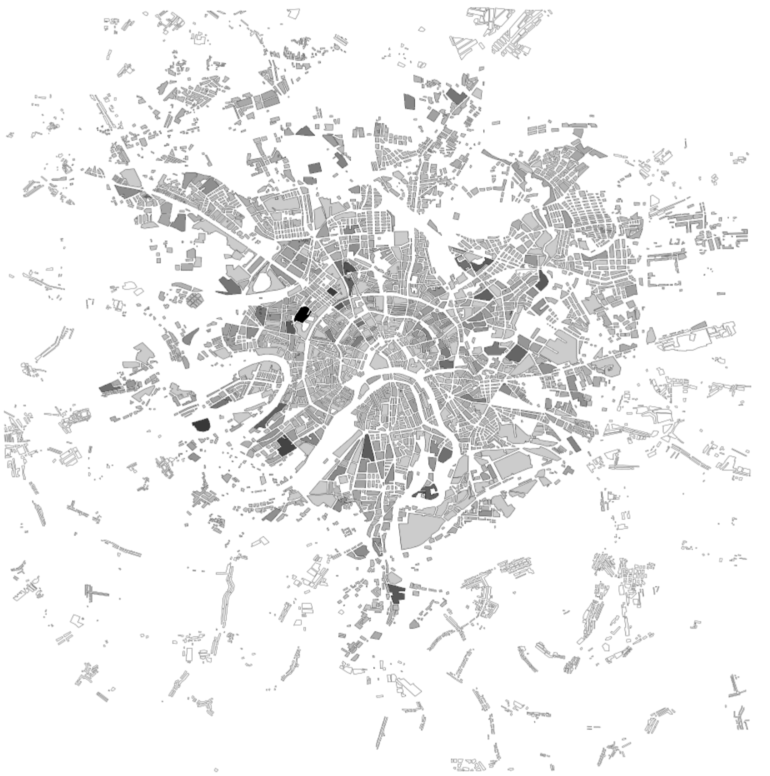
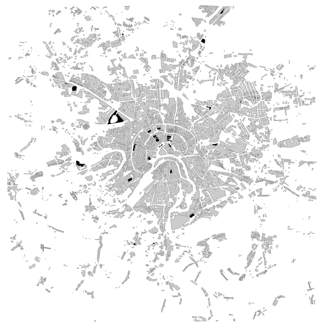
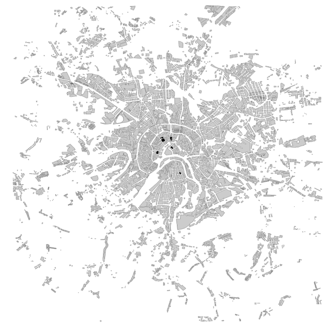


Figure A1.7: Block-level zoning measures, part 1

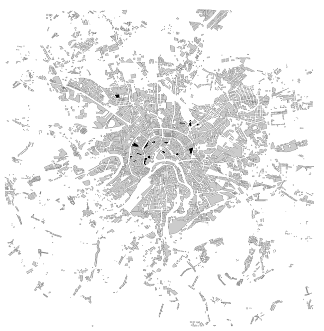
Party



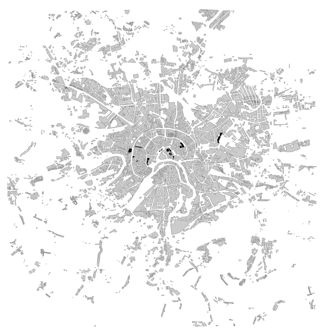
NKVD



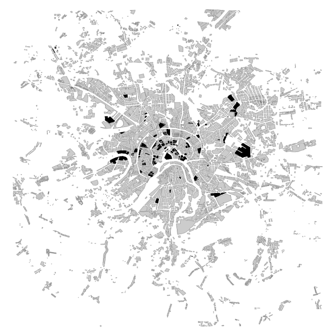
Prosecutor



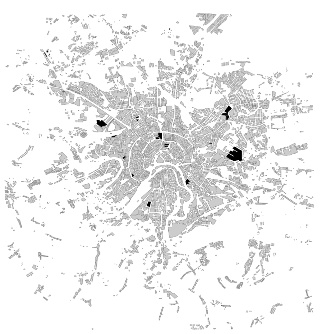
Courts



Military

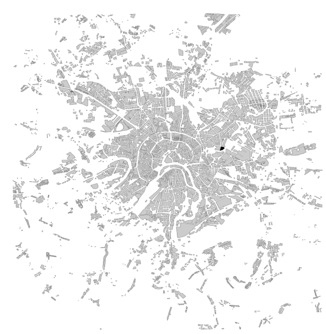


Other Government



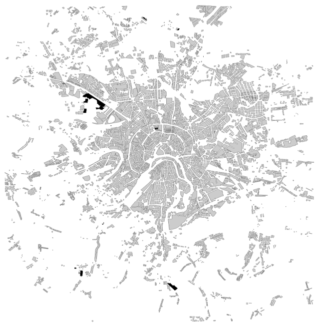
Jails/Prisons

Forced Labor

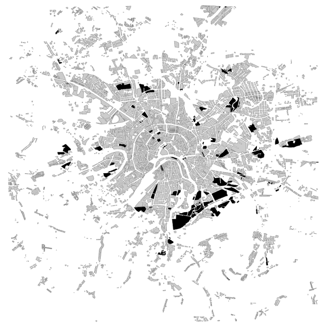


Sharashki

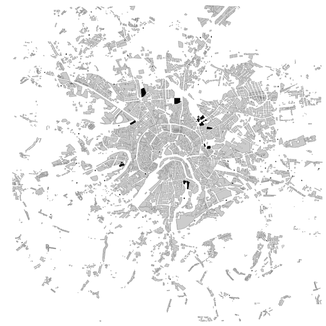
Figure A1.8: Block-level zoning measures, part 2



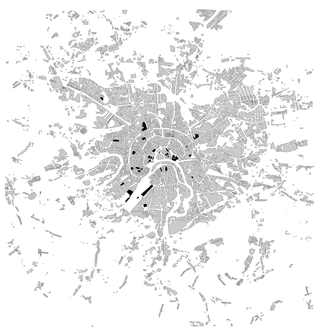
Agriculture



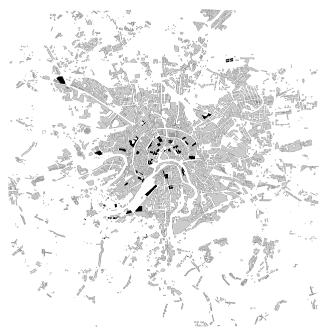
Factories/Industry



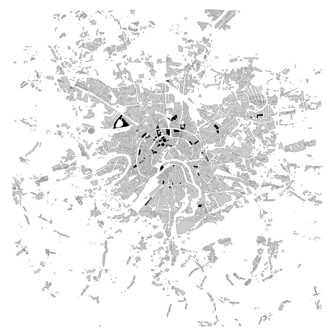
Transportation



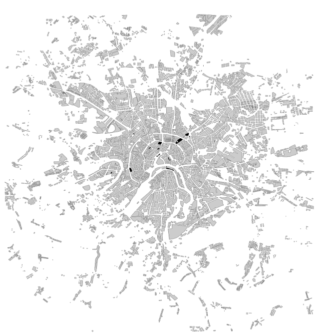
Museums



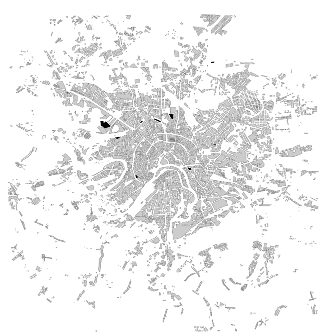
Education



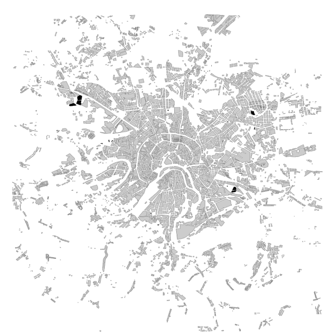
Entertainment



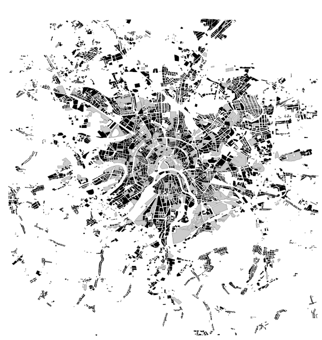
Hotels



Hospitals



Cemeteries



Residential

A2. Robustness Tests

A2.1. Spatial Autocorrelation

To account for spatial dependence in the distribution of commemorative markers over city blocks, we extend our core model specification to accommodate a spatial random effect τ:

$$y_i = g^{-1}\left(\gamma \cdot \log(\text{Repression}_i) + \beta'\mathbf{X}_i + \text{District}_{k[i]} + \text{Zoning}_i + f(\text{Long}_i, \text{Lat}_i) + \tau_i + \epsilon_i\right) \quad (4)$$

where $\mathbb{E}[\tau] = 0, \text{Cov}(\tau) = \sigma^2\mathbf{R}$, and $\mathbf{R}$ is a matrix that defines the spatial dependence structure. We consider models with two type of covariance functions. The first is a conditional autoregressive (CAR) spatial covariance function, which specifies $\mathbf{R}$ as follows:

$$\mathbf{R} = (\mathbf{I} - \rho\mathbf{W})^{-1}\mathbf{M} \quad (5)$$

where $\mathbf{I}$ is an identity matrix, $\mathbf{W}$ is a row-standardized spatial weights matrix, and ρ is a spatial autocorrelation parameter that determines the magnitude and direction of the neighborhood effect ($\rho > 0$ indicates that neighboring observations have similar values, $\rho < 0$ indicates that neighbors have dissimilar values). We define $\mathbf{W}$ through queen contiguity, where $0 < w_{ij} \leq 1$ if blocks i and j are adjacent and $w_{ij} = 0$ otherwise, and $\sum_j w_{ij} = 1$. $\mathbf{M}$ is a symmetry condition matrix, such that $m_{ii} > 0$ and $w_{ij}m_{ji} = w_{ji}m_{ij}$.

The second specification we consider uses a simultaneous autoregressive (SAR) spatial covariance function,

$$\mathbf{R} = [(\mathbf{I} - \rho\mathbf{W})(\mathbf{I} - \rho\mathbf{W})']^{-1} \quad (6)$$

where, unlike the symmetry requirements in equation (5), $\mathbf{W}$ is not necessarily symmetric.

Table A2.1 reports estimates from both sets of spatial autogressive models. In the case of petitions, $\hat{\gamma}$ coefficient estimates are numerically close to those in the (non-autoregressive) main specification in Table 1 in the main text, still positive and statistically significant. Our previous specification estimated a 0.3 percentage point (ppt) rise in petitions for each percentage-point increase in repression, and the CAR and SAR models both estimate this rise to be 0.26 percentage points. These results, along with the positive estimate for $\hat{\rho}$, suggest that spatial autocorrelation can account for some, although not all, of the estimated repression effect.

In the case of denials and removals, the $\hat{\gamma}$ coefficient estimates are negative, significant, and also numerically close to those in the main text. Previously, we estimated that each percentage point increase in repression yields a 10.6 ppt decline in denials or removals; here, as well, the estimate is for an 11 ppt decline.

Outcome	Petitions		Denied/Removed (%)	
Model	1. CAR	2. SAR	3. CAR	4. SAR
Estimate	0.26	0.26	-11	-11
Std. error	(0.01)**	(0.01)**	(0.98)**	(0.97)**
Rayon FE	✓	✓	✓	✓
Zoning FE	✓	✓	✓	✓
$\hat{\rho}$	0.55	0.57	0.52	0.01
Pseudo R^2	0.49	0.49	0.25	0.25
RMSE	0.32	0.32	25.11	25.11
AIC	2017.1	2015.1	10693.4	10693.4
N	3305	3305	1191	1191

Estimates from models with conditional (CAR) and simultaneous autoregressive (SAR) covariance functions. Treatment is number of city block residents executed (logged). Outcome is log-transformed. Robust standard errors in parentheses, clustered by rayon. All models include spatial spline and block-level covariates. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table A2.1: **Severity of repression and memorialization**, spatial models.

A2.2. Discontinuities Across District Borders

Our next set of analyses is motivated by the observation that RO NKVD branches — although subject to the same quotas within Moscow's city limits — had some discretion in how they implemented central orders. The junior and mid-level officers who staffed these local units were the ones who translated directives and quotas into the language of criminal investigations, assembled lists of names, detained and interrogated suspects, built the "criminal cases" against them, and — after sentencing — carried out executions. Although we cannot directly observe how zealous or cautious a given NKVD official was, we can observe some of the consequences of this discretion. For example, arrest levels (and quotas) were strongly correlated with local population size and other structural considerations, like logistics and proximity to certain government and industrial sites (Appendix A3). If local levels of repression were significantly higher or lower than these observable factors would predict, administrative discretion may help explain this variation.

To exploit variation across district borders, we implement a fuzzy regression discontinuity design (FRDD), where the forcing variable is distance from a city block to the nearest city district border. Following Rozenas, Talibova and Zhukov (2024), we first estimate how much the level of repression in each district deviated from what we would expect, given observables like population, geographic area, distance to the nearest industrial site, and the average "intra-Troika" distance

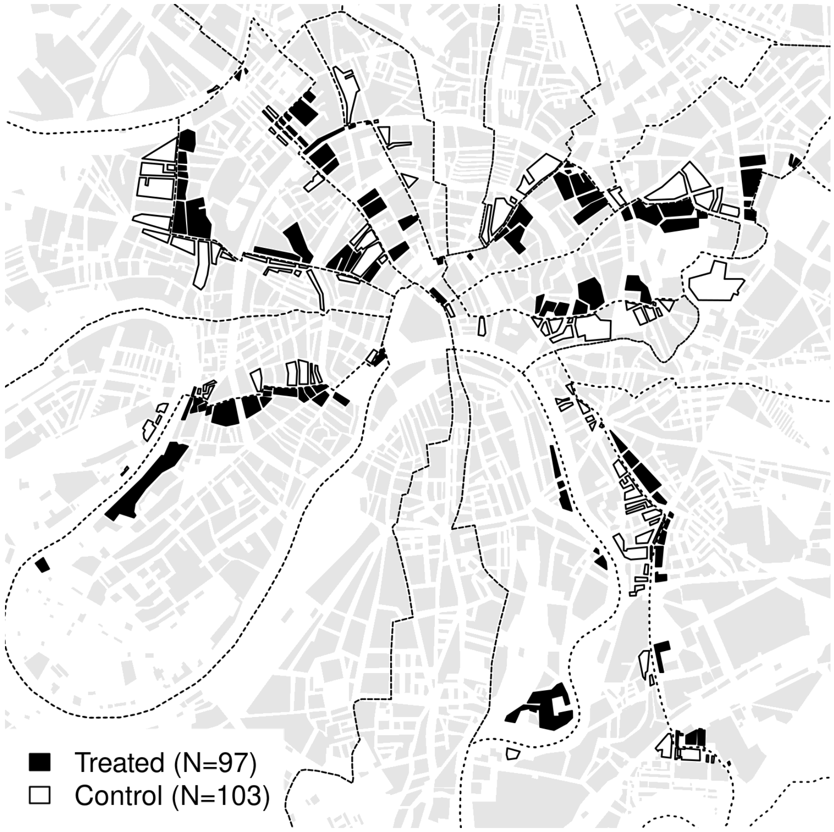


Figure A2.9: City blocks used in RDD analyses

in the RO NKVD's jurisdiction. Our first-stage equation is:

$$\text{Repression}_k = \alpha + \beta_1 \cdot \log(\text{Population}_k) + \beta_2 \cdot \text{Area}_k + \beta_3 \cdot \text{Industry} + \beta_4 \cdot \text{Troika}_k + \epsilon_k \quad (7)$$

where k indexes city districts. We take the residuals from this model, and select (with replacement) pairs of adjacent districts with highly divergent levels of repression that cannot be explained by these basic background characteristics (i.e. where the absolute difference in average residuals is at least one standard deviation).[1] To ensure that treated and control cases are as similar and proximate to each other as possible, we extract city blocks located within a 100 meter bandwidth of these district borders.

Figure A2.9 shows the 200 city blocks we selected for the FRDD analysis. Black blocks are located in high-repression border areas, and white blocks are in low-repression areas. Dotted lines represent city district boundaries. The selected blocks are all near the center of Moscow, inside the Garden Ring and (future) Third Ring roads.

[1] From equation (7), we calculate the average residual $\bar{\epsilon}_k$ for each district. We select pairs of adjacent regions (k, k') where $|\bar{\epsilon}_k - \bar{\epsilon}_{k'}| \geq \text{SD}(\epsilon_k)$.

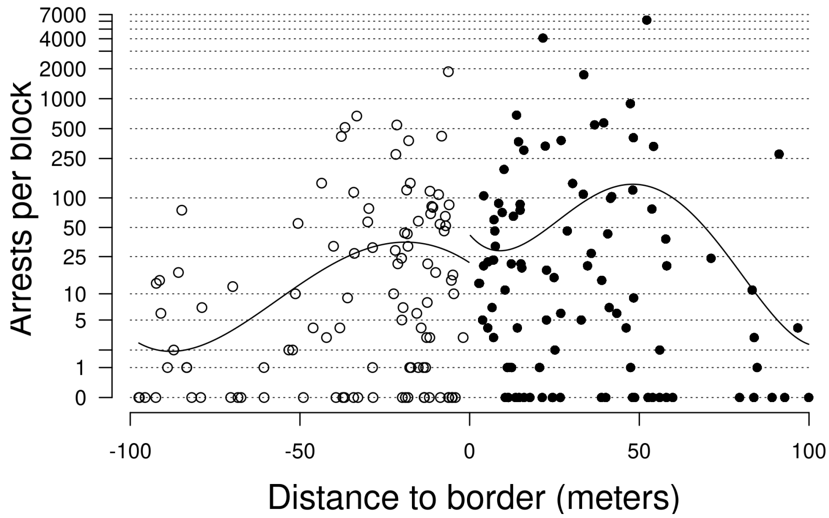


Figure A2.10: Discontinuity at city district borders

We define our forcing variable, d_{ik} as the distance from block i in district k to the border of the neighboring district, such that $d_{ik} < 0$ in lower-repression districts and $d_{ik} > 0$ in higher repression ones. Figure A2.10 plots levels of repression as a function of this forcing variable. On the left are blocks in lower-repression districts ($d_{ik} < 0$), and on the right are blocks in higher-repression districts ($d_{ik} > 0$). In the middle ($d_{ik} = 0$) is a discontinuous rise in executions as one crosses the border from less to more repressive districts.[2] Covariate balance tests (Figure A2.11) suggest that repression is the only observed variable with a statistically significant discontinuity across borders.

Our FRDD estimating equations are the following:

$$\begin{aligned} \log(\text{Repression}_i) &= \alpha \cdot \mathbb{1}\{\delta_{ik} > 0\} + f_1(\delta_{ik}) + \epsilon_{1i} \\ y_i &= \gamma \cdot \log(\widehat{\text{Repression}_i}) + f_2(\delta_{ik}) + \epsilon_{2i} \end{aligned} \tag{8}$$

where f_1 and f_2 are cubic splines of δ_{ik}, and $\mathbb{1}\{\delta_{ik} > 0\}$ is an instrument for repression.

Table A2.2 reports the FRDD estimates, which align in direction with the fixed effect estimates in Tables 1 and A3.6.[3] According to model 1, a one percentage point increase in repression is associated with a 1.3 ppt increase in petitions, and a 36 ppt decline in denials and removals. The magnitude of these point estimates is over three times larger than in the previous block-level analyses, although the FRDD estimates represent a different quantity of interest (i.e. local average treatment effect due to proximity to district borders).[4]

[2] Bias-corrected local polynomial estimate (Calonico, Cattaneo and Titiunik, 2015) is 2.09 (S.E.$= 0.76$).

[3] FRDD estimate for denials and removals drops in significance from $p < 0.01$ to $p < 0.10$.

[4] This discrepancy may also reflect attenuation bias due to measurement error in the original treatment.

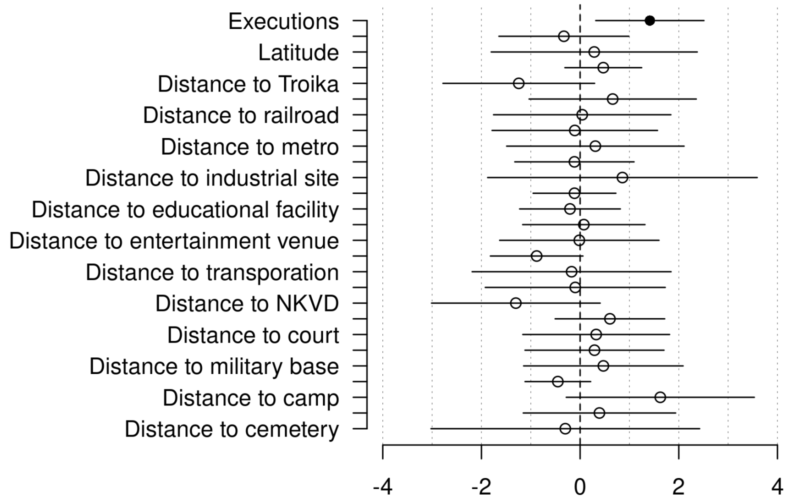


Figure A2.11: Covariate balance at city district borders

Below, we re-estimate our FRDD models with a per capita measure of repression. We also considered alternative first- and second-stage estimating equations, and alternative weights. These additional estimates are consistent with the results reported here.

A2.3. Per Capita Repression

While our main specifications measure exposure to repression as the absolute number of executions per city block, we supplement those analyses with a per capita measure, in which repression is the percent of block residents whom the NKVD executed. The "denominator" here is the block-level population estimate we obtained via dasymetric interpolation from the 1939 Soviet census (see Appendix A1), and the same measure that we use as weights for our main models in Table 1.

Table A2.3 re-estimates the linear and binomial models in Table 1 with the per capita treatment variable. Table A2.4 re-estimates the CAR and SAR models from Table A2.1 in the previous section. Table A2.5 does the same for our FRDD models from A2.2. Due to re-scaling, these estimates differ from the originals in their numerical magnitude, but not in sign or significance.

Outcome	Petitions	Denied/Removed (%)
Model	1. FRDD	2. FRDD
Estimate	1.31	-36.02
Std. error	(0.55)*	(18.09)†
First stage $\mathcal{F}$ score	3.05†	4.75*
Wu-Hausman test statistic	7.17**	2.06
Adj. R^2	0.63	0.1
RMSE	62.43	2325.46
N	200	147

Estimates from fuzzy regression discontinuity design. Treatment is number of city block residents executed (logged). Outcome is log-transformed. Robust standard errors in parentheses, clustered by rayon. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^\dagger p < 0.1$; $^* p < 0.05$; $^{**} p < 0.01$.

Table A2.2: **Severity of repression and memorialization**, FRDD estimates.

Outcome	Petitions	Denied/Removed (%)	
Model	1. Linear	2. Linear	3. Binomial
Estimate	1.09	-21.07	-1.35
Std. error	(0.08)**	(5.13)**	(0.39)**
Rayon FE	✓	✓	✓
Zoning FE	✓	✓	✓
Adj. R^2	0.52	0.27	
Pseudo R^2			0.44
RMSE	16.91	1321.26	0.28
N	3305	1191	1191

Estimates from Linear and Binomial fixed effect regression models. Treatment is percent of city block residents executed (logged). Outcome is log-transformed in Linear model, rescaled as proportion between 0 and 1 in Binomial model. Robust standard errors in parentheses, clustered by rayon. All models include spatial spline and block-level covariates. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^\dagger p < 0.1$; $^* p < 0.05$; $^{**} p < 0.01$.

Table A2.3: **Per capita repression and memorialization**.

Outcome	Petitions		Denied/Removed (%)	
Model	1. CAR	2. SAR	3. CAR	4. SAR
Estimate	0.48	0.48	-7.42	-7.42
Std. error	(0.02)**	(0.02)**	(2.12)**	(2.12)**
Rayon FE	✓	✓	✓	✓
Zoning FE	✓	✓	✓	✓
$\hat{\rho}$	0.99	0.97	0.02	0.02
Pseudo R^2	0.39	0.39	0.17	0.17
RMSE	0.35	0.35	26.33	26.33
AIC	2577.7	2573.1	10800.1	10800.1
N	3305	3305	1191	1191

Estimates from models with conditional (CAR) and simultaneous autoregressive (SAR) covariance functions. Treatment is percent of city block residents executed (logged). Outcome is log-transformed. Robust standard errors in parentheses, clustered by rayon. All models include spatial spline and block-level covariates. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table A2.4: **Per capita repression and memorialization**, spatial models.

Outcome	Petitions	Denied/Removed (%)
Model	1. FRDD	2. FRDD
Estimate	4.49	-129.66
Std. error	(1.96)*	(69.41)†
First stage $\mathcal{F}$ score	3.88†	3.89†
Wu-Hausman test statistic	6.18*	3.15†
Adj. R^2	0.63	0.58
RMSE	62.5	2780.18
N	200	147

Estimates from fuzzy regression discontinuity design. Treatment is percent of city block residents executed (logged). Outcome is log-transformed. Robust standard errors in parentheses, clustered by rayon. Observations (blocks) weighted by population size. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table A2.5: **Per capita repression and memorialization**, FRDD estimates.

A3. Additional Analyses

A3.1. Individual-Level Coefficient Estimates

Tables A3.6 and A3.7 report individual-level coefficient estimates, regressing petition (models 1 and 2) and denial/removal (models 3 and 4) on the severity of repression and other predictors in equation (2). Table A3.6 reports estimates for "repression at home" and Table A3.7 "repression at work." The outcomes are log-transformed for the linear models in columns 1 and 3 ($g(\cdot)$ is an identity link), and binary in the Binomial models in columns 2 and 4 ($g(\cdot)$ is a logit link). The predicted probabilities in Figures 3 and 4 in the main text are based on models 2 and 4.

Doubling the number of victims at an individual's home address (workplace) is associated with a 0.8 (2) percentage point increase in the probability that victim j receives a petition ($(2^{\,0.012} - 1) \cdot 100 = 0.84$ and $(2^{\,0.029} - 1) \cdot 100 = 2.03$, per model 1). Doubling the number of repressed neighbors (co-workers) is associated with a 5.7 (2) ppt drop in the chances of denial/removal ($(2^{-0.085} - 1) \cdot 100 = -5.7$ and $(2^{-0.03} - 1) \cdot 100 = -2.1$, per model 3).

Outcome	Petition		Denied/Removed	
Model	1. Linear	2. Binomial	3. Linear	4. Binomial
Estimate	0.01	0.21	-0.09	-0.63
Std. error	(0.0000)**	(0.07)**	(0.02)**	(0.14)**
Rayon FE	✓	✓	✓	✓
Zoning FE	✓	✓	✓	✓
Nationality FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R^2	0.03		0.19	
Pseudo R^2		0.07		0.21
RMSE	0.19	0.28	0.29	0.43
AIC	-4910	5550.7	528.5	1042.4
N	10121	9699	843	798

Estimates from Linear and Binomial fixed effect regression models. Treatment is number of residents from same street address executed (logged). Outcome is log-transformed in Linear model, binary in Binomial model. Robust standard errors in parentheses, clustered by rayon. All models include individual-level biographic covariates. Observations (individuals) weighted equally. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table A3.6: **Severity of repression vs. neighbors and memorialization**, individual-level.

Outcome	Petition		Denied/Removed	
Model	1. Linear	2. Binomial	3. Linear	4. Binomial
Estimate	0.03	0.51	-0.03	-0.28
Std. error	(0.0000)**	(0.03)**	(0.01)**	(0.08)**
Rayon FE	✓	✓	✓	✓
Zoning FE	✓	✓	✓	✓
Nationality FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R^2	0.06		0.14	
Pseudo R^2		0.12		0.2
RMSE	0.18	0.26	0.29	0.44
AIC	-4486.9	3915.2	441.4	794.4
N	7849	7448	615	574

Estimates from Linear and Binomial fixed effect regression models. Treatment is number of residents from same street address executed (logged). Outcome is log-transformed in Linear model, binary in Binomial model. Robust standard errors in parentheses, clustered by rayon. All models include individual-level biographic covariates. Observations (individuals) weighted equally. Significance levels (two-tailed): $^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$.

Table A3.7: **Severity of repression vs. co-workers and memorialization**, individual-level.

A3.2. Predictors of Repression

Our FRDD analyses exploit differences in repression across city district lines, net of observable predictors of NKVD activity. To establish what some of these observable factors might have been, we use Bayesian Model Averaging (BMA) (Madigan and Raftery, 1994; Raftery et al., 2022). This approach computes posterior probabilities over models with all possible combinations of relevant covariates, and constructs a weighted average over this model space. BMA accounts for uncertainty over the "true" predictors of repression, by assessing whether a variable consistently contributes to models' explanatory power.

Our quantities of interest are model-weighted posterior distributions for coefficients:

$$P(\beta|\text{Repression}, X) = \sum_{m}^{2^K} P(\beta|M_m, \text{Repression}, X) P(M_m|\text{Repression}, X) \quad (9)$$

where M_m denotes the m-th model, and $P(M_m|\text{Repression}, X)$ are the posterior model probabilities that we use as model weights.

$$P(M_m|\text{Repression}, X) = \frac{P(\text{Repression}|M_m, X)P(M_m)}{\sum_{s}^{2^K} P(\text{Repression}|M_s, X)P(M_s)} \quad (10)$$

where $P(M_m)$ is the prior probability of model m (we use a uniform prior, $P(M_m) = \frac{1}{2^K}$) and $P(M_m|\text{Repression}, X)$ is the marginal likelihood of model m. For our inclusion probability priors, we use a BIC approximation, $P(\beta_1 \neq 0|\text{Repression}, X) = \sum_{j:\beta_1 \in M_j} \frac{\exp(BIC_j/2)}{\sum_i^K \exp(BIC_i/2)}$.

Our core model specification is the following:

$$\text{Repression}_i = g^{-1}\left(\beta'\mathbf{X}_i + \text{District}_{k[i]} + \epsilon_i\right) \tag{11}$$

where $g^{-1}(\cdot)$ is an inverse link function. We consider two sets of models: (1) with a Gaussian link function and logged outcome, $\log(\text{Repression}_i)$, and (2) with a quasi-Poisson link function — an extension of the Poisson family with an unrestricted dispersion parameter — and the outcome as an event count on a natural scale. The vector X may contain any combination of the following covariates: (a) block population (logged), to account for the number of potential targets, (b) intra-Troika distance (i.e. distance from each block to the nearest NKVD branch, plus the distance from that NKVD branch to the nearest prosecutor and party offices), to account for the logistical cost of repression, (c) distance to the nearest industrial site, to account for ease of targeting by factory lists, (d) longitude and latitude, to account for spatial trends, (e) geographic area, to account for the size of zones of operation, and (f) district fixed effects, as binary indicators.

Excluding the intercept and omitted district indicator, the model space includes $K = 28$ covariates and $2^{28} = 268{,}435{,}456$ potential model specifications.

Table A3.8 reports inclusion probabilities and posterior means and standard deviations for the BMA analysis. The strongest predictors of higher levels of repression on a city block, according to both sets of models (Gaussian and quasi-Poisson), are population size, intra-Troika distance, distance to industrial site and, to a lesser extent, area. These are the covariates we include on the right-hand side of the first-stage FRDD specification (equation 7).

Variable	(1) Gaussian $P(\hat{\beta} \neq 0)$	(1) Gaussian Post. Mean	(2) Quasi-Poisson $P(\hat{\beta} \neq 0)$	(2) Quasi-Poisson Post. Mean
Intercept	100	-175.9 (62.2)	100	-179.8 (130.3)
Population (log)	100	0.2 (0.02)	100	0.8 (0.1)
Distance to Troika	100	-0.2 (0.02)	100	-0.9 (0.1)
Distance to industrial site	100	-0.1 (0.02)	99.5	-0.3 (0.1)
Longitude	100	4.1 (0.4)	87.3	5.9 (2.6)
Latitude	18.1	0.4 (1)	18.4	-0.8 (2)
Area	95.6	3.1 (1.1)	75	-4.9 (3.7)
Dzerzhinskiy	1.2	0.0003 (0.01)	29.3	0.2 (0.4)
Frunzenskiy	100	0.4 (0.1)	17.6	0.1 (0.3)
Kievskiy	5.8	0.003 (0.04)	11.2	0.1 (0.2)
Kirovskiy	6	-0.01 (0.05)	78.1	-0.7 (0.5)
Kominternovskiy	95.7	0.5 (0.2)	3.5	-0.0003 (0.1)
Krasnogvardeyskiy	99.9	0.7 (0.2)	8.9	0.04 (0.2)
Krasnopresenskiy	15.2	0.03 (0.1)	75.2	0.4 (0.4)
Kuybyshevskiy	100	1.4 (0.2)	92.3	0.6 (0.3)
Leningradskiy	3.5	-0.004 (0.02)	6.2	0.01 (0.2)
Leninskiy	16.4	0.05 (0.1)	39.6	0.3 (0.4)
Molotovskiy	13.1	-0.04 (0.1)	34.2	-0.3 (0.4)
Moskvoretskiy	96.6	-0.4 (0.1)	80.6	-0.8 (0.4)
Oktyabrskiy	3.7	0.003 (0.02)	10.9	0.1 (0.3)
Pervomayskiy	100	-0.7 (0.1)	78.3	-1.1 (0.7)
Proletarskiy	100	-0.7 (0.1)	99.4	-1.6 (0.5)
Rostokinskiy	100	-0.4 (0.1)	23.3	0.2 (0.3)
Sokolnicheskiy	100	-0.8 (0.1)	78.6	-1.1 (0.6)
Sovetskiy	100	0.7 (0.1)	14.3	0.1 (0.2)
Stalinskiy	100	-0.7 (0.1)	78	-1.1 (0.6)
Sverdlovskiy	100	1.5 (0.2)	16.2	-0.1 (0.2)
Taganskiy	100	-0.6 (0.1)	75.1	-0.7 (0.5)
Zheleznodorozhnyy	12.6	-0.03 (0.1)	68.8	-0.5 (0.4)

$P(\hat{\beta} \neq 0)$ are posterior inclusion probabilities, scaled 0 to 100. Quantities reported under "Post. Mean" are the mean (and standard deviation) of the posterior distribution of coefficient estimates associated with each variable. 132 Gaussian models selected (28 covariates), 1018 quasi-Poisson models selected (28 covariates).

Table A3.8: **Predictors of Repression**, Bayesian Model Averaging

A3.3. Barriers to Memorialization: Alternative Measurements

The main text examined how several individual and block-level attributes — including victim's identity, party membership, and local political opportunity structures — might moderate the relationship between the historical severity of repression and contemporary memorialization. The current section presents results for alternative measures of these attributes.

First, we consider whether patters for foreign-born victims of the Great Terror are similar to those for non-Russian victims. To this end, we expanded individual-level model (2) with interaction term $\log(\text{Repression}_j) \times \text{Foreign-born}_j$, where Foreign-born_j is an indicator equal to 1 if j was born outside the original 1922 borders of the USSR, and 0 otherwise. Figure A3.12 illustrates simulation results for native-born (solid line) and foreign-born victims (dashed line). The probability of a petition is significantly lower for the latter group, hovering around 0.04, irrespective of the severity of repression. By contrast, native-born victims' probability of petition rises from 0.06 (solitary) to 0.18 (maximum). The probability of denial or removal is consistently higher for foreign-born victims, but this difference is not statistically significant.

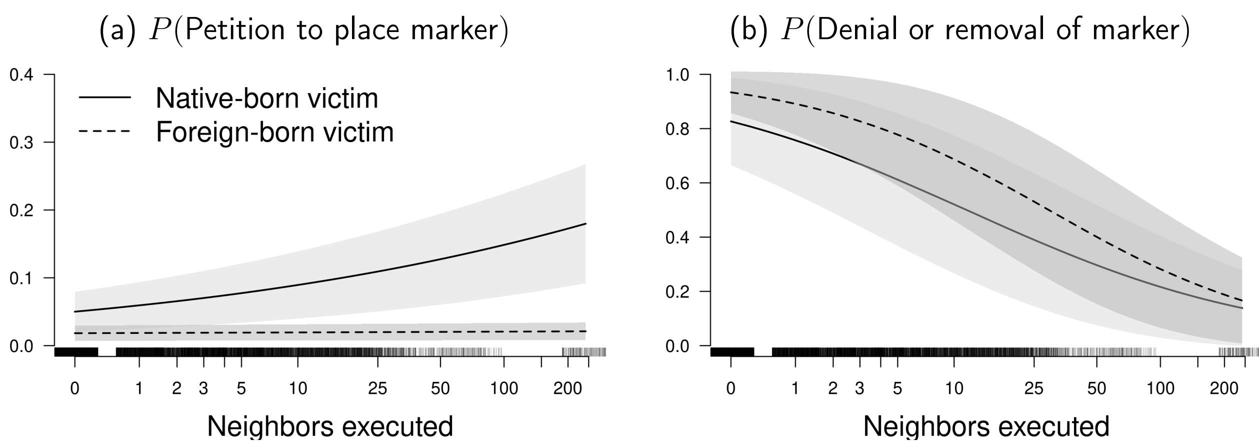


Figure A3.12: **Foreign-born victims' probability of memorialization**. Solid and dashed lines represent point estimates for victims born inside and outside of the USSR's 1922 borders; grey regions are bootstrapped 95% confidence intervals from 1000 simulations.

Second, we expand our measure of party affiliation to include not only VKP(b) members (43% of victims), but also candidate members (0.9%) and youth wing affiliates (0.3%). The simulation results, in Figure A3.13, are nearly identical to those in Figure 6 in the main text.

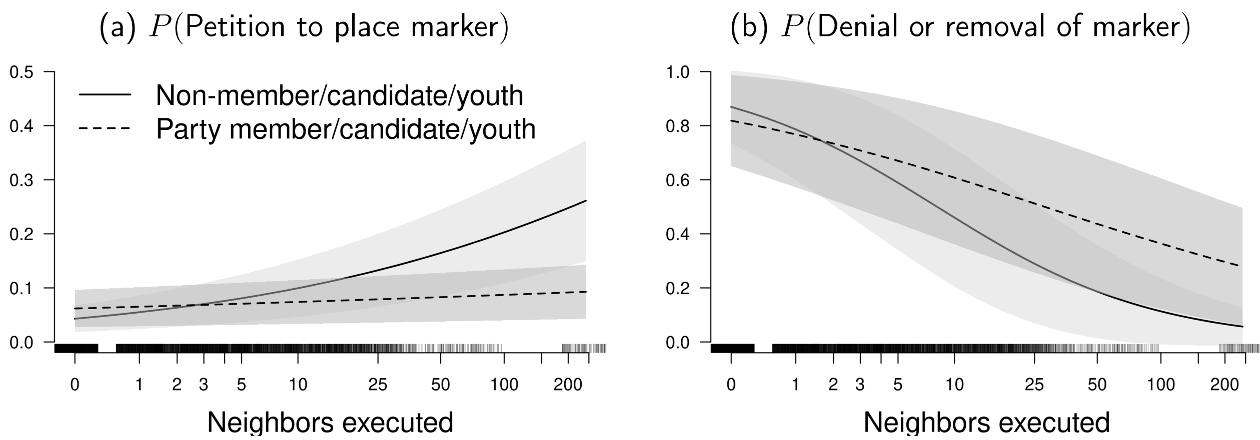


Figure A3.13: **Party membership (expanded) and victim's memorialization**. Solid and dashed lines represent point estimates for victims without and with membership in the CPSU, respectively; grey regions are bootstrapped 95% confidence intervals from 1000 simulations.

Third, we expanded our definition of state security presence to include judicial and defense-related entities. The simulation results, in Figure A3.14, align with to those in Figure 7 in the main text, which includes only public safety and order institutions like the FSB and law enforcement.

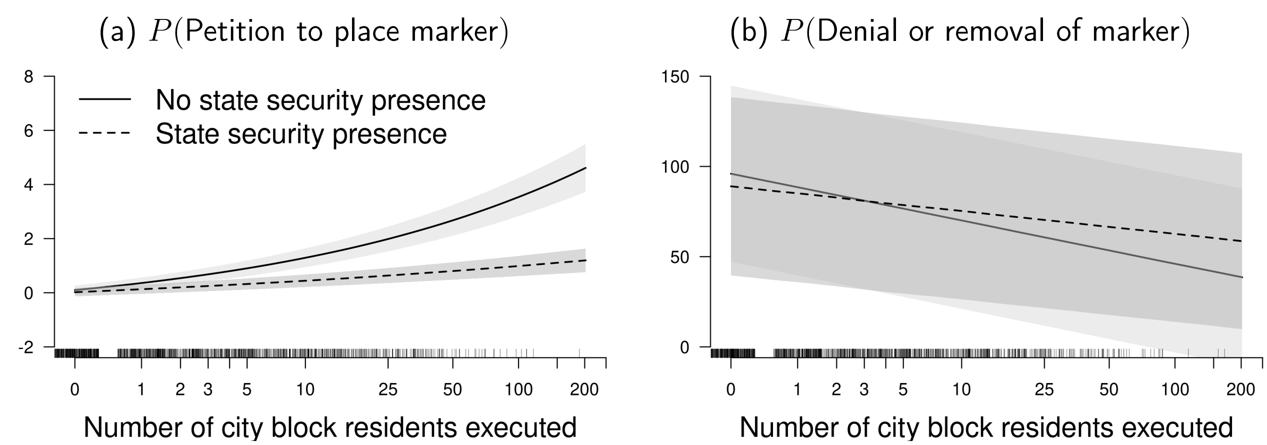


Figure A3.14: **State security presence (expanded) and memorialization**. Solid and dashed lines represent point estimates for city blocks with no vs. at least one state security agency, respectively; grey regions are bootstrapped 95% confidence intervals from 1000 simulations.

A3.4. Barriers to Memorialization: Model Comparisons

Tables A3.9-A3.11 report partial F tests comparing the fully-specified interactive models in Figures 5-7 with nested models that exclude either the severity of repression or covariates measuring the respective individual- or block-level attributes. By comparing the models' residual sums of squares

(RSS), each table considers the null hypothesis that the nested model is more appropriate than the full model. The alternative hypothesis is that the difference in RSS is sufficiently large for the removal of the covariate to be detrimental to the model's explanatory power.

In all cases, partial F tests reject the null hypothesis for the severity of repression. Results for the other covariates are more mixed. We failed to reject the null for state security agency presence — removing this covariate does not significantly undermine model performance. In the other two cases, F statistics were consistently smaller for tests comparing nested models without ethnic identity or party membership than for tests of nested models without severity. This evidence leads us to conclude that the historical severity of repression is more indispensable for our ability to explain memorialization than various proxies for the suppression-to-recognition ratio.

Model	Dropped covariate	F statistic
1	Non-Russian victim	7.18**
1	Neighbors executed	24.69***
2	Non-Russian victim	4.84*
2	Neighbors executed	20.13***

Table A3.9: **Partial F-tests: victim identity (non-Russian)**. Dependent variables are victim's probabilities of petition (Model 1) and denial/removal (Model 2). Fully-specified model includes both dropped variables in an interaction term. ***p<0.001, **p<0.01, *p<0.05, †p<0.001

Model	Dropped covariate	F statistic
1	Communist Party member	15.27***
1	Neighbors executed	28.76***
2	Communist Party member	4.36*
2	Neighbors executed	19.88***

Table A3.10: **Partial F-tests: victim political affiliation (party member)**. Dependent variables are victim's probabilities of petition (Model 1) and denial/removal (Model 2). Fully-specified model includes both dropped variables in an interaction term. ***p<0.001, **p<0.01, *p<0.05, †p<0.001

Model	Dropped covariate	F statistic
1	State security presence	0.17
1	Number of city block residents executed	501.43***
2	State security presence	0.2
2	Number of city block residents executed	58.91***

Table A3.11: **Partial F-tests: local political opportunity structure (state security presence).** Dependent variables are victim's probabilities of petition (Model 1) and denial/removal (Model 2). Fully-specified model includes both dropped variables in an interaction term. ***p<0.001, **p<0.01, *p<0.05, †p<0.001

References

Calonico, Sebastian, Matias D Cattaneo and Rocio Titiunik. 2015. "Optimal data-driven regression discontinuity plots." *Journal of the American Statistical Association* 14(4).

Central Statistical Directorate of USSR. 1939. *Vsesoyuznaya perepis' naseleniya 1939 goda*. Moscow: Central Statistical Directorate of USSR.

Krasil'nikov, K.P., ed. 1938. *Plan Moskvy i okrestnostey [Plan of Moscow and Surroundings]*. 2nd Cartographic Factory, Main Directorate for Geodesic Surveying and Cartography NKVD USSR.

Madigan, David and Adrian E Raftery. 1994. "Model selection and accounting for model uncertainty in graphical models using Occam's window." *Journal of the American Statistical Association* 89(428):1535–1546.

Mennis, Jeremy. 2003. "Generating surface models of population using dasymetric mapping." *The Professional Geographer* 55(1):31–42.

Raftery, Adrian, Jennifer Hoeting, Chris Volinsky, Ian Painter and Ka Yee Yeung. 2022. *BMA: Bayesian Model Averaging*. R package version 3.18.17.
URL: *https://CRAN.R-project.org/package=BMA*

Rozenas, Arturas, Roya Talibova and Yuri M. Zhukov. 2024. "Fighting for Tyranny: State Repression and Combat Motivation." *American Economic Journal: Applied Economics* 16(3):44–75.
URL: *https://www.aeaweb.org/articles?id=10.1257/app.20220085*

Wheatcroft, Stephen G. 1990. "More Light on the Scale of Repression and Excess Mortality in the Soviet Union in the 1930s." *Soviet Studies* 42(2):355–367.