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IZA DP No. 17138

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**Maxim Ananyev**

*University of Melbourne*

**Michael Poyker**

*University of Texas at Austin and IZA*

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**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9  
53113 Bonn, Germany

Phone: +49-228-3894-0  
Email: [publications@iza.org](mailto:publications@iza.org)

[www.iza.org](http://www.iza.org)

## ABSTRACT

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### **Prison Norms and Society beyond Bars\***

Inmates' informal code regulates their behavior and attitudes. We investigate whether prisons contribute to the spread of these norms to the general population using an exogenous shock of the Soviet amnesty of 1953, which released 1.2 million prisoners. We document the spread of prison norms in localities exposed to the released ex-prisoners. As inmates' code also ascribes low status to persons perceived as passive homosexuals, in the long run, we find effects on anti-LGBTQ+ hate crimes, homophobic slurs on social media, and discriminatory attitudes.

**JEL Classification:** J15, M14, N34, N44, P00, Z13

**Keywords:** incarceration, prison culture, russia, homosexuals

**Corresponding author:**

Michael Poyker  
UT Austin  
2515 Speedway  
Austin, TX 78712  
USA

E-mail: [mikhail.poyker@austin.utexas.edu](mailto:mikhail.poyker@austin.utexas.edu)

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Society-wide norms and values can be explained by history<sup>1</sup> (Nunn, 2021), current policies (Bau, 2021), or economic development (Inglehart and Welzel, 2005; Inglehart, 2018). Additionally, norms and culture are shaped by the *social organizations* with which people interact and participate, including schools, universities, businesses, bureaucracies, and notably, prisons. Such organizations have the potential to form their distinct norms and transmit them to the general population both vertically (participants socializing with younger generations of their families) and horizontally (participants influencing their non-participant peers). Sociologists have documented one of such norms in male prisons: self-governance by the informal code (Clemmer, 1940; Sykes and Messinger, 1960; Skarbek, 2014). It privileges an informal hierarchy and ascribes low status to people perceived to be passive homosexuals (Sykes, 1958; Einat and Einat, 2000) thus potentially leading to the creation and transmission of anti-gay norms. Given that there are currently more than 11 million prisoners worldwide and that world incarceration rates increased by 8% in the last ten years (Walmsley, 2019), it is possible that prisons can be an important source of norms including homophobia in the general population.<sup>2</sup> This effect can result from first-hand experience of ex-prisoners, exposure of their families, and gradual socialization of larger parts of the population into prison culture.

In this paper, we investigate empirically whether prisons serve as a source of society-wide norms. We use the largest prison amnesty in history — Soviet amnesty of 1953 — to evaluate the impact of the influx of people with prison experience on anti-gay attitudes and behaviors. Caused by the unexpected death of Soviet dictator Joseph Stalin, the amnesty resulted in 1.2 million people who were convicted for general criminal offenses being released and settled in the proximity of Gulag labor camps.<sup>3</sup> We measure the exposure of each Russian municipality to the amnesty of 1953 as the sum of the number of released persons from all Gulag camps weighted by the distance from each camp to the municipality. Then, we first show that the amnesty immediately spread the prison culture to nearby areas, as measured by the

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<sup>1</sup>In particular by pre-industrial agriculture (Alesina, Giuliano and Nunn, 2013), environmental risk (Giuliano and Nunn, 2021), tightness of kinship networks (Enke, 2019), political self-governance (Guiso, Sapienza and Zingales, 2016), religious institutions and teachings (Becker and Pascali, 2019; Bergeron, 2020; Henrich, 2020), migration (Becker et al., 2020; Miho, Jarotschkin and Zhuravskaya, 2023), and sex ratios (Grosjean and Khattar, 2019).

<sup>2</sup>For example, in the United States, the country with one of the largest incarceration rates in the world, prisons on average admitted 437,000 people per year in 2009–2019 according to the Bureau of Justice Statistics (<https://bjs.ojp.gov/>).

<sup>3</sup>Russian acronym for the “main administration of the camps.”

increase in the number of “thieves-in-law” (individuals responsible for adjudicating disputes related to the prison code). Second, we find that areas affected by the amnesty exhibit more hate crimes against LGBTQ+ people, greater intensity of homophobic slurs on social media, and more homophobic attitudes of individuals measured by representative surveys. In our sister paper ([Ananyev and Poyker, 2024](#)) we augment this analysis with modern longitudinal data from Australia showing that (i) males who go to prison became more intolerant toward homosexual individuals, and (ii) that the intolerance further spreads to the members of their households.

The question of the impact of prisons on the spread of norms is extremely difficult to study. First, the places where former inmates live after they leave prisons are decidedly non-exogenous since ex-prisoners are likely to return to their previous place of living. Second, it is hard to study cultural change because the number of ex-prisoners in any given location is relatively slow compared to the general population. In this study, we make advancements in these directions.

To study the transmission of prison norms, including anti-gay attitudes, to the general public one needs to find an episode of an exogenously determined influx of people with prison experience into the population. One such episode is the Soviet amnesty of 1953. Soviet dictator Joseph Stalin died suddenly and unexpectedly after a stroke in 1953. A power struggle within the Soviet elite ensued and resulted in the amnesty of 1.2 million people in the following three months ([Hardy, 2016](#)). Many of the released prisoners stayed in nearby cities and towns ([Dobson, 2009](#)).<sup>4</sup> No reform of the Gulag system had been planned and arguably no amnesty would have been implemented if Stalin lived ([Barnes, 2011](#)). We hypothesize that, through the interactions of the ex-prisoners with local populations, a rapid increase in the number of people with prison experience may have a long-lasting effect on the presence of prison culture in the locations most exposed to the amnesty.

Prisoners abide by certain behavioral codes and form a strict internal hierarchy. This creates an informal institution for resolving disputes among the prisoners where higher-ranked individuals have more rights. Individuals in higher social strata are forbidden from sharing tableware, making physical contact, or taking items from those in the lowest strata, as such actions carry the potential of their own descent into the lower strata ([Mironova,](#)

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<sup>4</sup>The amnesty only applied to people who had been convicted for fewer than five years. Importantly, political prisoners, who were convicted for “counter-revolutionary activity” were not eligible for the amnesty because most of them had been convicted of more than 5 years of imprisonment ([Shalamov, 1989](#)).

2023). It is well-documented that passive homosexual individuals are at the bottom of the hierarchy (Clemmer, 1940; Sykes and Messinger, 1960; Skarbek, 2014).

We measure the presence of prison culture both historically and in modern days. Historically, we make use of a unique feature of Russia’s context, namely, the presence of specific strata of criminals: thieves-in-law (*vory v zakone*). Upon leaving the prison, criminals may still live according to the prison norms, and when the demand for dispute resolution arises, an arbitrator is needed. In the Soviet Union, thieves-in-law were the ones who took this role (Lilin, 2010; Galeotti, 2018). They were usually selected from among the most respected members of the criminal community with a formal procedure of ascendance to this status. Their “coronation” made the criminal communities in all Soviet Union aware of the emergence of a new thief-in-law.<sup>5</sup> We argue that the rise of a thief-in-law in a particular location is a signal of a growing prevalence of prison culture in the society. We construct a panel dataset of the emergence of Russian thieves-in-law from 1922 to 2010 using textual data on their biographies from Prime Crime News Agency, an online resource on the Russian criminal community widely used in crime research and followed by criminals themselves (Lonsky, 2020; Varese, Lonsky and Podvysotskiy, 2021).

In contemporary settings, we focus on one salient aspect of prison culture: homophobia. We use three measures. First, we use geo-coded data on crimes against LGBTQ+ persons from Kondakov (2017, 2021), who meticulously collected the data on cases in 2010–2015 in which the motive of hate against LGBTQ+ persons was established by a court. Second, we have scraped the most popular social network in Russia, *vk.com*, for the geo-referenced public postings containing common Russian homophobic slurs. Third, we use three geo-referenced public opinion surveys — Life in Transition Survey, World Values Survey, and the Courier Survey by Levada Center — that contain questions about respondents’ attitudes towards homosexual individuals.

We regress all of our outcomes on the exposure to the 1953 amnesty. We measure a location’s exposure to amnesty using the sum of the number of released prisoners from *all* Gulag camps weighted by the distance from each camp to the location. While the location and the number of prisoners in Gulag were determined systematically, the amnesty was unexpected and chaotic (Hardy, 2016). We test this by (i) showing that the amnesty is not correlated to pre-1953 levels and changes in Gulag population or its industrial composition

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<sup>5</sup>The “law” in “thieves-in-law” refers to the criminal informal code, not to the laws of the state.

and (ii) showing that exposure to amnesty is uncorrelated with the pre-1953 changes and levels in the number of coronations of thieves-in-law, manufacturing output, population, sex ratios, or shares of the religious population.<sup>6</sup>

We first present evidence of the impact of the amnesty on the number of thieves-in-law coronations. Using an event-study design we show that locations more affected by the amnesty had a higher number of thieves-in-law coronations after 1953 but not before. The effect increases over time suggesting a self-reinforcing nature of the norms. On average, one standard deviation increase in exposure to the amnesty increases the number of coronations by 6 percent. Then we study the impact of the 1953 amnesty on modern-day homophobia in a cross-section. To further address endogeneity in the location of camps, we control for the coordinates, minimum distance, size, the convict-labor industries of the nearest Gulag camp, and total exposure to the prison population of the Gulag system. We find that exposure to 1953 amnesty is positively associated with all measures of present-day homophobia. A one-standard-deviation increase in the exposure to the amnesty of 1953 leads to a 13.3-percentage-point increase in the probability of a respondent being intolerant toward gay persons, a 2.7-percent increase in the number of hate crimes, and a 1.1-percent increase in the number of homophobic slur in social media.

Our results are robust to (i) controlling for the population, municipality type, regional fixed effects, and (for survey data) individual-level socio-economic and demographic controls, (ii) usage of the alternative measures of exposure to the amnesty, (iii) usage of the alternative (larger) unit of observation — county (*rayon*) — instead of municipality, (iv) usage of alternative spatial HAC standard errors, and (v) are not driven by a particular province. We document that our results are unlikely to be explained by any other factor by using a series of placebo estimates. We first show that exposure to the amnesty of 1953 yields a larger effect than exposure to any other change in the number of prisoners in the history of the Gulag. Second, we permute amnesty size and labor camp location and find that the true estimates are always within the top 10 percentile of the magnitude of the effect. We also find no effect when using exposure to amnesty from female labor camps. Using survey

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<sup>6</sup>Note, that according to the qualitative literature on the matter (Healey, 2001, 2017; Alexander, 2023) — Russian society had been tolerant of homosexual expressions before the Gulag was established. Even after male homosexuality was criminalized by Stalin in 1935, the enforcement had been sporadic and unsystematic until the 1950s. And the amnesty was a drastic and exogenous change in the number of released prisoners. Thus, our claim that Gulag contributed substantially to Russian homophobia is consistent with the qualitative evidence. Appendix B explores this issue in more detail.

data we confirm external validity by documenting the effect of the amnesty of 1953 on the homophobic attitudes in other ex-USSR countries with Gulag camps. We also document the effect on a contemporary measure of prison culture: consumption of music genres associated with the criminal underworld.

We find no evidence that our results are driven by (i) the proximity to Gulag camps, (ii) possible economic (under)-development due to exposure to amnesty, (iii) crime rates, (iv) biased sex ratios or attitudes toward women, (v) other possible confounding factors such as religion, army, or migration, or (vi) deterioration of trust and social capital. Thus, we argue that the most plausible channel of the effect of amnesty on homophobic attitudes is exposure to prison culture. We provide suggestive evidence of this mechanism by showing the effect of the cumulative number of thieves-in-law and having a family member going through the Gulag.

Our study makes several contributions. We contribute to the literature on cultural change and persistence (summarized in [Giuliano and Nunn, 2021](#)). The factors of cultural changes explored in the literature include religion ([Becker and Pascali, 2019](#); [Bergeron, 2020](#); [Henrich, 2020](#)), slavery ([Nunn, 2008](#); [Nunn and Wantchekon, 2011](#)), and historical stability of the environment ([Giuliano and Nunn, 2021](#)). We contribute to the discussion on the horizontal transmission of culture ([Richerson and Boyd, 2008](#); [Spolaore and Wacziarg, 2009](#); [Aghion et al., 2010](#); [Bisin and Verdier, 2011](#); [Henrich, 2017](#)) by providing an argument that mass imprisonment is also a significant determinant of norms and beliefs. One of the close papers to ours is [Miho, Jarotschkin and Zhuravskaya \(2023\)](#), which finds that gender norms from ethnic Germans and Chechens deported by Stalin during World War II diffused with those of the local population. In this paper, we study the internal diffusion of new cultural norms from social organizations to the general population rather than external diffusion from (forced) migration policy. We also contribute to the literature on informal institutions and the co-evolution of institutions and culture (summarized in [Alesina and Giuliano, 2015](#)). Here we are the first to show the effect of penitentiary policies and mass incarceration on the spread of informal prison institutions to society beyond bars that may substitute legal institutions.

Our paper also contributes to the literature on the sources of anti-gay attitudes. Some of the determinants previously identified by other studies include the influence of religion ([Grossman, 2015](#); [Ananyev and Poyker, 2021](#)), historical religious missions, country's legal definition of marriage ([Aksoy et al., 2020](#)), sex ratios among the early European settlers

(Baranov, De Haas and Grosjean, 2018; Chang, 2020; Brodeur and Haddad, 2021). We propose a new potential source of homophobic attitudes — prisons and penitentiary policies — and offer several quantitative tests for this hypothesis. In a complementary paper, Ananyev and Poyker (2024), we show that individuals who go through the prison system in modern Australia, as well as their family members, end up with more anti-gay attitudes. The present paper documents the long-run effect on society in general.

This paper also contributes to the literature on the effects of Stalin’s repressions in the Soviet Union and Russia (summarized in Zhuravskaya, Guriev and Markevich, forthcoming). The literature has focused on long-term effects such as voting, economy, and trust (Mikhailova, 2012; Kapelko and Markevich, 2014; Toews and Vézina, 2020; Nikolova, Popova and Otrachshenko, 2022) and short-term effects such as famine (Markevich, Naumenko and Qian, 2021; Naumenko, 2021). Here, we show that homophobia in Russia is at least partly a Gulag legacy using both short-term and long-term evidence.

## 1 Background

### 1.1 Prison Culture, Hierarchy, and Homophobia

How exactly prison norms can influence broader population? The most important potential channel is the informal inmate code. As Dolovich (2012) documents for the U.S. prisons, a set of norms emerge that privilege competition for status and power in an informal hierarchy. Such norms have been also documented in the Soviet underworld (Galeotti, 2018) as well as well as the U.S. prisons (Kupers, 2017). According to the informal code, not conforming to the stereotype of a “tough man” and possessing “feminine” qualities carry a stigma. In these environments “passive” homosexuals and trans persons are perceived as woman-like.<sup>7</sup> It has also been documented that in many cases, homosexual acts involve violence and coercion (O’Donnell, 2004).<sup>8</sup> Soviet prisons also developed a set of elaborate

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<sup>7</sup>Varlam Shalamov writes in *Swindler’s Blood*: “The criminals [blatari] are all pederasts. Each of them in the camp is surrounded by young people with swollen and muddy eyes ‘Zoikas,’ ‘Man’kas,’ ‘Verkas,’ whom the criminal is feeding and with whom he sleeps” (Kuntsman, 2009). It should also be noted that an “active” partner in such relationships is not perceived as a homosexual and thus does not carry the stigma.

<sup>8</sup>Some scholars of prison informal order (Fleisher and Krienert, 2009) have pointed out that sexual relationships between men in prisons often do not involve violence and are not described as rape by inmates. According to Trammell (2011), homosexual relationships in prison, even those that do not include outright violence, always happen in the shadow of violence: a “husband” “protects” “vulnerable wife.” Thus, a person who goes through a prison experience arguably can be socialized into ascribing low status to “passive”

rules, by which any physical contact with a person on the bottom end of informal hierarchy should be avoided as if their status is contagious (Mironova, 2023).

Prison norms are different from the norms of hegemonic masculinity. According to Mahalik et al. (2003), masculinity norms are comprised of violence, winning, risk-taking, emotional control, playboyism, primacy of work, disdain towards homosexual individuals, dominance, self-reliance, pursuit of status, and self-reliance. Out of these norms, the inmate code does prescribe disdain towards homosexuals. As for the other norms, it is either silent or dictates the opposite. The code also does not prescribe which beliefs inmates must hold regarding the appropriate role of women in society. Also, the explicit goal of the inmate code is to limit violence and risk-taking by inmates within the followers of the code. The punishment for transgressions is often denigration to the lowest status equal to that of “passive” homosexuals (Mironova, 2023). Given these differences, while intense male-to-male competition does produce masculinity norms (Baranov, De Haas and Grosjean, 2018), prison norms can be viewed as a separate phenomenon.

## 1.2 Amnesty of 1953 and Its Aftermath

To investigate the impact of prison experience on homophobia among the population, we use the Soviet amnesty of 1953 which dramatically downsized the system of the labor camps in the Soviet Union. This system emerged right after the Bolshevik revolution and started expanding dramatically after Stalin had taken power in 1929. At its peak, it had grown to comprise 475 labor camps. By 1953, approximately 18 million people had passed through the system (Applebaum, 2003). Gulag was officially dismantled in January 1960.

After the death of Stalin in 1953, a power struggle within the Soviet elite ensued. Soviet Minister of Internal Affairs, Lavrentiy Beria, launched a campaign of reforms to Soviet law enforcement and the Gulag system. A part of Beria’s proposed reform package was a sweeping amnesty. Beria argued that the Ministry of Internal Affairs should be free of its “economic responsibilities” (Elie, 2013). Some suspect that Beria advocated for the amnesty for political reasons (Solzhenitsyn, 1974), while others point out that the Gulag system became bloated and unmanageable (Galeotti, 2018). While Beria himself did not survive the post-Stalin power struggle (he was arrested and executed), his idea was implemented:

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homosexuals and expressing anti-gay attitudes later on.

1, 201, 738 prisoners were freed from convict labor camps in 1953.<sup>9</sup>

Despite the amnesty's ambition, its execution was poor. Uncertainty in the rules about who is supposed to be free led to many career criminals being released. The released individuals were not offered any transportation options to their pre-conviction places of residence so they stayed in the nearby areas prompting the surge in criminality in those places. For example, by June 1, 1953, 5, 500 released individuals arrived in the Siberian city of Omsk. In the weeks after that, a wave of assaults followed (70 people were admitted to hospitals with knife wounds). Similar events were happening throughout the country, and the government largely lacked the capacity to intervene (Mamin, 2018).

The first-order effect of amnesty was the rise in prominence of a specific stratum inside the criminal community — thieves-in-law — who was in charge of maintaining the inmate code.<sup>10</sup> The inmate code had crystallized earlier and can be traced to the aftermath of the Russian Civil War and even earlier times (Galeotti, 2018), but the Gulag system changed it significantly. One of the most important factors was the so-called "bitch war" (*suchya voina*): a series of violent clashes between two groups of criminals: one of the groups (*vory*) saw itself as upholders of the old inmate code, while the other was accused of collaborating with the Soviet government and prison administration (*suki*). The war ended in 1953 with the *suki* prevailing. Nevertheless, they largely adopted the old *vory's* code but made it more stringent when it comes to the perceived "passive" homosexuality. Specifically, elaborate rules of "cleanliness" were adopted: perceived "passive" homosexual persons had to be segregated, use separate cutlery and dishes, and their belongings were never to be touched by others. The violators of this rule ran the risk of being shunned themselves (Mironova, 2023).<sup>11</sup> In the aftermath of the process, the thieves-in-law solidified as a class of individuals in the criminal community whose role was to uphold the rules and resolve informal disputes. Bitch wars are important for us as they officially *institutionalized* homophobia in communities living according to prison norms. Hence, we use coronations of thief-in-laws as a proxy for both the prevalence of prison culture and its most salient feature — male homophobia.

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<sup>9</sup>[https://urokiistorii.ru/history\\_days/berievskaja-ammistija](https://urokiistorii.ru/history_days/berievskaja-ammistija).

<sup>10</sup>The systematic data on the actual crime rates (or homicide data) following/before the amnesty are not available but it is reasonable to assume that the overall effect on crime was ambiguous. The arrival of career criminals contributed to the criminal activity in the area but the dispute resolution mechanism provided by the thieves-in-law limited potential inter-gang violence (Siegel, 2012).

<sup>11</sup>Alexander (2023) writes: "Any prisoner could rape or abuse such "passive pederasts" following which these unfortunate young men would occupy the lowest rung of prison hierarchy."

In this paper, we use the location-level exposure to amnesty as an exogenous shock. We hypothesize that the released individuals bring their networks and norms, including anti-gay attitudes, with them. As they settle in their new homes, they gradually start to influence the attitudes of the local population due to the high visibility of their activity and immersion in economic, social, and family life.

## 2 Data

### 2.1 Data on Gulag

The information on the locations of Gulag camps comes from [Mikhailova \(2012\)](#), who uses the data collected by the Russian non-government organization “Memorial.” Researchers of “Memorial” had compiled the locations and yearly estimates of number of prisoners for 462 out of 475 Gulag camps located in the Soviet Union.<sup>12,13</sup> For every camp, we take the difference between its population between 1954 and 1953 to estimate the number of pardoned prisoners from each labor camp.

To grasp the scope of the Gulag system [Figure A.1](#) shows the map with camp locations and the total number of people that pass through each camp between 1923 and 1960. During that period, more than 20.8 million people went through Gulag; of them, 1.7 million died. [Figure A.3](#) shows the time-series of the population of the Gulag system, where we can see that it spiked in 1953. By 1953 only 153 camps were operational (see map in [Figure A.2](#) and the time-series of active camps in [Figure A.4](#)). Most of these camps were located on the territory of the Russian Soviet Republic with a few on the territory of the Ukrainian, Kazakhstanian, and Uzbekistanian Republics. An average camp was containing 10,500 prisoners.

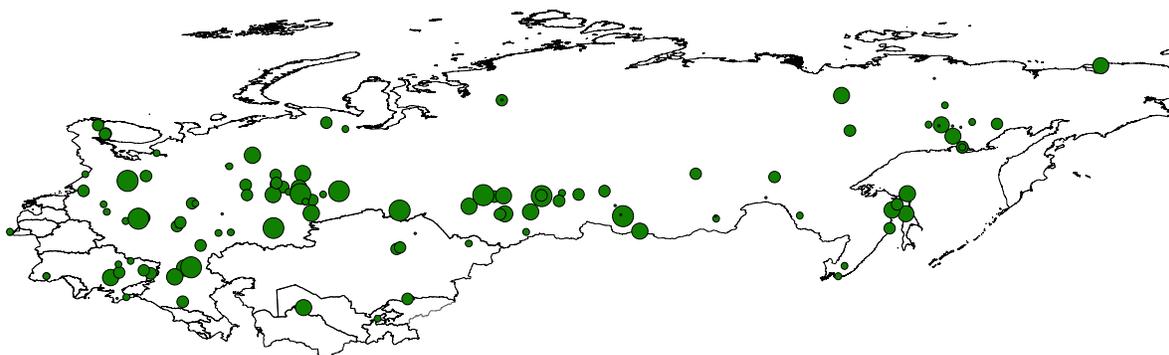
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<sup>12</sup>For 13 camps we know the location but not their population. Because these camps were closed before 1953 it does not introduce measurement error in the number of prisoners amnestied in 1953.

<sup>13</sup>Gulag system had five types of labor camps. For this paper only two types of camps are applicable: (i) correctional labor camps — the largest group of Gulag camps, and (ii) special camps — 12 camps with more harsh work and living conditions. We do not use data on the People’s Commissariat for Internal Affairs (NKVD) special camps that were established in the Soviet-occupied Eastern part of Germany in 1945 for interning the local population. These special camps were arranged in the former Nazi camps and were liquidated in 1950. We also do not use screening and filtration camps that were established in the USSR in December 1941 for temporary confinement of Soviet soldiers and the civil population from the Soviet territories occupied by Nazi Germany. These camps were also liquidated in 1950. Finally, we do not count prisoners-of-war (POW) camps. While captive German, Japanese, and their allied soldiers were working in labor camps, those who did not die in their harsh conditions were sent back to their home countries. The first POW extradition happened after 1955’s Konrad Adenauer visit to Moscow and was not related to the amnesty of 1953.

The amnesty released approximately 1.2 million ex-prisoners; as a result 93 out of 153 camps existing by 1953 were permanently closed. The average camp released 5,353 prisoners; however, the standard deviation was large — 7,603 released prisoners. 18 camps did not decrease the number of prisoners.<sup>14</sup> The largest release was from the Correctional Labor Camp #16 near Bratsk, Irkutskaya Oblast — more than 47,000 prisoners were released. The map in Figure 1 shows the magnitude of the releases from each existing Gulag camp and Figure A.5 shows the histogram of all releases by labor camp in 1953. Table C.1 demonstrates that the amnesty was uncorrelated to the pre-1953 numbers of prisoners, changes in the number of prisoners, maximum capacity, and average population in labor camps. It was also not correlated to the industries in which the prisoners were employed. Additionally, Table C.2 shows that locations’ exposure to the amnesty was uncorrelated to levels and changes in economic and demographic outcomes.<sup>15</sup>

**Figure 1** – Number of Amnestied Prisoners in 1953 by Gulag Camp



*Notes:* This map shows the location of 153 Gulag camps on the territory of the former Soviet Union that were operational in 1953. The size of the ball corresponds to the total number of prisoners that were released during the amnesty of 1953. 18 camps did not release any prisoners or slightly increased the number of prisoners. We set the number of amnestied prisoners from these camps to be equal to zero.

## 2.2 Data on Spread of Prison Culture in Russia

If our intuition on the effects of prison culture on the locations exposed to the amnesty is correct, we should expect an increase in the presence of thieves-in-law (*vory-v-zakone*): a

<sup>14</sup>Conditional on releasing prisoners, the mean is 6,067 and the standard deviation is 7,824.

<sup>15</sup>We discuss the construction of the measure of exposure to the amnesty in the next Section.

stratum of criminals responsible for resolving disputes and upholding informal “understandings” of Russian inmate code (Galeotti, 2018). To test this hypothesis, we use data on the dates and places of the ascendance of individual criminals to the status of a thief-in-law (so-called, “coronations”). Such coronations represent a significant upward step in the career of a member of the criminal underworld. The process of selecting a new thief-in-law was long and elaborate. As Galeotti (2018, p. 63) puts it: “Candidates had to be well known within their community, with sponsors willing to attest to their being upright exemplars of the criminal code.” Such coronations represent evidence of the robust presence of an underworld community as well as the importance of upholding “understandings.”

Biographies of thieves-in-law come from the criminal news website <http://primecrime.ru>. It contains textual biographies of Soviet and Russian thieves-in-law.<sup>16</sup> We extracted the year and location of the coronation of each thief-in-law and removed those that happened outside of Russia (mostly, in Georgia). In total, between 1922 and 2010 there were 452 coronations on Russian territory. For the 273 (60%) coronations we only observe the *rayon* of the coronation (the Russian equivalent of a county). For the rest of the 179 coronations, we observe the exact location (i.e., municipality) of the coronation. Because some years have only a few coronations, we bunch together 10 years bins creating *rayon*-decade-level panel.

### 2.3 Data on Homophobia in Russia

We use three measures to capture homophobia in Russia. All three measures are computed using recent (2010–2021) years. These measures capture different aspects of homophobia and estimating the effect of the amnesty of 1953 on all three of them is important for measuring anti-gay attitudes.

**Hate crimes** First, we use locations of hate crimes against LGBTQ+ persons collected by Kondakov (2017, 2021) in which the motive of hate against LGBTQ+ persons was established by a court. These data contain all locations that had a hate crime against gay persons in 2010–2015. We were able to uniquely match these locations to our sample of Russian municipalities and create a variable — inverse hyperbolic sine (hereafter, *ihs*)<sup>17</sup> of the total

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<sup>16</sup>According to Galeotti (2018), thieves-in-law are visible members of the criminal underworld. As a validity check, we have found that all thieves-in-law mentioned in Galeotti (2018) are also present on primecrime.ru. Thus we are unlikely to have consequential measurement error.

<sup>17</sup>We use the inverse hyperbolic sine for such variables as the total number of hate crimes as it can be interpreted in the same way as a standard logarithmic variable but without needing to adjust for zero values

number of hate crimes conducted in a municipality in 2010–2015.<sup>18</sup>

**Homophobic slurs on social media** Another way to measure the geography of homophobia is to look at social media. The most popular social media website in Russia is vk.com (also known as “vkontakte”). It has more than 47.2 million users (more than 40% of the Russian internet audience).<sup>19</sup> It is the fourth most popular website in Russia after Yandex (local search engine), Google, and Youtube.<sup>20</sup> Vk.com’s application programming interface allows scraping 1,000 latest public posts by the coordinates of the places of their authors (determined by their Internet Protocol address). Thus, we have scraped those and calculated the ihs of the prevalence of the most common derogatory terms used against homosexual persons.<sup>21</sup>

**Attitudes toward gay persons** We use five representative surveys of the Russian population from 2010 to 2017 that have a question about attitudes toward homosexual persons and the location of the respondents. Survey data comes from three different sources: 7th wave (2017) of the World Value Survey (WVS), 2nd (2010) and 3rd (2016) wave of the Life in Transition Survey (LiTS), and the Courier survey by Levada Center (the Courier) for 2013 and 2015.<sup>22</sup> While all three organizations that conducted the survey are different, the surveys are representative and have the same wording of the question about the residential attitudes toward homosexual persons.

In WVS and LiTS, the question we use is asked as follows: “On this list are various groups of people. Could you please mention any that you would not like to have as neighbors?” Homosexual persons are one of the groups that are proposed by the questionnaire. We construct our main variable of interest —  $\mathbb{1}(\text{Dislike homosexuals}_{i(t)})$  — as a dummy variable

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(Burbidge, Magee and Robb, 1988). We continue using logs for variables that do not have zero values.

<sup>18</sup>This variable may have a non-classical measurement error. In more homophobic areas, the court can be more homophobic and not count the crime as a hate crime or police may not register such a crime at all. In this case, we may underestimate the number of hate crimes in areas more affected by the amnesty of 1953 and it would work against us finding a positive effect of amnesty on the incidence of hate crimes.

<sup>19</sup>This data may have a bias. Specifically, vkontakte users are young (25-34 years old) and middle-aged (35-64), 26,2% and 25.4% respectively, and are 54.4% women.

<sup>20</sup>See <https://popsters.ru/blog/post/auditoriya-socsetey-v-rossii>. and <https://incliient.ru/vk-stats/>.

<sup>21</sup>All online data scraped for this paper was obtained on December 14th, 2021.

<sup>22</sup>WVS and LiTS have other waves with questions about attitudes toward homosexual persons but they don’t have respondent’s coordinates or city name to assign the treatment. The Courier has several other surveys with locations but with different questions on homophobia such as we can’t combine them with other surveys.

equal to one if the respondent  $i$  (nested in municipality  $l$ ) mentions homosexuals, and zero otherwise. In the Courier, the question is asked in a slightly different manner: “Would [you] like having people from this group [Homosexuals] as neighbors, dislike it, or not care?” If a respondent answered that they dislike having gay neighbors, we assign the value of 1 to the  $\mathbb{1}(\text{Dislike homosexuals}_{i(l)})$  and 0 otherwise.

The survey question asks only about residential preferences and not labor markets or voting intentions. It is unlikely, however, that residential preferences are unrelated to preferences in other domains. Another potential problem is social desirability bias. Given that homosexuality is currently politicized in Russia in various ways, it is possible that people feel pressured to provide a particular answer. This only matters for our estimates, however, if the willingness to express “true” anti-gay preferences is correlated with the amnesty of 1953. In this case, it is a part of the mechanism: prison culture makes expressing anti-gay sentiments more acceptable.

Overall our three measures capture three different aspects of the attitudes toward homosexuality and while each of them is limited in scope, together they show the big picture. And while each of them may have measurement error issues, they are of a different nature, thus robust results for all three measures would be indicative that these measurement errors are unlikely to drive our results. Table A.1 provides summary statistics of the Gulag, coronations, homophobia, and other Russian data. Appendix A contains additional details on variable construction.

Apart from these three measures, no other measure of homophobia aspects can be collected for a sufficient number of Russian municipalities. E.g., there is no data on workplace discrimination because national surveys don’t have questions about sexual orientation, and data on gay pride expressions is not available because (*any*) public meetings are criminalized and public expressions of pride (e.g., rainbows in vk.com posts) were connected to risks of physical harm even before it was legally criminalized by the government. It is also worth pointing out that we have attempted the collection of mentions of gay issues in the Soviet newspapers Pravda and Izvestia. Unfortunately, during the USSR’s existence those were rare: we have counted 21 mentions in the years 1917-1991, most of them related to the “pederasty” in Western capitalist countries being presented as a sign of their inevitable moral decline. Unfortunately, no region-level measure of homophobia can be constructed from these data.

## 2.4 Definition of Locations

Because our treatment is computed on the location level, we also compute our outcomes at the location level. According to the population census of 2020, Russia has more than 144,000 designated municipalities. We restrict our sample of municipalities to those with at least 1,000 people in it.<sup>23</sup> The resulting sample of cities, towns, and villages is 9,829. Hence, we compute two of our outcomes — hate crimes against LGBTQ+ people and incidence of homophobic slurs — for each of these municipalities. The third outcome — intolerance from the representative surveys — is estimated on the individual level, but the treatment is computed on the respondent’s location level, hence we use only 495 municipalities there.

We also use county (*rayon*)-level specifications. For these specifications, we use coordinates of the *rayon*’s population-weighted centroid to construct exposure to amnesty. Russia has 2,314 counties (some of them are quite large), each having at least one of our 9,829 municipalities. Despite Gulag camps spanning many republics of the Soviet Union, we do not add other ex-Soviet countries to our baseline analysis because most of our outcome variables are measured only within Russia.

## 3 Effect of Amnesty of 1953 on Prison Culture and Homophobia in Russia

In this Section, we report the results of the regression analysis for the effect of the amnesty of 1953 on the spread of prison culture and homophobic attitudes in Russia. Section 3.1 introduces an empirical specification to study the effect of amnesty on “coronations” of thieves-in-law and reports results. Section 3.2 introduces our empirical specification to study long-run effects, reports the results on homophobia, and contains robustness and sensitivity checks. Section 3.4 discusses alternative explanations and mechanisms.

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<sup>23</sup>We arbitrarily chose the 1,000 population cut-off due to complications in scraping the racial slur in social media: it would introduce measurement errors when misidentifying users in very small Russian villages. There are also a few large cities that are separated into a few municipalities (e.g., Moscow is divided into 12 such municipalities). We collapse them into unique city observations.

### 3.1 Amnesty of 1953 and Thieves-in-Law Coronations

#### 3.1.1 Empirical Specification and Identification

We start by estimating canonical difference-in-differences (DD) and fully dynamic difference-in-differences (FDDD) specifications. The canonical difference-in-differences specification is as follows:

$$\text{Ihs}(\# \text{ coronations})_{i,t} = \gamma \text{Exposure to amnesty}_{i,1954-53} \times \text{Post-amnesty}_t + \mu_i + \lambda_t + \eta X_{i,t} + \epsilon_{i,t}, \quad (1)$$

where  $\text{Ihs}(\# \text{ coronations})_{i,t}$  is the inverse hyperbolic sine of the number of thieves-in-law coronations happened in *rayon*  $i$  in decade  $t$ . The variable  $\text{Exposure to amnesty}_{i,1954-53} \equiv \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\text{Distance}_{i,g}^\sigma} \right)$  — is the exposure to the amnesty of 1953. We compute it in a way that each location in Russia is treated by *all* released prisoners from *all* Gulag camps, but released prisoners from the camps that are located farther away are counted with smaller weights than prisoners released from a nearby camp. For each *rayon*  $i$  we sum released prisoners in all camps weighted by distance from each camp to the *rayon*'s  $i$  population-weighted centroid.<sup>24</sup> In the baseline specification we assume linear decay of the effect of amnesty, i.e., the iceberg costs  $\sigma = 1$ . To make coefficients more interpretable we normalize exposure to the amnesty to have a mean of 0 and a standard deviation of 1. In this specification, we interact it with the  $\text{Post-amnesty}_t$  variable representing a dummy equal to one for the decades after 1953.

The fully dynamic specification is:

$$\begin{aligned} \text{Ihs}(\# \text{ of coronations})_{i,t} = & \underbrace{\sum_{l=-3}^0 \gamma_l \cdot \text{Exposure to amnesty}_{i,1954-53} \cdot D(w=l)}_{\text{pre-amnesty period}} \\ & + \underbrace{\sum_{l=1}^5 \gamma_l \cdot \text{Exposure to amnesty}_{i,1954-53} \cdot D(w=l)}_{\text{post-amnesty period}} + \quad (2) \\ & + \mu_i + \lambda_t + \eta X_{i,t} + \epsilon_{i,t}, \end{aligned}$$

where  $\text{Ihs}(\# \text{ of coronations})_{i,t}$  is the inverse hyperbolic sine of the number of thieves-in-

<sup>24</sup>Figure A.6 shows the map of the variation in *rayon*-level exposure to the amnesty.

law coronations happened in *rayon*  $i$  in decade  $t$ . Period indices run from  $-3$  to  $5$  and represent the decade relative to amnesty  $w = 0$  — decade period of 1953. The variable Exposure to amnesty $_{i,1954-53}$  — is the exposure to the amnesty of 1953. In this specification, we interact it with the  $D(w = l)$  — a dummy equal to one if decade  $w = l$ . Periods from  $l \in [-3; 0]$  represents pre-amnesty period and periods from  $l \in [1; 5]$  represents post-amnesty period. Coefficients  $\gamma_l$  with  $l \geq 1$  capture the effect of amnesty in the post period, and the ones with  $l \leq 0$  capture pre-trends.

These specifications allow us not only to estimate the immediate effect of the amnesty on the spread of prison culture — and homophobia being its part as a result of “bitch wars” — but also allow us to absorb time-invariant variation coming from the endogenous location of the Gulag camps. In addition to the location ( $\mu_i$ ) and decade ( $\lambda_t$ ) fixed effects, we also consider specification with controls ( $X_{i,t}$ ); in particular, we are concerned that due to proximity to Gulags local economy may have unobservable trends in economic development and demographics that will also affect the need for enforcement of criminal norms. Hence we add controls for the Gulag labor camp-specific trends in some specifications. We cluster standard errors on the *rayon* level.

### 3.1.2 Results on Coronations of Thieves-in-Law

Table 1 contains the results of the canonical DD specification in Equation 1. Column I controls only for *rayon* and decade fixed effects. It suggests, that a one-standard-deviation larger exposure to the amnesty results in a 6.5-percent larger increase in the number of thieves-in-law coronations. To address possible confounding trends from local economic development driven by convict labor, in Column II we control for the interaction of log distance to the nearest Gulag camp and decade dummy. In Columns III and IV, we also add interactions of decade fixed effects with the total size of the nearest Gulag camp and total *rayon*’s exposure to the Gulag system. We measure the latter in the same way as our exposure to the amnesty but use total labor camp population throughout Gulag history instead of camp’s number of amnestied prisoners —  $\sum_{g \in G_{All}} \left( \frac{\# \text{ total prisoners}_{g,1923-60}}{\text{Distance}_{i,g}} \right)$ . Finally, in case, these trends are driven by the industry in which convicts were employed, in Column VI we also control for the interaction of the industry fixed effects of the nearest labor camp with time fixed effects. Throughout Columns II–VI the coefficient of interest remains significant and does not change its magnitude much. In the most conservative specification of Column VI

one-standard-deviation larger exposure to the amnesty results in a 6-percent larger increase in the number of thieves-in-law coronations.<sup>25</sup> These results are consistent with [Lonsky \(2020\)](#) who found that the proximity to the nearest Gulag camp was a strong predictor of the presence of the thieves-in-law.

**Table 1** – Locations More Exposed to Amnesty of 1953 Had Larger Increase in the Number of Coronations

	I	II	III	IV	V
	Dependent variable: lhs # coronations (mean 0.007 st.dev. 0.115)				
Exposure to 1953 amnesty x Post amnesty	0.065*** (0.002)	0.065*** (0.002)	0.065*** (0.002)	0.060*** (0.003)	0.060*** (0.003)
R-squared	0.376	0.377	0.377	0.408	0.415
Observations	23,260	23,260	23,260	23,260	23,260
<i>Rayon</i> FE	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓
Min. distance to Gulag camp x time trends		✓	✓	✓	✓
Population of the closest Gulag camp x time trends			✓	✓	✓
Exposure to total Gulag population x time trends				✓	✓
Convict labor industry FEs of closest Gulag camp x time trends					✓

*Notes:* The unit of observation in this Table is a county (*rayon*)-decade. The dependent variable is an inverse hyperbolic sine of the number of coronations of thieves-in-law in *rayon i* decade *t*. Column II controls for the interaction of minimum distance from the population-weighted centroid of *rayon* to one of 475 ever-existing Gulag camps interacted with time fixed effects. Column III controls for the interaction of the total population of the nearest ever-existing Gulag camp interacted with time fixed effects. Column IV controls for the exposure to the total Gulag population. Column V controls for the convict labor industry fixed effects of the nearest ever-existing Gulag camp interacted with the time fixed effects. Standard errors clustered at the *rayon* level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Our results do not depend on the functional form of how we measure exposure to amnesty. [Table C.4](#) reports the specification from Column V of [Table 1](#) but uses alternative functional forms of weights to compute exposure to the amnesty. Column I shows the baseline measure for comparison. Our alternative measures of exposure to the amnesty are essentially a more flexible version than using different distance bins to omit (or include) exposure from more distant Gulag camps. We assume logarithmic and square root (i.e., slower) decay of exposure to the amnesty with distance in Columns II and III. We allow for a less skewed distribution of the number of amnestied prisoners, by using log and the square root of prisoners in the numerator in Columns IV and V. We also allow for polynomial iceberg costs (i.e., faster)

<sup>25</sup>Our results hold when we use alternative ways of computing standard errors. Panel A of [Table C.3](#) clusters standard errors on the province level (83 clusters) and Panels B and C provide results for standard errors adjusted for spatial correlation on 150 and 300 km thresholds.

in Column VI. Here quadratic terms in the denominator basically assign zero weights to faraway Gulag camps. All specifications yield significant coefficients comparable to the baseline, with the baseline and polynomial decay specifications being the most conservative and the logarithmic one in Column IV yielding the largest magnitude of the coefficient. We do not have a prior, which functional form should be preferred, and use the baseline in Column I as the one with the most conservative estimators. Finally, Columns VII and VIII report specifications with the most simple measure of exposure to the amnesty: total number (and log number) of released prisoners in *rayon i* (i.e., only taking into account amnesty from Gulag camps located inside *rayon i* and assigning zero weights for outside camps). While the resulting coefficients are significant we prefer less arbitrary and more flexible specifications with decay rate in exposure to the amnesty.<sup>26</sup>

Our results are also not driven by a particular geographical region of Russia. Figure C.1 estimates the preferred specification from Column V of Table 1 dropping one Russian province at a time.<sup>27</sup> All estimated coefficients remain positive and significant. Dropping Chelyabinskaya Oblast decreases the coefficient the most from 0.060 to 0.056. This direction is logical as there were many large Gulag camps in Chelyabinskaya Oblast famous for their metallurgy and overbearing masculinity of local males.<sup>28</sup> Dropping St. Petersburg increases the coefficient the most from 0.060 to 0.062. This change is also in-line with the fact that St. Petersburg is the second largest Russian city with a large economy because of which it had a large number of coronations without having many convict labor camps around it.

While we observe coronations without measurement error only on the *rayon* level we can also re-estimate Equation 1 on the municipality level by using coordinates of the *rayon's* largest city for those observations where we don't know the exact city. In this trade-off, we get a classical measurement error in the outcome variable (that increases standard errors)<sup>29</sup> but we can more precisely capture exposure to amnesty, use municipality fixed effects instead of *rayon* fixed effect, and allow us to be more consistent throughout the paper, as our dependent

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<sup>26</sup>Treatment with the amnesty from the nearest Gulag camp is not applicable for the *rayon*-level specifications as there may be multiple camps in the same *rayon*. However, we discuss this measure later in Section 3.2.2.

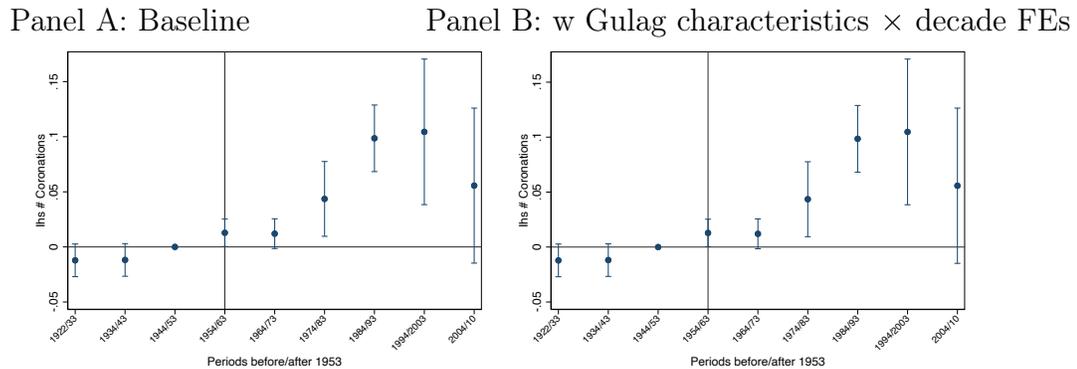
<sup>27</sup>Russia has 83 provinces (or federal subjects) that include *oblasts*, *kraya*, ethnic republics, autonomous regions, and two cities, Moscow and St. Petersburg. We do not consider two temporarily occupied territories, the Autonomous Republic of Crimea and the city of Sevastopol, which are part of Ukraine.

<sup>28</sup>E.g., see <https://russia.fandom.com/ru/wiki/%D0%A7%D0%B5%D0%BB%D1%8F%D0%B1%D0%B8%D0%BD%D1%81%D0%BA>.

<sup>29</sup>Exposure to the amnesty does not correlate with a dummy for having no information on the precise municipality of the coronations. Thus we assume that this measurement error is random.

variables in the next section are measured on the municipality level. Table C.5 re-estimate Table 1 on the municipality-level. The estimates appear substantively similar and significant.

**Figure 2** – FDDD Analysis: No Increase in Number of Thief-in-law Coronations Before 1953 and Increase After the Amnesty



*Notes:* This Figure graphs the results of estimating Equation 2. The dependent variable is the inverse hyperbolic sine of the number of coronations of thieves-in-law. Panel A uses controls from Column I of Table 1. Panel B uses controls from the Column V of Table 1. The p-value for the joint significance of the pre-trend’s coefficients is equal to 0.7222 in Panel A and 0.7557 in Panel B. This figure reports 95th-percent confidence bands. Columns I and II of Table C.6 contain the estimates for the specifications in Panel A and B, respectively. Standard errors clustered at the *rayon* level.

Figure 2 reports the results of the FDDD specification in Equation 2. Panel A presents results using the specification with the minimum set of controls (as in Column I of Table 1). We set a decade before the amnesty as a reference point. We see that within the next decade after the 1953 amnesty, locations with one standard deviation higher increase in exposure to the amnesty experienced by 2% increase in the number of thieves-in-law coronations in 1954–1963 and 1964–1973. The effect persisted and intensified over time, suggesting that prison norms became more pronounced over time, reaching approximately 5% in 1974–1983, and 10% after 1984.<sup>30</sup> At the same time, we see no pre-trends. Our results also hold when, in Panel B, we additionally control for the full set of controls from Column V. By doing so, we absorb possible variation coming from trends in local economic development.<sup>31</sup>

Finally, as we are concerned by the potential biases from the “forbidden comparisons” as well as heterogeneous effects, we re-estimate the event-study specification in Panel A of

<sup>30</sup>Results also hold if we bin the end-points, so that 2004–2010 is included in the 1993–2003 bin (Schmidheiny and Siegloch, 2019; Borusyak, Jaravel and Spiess, 2021).

<sup>31</sup>Our results also hold when, in Figure C.2, we re-estimate Equation 2 on the municipality level.

Figure 2 using the methodology by [Borusyak, Jaravel and Spiess \(2021\)](#).<sup>32</sup> The resulting estimates shown in Figure C.3 are qualitatively very similar to our ordinary least squares (OLS) one; hence, we conclude that the issues of forbidden comparisons and the biases due to heterogeneous treatment effects are unlikely to affect our estimates.

Overall, these results suggest, that in the aftermath of the amnesty of 1953, prison culture indeed spread and culminated in the coronation of thieves-in-law needed for its supervision. In the next section, we show how the amnesty affected one of the most salient manifestations of the prison culture — homophobia.

## 3.2 Amnesty of 1953 and Outcomes Related to Prison Norms in the Long Run

In this Section, we explore the long-run effect of exposure to the 1953 amnesty on a set of outcomes related to homophobia. As about 1.2 million prisoners were released simultaneously and settled in the nearby areas, we expect this influx to bring prison culture into civilian life. Here we explore the effect of the amnesty on a variety of contemporary outcomes: expressions of homophobia in surveys, the number of hate crimes against LGBTQ+ persons, and homophobic slurs on social media.

### 3.2.1 Empirical Specification and Identification

We estimate the following specification:

$$y_i = \alpha + \beta \cdot \text{Exposure to amnesty}_{i,1954-53} + \eta X_i + \varepsilon_i, \quad (3)$$

where  $y_i$  is one of our measures of intolerance toward gay persons in location  $i$ . Our main explanatory variable —  $\text{Exposure to amnesty}_{i,1954-53} \equiv \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\text{Distance}_{i,g}} \right)$  — is the exposure to the amnesty of 1953.<sup>33</sup> Because Gulag locations were endogenous to the economic geography of the Soviet Union, weighting by distance to Gulag camps may confound our results. For example, a location near Gulag’s labor camp may become an industrial center with a large number of low-skilled manufacturing workers who are homophobic due to socio-economic conditions rather than the amnesty of 1953. And because our measure of exposure

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<sup>32</sup>We use it since it is the only method that provides a stable and documented implementation that can be deployed for continuous treatments.

<sup>33</sup>Similarly to the specification in Section 3.1, here we also assume linear decay of exposure to the amnesty with the distance. We provide robustness for this measure later in the robustness section and Table C.9.

to the amnesty is correlated with the distance to that nearby camp we can capture the effect of Gulag on the local economy rather than the effect of prison culture. In the event-study specification presented in the previous Section, we were able to absorb location fixed effects and directly test for pre-trends. For this specification, our identifying assumption is that exposure to the amnesty is uncorrelated to the factors that may affect homophobia conditional on controls related to the Gulag system. Hence, we assume, that conditional on the geography of Gulag camps ( $X_i$ ), the number of released prisoners is exogenous to counterfactual future changes in the anti-gay sentiments. Because we always control for the distance and size of the nearest Gulag camp, total exposure to the Gulag camps system, and industrial composition of the nearest camp, our results are unlikely to be confounded by the (potentially endogenous) determinants of the location of the labor camps. The effect we capture is therefore not explained by the presence of the Gulag and its influence on the local economy but rather by the magnitude of the amnesty of 1953 from nearby camps.<sup>34</sup> Tables C.1 and C.2 additionally show that the amnesty is not correlated to pre-1953 levels and changes in Gulag population or its industrial composition and that the exposure to the amnesty of 1953 is uncorrelated to pre-1953 changes and levels in populations, electricity production, manufacturing output, sex ratios, shares of the adherents of various religious denominations, and the number of thief-in-law coronations.<sup>35</sup> We cluster standard errors on the province level for specifications where our observation is the location (for crimes against LGBTQ+ and homophobic slurs in vk.com) and cluster on respondents' location for specification with survey data.

### 3.2.2 Results on Homophobia

Table 2 presents our results from the estimation of Equation 3. The dependent variable in Panel A is an inverse hyperbolic sine of the number of crimes against gay persons in the city. The dependent variable in Panel B is the inverse hyperbolic sine of the number of mentions of homophobic slurs in the last 1,000 posts on vk.com. The dependent variable in Panel

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<sup>34</sup>Note, that controlling for Gulag's geography does not address the fact that amnesty may affect homophobia, not through prison culture but a change in economic conditions due to the inflow of a large number of ex-prisoners. We show that our results are not driven by this explanation separately in Section 3.4.

<sup>35</sup>We also need the amnesty to be uncorrelated with the pre-treatment levels and changes in homophobia; however, this assumption is plausible, because according to the historical and sociological literature discussed in Appendix B, expressions of homosexual orientation were tolerated in Russian society before Stalin's tenure (Healey, 2001, 2017).

C is a dummy, equal to one if the respondent said that he/she would not like homosexuals to be their neighbors. To make our coefficient of interest more interpretable we normalize exposure to the amnesty to have a mean of 0 and a standard deviation of 1.

**Table 2** – Locations More Exposed to Amnesty of 1953 are More Homophobic Now

	I	II	III	IV	V	VI
<i>Panel A:</i>	<u>Dependent variable: lhs # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty	0.0311*** (0.0100)	0.0307*** (0.0102)	0.0303*** (0.0102)	0.0303*** (0.0102)	0.0267*** (0.0101)	0.0273*** (0.0101)
R-squared	0.011	0.011	0.011	0.011	0.015	0.018
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	<u>Dependent variable: lhs # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty	0.0143*** (0.0050)	0.0143*** (0.0051)	0.0140*** (0.0051)	0.0140*** (0.0052)	0.0107* (0.0055)	0.0110** (0.0054)
R-squared	0.013	0.013	0.013	0.013	0.035	0.037
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	<u>Dependent variable: 1 (Dislike homosexuals) (mean 0.616 st.dev. 0.486)</u>					
Exposure to 1953 amnesty	0.1201** (0.0466)	0.1277*** (0.0406)	0.1281*** (0.0414)	0.1180*** (0.0414)	0.1165*** (0.0392)	0.1337*** (0.0506)
Survey-year FEs	✓	✓	✓	✓	✓	✓
R-squared	0.005	0.006	0.006	0.012	0.012	0.066
Observations	6,519	6,519	6,519	6,519	6,519	6,519
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* The unit of observation in Panels A and B is a town/village with a population of at least 1,000 people. The unit of observation in Panel C is a respondent. The dependent variable in Panel A is an inverse hyperbolic sine of the number of crimes against LGBTQ+ people in 2010–2015. The dependent variable in Panel B is an inverse hyperbolic sine of the number of homophobic slurs in the latest 1,000 public posts on vk.com. The dependent variable in Panel C is a dummy equal to 1 if respondents would not like having homosexuals as their neighbors. All Columns in Panel C include survey-year fixed effects because it pools the data from five different surveys (the 7th wave (2017) of the WVS, 2nd (2010) and 3rd (2016) waves of LiTS, and 2013's and 2015's Levada Courier Survey). Panel C weights all observations using survey population weights. In Panels A and B standard errors clustered at the province level are in parentheses (83 clusters). In Panel C standard errors clustered at the location level are in parentheses (495 clusters). \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Column I contains results for the bivariate regression and Columns II–VI gradually include additional controls, to keep our specifications in Table 2 as comparable to those in Table 1. Because, we are unable to control for the fixed effects of the location, in Column II, we flexibly control for the locations' coordinates. Column III controls for the distance to the closest existing Gulag camp and Column IV controls for its total size. We control for the total exposure to the Gulag system in Column V and dummies for the industry compo-

sitions of the closest Gulag camp in Column VI. The resulting coefficients appear positive and highly significant in all specifications.

Consider Column VI of Panel A, a one-standard-deviation increase in the exposure to the amnesty increases the number of crimes against gay persons by 2.7 percent or 1.3 of its mean. In Column VI of Panel B, a one-standard-deviation increase in the exposure to the amnesty increases the number of homophobic slurs on social media by 1.1 percent or 1.4 of its mean. Panel C presents results with the survey data on individual intolerance toward homosexuals. Note, that in addition to the controls in Panels A and B, in Panel C we always control for the survey-year fixed effects to address the fact that the data is pooled from five different survey waves. The resulting coefficient in Column VI suggests that a one-standard-deviation increase in the exposure to the amnesty increases the probability of a respondent being intolerant toward gay persons by 13.3-percentage-points (22 percent of the mean).<sup>36</sup>

Overall, we find that exposure to the amnesty of 1953 positively affects all three measures of intolerance toward homosexuals. The effect is statistically significant and explains a large share of the variation in these variables. As these measures are based on different dimensions of discrimination against gay persons and generated by different data-generation processes we see this as compelling evidence that the amnesty of 1953 had a profound effect on cultural acceptance of homosexuality in Russia.

### 3.3 Robustness Checks and External Validity

Here, we provide additional robustness and sensitivity checks. We consider robustness to (i) inclusion of additional geographic and individual controls; (ii) exclusion of each province at a time; (iii) usage of alternative functional forms of exposure to the amnesty; (iv) usage of alternative ways of computing standard errors; and (v) usage of coarser, *rayon*-level aggregation.

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<sup>36</sup>Note that the coefficients for, both, extreme level of homophobia (hate crimes in Panel A) and every-day level of passive homophobia (language in social media in Panel B) have very similar magnitudes, e.g., in terms of their means. The magnitudes of the coefficients are larger for the survey-data results in Panel C. Residential homophobia is more comparable with the homophobic slur in its mundane nature and one would expect the estimands to be more similar. We believe that the difference happens for two reasons. First, individual survey data is based on a sample of data while slur is measured for all municipalities in Russia. Second, slurs are measured very precisely with people unconsciously using them in their posts but in Panel C we combine the direct effect of amnesty on homophobia and its effect via social desirability bias, i.e., respondents saying that they are homophobic because they know that this is the most accepted behavior in their location (Coffman, Coffman and Ericson, 2017).

We first show that our results hold when we control for a set of additional controls in Table C.7. Column I contains the baseline specification for reference. In Column II, we control for the location-type fixed effects. This control is more exogenous than the contemporary population as it only classifies locations into official categories based on location’s importance: provincial capital, city, township, and big (*poselok*) or small (*selo*) village. Then we show that our results hold when we control for the log of the population in 2020 (Column III). The population itself is a “bad” control as it is affected by the Gulag system as shown in Mikhailova (2012); however, for the specification with the *ihs* number of crimes against gay persons, it may be beneficial to flexibly control for the population on the right-hand side because large cities may have more anti-gay crimes mechanically. It is less important to control for the population for the other two outcomes of interest, as a homophobic slur is measured relative to the total posts on social media and we use population weights supplied by the survey in the individual-level homophobia regressions. Indeed, the coefficient of interest for the specification with the *ihs* of crimes in Column II decreases in magnitude; however, remains significant. Coefficients for the specifications with other dependent variables remain stable and also significant. In Column IV, we show the robustness of our results to the inclusion of the regional (federal districts) fixed effects.<sup>37</sup> These regions are large enough to have enough identifying variation but at the same time may absorb some geographic variation in the vast Russian territory. Reassuringly, our results hold. In case the effect is driven by ethnic republics that may have different demographics, in Column V we add a dummy for them. Finally, in Column VI, we show that our results are robust to the inclusion of province fixed effects, essentially allowing each province to be on a separate intercept.<sup>38,39</sup>

In Table C.8, we employ an additional set of individual-level demographic controls, available for our survey-based measure of homophobia. To address the possible differential effects of prison culture on different demographics, Column I controls for the gender and age of the respondent. Column II includes dummies for marital status. Columns III and IV include

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<sup>37</sup>Russia is divided into eight federal districts representing a collection of provinces: Central, Northwestern, Southern, North Caucasian, Volga, Ural, Siberian, and Far Eastern.

<sup>38</sup>Note, that the coefficient for individual intolerance toward gay persons (Column VI of Panel C) significantly increases in magnitude. This happens because the city of Moscow’s fixed effect is now included. We provide relevant discussion below, where we show the robustness of our results to the omission of one province at a time in Figure C.4.

<sup>39</sup>Note, that adding province fixed effects is not a straightforward thing to do. We think that it is not correct to include province fixed effects because in this case, we would identify within-province exposure to the amnesty and control for within-province proximity to Gulag camps. While our baseline results hold when we include province fixed effects, we are unsure whether these results can be interpreted meaningfully.

respondents’ ethnicity and religion fixed effects, respectively. Column V additionally controls for respondents’ education. Finally, we control for the respondent’s occupation and household income in Column VI. Our results remain highly significant throughout all specifications.

To demonstrate that our results are not driven by any specific province, Figure C.4 reports the robustness of our preferred estimate in Column VI for all our three dependent variables to dropping one province at a time. The estimated coefficient always remains significantly different from zero. For the number of hate crimes (Panel A), dropping Volgogradskaya Oblast, decreases the coefficient the most, from 0.0273 to 0.0247. Dropping the Sahalinskaya Oblast — an island in the Pacific Ocean — increases the coefficient the most, from 0.0273 to 0.0385. For the homophobic slur (Panel B), dropping Tomskaya Oblast, decreases the coefficient the most, from 0.0110 to 0.0100. Dropping the Sahalinskaya Oblast also increases the coefficient the most, from 0.0110 to 0.0157. For the survey-based responses (Panel C), dropping Volgogradskaya Oblast, decreases the coefficient the most, from 0.1337 to 0.1110. Dropping the city of Moscow increases the coefficient the most, from 0.1337 to 0.6731. This aberration may be explained by the fact that Moscow constitutes 10% of the survey data and that Moscow is a relatively progressive city and attracts population being the most prosperous region of Russia while having a lot of Gulag camps nearby in 1953. For consistency, we choose to keep Moscow (despite being an outlier), especially as the estimate is more conservative in its magnitude.

Our results hold if we use alternative measures for exposure to the amnesty. In the baseline measure, we used  $\text{Exposure to amnesty}_{i,1954-53} \equiv \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1953-52}}{(\text{Distance}_{i,g})^\sigma} \right)$ ,  $\sigma = 1$ ; however, we can assume a faster (or slower) decay of the effect of inflow of prisoners. These alternative measures of exposure to the amnesty are essentially a more flexible version than using different distance bins to omit towns far away from gulags, as larger  $\sigma$  assigns zero weights to faraway Gulag camps. Hence, we repeat our baseline results but with alternative measures of exposure to the amnesty (as we do in Table C.4 in Section 3.1). Panel A of Table C.9 contains results for the ihs number of crimes against gay persons, Panel B — ihs incidences of homophobic slurs, and Panel C — individuals’ homophobia. All specifications result in qualitative similar estimates. Column I reports baseline estimates from Column VI of Table 2 for comparison. Columns II–V show specifications with a slower rate of decay and specification in Column VI — faster. All specifications in Columns II–V appear significant,

suggesting the robustness of our results to alternative weights. Specification in Column VI, with polynomial weights  $(\text{Distance}_{i,g}^2 + \text{Distance}_{i,g})^{-1}$ , appears to be not significant in Panels A and B but significant in Panel C. We believe that because Russia is large and has a considerable distance between cities and villages, in specifications in Panels A and B, where observation is every settlement with a population above 1,000, very few locations will be treated by the amnesty if its effects decay will be too fast. Panel C uses individual-level observations from nationally representative surveys. Hence, most of them are urban and since Gulag camps were often located near cities, more observations are likely to be quite close to labor camps to be treated even with fast-decay weights. Overall, we find that our results appear to be robust to the usage of alternative measures of exposure to the amnesty, with slower-decay weights producing more significant results.<sup>40</sup> Additionally, in Table C.11 we show that our results are robust to specification where we use the total number of prisoners released within 50, 150, 300, 500, 750, and 1,000 km of the location.<sup>41</sup>

Table C.12 shows the robustness of our location-level results from Table 2 to alternative methods of clustering. Our results hold when instead of clustering by province, we use spatial HAC, adjusting for possible spatial correlation in exposure to the amnesty.

Finally, we also replicate Panels A and B of Table 2 on the *rayon* level to be comparable with the *rayon*-level specification in Section 3.1.<sup>42</sup> For this we compute *rayon*-level number of crimes against LGBTQ+ and homophobic slur and show results in Panels A and B of Table C.13. The coefficients of interest remain positive and significant, consistent with our preferred location-level specification.

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<sup>40</sup>We believe that it is incorrect to use the number of released prisoners from the nearest Gulag camp as the alternative measure of exposure to the amnesty. As Figure 1 suggests, some locations may be surrounded by several closely located Gulag camps resulting in severe measurement error. As a result, we would underestimate the exposure of locations with several nearby Gulag camps and overestimate the exposure of locations far away from Gulag camps. Nevertheless, for completeness, we report these results in Table C.10; while the resulting coefficients have the correct sign, they are insignificant, in line with our understanding of the measurement error. Moreover, all the R-squares are smaller than in the corresponding specifications of Table C.9 suggesting that exposure to the amnesty from the nearest Gulag does not explain the same amount of variation in homophobia as exposure from the multiple nearby camps.

<sup>41</sup>We can see the effect of the amnesty across all Panels; however, Panels A and B exhibit larger and more significant coefficients with thresholds below 500 km while Panel C — for thresholds above 150 km. We believe that the latter result is difficult to interpret since Panel C uses only a subset of Russian municipalities.

<sup>42</sup>We do not replicate Panel C because the observation there is a respondent, and aggregation of the exposure to the amnesty from respondent’s location to their *rayon*’s centroid location just introduces measurement error.

**Permutations and placebo estimates** In this section, we provide a set of additional placebo tests that demonstrate that our results are not driven by potentially unobserved factors that might correlate with exposure to the amnesty of 1953.

First, in Figure C.5 we plot the coefficients of our baseline specification in Column VI but use the number of released prisoners for all other years from 1929 to 1960.<sup>43</sup> Results for the numbers of crimes against LGBTQ+ are shown in Panel A of Figure C.5. The coefficients from each regression are placed chronologically from 1929 (with almost zero variation from only two labor camps) to the end of the Gulag system in 1960. The baseline coefficient for the amnesty of 1953 (in gray) is on the red line indicating it as the reference and is the largest in magnitude. We see pre-1953 coefficients are mostly clustered around zero except one for 1931 and 1939, although they are insignificant on any conventional level. This is likely to happen due to little variation in the number of released prisoners: the Gulag system was mostly steadily growing (see Figures A.3 and A.4) until 1941 and continued to grow after its local minimum in 1946. The coefficients for 1954 and 1956 appear to be positive and not well-defined zeroes; however, they are smaller than the true estimate and are statistically insignificant. Panels B and C show results of similar exercises with the number of homophobic slurs in VK and individuals' homophobia, respectively. Some of the coefficients are positive and significant but are small in their magnitude. This is consistent with the fact that some released prisoners may still choose not to return home thus contributing to the growth of prison culture. The true coefficients are by far the largest in magnitude suggesting, that the amnesty of 1953 was indeed the most significant event in the history of Gulag's prison releases. Overall, it is safe to say that only the amnesty of 1953 consistently affected our outcomes on intolerance toward gay persons.

Second, we use the fact that homophobia does not appear in female prisons and that we have information on what labor camps were female Gulag camps.<sup>44,45</sup> We compute exposure to the amnesty of 1953 from them and replicate our baseline results in Table C.14. We find no effect of the release of female prisoners on homophobia across all Panels. All the

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<sup>43</sup>Even though the Gulag labor camps system appeared in 1922 until 1928 it was only one labor camp at the Solovetsky islands in the White Sea and the first camp-level decrease in the number of prisoners happened in 1929 when the Solovetsky labor camp on the island was closed and moved across the strait to the mainland town of Kem'.

<sup>44</sup>All camps could have both male and female prisoners but five labor camps had female-specific complexes: Akmolinsk Camp of Wives of Traitors to the Motherland in Karaganda, Temnikovsky labor camp, Podgornyy labor camp, Dzhangirsky labor camp, and Balahninsky labor camp.

<sup>45</sup>Ananyev and Poyker (2024) demonstrate that prison experience affects homophobia only through males.

coefficients are way smaller in magnitude than the baseline and are negative. These results are in line with our hypothesis that only male ex-prisoners spread homophobia although one needs to note that variation in Table C.14 results from computing the exposure to the released prisoners from just five camps.

Third, in the spirit of Dell and Olken (2020), we permute the location of the labor camp and the size of the amnesty.<sup>46</sup> Then we compute exposure to amnesty based on these counterfactual Gulag camps. We do it 500 times and then run our baseline specification. Figure C.6 compares our true point-estimates to the distribution of point-estimates obtained using counterfactual amnesties from the 153 labor camps existing in 1953. The true coefficient is within the 5th percentile of all counterfactual coefficients for all three dependent variables. Similarly, Figure C.7 compares our true point estimates to the factual amnesty size but permutating the location of the 153 existing labor camps between 475 ever-existing labor camps. We see that the true point estimates (for all three outcome variables) are in the 10th percentile of the coefficients received from the placebo regressions. This permutation test shows that the location of camps really existing in 1953 and the real size of the amnesty rather than anything else related to the location of Gulag camps are of specific importance for current anti-gay sentiments.

**Effect of amnesty of 1953 on other Soviet Republics** We study the effect of the amnesty of 1953 on homophobia only in Russia because we don't have data on various sets of homophobic outcomes in other post-Soviet countries.<sup>47</sup> However, since LiTS contains a question on residential homophobia, we test, whether the results we find in Panel C of Table 2 hold for other Soviet Republics. For this, we re-estimate Panel C of Table 2 on the sample of all Soviet Republics that ever had Gulag labor camps (without Russia) and additionally add country fixed effects. Table C.15 reports these results. The resulting coefficients are significant across all Columns, suggesting the effect of amnesty on residential homophobia not only in Russia but also in other post-Soviet countries exposed to Stalin's Gulag system.

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<sup>46</sup>When we permute amnesty location, we use the real locations of 475 camps that we know to permute locations of 153 camps existing in 1953 with their true amnesty sizes. When we permute amnesty size, we draw amnesty size without replacement from the 153 camp-amnesty observations.

<sup>47</sup>Additionally, according to Healey (2001, 2017), while the Russian society tolerated expressions to homosexuality, other places that later became parts of the Soviet Union exhibited substantial anti-gay sentiments during the time of the Russian Empire. In particular, Healey (2001) mentions Azerbaijan, Georgia, and the Zaporizhzhia region of Ukraine.

**Effect on consumption of ‘prison’ music** We can also test whether exposure to the amnesty affected other outcomes related to the prison culture. Probably the loudest expression of prison culture in Russia is music preference, as a whole genre was invented to romanticize prison life and its culture. This genre — Russian Chanson — was created in Gulag camps by evolving from the harsh romance, restaurant, and Odesa street songs of the 1920s, and was officially recognized as a stand-alone prison music genre in 1991.<sup>48</sup>

We collected data on the consumption of Russian Chanson in two steps. First, we perused the official charts of Russian music and chose the top 10 Chanson musicians.<sup>49</sup> Second, we downloaded *rayon*-level searches of these musicians from the Russian most popular search engine — Yandex. Then we replicate our baseline specification (Equation 3) on *rayon*-level using the inverse hyperbolic sine of music searches while flexibly controlling for the log of the total number of searches as the dependent variables. We report results in Panel A of Table C.16. We find a strong positive effect of exposure to amnesty on the consumption of prison romanticism music. We additionally show results for specifications where we use consumption of music by two famous Russian rappers Egor Kreed and Slava Marlow (in Panels B and C) and Alla Pugacheva — Russian most celebrated singer for more than 60 years (in Panel D); however, we find no robustly significant effect on consumption of non-prison music.

### 3.4 Alternative Explanations

In this section, we address possible alternative explanations for our long-run effects. Then we discuss possible mechanisms of how amnesty affected attitudes toward gay persons.

**Endogenous proximity to Gulag camps** Locations closer to Gulag camps may be different in terms of local economic composition. There is consistent evidence that Gulag labor camps were strategically placed to supply a coerced labor force for big industrial construction sites, timber production, mines, water channels, and railroad construction (Gregory

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<sup>48</sup>Songs of this genre usually combine a simple melody with the singer’s ruminations on the hardship of life of a career criminal, sentimental expressions of appreciation of the narrator’s mother, as well as general observations about the unfairness of life. One of the famous examples of this genre is the 1998 song by Mikhail Krug, “Vladimirsky Central” (“The Central Prison of Vladimir”). The song is about a career criminal celebrating the coming of spring in captivity and remembering his first love. More information on Russian Chanson can be found here: [https://en.wikipedia.org/wiki/Blatnaya\\_pesnya](https://en.wikipedia.org/wiki/Blatnaya_pesnya).

<sup>49</sup>In particular, we used searches for Villie Tokarev, Grigorii Leps, Lesopoval, Denis Maydanov, Katya Ogonek, Nikolay Rastorguev, Mikhail Schufutinsky, Zheka, Mikhail Krug, and Ivan Kuchin.

and Lazarev, 2003; Khlevniuk, 2004; Miller and Smith, 2015; Gallen, 2019). As a result, it (differentially) affected the long-run economic development of these locations (Mikhailova, 2012; Toews and Vézina, 2020) and, because modernization is generally associated with more inclusive values (Inglehart and Welzel, 2005), could affect cultural norms such as attitudes toward gay individuals.

Our specification, however, allows us to directly control for the endogenous locations of Gulag labor camps by controlling for the distance to the closest labor camp, its size and industry, total exposure to the Gulag system, and the coordinates of the location.<sup>50</sup> This is possible because our identifying variation comes from the exogenous number of released prisoners of that unique amnesty rather than total exposure to labor camps itself. As a result, while the existence of labor camps could affect (both, positively and negatively) attitudes toward gays directly through the economic development of the region, our specification absorbs this effect and while we can't identify it separately it does not confound our results. It is also worth keeping in mind that the specification in Equation 2, where we estimate the effect of exposure to the amnesty on the emergence of prison culture as measured by the coronations of thieves-in-law, does include location fixed effects and yields substantively similar results (see Section 3.1).

Overall, our effect is driven by the variation in amnesty exposure rather than the potentially endogenous location of camps. Other *mechanisms*, however, remain plausible: such as the effect of amnesty being driven by economic underdevelopment, gender norms, religion, and other factors. We address these concerns below.

**Economic (under)-development** One of the important concerns is that the amnesty itself affected local economic development as ex-convicts could hinder economic growth through criminal activities. We address this concern by showing that conditional on Gulag controls, exposure to the amnesty does not correlate with economic outcomes. Table C.17 replicates Table 2 but uses log average household income and population as the main dependent variables. We observe that in none of the columns, the exposure to the amnesty is significantly associated with contemporary wages. The amnesty exposure is positively corre-

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<sup>50</sup>We use all ever existing labor camp locations when computing this minimal distance/size/industry even if the camp was already closed by 1953. We do so because we intend to absorb the confounding effect of endogenous labor camp location and omitting already closed camps would introduce non-classical measurement error. However, results hold if we compute these variables using only a set of existing in 1953 camps.

lated with the current population, but the coefficient becomes insignificant and its magnitude drops fourfold once we control for the exposure to the total Gulag population. These results suggest, that the effect of amnesty on the economy was not economically strong and the long-run economic development is likely to be driven only by the existence of labor camps rather than how many people were released in 1953.

Additionally, economic underdevelopment is unlikely to explain our results, as findings by [Mikhailova \(2012\)](#) show that areas near Gulag camps have higher levels of population and regional economic development. Hence, it is likely that this mechanism works against us finding the negative effect of amnesty on tolerance toward gay persons.

**Change in crime rates** An alternative explanation would be not the horizontal and vertical spread of homophobia norms among exposed locations but a direct effect on the number of criminals and/or the spread of homophobia only between the local criminals.

To demonstrate that this mechanism does not explain our results we, first, show that the amnesty by itself does not explain crime rates and the number of criminals in Russian locations today. Unfortunately, we do not have the number of general crimes for *all* location or even *rayons*. However, we obtained data on the number of crimes and number of criminals for the 200 largest Russian cities for 2010–2015 — the same years as data on crimes against gay persons.<sup>51</sup> Table [C.18](#) replicates specification in Table [2](#) but uses the log number of crimes per capita as the dependent variable. The positive and significant coefficient in Column I indicates that more exposed cities have a larger number of crimes. However, the magnitude and significance of the coefficient fall when we start to control for the coordinates and total Gulag exposure in subsequent columns, essentially having zero coefficients in our preferred specification with Gulag geography controls (Column VI). Hence, the crime is likely to be explained by Gulag-driven economic factors rather than that one amnesty in 1953.<sup>52</sup> Nevertheless, such regressions would be confounded by the first-order effect of the Gulag system on economic development and by the effect of the amnesty on the number of thieves-in-law decreasing inter-gang violence and pushing the coefficient toward zero. Hence we propose a more clean placebo test below.

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<sup>51</sup>The alternative is to use the Russian Bureau of Statistics province-level data but it would reduce the number of observations to 83 and introduce measurement error in exposure to the amnesty.

<sup>52</sup>Figure [C.8](#) shows coefficients for the effect of the amnesty on the number of crimes for every year where the crime data are available (from 1997 to 2017). None of the coefficients is significant at the conventional level.

Prison culture is specific about discrimination of only male “passive” homosexuals and feminine men but not lesbians. Because we observe the victim of the crime against LGBTQ+ in our data, we separately construct variables for crimes against ‘gay men,’ ‘gay women,’ and ‘trans and other LGBTQ+ persons’ and re-estimate our baseline regression with these variables. Panel A of Table C.19 shows results for the crimes against gay men. We find that our estimates are significant and very similar to those in Table 2 suggesting that they drive our baseline results. At the same time, we find no effect of the exposure to the amnesty on the number of crimes against lesbians in Panel B or trans persons in Panel C.<sup>53</sup>

**Change in social values unrelated to prison norms** The question remains whether our results are driven by the spread of the prison culture rather than the general change of social values. Here we provide evidence against this alternative explanation.

We show that exposure to the amnesty of 1953 does not affect the usage of non-homophobic derogatory language on social media. If prison culture makes people just hate everyone rather than just gay persons we would also see the effect on the usage of derogatory language to other groups or of general curse words. For this, we scrape the number of such derogatory words used on the VK social network in the last 1,000 posts of each location. Then we replicate Panel B of Table 2 but use these non-homophobic slurs in social media as the dependent variables. Panel A of Table C.20 contains results for derogatory language toward women. Panel B — derogatory (non-homophobic) language used in the description of men. In Panel C the dependent variable is the number of times the most common Russian family of swear words with the root ‘huj’ (хуй) and its derivatives are used. We find no significant estimates throughout all specifications, suggesting that the amnesty only affects the homophobic aspect of the language.<sup>54</sup>

**Religion** It was documented that religion can be an important determinant of homophobia. To address this concern we show that our amnesty was uncorrelated to the latest pre-1953 available data on the prevalence of Orthodox Christianity and other major religious denom-

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<sup>53</sup>Note that our results for trans persons in Panel C need to be taken with caution as we don’t have a lot of variation in this variable.

<sup>54</sup>We also considered measuring the usage of derogatory language toward ethnic minorities and/or immigrants but there are too many possible words that can be counted as those and it makes the construction of such variable unrealistic without strong assumptions. However below we show no effect on trust toward foreigners using survey data.

inations (Catholics, Protestants, and Muslim) from the 1897 census data (see Table C.2).<sup>55</sup> Hence, our treatment is unlikely to capture any confounding effect from local religiosity that can transmit homophobia.

**Biased sex ratios and attitudes toward women** The effect on homophobia may also be either confounded by the biased sex ratios or caused by them if enough male ex-prisoners change the local sex ratios. Regarding the former, we show in Table C.2 that exposure to the amnesty of 1953 does not correlate with the levels (1897) and changes (1897-1959) in sex ratios. Moreover, after the Civil War and two World Wars, the sex ratios were skewed in the opposite direction (Brainerd, 2017) making it more difficult for us to find a positive effect on intolerance. Regarding the latter, as the average prison release was 4,500 people, we do not think that this is enough to dramatically change the sex ratios of any Russian town. Additionally, sex ratios after World War II were very correlated with the geographical coordinates; i.e., the largest ratio was in the west and it was converging to the 50/50 level in the east. As we control for the location-level coordinates in our baseline specification, this control may be even better than the province-level sex-ratio controls.

Finally, in Table C.21, using our survey data, we show that amnesty did not affect attitudes toward women that would be affected if the effect we capture is about masculinity norms rather than prison culture. We use nine different questions on different aspects of attitudes and discrimination toward women; however, none appear to be significant. Additionally, in Panel A of Table C.20 we show no effect on derogatory language toward women in social networks.

**Army** We also consider the possibility of our results being driven by the Soviet Red Army. First, we need to note that there is no evidence, that the Soviet army had elements of the prison culture in the 1950s. By the end of the USSR, the army developed a hierarchy of abuse that resembled those that had emerged in prisons (Duggleby, 1998; Herspring, 2005). This hierarchy — hazing (*dedovschina*) — was driven by the fact that conscripts serve for two years and when newly conscripted soldiers arrive, those who already served for one year may abuse the newcomers. Thus the army service at present may have a separate and independent effect on homophobia in Russia. However, given that the emergence of *dedovschina* is traced

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<sup>55</sup>The question about religion was not asked in USSR censi. That’s why we can’t show the correlation of the exposure to the amnesty with the changes in religiosity in 1897–1959.

back to the conscription reform of 1967 (Herspring, 2005), it is unlikely that it confounds our results that are based on the amnesty of 1953.

**Trust and social capital** Nikolova, Popova and Otrachshenko (2022) suggest that the Gulag system eroded trust and social capital in locations near Gulag labor camps. In Table C.22 we check the effect of amnesty on related outcomes: the respondents' level of general trust and trust toward family, strangers, and foreigners/migrants.<sup>56</sup> We find no effect of amnesty on trust measures. Overall, while the proximity to Gulag camps might have an independent effect on the measures of social capital, we find no effect of the influx of ex-prisoners on such outcomes suggesting that our findings are not driven by the decline in trust toward out-group members.

**Migration** The effect of the amnesty on homophobia could be also overestimated if there was a selective migration and more homophobic people moved into areas affected by the amnesty while less homophobic — moved out. However, in the context of Russia, it is unlikely the case. The Soviet Union and then Russia had (and still has) a system of internal migration restrictions ("*propiska*") similar to the Chinese *hukou* system. Migration in the Soviet Union was mainly driven by the allocation of university graduates to jobs via central planning mechanisms. Partial relaxation of this policy in the 2000s-2010s led to a situation when migrants could get temporary local *propiska* if they received substantial income or if their employer agreed to subsidize it. Hence, it would not create selective migration based on homophobia but rather based on job opportunities.<sup>57</sup>

### 3.5 Mechanisms

**Thieves-in-law** Previously we showed that exposure to the amnesty increased the number of coronations of the thieves-in-laws, criminals whose role is to uphold prison cultural norms. Hence, these coronations are the most reasonable proxy for our mechanism — the strength

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<sup>56</sup>Surveys that we use don't have questions on attitudes toward homeless/poor people or ethnic minorities.

<sup>57</sup>Most internal migration happens from the rural areas to regional centers and from those to the few largest cities (Moscow, St. Petersburg, or Yekaterinburg). See Markevich and Mikhailova, 2013 for the most thorough overview of Soviet/Russian demographics and economic geography. Hence, population controls in Table C.7 should account for the most attractive migration destinations.

of prison culture. To test it, we estimate the following specification:

$$y_i = \alpha + \theta \cdot \text{Ihs}(\# \text{ of coronations})_{i,1953-2010} + \eta X_i + \varepsilon_i, \quad (4)$$

where  $y_i$  is one of our measures of intolerance toward gay persons in location  $i$  and  $\text{Ihs}(\# \text{ of coronations})_{i,1953-2010}$  is an inverse hyperbolic sine of the total number of coronations of thieves-in-law in that location after 1953.

Table C.23 reports the results. Results in Panels A and B can be interpreted as elasticities: a one-percent increase in the number of coronations of thieves-in-law increases the number of crimes against gay persons by 0.95 percent and increases the number of homophobic slurs on social media by 0.38 percent. Panel C contains results for individual homophobia: a one-percent increase in the number of coronations of thieves-in-law increases the probability that the respondent is intolerant toward gays by 1.3-percentage-points.<sup>58</sup>

To evaluate what portion of the effect of the amnesty of 1953 can be attributed to the coronations of thieves-in-law, representing the strength of local prison norms, we apply mediation analysis. Under the assumption that the exposure to the amnesty of 1953 is exogenous conditional on the location of the Gulag system, the amnesty affects homophobia either directly or through the mediator — coronations. To make the computation, in Table C.24 we write down the effect of exposure to amnesty on homophobia ( $X$  on  $Y$ ) and coronations ( $X$  on  $M$ ) that we estimated previously. Then we additionally re-estimate Equation 4 with exposure to the amnesty to get the effect of  $M$  on  $Y|X$ . We compute the effect of the amnesty on the number of crimes against gay persons through coronations in Column I. We multiply the direct effect of amnesty on coronations (0.020) by the effect of coronations conditional on the amnesty (0.944) divided by the total effect of amnesty on homophobia (0.027). Almost 70.2% ( $\frac{0.9443 \times 0.0203}{0.0273}$ ) of the total effect of the amnesty on the number of crimes goes through the coronations, suggesting that prison culture is the major mechanism of the effect. Similarly, our results suggest that the coronations explain the 71.8% effect of homophobic slurs (Column II) and the 50.2% effect on individual homophobia (Column III).

**Family history** In this section, we provide evidence that prison culture is the mechanism behind the effect of amnesty on changes in attitudes toward gays. The 3rd LiTS survey

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<sup>58</sup>We match survey respondents to the number of coronations that happened in their *rayons* between 1953 and 2010.

(2016) contains the question of whether the respondent’s immediate family members served sentences in labor camps. We use this question to estimate the effect of having immediate family members (parents or grandparents) in labor camps on respondents’ anti-gay attitudes. We estimate the following specification:

$$\mathbb{1}(\text{Dislike homosexuals})_i = \beta \cdot \mathbb{1}(\text{Family member was in labor camps})_i + \eta X_i + \varepsilon_i, \quad (5)$$

where  $\mathbb{1}(\text{Dislike homosexuals})_i$  is our dependent variable from Panel C of Table 2 — a dummy variable equal to one if the respondent  $i$  would not like to have homosexuals as neighbors, and zero otherwise.  $\mathbb{1}(\text{Family member was in labor camps})_i$  is a dummy variable equal to one if the respondent said that they had an immediate family member who was in a labor camp, and zero otherwise. Matrix  $X_i$  represents a set of geographic and individual controls.<sup>59</sup>

Column I of Table C.25 reports the results of this regression without any controls and Columns II–XII gradually add baseline geographic and additional individual-level controls. We find a strong positive correlation, suggesting that descendants of Gulag camps’ prisoners are more likely to be intolerant toward gays even conditionally on such factors as income and education. Note that these results show a suggestive mechanism that bridges the connection of the Gulag system with current homophobia levels. Ananyev and Poyker (2024) show the causal effect of prison experience on an individual’s homophobia using within-person variation in prison experience and show that respondents become more homophobic if a family member returns from prison.

## 4 Conclusion

In March 2021, Russian journalist and YouTube blogger Yuri Dud’ published an interview with a popular Russian stand-up comedian Evgeniy Chebatkov. In this conversation, Dud’ asked Chebatkov: “You are a homophobe. How come?” Chebatkov, who indeed had expressed his anti-gay sentiments publicly on many occasions, responded after some equivocation: “My dad served time. My dad and his buddies were around. Their views influenced mine since my early years. ... I knew their stance intuitively.”<sup>60</sup>

This is an example of how prison norms might influence culture beyond the bars. Our

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<sup>59</sup>We use the same set of controls as in the baseline survey-data Table 2 and Table C.8 but we do not include survey-wave-year fixed effects because we only have one wave with this question.

<sup>60</sup>See [www.youtube.com/watch?v=szLL1bmFRIk](https://www.youtube.com/watch?v=szLL1bmFRIk), time-code 1:28:20.

paper studies the issue systematically. We investigate the potential transmission of prison culture, including homophobia, to the general population. To demonstrate such a phenomenon takes place, we need an event in which many geographical locations in a country are exogenously exposed to the influx of people with prison experiences. We use the Soviet amnesty of 1953 that freed 53 percent of Gulag prisoners as an example of such an event. We find that places more exposed to the amnesty had an immediate increase in the number of thieves-in-laws' coronations — indicative of the intensification of prison culture. We also find that more affected by amnesty locations have more instances of hate crimes against LGBTQ+ individuals, have a higher rate of homophobic slurs on social media, and have a higher level of anti-gay sentiments expressed in the representative surveys.

It is important to point out that in our estimation using Russian data, we are not recovering the total effect of prison experiences on modern-day homophobia. Even after the amnesty, the USSR continued to have one of the largest prison populations in the world thus the same mechanism would continue to operate. There are several potential channels: ex-convicts influence their family members (like Chebatkov's father and his "buddies" influenced Chebatkov himself), they also shape their social norms in the local communities, and, finally, they influence mass culture spreading the reach of the inmate code far beyond their initial audience.

Our results demonstrate an important source of norms and values that was previously under-explored in quantitative studies: prisons. When policymakers contemplate new reforms that can potentially increase the number of incarcerated individuals, they should take into account the potential effects on societal norms, including anti-LGBTQ+ intolerance. Also, an attempt to limit the prison culture of homophobia — through raising awareness and education of former inmates on important gender issues — should be implemented and rigorously tested.

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Online Appendix  
to  
“Prison Norms and Society Beyond Bars”

## A Additional Data Description

**Gulag data** The data on the locations of Gulag camps come from [Mikhailova \(2012\)](#), which uses the data collected by the Russian non-government organization “Memorial.”<sup>61</sup> Then we updated [Mikhailova](#)’s data with the newest version of Memorial data.

- Exposure to 1953 amnesty (baseline) — Exposure to amnesty $_{i,1954-53} \equiv \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\text{Distance}_{i,g}^{\sigma}} \right)$ . # released $_{g,1954-53}$  is equal to the difference in the number of prisoners in labor camp  $g$  between the year 1953 and 1954 if camp  $g$  decreased in size/closed or equal to zero if the camp’s population increased. Distance $_{i,g}$  is the distance (in km) from labor camp  $g$  and location  $i$  (rayon’s population-weighted centroid in *rayon*-level specifications). In the baseline specification, we assume that  $\sigma$  — decay rate of the exposure to the amnesty — is equal to 1.  $G_{1953}$  is a set of Gulag camps active in 1953. We compute exposure to the 1953 amnesty in a way that each location in Russia is treated by *all* released prisoners from *all* Gulag camps, but released prisoners from the camps that are located farther away are counted with smaller weights than prisoners released from a nearby camp.
- Exposure to 1953 amnesty (alternative) — we use several alternative measures of exposure to amnesty. We either use an alternative decay rate of the effect with distance from the labor camp or adjust for the less skewed distribution in the number of released prisoners. Hence we use the following measures of alternative exposure to the amnesty:

$$\begin{aligned}
 & - \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\ln \text{Distance}_{i,g}} \right); \\
 & - \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\sqrt{\text{Distance}_{i,g}}} \right); \\
 & - \sum_{g \in G_{1953}} \left( \frac{\ln \# \text{ released}_{g,1954-53}}{\ln \text{Distance}_{i,g}} \right); \\
 & - \sum_{g \in G_{1953}} \left( \frac{\sqrt{\# \text{ released}_{g,1954-53}}}{\sqrt{\text{Distance}_{i,g}}} \right); \\
 & - \sum_{g \in G_{1953}} \left( \frac{\# \text{ released}_{g,1954-53}}{\text{Distance}_{i,g} + \text{Distance}_{i,g}^2} \right).
 \end{aligned}$$

- Min. distance to Gulag camp — is the distance (in km) from location  $i$  to the closest ever existing labor camp  $g \in G_{\text{All}}$ . For *rayon*-level specifications we use population-weighted centroid as the coordinates of the location. Results hold if in rayon-level specifications we set the minimum distance to the Gulag labor camp equal to zero if there was a Gulag camp in that *rayon*.
- Population of the nearest Gulag camp —  $\sum_{t \in T_{\text{All}}} (\# \text{ prisoners}_{g,t})$ , i.e., it is the total population (for all  $t \in T$  of the closest ever existing labor camp  $g \in G_{\text{All}}$ . For *rayon*-level specifications we use population-weighted centroid as the coordinates of the location. In rayon-level specifications where there were several Gulag camps, we use the total number of prisoners in that *rayon*’s Gulag camps.

<sup>61</sup>More on NGO Memorial can be found here: <https://www.memo.ru/en-us/>.

- Exposure to total Gulag population — Total exposure to Gulag<sub>*i*</sub> ≡ 
$$\sum_{g \in G_{\text{all}}} \left( \frac{\sum_{t \in T_{\text{All}}} (\# \text{ prisoners}_{g,t})}{\text{Distance}_{i,g}^{\sigma}} \right)$$
. # prisoners<sub>*g,t*</sub> is equal to the number of prisoners in labor camp *g* in year *t*. We sum it over all years  $t \in T$ . Distance<sub>*i,g*</sub> is the distance (in km) from labor camp *g* and location *i* (rayon’s population-weighted centroid in *rayon*-level specifications). In the baseline specification, we assume that  $\sigma$  — decay rate of the exposure to the amnesty — is equal to 1.  $G_{\text{All}}$  is a set of Gulag camps active throughout all Gulag history. We compute total exposure to Gulag in a way that each location in Russia is treated by *all* prisoners in *all* years from *all* Gulag camps, but prisoners from the camps that are located farther away are counted with smaller weights than prisoners released from a nearby camp.
- Convict labor industry FEs — is a matrix of dummies for the convict labor industry of the closest ever-existing Gulag labor camp. Memorial defines 20 industries of Gulag camps: construction of extraction facilities, housing construction, industrial construction, infrastructural construction, fuel and energy industry, metallurgy, military industry, timber production, construction materials, machinery, food industry, coal mining, uranium mining, gold mining, tin mining, other metallic ore mining, apatite mining, stone quarrying, research and development, and service.

**Thieves-in-law data** Biographies of thieves-in-law come from the criminal news website <http://primecrime.ru>. It contains textual biographies of Soviet and Russian thieves-in-law. As a validity check, we have found that all thieves-in-law mentioned in Galeotti (2018) are also present on [primecrime.ru](http://primecrime.ru). We extracted the year and location of the coronation of each thief-in-law and removed those that happened outside of Russia.

- Ihs (# coronations of thieves-in-law)<sub>*i,t*</sub> (*rayon*-level) — inverse hyperbolic sine of the number of coronations of thieves-in-law in *rayon i* decade *t*.
- Ihs (# coronations of thieves-in-law)<sub>*i,t*</sub> (location-level) — inverse hyperbolic sine of the number of coronations of thieves-in-law in location *i* decade *t*. For the coronations where we only observe *rayon* of the coronation, we assign them to the most populous location of that *rayon*.
- Ihs (# coronations of thieves-in-law)<sub>*i*,post-1953</sub> — inverse hyperbolic sine of the number of coronations of thieves-in-law in *rayon i* in all years after 1953.
- Ihs (# coronations of thieves-in-law)<sub>*i*,1922–1953</sub> — inverse hyperbolic sine of the number of coronations of thieves-in-law in *rayon i* in all years before the amnesty, i.e., from 1922 to 1953.

**Crimes against LGBTQ+** The data on hate crimes against LGBTQ+ persons were collected by Kondakov (2017, 2021). This dataset only contains cases when the motive of hate against LGBTQ+ persons was established by a court. These data contain all locations that had a hate crime against gay persons in 2010–2015. We uniquely matched these locations to our sample of Russian municipalities. The data also contain information on whether the victim was a gay man, gay woman, trans, or other LGBTQ+ people.

- Ihs # of crimes against LGBTQ+ persons (*total*) — inverse hyperbolic sine of the total number of crimes against gay persons in location  $i$  in 2010–2015.
- Ihs # of crimes against gay men — inverse hyperbolic sine of the total number of crimes against gay men in location  $i$  in 2010–2015.
- Ihs # of crimes against gay women — inverse hyperbolic sine of the total number of crimes against lesbians in location  $i$  in 2010–2015.
- Ihs # of crimes against trans and other LGBTQ+ persons — inverse hyperbolic sine of the total number of crimes against gay persons who identify as trans or other in location  $i$  in 2010–2015.

Note, that # of total crimes against LGBTQ+ persons is equal to the sum of the crimes against gay men, gay women, and trans and other persons.

For *rayon*-level specifications we sum crimes over all locations within the *rayon*.

**VK.com data** We gather data on the language used in social media by scraping the most popular social media website in Russia vk.com (also known as “Vkontakte”). Vk.com’s application programming interface allows scraping 1,000 latest public posts by the coordinates of the places of their authors. This data was collected in December 2021. We used *Rvk* package for *R* programming language developed by Denis Stukal.<sup>62</sup>

- Ihs # homophobic slur in VK — inverse hyperbolic sine of the total number of times homophobic slur was used in the last 1,000 posts in location  $i$  (snapshot of December 2021). We used the following homophobic slurs: гомик, педик, пидор, пидорас.
- Ihs # male derogatory terms in VK — inverse hyperbolic sine of the total number of times derogative slur (non-homophobic) toward men was used in the last 1,000 posts in location  $i$  (snapshot of December 2021). We used the following word: мудака.
- Ihs # female derogatory terms in VK — inverse hyperbolic sine of the total number of times derogative slur (non-homophobic) toward women was used in the last 1,000 posts in location  $i$  (snapshot of December 2021). We used the following word: блядь. Note that this word can also indicate a general frustration and not be directed at any particular person.
- Ihs # common swear word in VK — inverse hyperbolic sine of the total number of times a common swear word (non-homophobic) was used in the last 1,000 posts in location  $i$  (snapshot of December 2021). We used the following words: хуй, хуя, хуй.

For *rayon*-level specifications we similarly collect VK data but use the area circled by the radius around *rayon*’s centroid when computing incidents of homophobic slur in the latest 1,000 posts. We choose a radius to maximize the area of the *rayon*. We also tried to do the average of location-level homophobic slur as the *rayon*-level and all results hold. Hence, we don’t think that one measure is better than the other.

<sup>62</sup>Available in Git repository: <https://github.com/denisStukal/Rvk>.

**Survey data** We use five representative surveys of the Russian population from 2010 to 2017 that have a question about attitudes toward homosexuals and the location of the respondents. Survey data comes from three different sources: the 7th wave (2017) of the World Value Survey (WVS), 2nd (2010) and 3rd (2016) wave of the Life in Transition Survey (LiTS), and the Courier survey by Levada Center (the Courier) for 2013 and 2015.

- $\mathbb{1}(\text{Dislike homosexuals}_{i(l)})$  — the dummy variable  $\mathbb{1}(\text{Dislike homosexuals}_{i(l)})$  is pooled from different surveys. It is based on the variables **q333h** in LiTS (2010), **q429h** in LiTS (2016), and **Q22** in WVS (2017): “Could you please mention any that you would not like to have as a neighbor?” If the respondent  $i$  (nested in location  $l$ ) chose “homosexuals” we assign a value of 1 and 0 otherwise. In the Courier Levada it is based on the variables **C10A** in the Courier (February 2013) and **qC10A** in the Courier (March 2015): “Would [you] like having people from this group [Homosexuals] as neighbors, dislike it, or not care?” If a respondent answered that they dislike having gay neighbors, we assign the value of 1 to the  $\mathbb{1}(\text{Dislike homosexuals}_{i(l)})$  and 0 otherwise.
- Women are as competent as men to be business executives — based on the variable **q426a** in LiTS (2016): “Do you agree that - women are as competent as men to be business executives?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- Men make better political leaders than women do — based on the variable **q426b** in LiTS (2016): “Do you agree that - men make better political leaders than women do?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- A woman should do most of the household chores even if the husband is not working — based on the variable **q426c** in LiTS (2016): “Do you agree that - a woman should do most of the household chores even if the husband is not working?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- It is important that my daughter achieves university education — based on the variable **q426d** in LiTS (2016): “Do you agree that - it is important that my daughter achieves university education?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- It is important that my son achieves university education — based on the variable **q426e** in LiTS (2016): “Do you agree that - it is important that my son achieves university education?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- Cohabiting partners should be married — based on the variable **q426g** in LiTS (2016): “Do you agree that - co-habiting partners should be married?” We set the dummy equal to one if the respondent answers “Strongly agree” or “agree” and zero otherwise.
- It is better for everyone involved if the man earns the money and the woman takes care of the home and children — based on the variable **q426h** in LiTS (2016): “Do

you agree that - it is better for everyone involved if the man earns the money and the woman takes care of the home and children?" We set the dummy equal to one if the respondent answers "Strongly agree" or "agree" and zero otherwise.

- Equal rights for women as citizens are important — based on the variable **q414h** in LiTS (2016): "Important for the country - equal rights for women as citizens?" We set the dummy equal to one if the respondent answers "Strongly agree" or "agree" and zero otherwise.
- Most people can be trusted — based on the variable **q302** in LiTS (2010) and **q403** in LiTS (2016): "Generally speaking, would you say that most people can be trusted?" We set the dummy equal to one if the respondent answers "complete trust" or "some trust" and zero otherwise.
- Family can be trusted — based on the variable **q304a** in LiTS (2010) and **q405a** in LiTS (2016): "To what extent do you trust people from the following groups?" We set the dummy equal to one if the respondent mentions "family living with you" and zero otherwise.
- People in the neighborhood can be trusted — based on the variable **q304b** in LiTS (2010) and **q405b** in LiTS (2016): "To what extent do you trust people from the following groups?" We set the dummy equal to one if the respondent mentions "your neighborhood" and zero otherwise.
- Strangers can be trusted — based on the variable **q304c** in LiTS (2010) and **q405c** in LiTS (2016): "To what extent do you trust people from the following groups?" We set the dummy equal to one if the respondent mentions "strangers" and zero otherwise.
- Foreigners can be trusted — based on the variable **q304f** in LiTS (2010) and **q405d** in LiTS (2016): "To what extent do you trust people from the following groups?" We set the dummy equal to one if the respondent mentions "foreigners" and zero otherwise.

**2020 Russian population Census data** Contemporary location-level data on Russia come from the Russian database of municipalities (<https://data-in.ru/bdmo/>) which uses Census data as well as other administrative data to provide information on the demographic characteristics of Russia's municipalities.

- Log population — log of location's population.
- Log income — log of average monthly household income, Russian rubles.
- Location type FEs — A set of dummies for the provincial capital, city, township, and big (*poselok*) or small (*selo*) village. In a few cases, these location types have local names (e.g., *aul* or *stanitsa*) and we assign them with their relevant location type manually.

**Russian historical censi** We use historical census data on Russian provinces collected by Kessler and Markevich (2020). The data is conveniently available here: <https://ristat.org/ru/topics>. We only use data for 83 provinces that constitute contemporary Russia.

- Log Population, 1959 — defined as a log total population in that province.
- Log Population, 1897 — defined as a log total population in that province.
- Sex ratios, 1959 — defined as the number of women divided by the number of men in that province.
- Sex ratios, 1897 — defined as the number of women divided by the number of men in that province.
- Log Manufacturing output, 1959 — defined as the log of total manufacturing output in that province in rubles of 1959.
- Log Manufacturing output, 1897 — defined as the log of total manufacturing output in that province in rubles of 1959.
- Share of Orthodox population, 1897 — defined as a share of the population that considers themselves Orthodox Christians divided by the number of people in that province.
- Share of the Catholic population, 1897 — defined as a share of the population considering themselves Catholic Christians divided by the number of people in that province.
- Share of the Protestant population, 1897 — defined as a share of the population considering themselves Protestant Christians divided by the number of people in that province.
- Share of the Muslim population, 1897 — defined as a share of the population considering themselves Muslim (all denominations) divided by the number of people in that province.
- $\Delta$  Sex ratios, 1959-1897 — defined as the difference between sex ratios in 1959 and 1897 in that province. Here we match Soviet provinces to the respective provinces in the Russian Empire.
- $\Delta$  Log manufacturing output, 1959-1897 — defined as the difference between logs of manufacturing output in 1959 and 1897 in that province. Here we match Soviet provinces to the respective provinces in the Russian Empire.
- $\Delta$  Log population, 1959-1897 — defined as the difference between logs of the population in 1959 and 1897 in that province. Here we match Soviet provinces to the respective provinces in the Russian Empire.

**Yandex.ru data** All data from Yandex.ru is scraped on the *rayon*-level during December 2021. We used the Yandex Wordstat service which provides, for every search term, the number of times it was searched from a particular location in the preceding month.

- Ihs # Chanson searches — inverse hyperbolic sine of the total number of searches for Chanson musicians in Yandex.ru in 2021. We use searches for Villie Tokarev, Grigorii Leps, Lesopoval, Denis Maydanov, Katya Ogonek, Nikolay Rastorguev, Mikhail Schufutinsky, Zheka (Evgenij Grigoriev), Mikhail Krug, and Ivan Kuchin (first name and last name, last name and first name, or last name).
- Ihs # Egor Kreed searches — inverse hyperbolic sine of the total number of searches for Egor Kreed in Yandex.ru in 2021.
- Ihs # Slava Marlow searches — inverse hyperbolic sine of the total number of searches for Slava Marlow in Yandex.ru in 2021.
- Ihs # Alla Pugacheva searches — inverse hyperbolic sine of the total number of searches for Alla Pugacheva in Yandex.ru in 2021.
- Log # total searches — Log of the total number of searches in Yandex.ru in 2021.

#### Other data

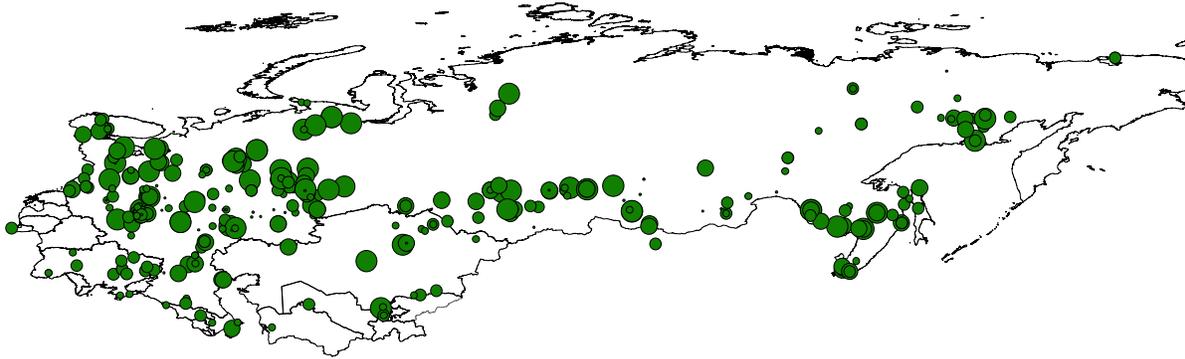
- Ethnic Republics fixed effects: A list of Russian Ethnic Republics can be found here: [https://en.wikipedia.org/wiki/Republics\\_of\\_Russia](https://en.wikipedia.org/wiki/Republics_of_Russia). World Prison Brief (accessible at [PrisonStudies.org](https://www.prisonstudies.org), Fair and Walmsley, 2021).

**Table A.1** – Summary Statistics: Effect of the 1953 Amnesty

Variable	Minimum level of aggregation	Mean	St. dev.	Min.	Max.	Source of original data
Exposure to the amnesty of 1953	location/municipality	844.22	1646.94	194	79,360	NGO Memorial
Minimum distance to Gulag labor camp (any from 1923-1960), km	location/municipality	107.1	102.6	0.02	2,129	NGO Memorial
Total exposure to Gulag labor camp system (from 1923-1960)	location/municipality	26,561	88,769	6,779	4,264,648	NGO Memorial
# of coronations of thieves-in-law (decade average, 1922-2010)	rayon/county*	0.02	0.94	0	131	Prime Crime News Agency
# of coronations of thieves-in-law (total post-1953)	rayon/county*	0.19	4.43	0	210	Prime Crime News Agency
# of crimes against LGBTQ+, 2010-2015	location/municipality	0.42	15.79	0	1,148	Kondakov (2017, 2021)
# of homophobic slur in VK, in last 1,000 posts, 2021	location/municipality	0.024	0.76	0	63	VK.ru
Individual homophobia (would not like homosexuals as neighbors), all surveys	location/municipality	0.68	0.47	0	1	NGO Memorial
Individual homophobia (would not like homosexuals as neighbors), LiTS	location/municipality	0.71	0.45	0	1	LiTS
Individual homophobia (would not like homosexuals as neighbors), WVS	location/municipality	0.66	0.48	0	1	WVS
Individual homophobia (would not like homosexuals as neighbors), Levada Courier	location/municipality	0.67	0.47	0	1	Levada
Parents/grandparents sent in a labor camp, LiTS (2016)	location/municipality	0.02	0.12	0	1	LiTS
# Chanson searches in Yandex, 2021	rayon/county	79.27	640.64	0	16,626	Yandex.ru
# Egor Kreed searches in Yandex, 2021	rayon/county	12.15	35.23	0	204	Yandex.ru
# Slava Marlow searches in Yandex, 2021	rayon/county	2.46	17.17	0	219	Yandex.ru
# Alla Pugacheva searches in Yandex, 2021	rayon/county	10.58	35.50	0	549	Yandex.ru
# of crimes against gay men, 2010-2015	location/municipality	0.39	15.47	0	1,148	Kondakov (2017, 2021)
# of crimes against lesbians, 2010-2015	location/municipality	0.06	2.24	0	137	Kondakov (2017, 2021)
# of crimes against trans persons, 2010-2015	location/municipality	0.03	3.12	0	310	Kondakov (2017, 2021)
# of female derogative slur in VK, in last 1,000 posts, 2021	location/municipality	0.00	0.07	0	4	VK.ru
# of male derogative slur in VK, in last 1,000 posts, 2021	location/municipality	0.01	0.10	0	4	VK.ru
# of swear words with root 'huj' in VK, in last 1,000 posts, 2021	location/municipality	16.80	127.25	0	160	VK.ru
Population, 2020	location/municipality	13,206	72,614	1001	12,380,664	Population census, 2020
Average monthly income, rubles, 2020	location/municipality	7,510	10,645	205.53	80,762	Population census, 2020
Manufacturing output, mln. rubles, 1959	province	9,504	10,808	150	61,250	Manufacturing census, 1959**
Manufacturing output, mln. rubles, 1897 (in 1959 rubles)	province	7,227	13,488	28	69,409	Manufacturing census, 1897**
Share of Orthodox population, 1897	province	0.61	0.39	0.01	1.00	Population census, 1897**
Share of Catholic population, 1897	province	0.12	0.26	0.00	0.87	Population census, 1897**
Share of Protestant population, 1897	province	0.04	0.15	0.00	0.90	Population census, 1897**
Share of Muslim population, 1897	province	0.16	0.30	0.00	0.99	Population census, 1897**
Sex ratios (women/men), 1959	province	1.22	0.12	0.78	1.40	Population census, 1959**
Sex ratios (women/men), 1897	province	0.98	0.14	0.37	1.33	Population census, 1897**

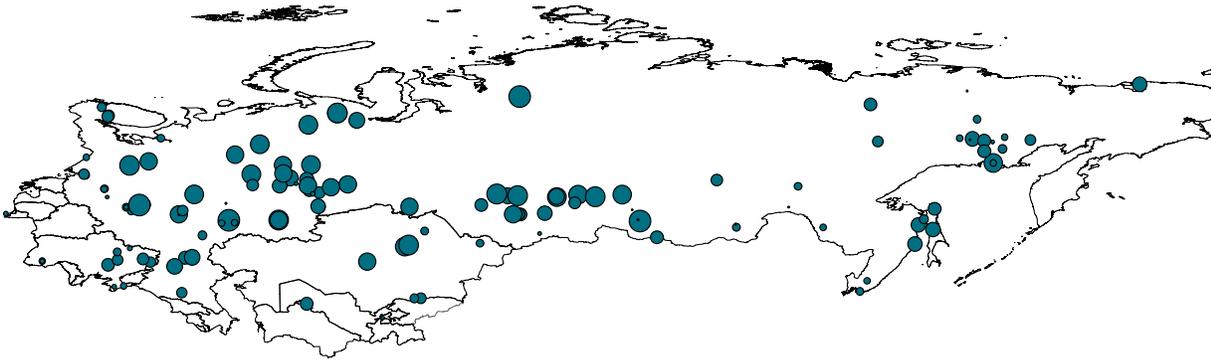
*Notes:* \* For the 40% of the coronations of thieves-in-law, we observe the location/municipality. Thus for robustness, by imputing the rest 60% of the observation with the location of the largest municipality in that *rayon* we are able to estimate location-level regressions. \*\* Historical census data are available from [Kessler and Markevich \(2020\)](#).

**Figure A.1** – Location and Sizes of *All* Gulag Camps



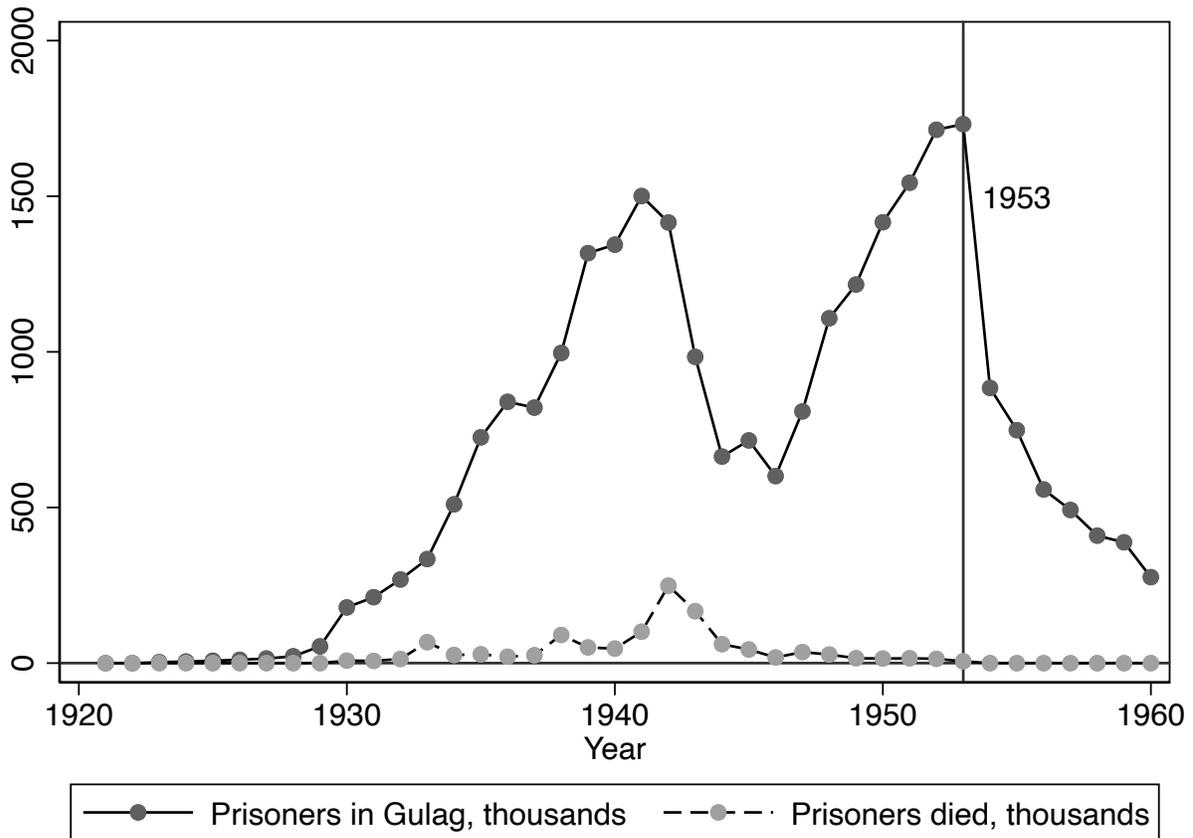
*Notes:* This map shows the location of 460 Gulag camps on the territory of the former Soviet Union. The size of the ball corresponds to the total number of prisoners that pass through each camp. 408 camps were located in the RSFSR, i.e., in Russia. Note, that one camp was located in Ulaanbaatar, the capital of Mongolia.

Figure A.2 – Location and Sizes of Gulag Camps in 1953



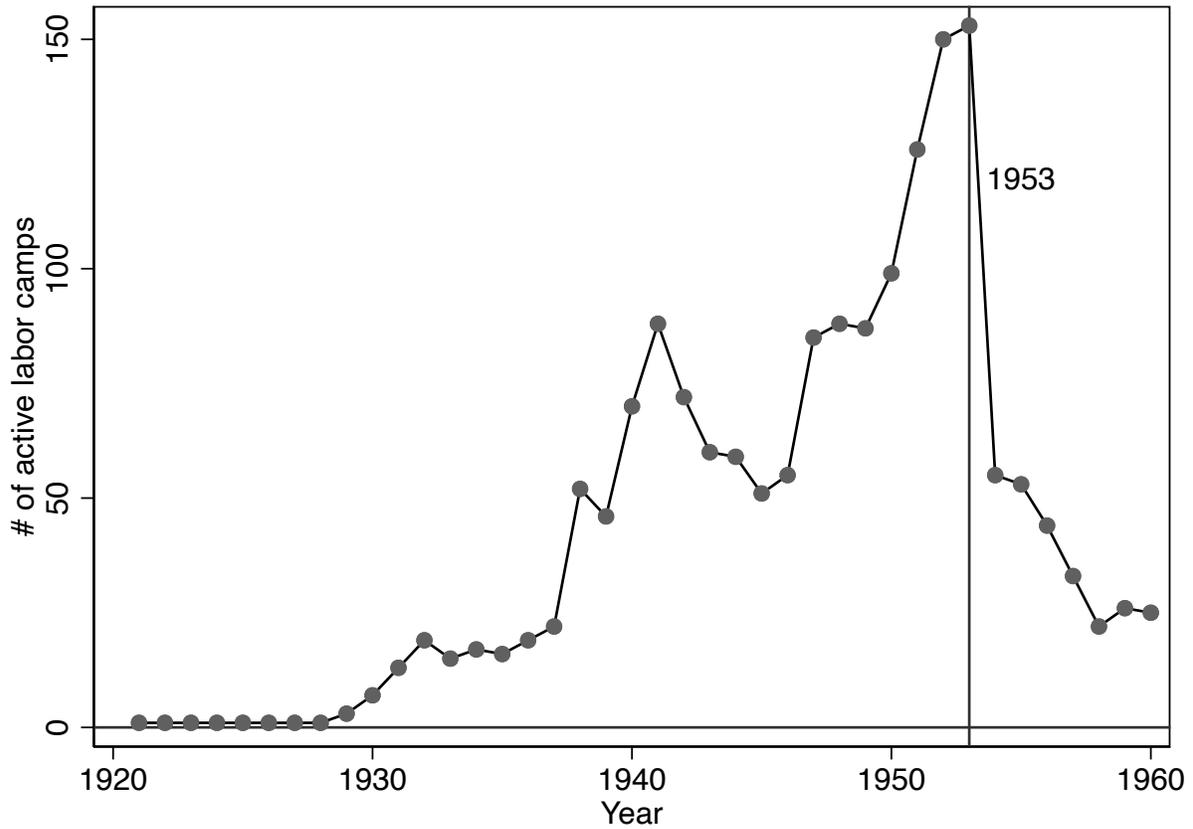
*Notes:* This map shows the location of 153 Gulag camps on the territory of the former Soviet Union that were operational in 1953. The size of the ball corresponds to the total number of prisoners that pass through each camp.

**Figure A.3** – Population of Gulag Labor Camps, 1921–1960



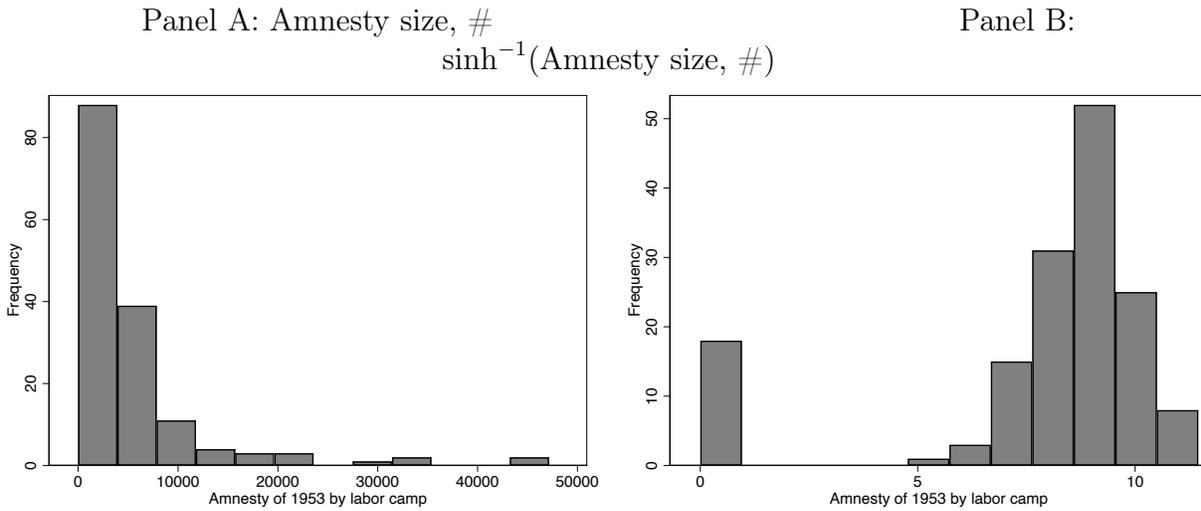
*Notes:* This Figure shows the population of all Gulag camps during Gulag’s history, 1921–1960. The solid line shows the labor camps’ population in thousands (stock variable). The dashed line shows the number of prisoners (in thousands) that died each year (flow variable). There are two local maximum of the prisoners, the first in 1941 at the beginning of the German invasion of the Soviet Union and the second in 1953 right before the death of Joseph Stalin. Prisoners’ deaths have three local maximum, one in 1933 is related to the Soviet famine of 1932–1933, the second is related to the repressions of 1938, and the third is driven by famine and labor conditions during the first years of the war with Germany.

**Figure A.4** – Number of Active Gulag Labor Camps, 1921–1960



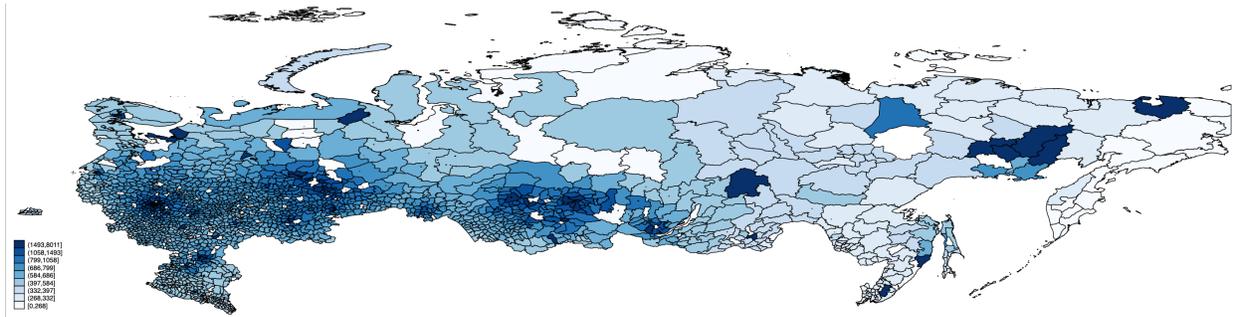
*Notes:* This Figure shows the number of active Gulag labor camps during Gulag’s history, 1921–1960. There are two local maximum of prisoners, the first during the first in 1941 at the beginning of the German invasion of the Soviet Union and the second in 1953 right before the death of Joseph Stalin.

**Figure A.5** – Histogram of 1953 Amnesty by Gulag Camp (# and Inverse Hyperbolic Sine)



*Notes:* This Figure shows histograms of the amnesty of 1953 for 153 Gulag camps on the territory of the former Soviet Union that were operational in 1953. Panel A shows the raw numbers of released prisoners. Panel B uses inverse hyperbolic sine. 18 camps did not release any prisoners or slightly increased the number of prisoners. We set the number of amnestied prisoners from these camps to be equal to zero.

**Figure A.6** – Rayon-Level Exposure to the Amnesty of 1953



*Notes:* This map shows the rayon-level variation in the exposure to the amnesty of 1953.

## B Attitudes Toward Gay Individuals in Russia

According to representative surveys, the level of anti-gay attitudes in Russia is one of the highest in the world: 67 percent of World Values Survey respondents of the 2017–2020 wave in Russia stated that they would not like to have homosexual individuals as neighbors, only 12 percent agree that homosexual parents are as good as the heterosexual ones, and 58 percent of individuals say that homosexuality is never justifiable.<sup>63</sup> According to the human rights watchdog “SOVA Center,” 16 people were beaten in 2020 for the reasons of anti-LGBT hate, while in 2019, 7 people were beaten and one person was killed. LGBTQ+ persons are routinely publicly insulted by politicians and celebrities.<sup>64</sup>

How deep are the roots of such attitudes? Recent historical research suggests that even though Orthodox Christianity considers homosexuality sinful, before Stalin’s time it was not particularly stigmatized, and Gulags’ prison culture became one of the main sources of homophobia in post-Stalin Russia (Healey, 2001, 2017). According to Healey (2001), Russia imposed anti-sodomy laws later than Western European countries. Peter I forbade “sodomy” in 1716 but only in the army and navy. Civil anti-sodomy laws were first introduced in 1835 during the rule of Nicholas I; however, the punishment for it was only introduced in 1866.<sup>65</sup> Female same-sex relationships had never been criminalized. The criminalization of “sodomy,” however did not change much in the culture and such offenses were rarely enforced. Russian society in that period was quite tolerant of the expressions of homosexuality. Criminal charges of “sodomy” in cases involving voluntary same-sex relationships were usually dropped without a trial. When such cases did reach a trial, judges were inclined to acquit the accused or to appoint relatively lenient punishment without a jail sentence. If the homosexual acts were found to be involuntary, then the accused was charged with both “sodomy” and sexual assault.

After the revolution of 1905, with the surge of *all* criminal convictions by 35% the number of people convicted for sodomy also increased. In total, in 1905–1913, 96 people were convicted for voluntary “sodomy” and 408 for involuntary “sodomy.” Most of such cases, however, came outside the territory of modern Russia. Instead, they came from the territory of modern Ukraine and the territory of modern republics of the Caucasus and Central Asia. One of the suggested explanations was that such cases were fabricated by the police to arrest political dissidents, especially pro-independence campaigners. The Bolshevik revolution of 1917 was followed by the Golden Age of Russian queer culture with gay weddings (although not officially recognized) and regular cross-dressing parties. Homosexuality was entirely legal

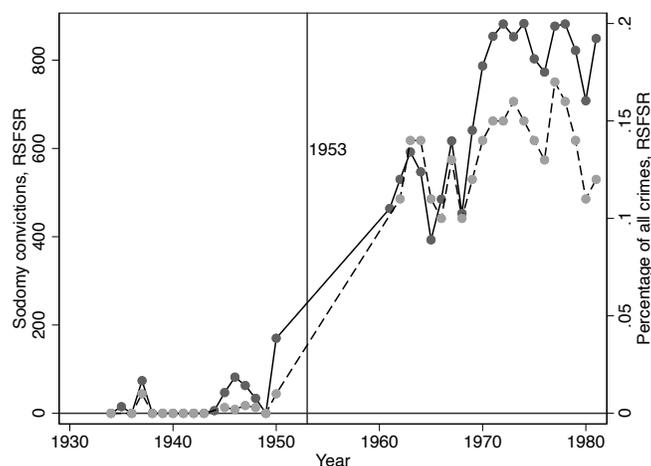
<sup>63</sup>Such a high level is not explained by the recent legislation prohibiting “homosexual propaganda,” since as early as 2006 (WVS, 5th wave) it was on the same level: 66 percent of Russian respondents said that would not like to have homosexual persons as neighbors then.

<sup>64</sup>It is important to point out that masculinity norms caused by male-biased gender ratio cannot explain the prevalence of homophobia in modern-day Russia. In general, Russia did not suffer from male-biased gender ratios. In fact, after World War II, in many regions, the sex ratios were female-biased due to the war casualties (Brainerd, 2017). Before that male population either disproportionately died during World War I and the Civil War or migrated out as soldiers of the White Army who fled the country after defeat in the Civil War. As can be seen in Table A.1, the average women-to-men ratio in 1959 — 14 years after the end of WWII — is 1.23; still skewed.

<sup>65</sup>The punishment was retracting of the titles (i.e., estates) and exile in Siberia. In 1900, the exile was replaced with 4–5 years in prison.

during this period. Stalin criminalized homosexuality in 1935, but the enforcement, as in the pre-revolutionary period, was rare. Figure B.1 shows the number of “sodomy” convictions in the Soviet Union (solid line) and their share in the total number of convictions (dashed line): they surged in the 1950s, strongly hinting at the role of the Gulag system in promoting homophobic attitudes.<sup>66</sup>

**Figure B.1** – Number of Sodomy Convictions and Their Share in the Total Number of Crimes in Russia (RSFSR), 1935–1981



*Notes:* This Figure shows with a black line the number of convicted individuals under the sodomy laws in the Russian Soviet Federative Socialist Republic (RSFSR). The gray dashed line shows their share in the total number of convictions in RSFSR in that year. Data for 1951–1960 are not available. The share of sodomy convictions in the total number of convictions in 1961 is also not available, but for the whole USSR the total number of sodomy convictions was 705 and their share was 0.09%. Source: Tables 1 and 2 of Healey, 2001, Appendix, pp. 261–262.

In the Gulag camps, a hierarchical system emerged which consisted of several groups or “castes” (Abramkin and Chizov, 1992).<sup>67</sup> On the top were “blatnye,” professional criminals with a high level of authority in charge of dispute resolution and overall management of the informal economy inside the camp. The biggest part of the prison population were “muzhiki” (“commoners”) who had no voice in the dealings of the “blatnye.” The lowest caste were “petukhi” (“roosters”), the untouchables with the reputation of being “passive” homosexual persons. Many individuals in this category ended up there because they were “punished” for transgressions by a sexual assault from another inmate, often informally sanctioned by the camp’s administration. According to historian Irina Roldugina, “Homosexuality ... was closely related to humiliation, subordination, and violence. This system of violence and fear was beneficial for the camps’ administration because it cemented their power.”<sup>68</sup>

<sup>66</sup>At the same time, the state did not necessarily participate in the homophobic propaganda itself. We have counted only 21 mentions of gay issues (mostly unfavorably mentions of gay rights activism in the U.S. and other Western countries) in the *Izvestia* and *Pravda* newspapers in 1917–1991. The source is East View Information Services: <https://dlib.eastview.com/browse/publication/9305/udb/870/>.

<sup>67</sup>The term “caste” here is used by the scholars of this topic only metaphorically and no deep analogies with the Indian caste system is implied.

<sup>68</sup>Wonderzine.com: “From Stalin to “Petukhi”: Why Russian Men Fear Anything Gay.” URL: [www.wonderzine.com](http://www.wonderzine.com).

Overall, if a non-homophobic person ends up in prison where he observed roosters being untouchable and maintained these homophobic norms himself to not become a “rooster” himself, he may remain homophobic even after leaving the prison.

## C Additional Results for the Effect of Amnesty of 1953 on Prison Culture and Homophobia in Russia

**Table C.1** – Balance Table for the Numbers of Released Prisoners During the Amnesty of 1953

~ Exposure to the amnesty (location-level regressions)	I	II	III
	Coefficient	S.E.	P-value
<u>Gulag economic geography:</u>			
Log cumulative # of prisoners before 1953	-0.0011	(0.0042)	[0.8020]
Log # of prisoners before the amnesty, 1953	0.0635	(0.1445)	[0.6636]
Log maximum camp capacity	0.0001	(0.0003)	[0.7110]
$\Delta$ # of prisoners before the amnesty (1952-1953)	0.0026	(0.0047)	[0.5846]
Log average # of prisoners before 1953	-0.0991	(0.1038)	[0.3476]
Camp's longitude	-0.2079	(0.1968)	[0.2998]
Camp's latitude	0.0033	(0.0029)	[0.2647]
Camp employs prisoners in manufacturing (dummy)	-0.9626	(1.2299)	[0.4404]
~ in natural resources extraction	2.5861	(1.9039)	[0.1870]
~ in construction	-0.8723	(1.3849)	[0.5350]
~ in agriculture	0.0972	(0.1640)	[0.5585]

*Notes:* The unit of observation here is a camp. Column I contains the coefficient of the bivariate regression of exposure to the amnesty of 1953 on various outcomes. Column II reports robust standard errors for the pre-1953 coronations specification in the first line and robust standard errors in other regressions. Column III reports p-values. Note, that for the first two regressions with ‘Log cumulative # of prisoners before 1953’ and ‘Log # of prisoners before the amnesty, 1953’ we drop one outlier — Construction Correctional Labor Camp #16 that released almost 50,000 prisoners. Dummy for manufacturing industries assigns the value of one to those camps that employed prisoners in metallurgy, military industry, machinery, food industry, construction materials, and zero otherwise. Dummy for the extraction of natural resources assigns the value of one to those camps that employed prisoners in the fuel and energy industry, coal mining, uranium mining, gold mining, tin mining, other metallic ore mining, apatite mining, stone quarrying, and zero otherwise. Dummy for construction assigns the value of one to those camps that employed prisoners in the construction of extraction facilities, housing construction, industrial construction, infrastructural construction, and zero otherwise. Dummy for agriculture assigns the value of one to those camps that employed prisoners in agriculture and timber production, and zero otherwise. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table C.2 – Balance Table for Exposure to Amnesty of 1953

	I	II	III
~ Exposure to the amnesty (location-level regressions)	Coefficient	S.E.	P-value
<u>Pre-treatment # of coronations of thieves-in-law:</u>			
Ihs # of coronations of thieves-in-law, 1922-1953	-0.001	(0.0042)	[0.8020]
<u>Pre-treatment Gulag controls:</u>			
Exposure to total Gulag population, pre-1953	0.135	(0.0958)	[0.1616]
<u>Historical controls, levels:</u>			
Share of Orthodox population, 1897	0.064	(0.1445)	[0.6636]
Share of Catholic population, 1897	0.0001	(0.0003)	[0.7110]
Share of Protestant population, 1897	0.003	(0.0047)	[0.5846]
Share of Muslim population, 1897	-0.099	(0.1038)	[0.3476]
Sex ratios (women/men), 1939	-0.208	(0.1968)	[0.2998]
Sex ratios (women/men), 1959	0.003	(0.0029)	[0.2647]
Urban share, 1939	0.014	(0.0117)	[0.2366]
Log population, 1939	-0.963	(1.2299)	[0.4404]
Log manufacturing output, 1897	2.586	(1.9039)	[0.1870]
Electricity production, 1932	0.054	(0.0324)	[0.1022]
Electricity production, 1952	0.054	(0.0366)	[0.1384]
<u>Historical controls, changes:</u>			
Δ Electricity production, 1952-1932	-0.038	(0.0287)	[0.1951]
Δ Log manufacturing output, 1959-1897	-0.872	(1.3849)	[0.5350]
Δ Log population, 1959-1939	0.917	(1.0626)	[0.3958]
Δ Sex ratios (women/men), 1959-1939	0.097	(0.1640)	[0.5585]
Δ Urban share, 1959-1939	-0.0043	(0.0036)	[0.2362]

Notes: Observation for the pre-1953 coronations in the first line is *rayon*. All other observations are provinces. Column I contains the coefficient of the bivariate regression of exposure to the amnesty of 1953 on various outcomes. Column II reports robust clustered on province-level standard errors for the pre-1953 coronations specification in the first line and robust standard errors in other regressions. Column III reports p-values.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.3** – Robustness for Table 1: Alternative Standard Errors

	I	II	III	IV	V
<i>Panel A: ~Baseline clustered by province</i>	Dependent variable: Ihs # coronations (mean 0.007 st.dev. 0.115)				
Exposure to 1953 amnesty x Post amnesty	0.065*** (0.003)	0.065*** (0.003)	0.065*** (0.003)	0.060*** (0.003)	0.060*** (0.003)
<i>Panel B: ~spatial HAC, 150 km</i>					
Exposure to 1953 amnesty x Post amnesty	0.065*** (0.015)	0.065*** (0.015)	0.065*** (0.015)	0.060*** (0.013)	0.060*** (0.013)
<i>Panel C: ~spatial HAC, 300 km</i>					
Exposure to 1953 amnesty x Post amnesty	0.065*** (0.015)	0.065*** (0.015)	0.065*** (0.015)	0.060*** (0.013)	0.060*** (0.013)
R-squared	0.376	0.377	0.377	0.408	0.415
Observations	23,260	23,260	23,260	23,260	23,260
Location FE	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓
Min. distance to Gulag camp x time trends		✓	✓	✓	✓
Population of the closest Gulag camp x time trends			✓	✓	✓
Exposure to total Gulag population x time trends				✓	✓
Convict labor industry FEs of closest Gulag camp x time trends					✓

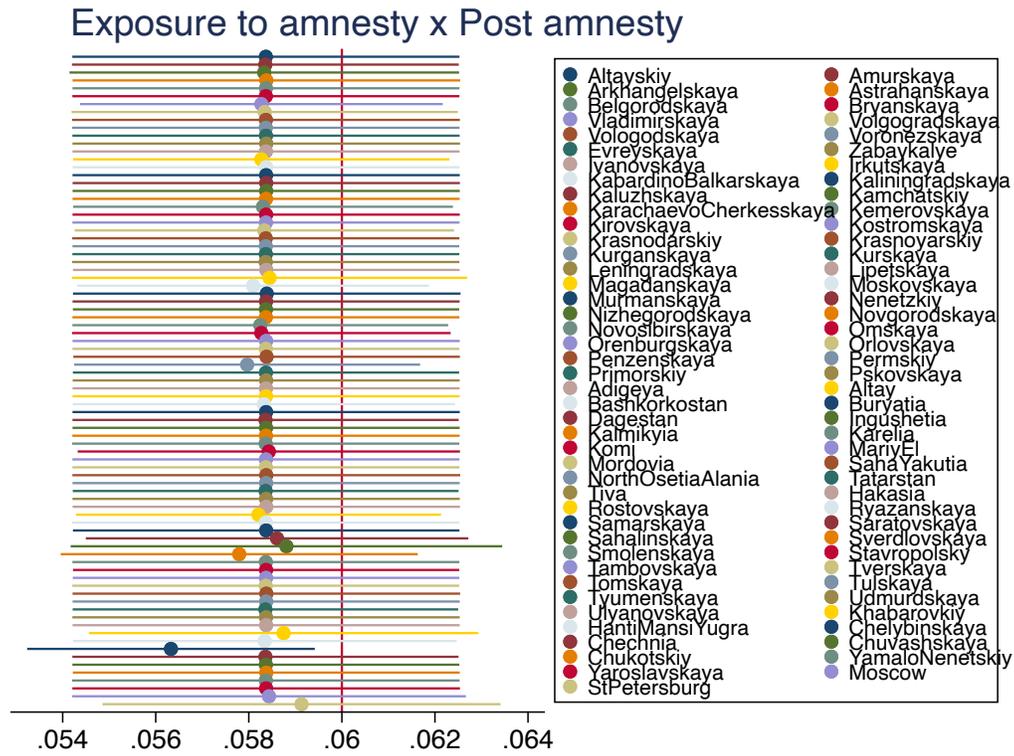
*Notes:* This Table replicates Table 1 but uses alternative methods of computing standard errors. Panel A clusters standard errors on the province level (83 clusters). Panels B and C report spatially corrected HAC standard errors with 150 and 300 km thresholds, respectively. Standard errors in Panels B and C start to be different only on the 4th digit after the dot. Standard errors clustered at the county (*rayon*) level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.4** – Robustness for Table 1: Alternative Measures of Exposure to the Amnesty of 1953

	I	II	III	IV	V	VI	VII	VIII
	Dependent variable: lns # coronations (mean 0.007 st.dev. 0.115)							
Exposure to 1953 amnesty x Post amnesty								
Baseline ~ $\sum (\# \text{ released})/(\text{distance})$	0.060*** (0.003)							
$\sum (\# \text{ released})/(\log \text{ distance})$		0.079*** (0.006)						
$\sum (\# \text{ released})/(\text{sqrt. distance})$			0.074*** (0.009)					
$\sum (\log \# \text{ released})/(\log \text{ distance})$				0.079*** (0.008)				
$\sum (\text{sqrt. } \# \text{ released})/(\text{sqrt. distance})$					0.080*** (0.005)			
$\sum (\# \text{ released})/(\text{distance} + \text{distance}^2)$						0.057*** (0.004)		
$\sum (\# \text{ released in rayon } i)$							0.075*** (0.003)	
$\log \sum (\# \text{ released in rayon } i)$								0.080*** (0.005)
R-squared	0.415	0.454	0.444	0.453	0.453	0.410	0.509	0.516
Observations	23,260	23,260	23,260	23,260	23,260	23,260	23,260	23,260

*Notes:* This Table replicates Column V of Table 1 but uses alternative functional forms of weights when computing the measure of exposure to the amnesty. Column I provides the baseline coefficient from Column V of Table 1 for comparison. All exposures to the amnesty are normalized to have a mean of 0 and a standard deviation of 1. Standard errors clustered at the county (*rayon*) level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure C.1 – Results on Thieves-in-Law are Not Driven by a Particular Province



Notes: This Figure reports on the point-estimate and 95th-percent confidence band that results when re-estimating the specification in Column VI of Table 1, dropping one province at a time. The (red) vertical line is the baseline point estimate. The results are sorted left-to-right and top-to-bottom, i.e., Altayskiy Kray, Amurskaya Oblast, Arkhangelskaya oblast, etc. The results are sorted alphabetically, except for the cities of Moscow and St. Petersburg, which are at the end.

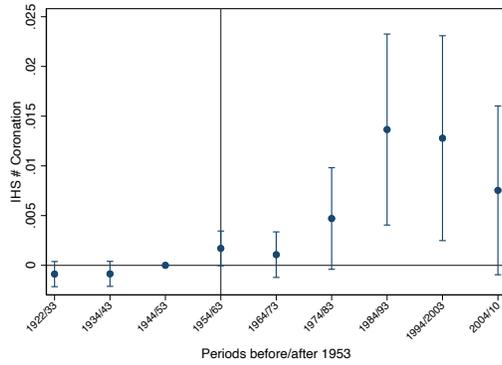
**Table C.5** – Robustness for Table 1: Municipality-Level Specification

	I	II	III	IV	V
	Dependent variable: Ihs # coronations (mean 0.002 st.dev. 0.056)				
Exposure to 1953 amnesty x Post amnesty	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003* (0.001)	0.003* (0.002)
R-squared	0.296	0.296	0.296	0.298	0.299
Observations	98,290	98,290	98,290	98,290	98,290
Location FE	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓
Min. distance to Gulag camp x time trends		✓	✓	✓	✓
Population of the closest Gulag camp x time trends			✓	✓	✓
Exposure to total Gulag population x time trends				✓	✓
Convict labor industry FEs of closest Gulag camp x time trends					✓

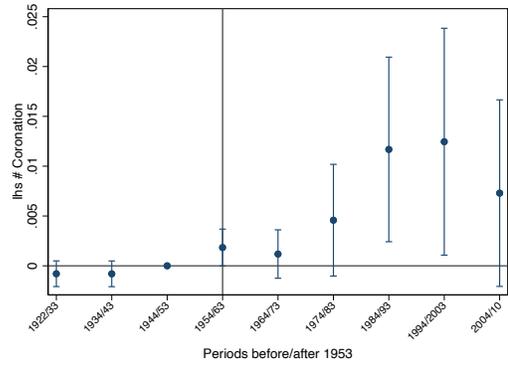
*Notes:* Panel A of this Table replicates Table 1 but uses municipality as a unit of observation instead of county (*rayon*). Standard errors clustered at the location level, are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Figure C.2** – FDDD Analysis: No Increase in Number of Thieves-in-Law Coronations Before 1953 and Increase After the Amnesty, Municipality-Level

Panel A: Baseline



Panel B: w proximity to Gulag ×



decade FEs

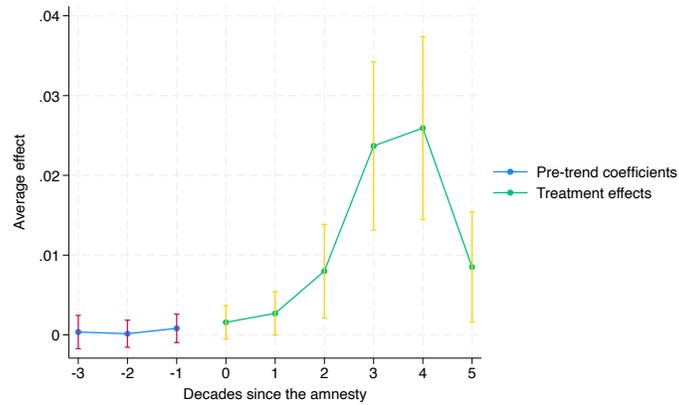
*Notes:* This Figure graphs the results of estimating Equation 2 but uses location-level coordinates instead of *rayon*-level. The dependent variable is the inverse hyperbolic sine of the number of coronations of thieves-in-law. The p-value for the joint significance of the pre-trend’s coefficients is equal to 0.6669 in Panel A and 0.8208 in Panel B. This figure reports 95th-percent confidence bands. Columns III and IV of Table C.6 contain the estimates for the specifications in Panel A and B, respectively. Standard errors clustered at the location (*rayon*) level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.6** – Results for the Fully Dynamic Specifications in Figure 2 and Figure C.2

	I	II	III	IV
	Dependent variable: lhs # coronations			
Observation	<i>Rayon</i> -decade		Location-decade	
Exposure to 1953 amnesty				
x 1922-1933	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
x 1934-1943	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
x 1954-1963	0.018*** (0.000)	0.018*** (0.001)	0.002 (0.001)	0.002 (0.001)
x 1964-1973	0.018*** (0.001)	0.017*** (0.001)	0.001 (0.001)	0.001 (0.001)
x 1974-1983	0.053*** (0.003)	0.050*** (0.003)	0.005 (0.003)	0.005 (0.003)
x 1984-1993	0.095*** (0.005)	0.077*** (0.004)	0.014** (0.006)	0.012** (0.006)
x 1994-2003	0.119*** (0.004)	0.108*** (0.007)	0.013** (0.006)	0.012* (0.007)
x 2004-2010	0.084*** (0.003)	0.078*** (0.005)	0.008 (0.005)	0.007 (0.006)
Joint F-test for pre-trend coef., p-value	[0.7222]	[0.7557]	[0.6669]	[0.8208]
<i>Rayon</i> /location & decade FEs	✓	✓	✓	✓
Controls		✓		✓
R-squared	0.493	0.527	0.336	0.337
Observations	23,260	23,260	98,290	98,290

*Notes:* This Table reports coefficients for the event-study specifications in Figure 2 and Figure C.2. Standard errors clustered at the county (*rayon*) level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Figure C.3** – Robustness for Panel A of Figure 2: Robustness to the Methodology in [Borusyak, Jaravel and Spiess \(2021\)](#)



*Notes:* This Figure replicates the specification in Panel A of Figure 2 but uses the methodology proposed in [Borusyak, Jaravel and Spiess \(2021\)](#).

**Table C.7** – Robustness for Table 2: Additional Controls

	I	II	III	IV	V	VI
<i>Panel A:</i>	<u>Dependent variable: lhs # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty	0.0273*** (0.0101)	0.0210** (0.0090)	0.0138* (0.0073)	0.0280*** (0.0104)	0.0273*** (0.0101)	0.0164** (0.0077)
R-squared	0.018	0.057	0.101	0.018	0.018	0.023
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	<u>Dependent variable: lhs # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty	0.0110** (0.0054)	0.0092* (0.0051)	0.0068* (0.0041)	0.0108* (0.0055)	0.0110** (0.0054)	0.0064** (0.0027)
R-squared	0.037	0.057	0.083	0.037	0.037	0.056
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	<u>Dependent variable: 1(Dislike homosexuals) (mean 0.616 st.dev. 0.486)</u>					
Exposure to 1953 amnesty	0.1337*** (0.0506)	0.1507* (0.0781)	0.1060* (0.0544)	0.0942* (0.0521)	0.1407*** (0.0511)	0.3240*** (0.0774)
Survey-year FEs	✓	✓	✓	✓	✓	✓
R-squared	0.066	0.067	0.067	0.101	0.067	0.166
Observations	6,519	6,519	6,519	6,519	6,519	6,519
Baseline controls	✓	✓	✓	✓	✓	✓
Location's classification FEs		✓				
Location's log population			✓			
Federal district FEs				✓		
Ethnic republics FEs					✓	
Province FEs						✓

*Notes:* This Table shows the robustness of Table 2 to the inclusion of additional controls. Baseline controls include controls from the corresponding specifications from Column VI of Table 2. Column II includes fixed effects for the type of location: provincial capital, city, township, and big (*poselok*) or small (*selo*) village. Column III includes control for the location's log of the population from the 2020 Population Census. Column IV includes fixed effects for eight federal districts representing a collection of provinces: Central, Northwestern, Southern, North Caucasian, Volga, Ural, Siberian, and Far Eastern. Column V includes a dummy for ethnic republics. Column VI includes province fixed effects. Standard errors clustered at the province level (in Panels A and B) and on respondents' location level (in Panel C) are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

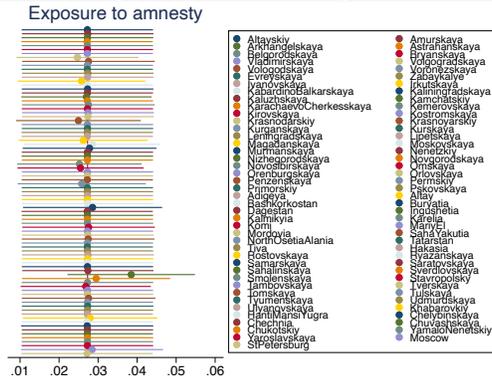
**Table C.8** – Robustness for Panel C of Table 2: Additional Individual-Level Controls

	I	II	III	IV	V	VI
	Dependent variable: 1(Dislike homosexuals)					
Exposure to 1953 amnesty	0.1280** (0.0504)	0.1282** (0.0512)	0.1281** (0.0512)	0.1219** (0.0496)	0.1105** (0.0490)	0.1273*** (0.0489)
Baseline controls	✓	✓	✓	✓	✓	✓
Age & gender	✓	✓	✓	✓	✓	✓
Marital status		✓	✓	✓	✓	✓
Ethnicity FEs			✓	✓	✓	✓
Religion FEs				✓	✓	✓
Education FEs					✓	✓
Log income & occupation FEs						✓
R-squared	0.069	0.071	0.071	0.079	0.089	0.096
Observations	6,522	6,522	6,522	6,522	6,522	6,522

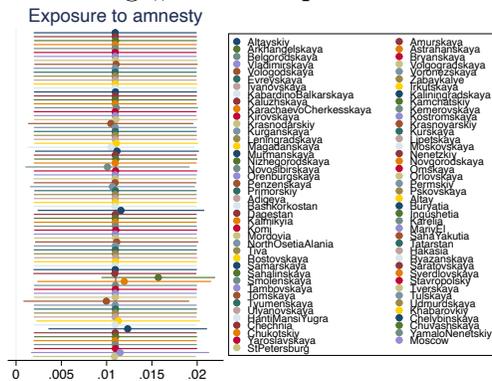
*Notes:* This Table shows the robustness of Panel C of Table 2 to the inclusion of additional individual controls. Baseline controls include controls from the corresponding specifications from Column VI of Table 2. Income is a self-reported household's monthly income. We harmonized variables for marital status, ethnicity, religion, and education between the surveys. We use survey-specific occupation fixed effects, as occupations are not comparable between surveys. This Table uses survey population weights. Standard errors clustered at the location level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Figure C.4 – Robustness for Table 2: Results are Not Driven by a Particular Region

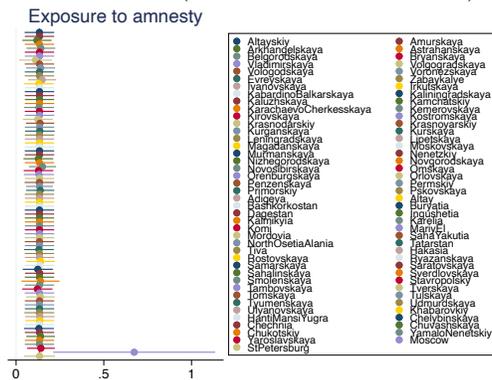
Panel A: Log # of Crimes Against LGBTQ+



Panel B: Log # of Homophobic Slur in VK



Panel C: 1(Dislike Homosexuals)



Notes: This Figure reports on the point-estimate and 90th-percent confidence band that results when re-estimating the specification in Column VI of Table 2, dropping one province at a time. The (red) vertical line is the baseline point estimate. The results are sorted alphabetically, except for the cities of Moscow and St. Petersburg, which are at the end.

**Table C.9** – Robustness for Table 2: Alternative Measures of Exposure to Amnesty (Alternative Decay Rates)

	I	II	III	IV	V	VI
<i>Panel A:</i>						
Dependent variable: Log # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)						
Exposure to 1953 amnesty						
Baseline ~ $\sum$ (# released)/(distance)	0.0273*** (0.0101)					
$\sum$ (# released)/(log distance)		0.0225** (0.0099)				
$\sum$ (# released)/(sqrt. distance)			0.0252** (0.0104)			
$\sum$ (log # released)/(log distance)				0.0208** (0.0085)		
$\sum$ (sqrt. # released)/(sqrt. distance)					0.0269** (0.0107)	
$\sum$ (# released)/(distance + distance <sup>2</sup> )						0.0147 (0.0113)
R-squared	0.018	0.013	0.014	0.012	0.014	0.012
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>						
Dependent variable: Log # homophobic slur in VK (mean 0.008 st.dev. 0.127)						
Exposure to 1953 amnesty						
Baseline ~ $\sum$ (# released)/(distance)	0.0110** (0.0054)					
$\sum$ (# released)/(log distance)		0.0112* (0.0059)				
$\sum$ (# released)/(sqrt. distance)			0.0132** (0.0054)			
$\sum$ (log # released)/(log distance)				0.0065* (0.0040)		
$\sum$ (sqrt. # released)/(sqrt. distance)					0.0110** (0.0054)	
$\sum$ (# released)/(distance + distance <sup>2</sup> )						0.0051 (0.0056)
R-squared	0.037	0.034	0.036	0.031	0.033	0.032
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>						
Dependent variable: 1(Dislike homosexuals) (mean 0.616 st.dev. 0.486)						
Exposure to 1953 amnesty						
Baseline ~ $\sum$ (# released)/(distance)	0.1334*** (0.0508)					
$\sum$ (# released)/(log distance)		0.1272** (0.0621)				
$\sum$ (# released)/(sqrt. distance)			0.1812*** (0.0616)			
$\sum$ (log # released)/(log distance)				0.1050** (0.0481)		
$\sum$ (sqrt. # released)/(sqrt. distance)					0.1423** (0.0582)	
$\sum$ (# released)/(distance + distance <sup>2</sup> )						0.2389*** (0.0521)
R-squared	0.066	0.067	0.067	0.065	0.066	0.068
Observations	6,519	6,519	6,519	6,519	6,519	6,519

*Notes:* This Table replicates Column VI of Table 2 but uses alternative measures of exposure to the amnesty of 1953. In Panels A and B standard errors clustered at the province level are in parentheses. In Panel C standard errors clustered at the location level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.10** – Robustness for Table 2: Alternative Measures of Exposure to Amnesty (Exposure to Only the Nearest Gulag Camp)

	I	II	III	IV	V	VI
<i>Panel A:</i>						
Dependent variable: Log # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)						
Exposure to 1953 amnesty x Post amnesty (# released in closest)/(distance to closest)	0.0064 (0.0071)					
(# released in closest)/(log distance to closest)		0.0073 (0.0065)				
(# released in closest)/(sqrt. distance to closest)			0.0133 (0.0086)			
(log # released in closest)/(log distance to closest)				0.0025 (0.0043)		
(sqrt. # released in closest)/(sqrt. distance to closest)					0.0120 (0.0084)	
(# released in closest)/(distance + distance <sup>2</sup> to closest)						0.0015 (0.0035)
R-squared	0.009	0.009	0.010	0.009	0.010	0.009
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>						
Dependent variable: Log # homophobic slur in VK (mean 0.008 st.dev. 0.127)						
Exposure to 1953 amnesty x Post amnesty (# released in closest)/(distance to closest)	0.0110** (0.0054)					
(# released in closest)/(log distance to closest)		0.0112* (0.0059)				
(# released in closest)/(sqrt. distance to closest)			0.0132** (0.0054)			
(log # released in closest)/(log distance to closest)				0.0065* (0.0040)		
(sqrt. # released in closest)/(sqrt. distance to closest)					0.0110** (0.0054)	
(# released in closest)/(distance + distance <sup>2</sup> to closest)						0.0051 (0.0056)
R-squared	0.016	0.016	0.017	0.015	0.016	0.015
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>						
Dependent variable: I (Dislike homosexuals) (mean 0.616 st.dev. 0.486)						
Exposure to 1953 amnesty x Post amnesty (# released in closest)/(distance to closest)	-0.0122 (0.0139)					
(# released in closest)/(log distance to closest)		-0.0235 (0.0248)				
(# released in closest)/(sqrt. distance to closest)			-0.0249 (0.0252)			
(log # released in closest)/(log distance to closest)				-0.0194 (0.0234)		
(sqrt. # released in closest)/(sqrt. distance to closest)					-0.0258 (0.0232)	
(# released in closest)/(distance + distance <sup>2</sup> to closest)						0.0055 (0.0167)
R-squared	0.065	0.065	0.064	0.063	0.064	0.062
Observations	6,519	6,519	6,519	6,519	6,519	6,519

*Notes:* This Table replicates Column VI of Table 2 but uses alternative measures of exposure to the amnesty of 1953. In Panels A and B standard errors clustered at the province level are in parentheses. In Panel C standard errors clustered at the location level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table C.11** – Robustness for Table 2: Alternative Measures of Exposure to Amnesty (Thresholds of Effect w/o Decay Rate)

	I	II	III	IV	V	VI
<i>Panel A:</i>	<u>Dependent variable: Log # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty (thresholds)						
50 km	0.0233* (0.0121)					
150 km		0.0177 (0.0122)				
300 km			0.0135 (0.0089)			
500 km				0.0133* (0.0070)		
750 km					0.0094 (0.0075)	
1000 km						0.0080 (0.0068)
R-squared	0.014	0.011	0.010	0.010	0.009	0.009
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	<u>Dependent variable: Log # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty (thresholds)						
50 km	0.0128*** (0.0044)					
150 km		0.0105** (0.0051)				
300 km			0.0086* (0.0045)			
500 km				0.0079** (0.0039)		
750 km					0.0067 (0.0041)	
1000 km						0.0052 (0.0037)
R-squared	0.024	0.021	0.019	0.018	0.017	0.016
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	<u>Dependent variable: I(Dislike homosexuals) (mean 0.616 st.dev. 0.486)</u>					
Exposure to 1953 amnesty (thresholds)						
50 km	0.0299 (0.0762)					
150 km		0.1014 (0.0675)				
300 km			0.1489*** (0.0527)			
500 km				0.1553*** (0.0476)		
750 km					0.1460** (0.0626)	
1000 km						0.1436** (0.0631)
R-squared	0.065	0.066	0.067	0.069	0.067	0.067
Observations	6,519	6,519	6,519	6,519	6,519	6,519

*Notes:* This Table replicates Column VI of Table 2 but uses alternative measures of exposure to the amnesty of 1953. All explanatory variables are normalized (with a mean of 0 and standard deviation of 1) and constructed as a sum of released prisoners within a radius (specified threshold) of that location. In Panels A and B standard errors clustered at the province level are in parentheses. In Panel C standard errors clustered at the location level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.12** – Robustness for Table 2: Alternative Spatially Adjusted Standard Errors

	I	II	III	IV	V	VI
<i>Panel A: ~baseline Panel A with 150 km cutoff</i>	<u>Dependent variable: lhs # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty	0.0311*** (0.0093)	0.0307*** (0.0093)	0.0303*** (0.0094)	0.0303*** (0.0094)	0.0267*** (0.0091)	0.0273*** (0.0091)
R-squared	0.011	0.011	0.011	0.011	0.015	0.018
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B: ~baseline Panel A with 300 km cutoff</i>	<u>Dependent variable: lhs # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty	0.0311*** (0.0092)	0.0307*** (0.0092)	0.0303*** (0.0093)	0.0303*** (0.0093)	0.0267*** (0.0091)	0.0273*** (0.0091)
R-squared	0.011	0.011	0.011	0.011	0.015	0.018
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C: ~baseline Panel B with 150 km cutoff</i>	<u>Dependent variable: lhs # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty	0.0143*** (0.0052)	0.0143*** (0.0050)	0.0140*** (0.0051)	0.0140*** (0.0051)	0.0107* (0.0055)	0.0110** (0.0055)
R-squared	0.013	0.013	0.013	0.013	0.035	0.037
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel D: ~baseline Panel B with 300 km cutoff</i>	<u>Dependent variable: lhs # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty	0.0143*** (0.0052)	0.0143*** (0.0050)	0.0140*** (0.0051)	0.0140*** (0.0051)	0.0107* (0.0055)	0.0110** (0.0055)
R-squared	0.013	0.013	0.013	0.013	0.035	0.037
Observations	9,829	9,829	9,829	9,829	9,829	9,829
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Panels A and B of Table 2 but uses alternative ways of computing standard errors. Spatially corrected standard errors with a 150 km (300 km) threshold are in parentheses in Panels A and C (Panels B and D). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table C.13** – Robustness for Table 2: *Rayon*-Level Results

	I	II	III	IV	V	VI
<i>Panel A: ~baseline Panel A on rayon-level</i>						
	Dependent variable: lhs # crimes against LGBTQ+ (mean 0.101 st.dev. 0.622)					
Exposure to 1953 amnesty	0.0645** (0.0269)	0.0646** (0.0274)	0.0614** (0.0269)	0.0614** (0.0269)	0.0551** (0.0264)	0.0567** (0.0261)
R-squared	0.010	0.010	0.012	0.012	0.014	0.023
Observations	2,314	2,314	2,314	2,314	2,314	2,314
<i>Panel B: ~baseline Panel B on rayon-level</i>						
	Dependent variable: lhs # homophobic slur in VK (mean 0.033 st.dev. 0.260)					
Exposure to 1953 amnesty	0.0316** (0.0128)	0.0319** (0.0127)	0.0303** (0.0126)	0.0303** (0.0126)	0.0263** (0.0128)	0.0266** (0.0122)
R-squared	0.014	0.015	0.017	0.017	0.022	0.029
Observations	2,314	2,314	2,314	2,314	2,314	2,314
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Panels A and B of Table 2 but uses a different unit of observation — it uses a county (*rayon*) instead of municipality. Standard errors clustered at the province level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.14** – Amnesty From Female Labor Camps Has No Effect on Homophobia

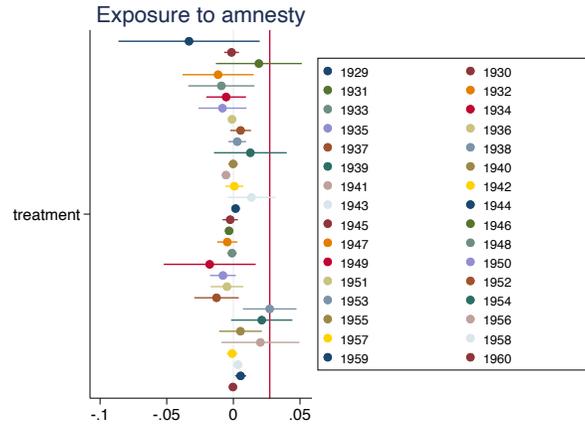
	I	II	III	IV	V	VI
<i>Panel A:</i>	<u>Dependent variable: lhs # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)</u>					
Exposure to 1953 amnesty	-0.0025 (0.0025)	-0.0031 (0.0025)	-0.0035 (0.0025)	-0.0035 (0.0025)	-0.0023 (0.0024)	-0.0029 (0.0025)
R-squared	0.000	0.001	0.001	0.001	0.008	0.010
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	<u>Dependent variable: lhs # homophobic slur in VK (mean 0.008 st.dev. 0.127)</u>					
Exposure to 1953 amnesty	-0.0020* (0.0010)	-0.0019* (0.0010)	-0.0022** (0.0010)	-0.0022** (0.0010)	-0.0012 (0.0009)	-0.0004 (0.0008)
R-squared	0.000	0.000	0.002	0.002	0.028	0.030
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	<u>Dependent variable: 1(Dislike homosexuals) (mean 0.616 st.dev. 0.486)</u>					
Exposure to 1953 amnesty	-0.0052 (0.0179)	-0.0058 (0.0178)	-0.0049 (0.0179)	-0.0070 (0.0176)	-0.0035 (0.0188)	-0.0083 (0.0164)
Survey-year FEs	✓	✓	✓	✓	✓	✓
R-squared	0.005	0.006	0.006	0.012	0.012	0.066
Observations	6,519	6,519	6,519	6,519	6,519	6,519
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Table 2 but uses exposure to the amnesty from female Gulag labor camps. Standard errors clustered at the province (*oblast'*) level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

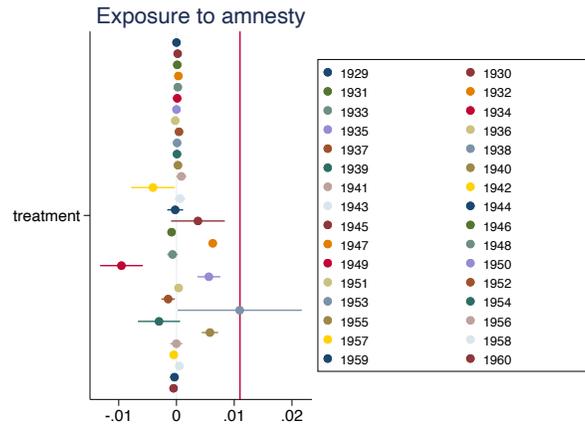


**Figure C.5** – Placebo Exposure to the Amnesty for All Gulag’s Years

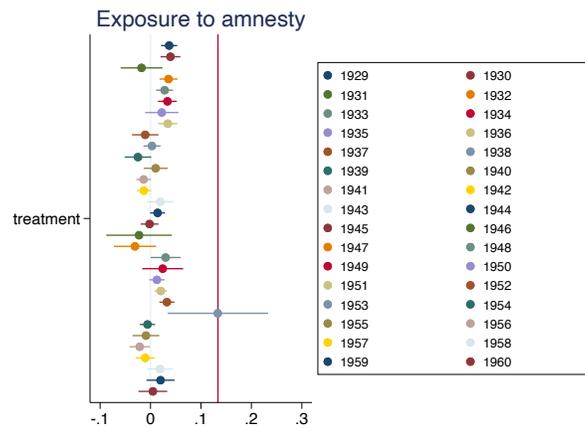
Panel A: Log # of Crimes Against LGBTQ+



Panel B: Log # of Homophobic Slur in VK



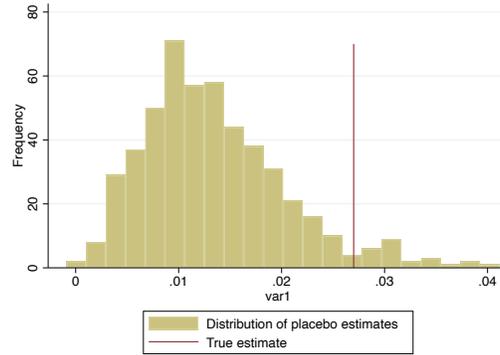
Panel C: 1(Dislike Homosexuals)



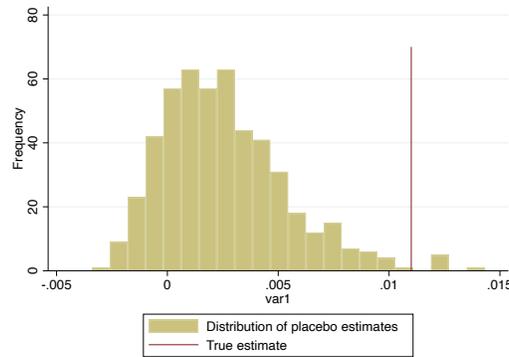
*Notes:* This Figure reports on the point-estimate and 95th-percent confidence band that results when re-estimating the specification in Column VI of Table 2 but uses amnesty in every year from 1929 to 1960. The (red) vertical line is the baseline point estimate for the amnesty of 1953. The results are sorted numerically from 1929 to 1960.

**Figure C.6** – The Effect of Contrafactual Amnesty Size

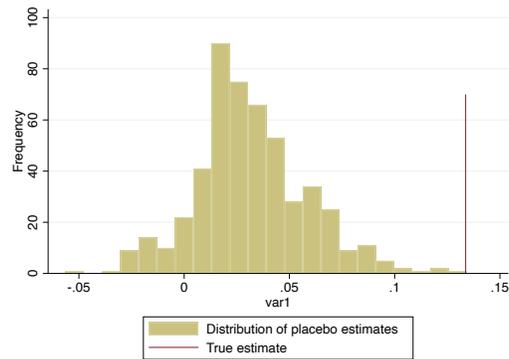
Panel A: Log # of Crimes Against LGBTQ+



Panel B: Log # of Homophobic Slur in VK



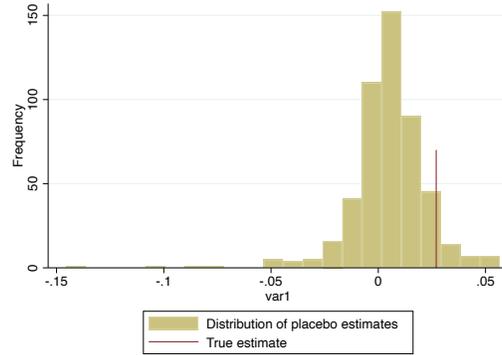
Panel C: 1(Dislike Homosexuals)



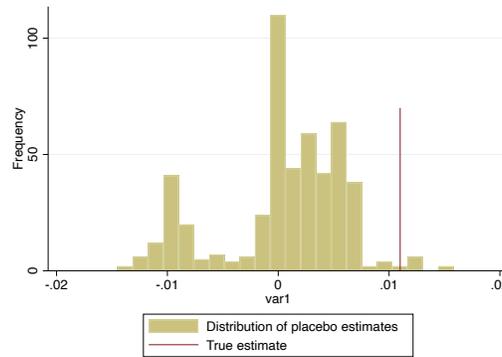
*Notes:* In this Figure, we take the most demanding specification from the baseline results, i.e., Column VI of Table 2. This The figure shows estimated coefficients using 500 placebo amnesties (drawn from the factual distribution of the amnesties with replacement) for the 153 Gulag labor camps existing in 1953. The red vertical line is the true point estimate of  $\beta$ . Panel A reports results for the inverse hyperbolic sine of the number of crimes against LGBTQ+ as the dependent variable. Panel B reports results for the inverse hyperbolic sine of the number of homophobic slurs in VK as the dependent variable. Panel C reports results for the dummy for an individual’s homophobia as the dependent variable. In Panel A 25 estimates are larger than the true (4.8 percentile). In Panel B 6 estimates are larger than the true (1.2 percentile). In Panel C one estimate is larger than the true (0.02 percentile).

**Figure C.7** – The Effect of Contrafactual Gulag Camps Locations

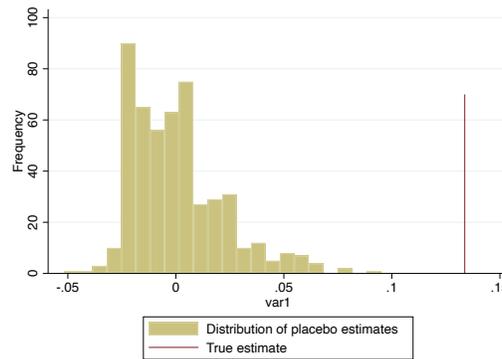
Panel A: Log # of Crimes Against LGBTQ+



Panel B: Log # of Homophobic Slur in VK



Panel C: 1(Dislike Homosexuals)



*Notes:* In this Figure, we take the most demanding specification from the baseline results, i.e., Column VI of Table 2. This figure shows estimated coefficients using 500 placebo amnesties for the 153 factual amnesties randomly assigned to 475 ever-existing Gulag labor camps. The red vertical line is the true point estimate of  $\beta$ . Panel A reports results for the inverse hyperbolic sine of the number of crimes against LGBTQ+ as the dependent variable. Panel B reports results for the inverse hyperbolic sine of the number of homophobic slurs in VK as the dependent variable. Panel C reports results for the dummy for an individual’s homophobia as the dependent variable. In Panel A 34 estimates are larger than the true (6.8 percentile). In Panel B 10 estimates are larger than the true (0.2 percentile). In Panel C one estimate is larger than the true (0.02 percentile).

**Table C.15** – Effect of Amnesty of 1953 on Residential Homophobia in Post-Soviet Countries (Without Russia)

	I	II	III	IV	V	VI
<i>Panel C: ~ All Soviet Republics with Gulag camps</i>	Dependent variable: 1(Dislike homosexuals) (mean 0.574 st.dev. 0.494)					
Exposure to 1953 amnesty	0.4503** (0.1910)	0.4444* (0.2367)	0.4033* (0.2447)	0.4624* (0.2527)	0.4386* (0.2375)	0.5376*** (0.1897)
Country FEs	✓	✓	✓	✓	✓	✓
R-squared	0.070	0.076	0.076	0.079	0.080	0.126
Observations	14,255	14,255	14,255	14,255	14,255	14,255
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Panel C of Table 2 but uses data on all post-Soviet countries (without Russia) that had Gulag labor camps. In particular, we use data from Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan Tajikistan, Ukraine, and Uzbekistan. Armenia, Belarus, Estonia, Latvia, Lithuania, and Moldova had never had labor camps. We don't add them to the sample because exposure to the amnesty of 1953 would be collinear with the distance to the Russian border when country fixed effects are added. We also don't use Turkmenistan's data because LiTS for Turkmenistan is not available. This Table weighs all observations using survey population weights. Standard errors clustered on the location level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.16** – Locations More Exposed to Amnesty of 1953 Consume More ‘Prison’ Music (Russian Chanson)

	I	II	III	IV	V	VI
<i>Panel A:</i>						
	Dependent variable: lns # Chanson searches in Yandex (mean 0.488 st.dev. 1.77)					
Exposure to 1953 amnesty	0.0174*** (0.0055)	0.0181*** (0.0059)	0.0146** (0.0058)	0.0146** (0.0058)	0.0179*** (0.0067)	0.0144** (0.0068)
R-squared	0.000	0.001	0.001	0.001	0.001	0.010
Observations	2,326	2,326	2,326	2,326	2,326	2,326
<i>Panel B:</i>						
	Dependent variable: lns # Egor Kreed searches in Yandex (mean 0.597 st.dev. 1.69)					
Exposure to 1953 amnesty	0.0140 (0.0231)	0.0143 (0.0228)	0.0114 (0.0223)	0.0103 (0.0222)	0.0208 (0.0244)	0.0205 (0.0237)
R-squared	0.000	0.000	0.000	0.001	0.002	0.025
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>						
	Dependent variable: lns # Slava Marlow searches in Yandex (mean 0.114 st.dev. 0.781)					
Exposure to 1953 amnesty	0.0335* (0.0195)	0.0327* (0.0194)	0.0256 (0.0184)	0.0254 (0.0184)	0.0306 (0.0202)	0.0271 (0.0193)
R-squared	0.002	0.002	0.006	0.006	0.007	0.025
Observations	6,519	6,519	6,519	6,519	6,519	6,519
<i>Panel D:</i>						
	Dependent variable: lns # Alla Pugacheva searches in Yandex (mean 0.527 st.dev. 1.59)					
Exposure to 1953 amnesty	0.0222 (0.0238)	0.0233 (0.0236)	0.0197 (0.0230)	0.0188 (0.0228)	0.0274 (0.0249)	0.0266 (0.0241)
R-squared	0.000	0.001	0.001	0.002	0.002	0.028
Observations	6,519	6,519	6,519	6,519	6,519	6,519
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* The unit of observation in this Table is *rayon*. The dependent variable in Panel A is a log number of searches of Chanson singers relative to the total number of searches on Yandex.ru in 2021. We use searches for Wili Tokarev, Yuri Leps, Lesopoval, Denis Maydanov, Katya Ogonek, Nikolay Rastorguev, Mikhail Schafutinsky, Zheka, Mikhail Krug, and Ivan Kuchin. The dependent variable in Panel B is a log number of searches for Rapper Egor Kreed relative to the total number of searches in Yandex.ru in 2021. The dependent variable in Panel C is a log number of searches for Rapper Slava Marlow relative to the total number of searches in Yandex.ru in 2021. The dependent variable in Panel D is a log number of searches for the most famous Russian pop singer Alla Pugacheva relative to the total number of searches on Yandex.ru in 2021. All columns have the same controls as in the baseline specification in Table C.13. Standard errors clustered at the province level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.17** – Amnesty of 1953 Has no Effect on Income in 2020

	I	II	III	IV	V	VI
<i>Panel A:</i>	Dependent variable: Log average monthly income in 2020 (mean 2.89 st.dev. 4.4)					
Exposure to 1953 amnesty	0.1662 (0.1707)	0.1325 (0.1509)	0.1019 (0.1451)	0.1026 (0.1464)	0.1176 (0.1505)	0.0840 (0.1253)
R-squared	0.001	0.010	0.012	0.012	0.012	0.065
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	Dependent variable: Log population in 2020 (mean 8.8 st.dev. 1.2)					
Exposure to 1953 amnesty	0.1511*** (0.0521)	0.1460*** (0.0506)	0.0964** (0.0371)	0.0963** (0.0371)	0.0208 (0.0398)	0.0211 (0.0393)
R-squared	0.016	0.017	0.034	0.034	0.047	0.054
Observations	9,829	9,829	9,829	9,829	9,829	9,829
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

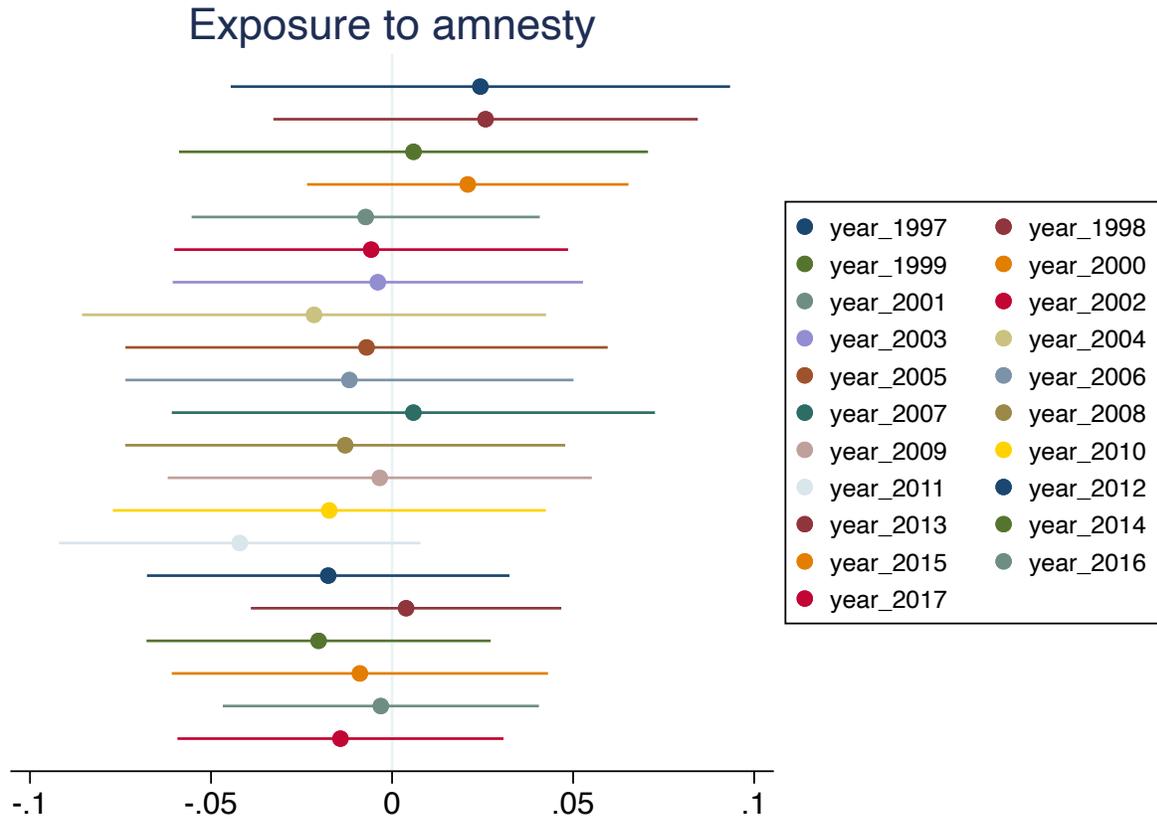
*Notes:* This Table replicates Table 2 but uses different dependent variables — log average household income (in Panel A) and log population (in Panel B). Standard errors clustered at the province level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table C.18** – Amnesty of 1953 Has no Effect on Crime Rates in 2010–2015

	I	II	III	IV	V	VI
	Dependent variable: Log number of crimes per capita					
Exposure to 1953 amnesty	0.0701*** (0.0169)	0.0217 (0.0194)	-0.0051 (0.0212)	-0.0022 (0.0214)	-0.0025 (0.0214)	-0.0093 (0.0274)
R-squared	0.030	0.312	0.352	0.355	0.356	0.488
Observations	200	200	200	200	200	200
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Table 2 but uses the log number of crimes per capita as the dependent variable in 2010–2015 (years for which hate crimes are available). The unit of observation is a municipality (as in Panels A and B of Table 2) but it is a subsample of the 200 largest Russian cities. Standard errors clustered at the province level, are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Figure C.8 – Amnesty of 1953 Has no Effect on Crime Rates in 1997–2017



Notes: Each coefficient in this Figure comes from a specification similar to one in Column VI of Table C.18 but uses the number of crimes for every available year.

**Table C.19** – The Effect On Crimes Against LGBTQ+ Persons Is Driven By Crimes Against Gays But Not Lesbian or Trans Persons

	I	II	III	IV	V	VI
<i>Panel A:</i>	<u>Dependent variable: lns # crimes against gays (mean 0.023 st.dev. 0.299)</u>					
Exposure to 1953 amnesty	0.0311*** (0.0100)	0.0307*** (0.0102)	0.0303*** (0.0102)	0.0303*** (0.0103)	0.0267*** (0.0101)	0.0272*** (0.0101)
R-squared	0.011	0.011	0.011	0.011	0.016	0.018
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	<u>Dependent variable: lns # crimes against lesbians (mean 0.002 st.dev. 0.033)</u>					
Exposure to 1953 amnesty	0.0000 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)
R-squared	0.000	0.000	0.000	0.000	0.000	0.004
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	<u>Dependent variable: lns # crimes against trans persons (mean 0.001 st.dev. 0.068)</u>					
Exposure to 1953 amnesty	0.0000 (0.0001)	-0.0000 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)	0.0001 (0.0001)
R-squared	0.000	0.000	0.000	0.000	0.000	0.001
Observations	9,829	9,829	9,829	9,829	9,829	9,829
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Table 2 but uses different dependent variables. The dependent variable in Panel A is the inverse hyperbolic sine of the number of crimes against gays. The dependent variable in Panel B is the inverse hyperbolic sine of the number of crimes against lesbians. The dependent variable in Panel C is the inverse hyperbolic sine of the number of crimes against trans persons. Standard errors clustered at the province level, are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table C.20** – No Effect on Non-Homophobic Derogatory Language in Social Media

	I	II	III	IV	V	VI
<i>Panel A:</i>	Dependent variable: lns # female derogative slur in VK (mean 0.004 st.dev. 0.054)					
Exposure to 1953 amnesty	-0.0005 (0.0011)	-0.0006 (0.0011)	-0.0006 (0.0011)	-0.0006 (0.0011)	-0.0009 (0.0010)	-0.0010 (0.0010)
R-squared	0.153	0.154	0.154	0.154	0.155	0.157
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>	Dependent variable: lns # male derogative slur in VK (mean 0.009 st.dev. 0.101)					
Exposure to 1953 amnesty	-0.0004 (0.0014)	-0.0006 (0.0013)	-0.0005 (0.0013)	-0.0006 (0.0013)	-0.0017 (0.0011)	-0.0016 (0.0011)
R-squared	0.233	0.233	0.233	0.233	0.245	0.246
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>	Dependent variable: lns # swear words with root 'huj' in VK (mean 0.169 st.dev. 1.027)					
Exposure to 1953 amnesty	0.0667 (0.0455)	0.0690 (0.0460)	0.0703 (0.0465)	0.0705 (0.0464)	0.0666 (0.0478)	0.0677 (0.0480)
Survey-year FEs	✓	✓	✓	✓	✓	✓
R-squared	0.712	0.712	0.712	0.712	0.713	0.714
Observations	6,519	6,519	6,519	6,519	6,519	6,519
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Table 2 but uses different dependent variables. The dependent variable in Panel A is the inverse hyperbolic sine of the number of derogatory slurs against women. The dependent variable in Panel B is the inverse hyperbolic sine of the number of derogatory slurs against men. The dependent variable in Panel C is the inverse hyperbolic sine of the number of general swear words with the root 'huj.' Standard errors clustered at the province level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.21** – Amnesty of 1953 Has no Effect on Attitudes Toward Women

	I	II	III	IV	V	VI	VII	VIII	IX
	Dependent variable:								
	Women are as competent as men to be business executives	Men make better political leaders than women do	A woman should do most of the household chores even if the husband is not working	It is important that my daughter achieves university education	It is important that my son achieves university education	My opinions are taken into account in decisions made by the household	Cohabiting partners should be married	It is better for everyone involved if the man earns the money and the woman takes care of the home and children	Equal rights for women as citizens are important
Exposure to 1953 amnesty	0.0284 (0.6938)	0.0855 (0.8308)	0.2344 (1.0871)	-0.7089 (0.8424)	0.4548 (0.8037)	-0.7208 (0.6583)	-0.8183 (1.1307)	0.5143 (1.1431)	-0.2937 (1.0305)
R-squared	0.145	0.090	0.119	0.128	0.151	0.097	0.086	0.076	0.116
Observations	1,445	1,417	1,449	1,284	1,278	1,413	1,391	1,410	1,458

*Notes:* This Table replicates Column VI of Panel C of Table 2 but uses different dependent variables. Here we only use LiTS (2016) data. Courier (2013, 2015) and LiTS (2010) don't have questions about attitudes toward women. WVS has one similar question (whether men are better executives) but the answers are not comparable. Hence, we use LiTS which has more questions and the largest number of observations. The results hold if we arbitrarily convert LiTS's and WVS's ordinal variables to a dummy and pool them. These results are available on request. Standard errors clustered at the province level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.22** – Amnesty of 1953 Has no Effect on Trust and Social Capital

	I	II	III	IV	V
	Dependent variable:				
	Most people can be trusted	Family can be trusted	People in the neighborhood can be trusted	Strangers can be trusted	Foreigners can be trusted
Exposure to 1953 amnesty	0.0830 (0.1959)	0.0039 (0.0091)	-0.0900 (0.0550)	0.1171 (0.0826)	0.0285 (0.1128)
R-squared	0.104	0.023	0.059	0.059	0.121
Observations	6,525	6,525	6,525	6,525	6,525

*Notes:* This Table replicates Column VI of Panel C of Table 2 but uses different dependent variables. Here we only use LiTS data. Courier (2013, 2015) doesn't have questions about trust. WVS has similar questions but the answers are not comparable. Hence, we use LiTS which has more questions and the largest number of observations. The results hold if we arbitrarily convert LiTS's and WVS's ordinal variables to a dummy and pool them. These results are available on request. Standard errors clustered at the province level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table C.23** – Locations That Had More Coronations of Thieves-in-Law after 1953 Are More Homophobic Now

	I	II	III	IV	V	VI
<i>Panel A:</i>						
	Dependent variable: lns # crimes against LGBTQ+ (mean 0.024 st.dev. 0.307)					
lns # coronations of thieves-in-law	0.9572*** (0.1309)	0.9566*** (0.1309)	0.9562*** (0.1308)	0.9563*** (0.1308)	0.9501*** (0.1299)	0.9505*** (0.1305)
R-squared	0.250	0.250	0.250	0.250	0.252	0.254
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel B:</i>						
	Dependent variable: lns # homophobic slur in VK (mean 0.008 st.dev. 0.127)					
lns # coronations of thieves-in-law	0.3884*** (0.0871)	0.3884*** (0.0871)	0.3880*** (0.0871)	0.3881*** (0.0871)	0.3813*** (0.0872)	0.3815*** (0.0874)
R-squared	0.238	0.238	0.239	0.239	0.256	0.258
Observations	9,829	9,829	9,829	9,829	9,829	9,829
<i>Panel C:</i>						
	Dependent variable: 1(Dislike homosexuals) (mean 0.616 st.dev. 0.486)					
lns # coronations of thieves-in-law	0.0122* (0.0073)	0.0122* (0.0073)	0.0122* (0.0073)	0.0130* (0.0075)	0.0132* (0.0075)	0.0132* (0.0069)
Survey-year FEs	✓	✓	✓	✓	✓	✓
R-squared	0.002	0.003	0.003	0.009	0.010	0.064
Observations	0.002	0.003	0.003	0.009	0.010	0.064
Latitude & longitude		✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓
Exposure to total Gulag population					✓	✓
Convict labor industry FEs of closest Gulag camp						✓

*Notes:* This Table replicates Table 2 but uses a different explanatory variable — inverse hyperbolic sine of the number of coronations of thieves-in-law between 1953 and 2010. Standard errors clustered at the province level, are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table C.24** – Mediation Analysis

	I	II	III
	Dependent variable:		
	Ihs # crimes against LGBTQ+	Ihs # homophobic slur in VK	1(Dislike homosexuals)
X on Y	0.027	0.011	0.134
X on M	0.020	0.020	3.529
M on Y X	0.944	0.379	0.019
Effect through M	0.702	0.719	0.502

*Notes:* This Table computes what share of the effect of amnesty on homophobia goes through the coronations of the thieves-in-law. The point-estimates for  $X$  on  $Y$  come from the Column VI of Table 2. The point-estimates for  $X$  on  $M$  come from using the specification from Column VI of Table 2 but using inverse hyperbolic sine of the number of the post-1953 coronations as the dependent variable. The point estimates for  $M$  on  $Y|X$  come from the estimation of Equation 4 while controlling for the exposure to the amnesty of 1953. Here we assume linear effects and exogeneity of our treatment — exposure to the amnesty of 1953 conditional on the controls (specification in Column VI of Table 2).

**Table C.25** – Respondents Whose Close Relatives Were in Labor Camps are More Homophobic: Survey Data (LiTS, 2016)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Sample: LiTS 2016	Dependent variable: 1(Dislike homosexuals) (mean 0.69 st.dev. 0.46)											
Parents/Grandparents sent to labor camp	0.2187*** (0.0376)	0.2357*** (0.0342)	0.2315*** (0.0351)	0.2326*** (0.0364)	0.2357*** (0.0364)	0.2057*** (0.0493)	0.2034*** (0.0512)	0.2059*** (0.0548)	0.2044*** (0.0562)	0.2010*** (0.0549)	0.1877*** (0.0576)	0.2039*** (0.0537)
R-squared	0.004	0.016	0.021	0.021	0.021	0.131	0.135	0.139	0.140	0.149	0.151	0.150
Observations	1,507	1,507	1,507	1,507	1,507	1,508	1,509	1,510	1,507	1,507	1,507	1,507
Latitude & longitude		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Min. distance to Gulag camp			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Population of the closest Gulag camp				✓	✓	✓	✓	✓	✓	✓	✓	✓
Exposure to total Gulag population					✓	✓	✓	✓	✓	✓	✓	✓
Convict labor industry FEs of closest Gulag camp						✓	✓	✓	✓	✓	✓	✓
Age & gender							✓	✓	✓	✓	✓	✓
Marital status								✓	✓	✓	✓	✓
Ethnicity FEs									✓	✓	✓	✓
Religion FEs										✓	✓	✓
Education FEs											✓	✓
Log income & occupation FEs												✓

*Notes:* The unit of observation in this Table is a survey respondent. The dependent variable is a dummy equal to 1 if respondents would not like having homosexual persons as their neighbors. The explanatory variable is a dummy equal to one if the respondent’s immediate relatives (parents or grandparents) were in Gulag and zero otherwise. This Table is using data from the 3rd (2016) wave of LiTS. Standard errors clustered at the primary sampling unit level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1