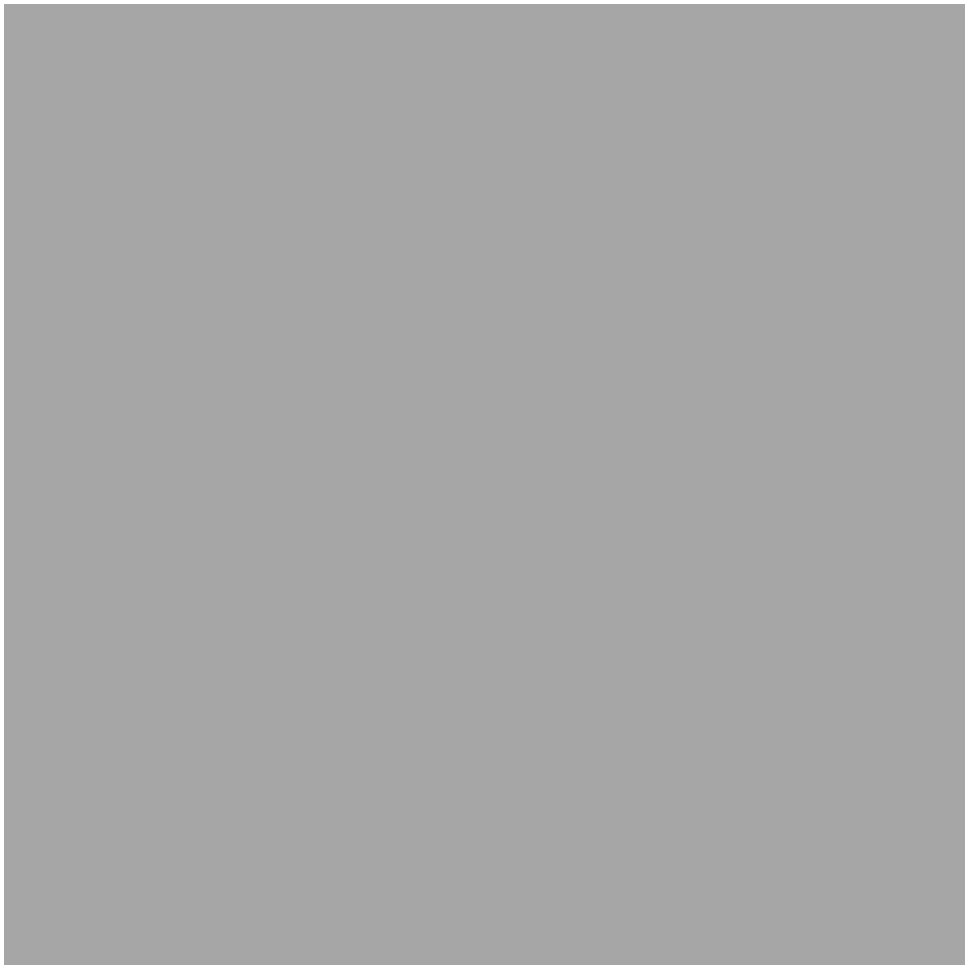

ENEMIES OF THE PEOPLE

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Abstract

Enemies of the people were the millions of artists, engineers, professors, and affluent peasants that were thought a threat to the Soviet regime for being the educated elite, and were forcedly resettled to the Gulag, i.e. the system of forced labor camps across the Soviet Union. In this paper we look at the long-run consequences of this dark re-location episode. We show that areas around camps with a larger share of *enemies* among camp prisoners are more prosperous today, as captured by firms' wages and profits, as well as night lights per capita. We also show that the descendants of *enemies* are more likely to be tertiary educated today. Our results point in the direction of a long-run persistence of education and a resulting positive effect on local economic outcomes. A 28 percentage point increase in the share of *enemies* increases night lights per capita by 58%, profits per employee by 65%, and average wages by 22%.

JEL CODES: O15, O47
Key Words: Soviet Union, forced migration, education, persistence, natural experiment.

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No mercy for these enemies of the people, the enemies of socialism, the enemies of the working people! War to the death against the rich and their hangers-on, the bourgeois intellectuals; war on the rogues, the idlers and the rowdies!

Lenin, 1917

Whoever tries to break the unity of the socialist state... is a sworn enemy of the state, of the peoples of the USSR. And we will destroy any such enemy... we will destroy his kin, his family.

Stalin, 1937

1 INTRODUCTION

The enemies of the people, or vragi naroda, were the millions of intellectuals, artists, engineers, politicians, businessmen, professors, landowners, scientists, and affluent peasants who were thought a threat to the Soviet regime. Along with millions of other non-political criminals, they were sent to forced labor camps scattered across the Soviet Union, what Aleksandr Solzhenitsyn called the Gulag Archipelago (Solzhenitsyn, 1973). In this paper we look at the long-run development consequences of this re-location policy.

We look at the long-run effects of the forced displacement of enemies of the people, or *enemies*, on development outcomes across Gulag localities in Russia.[1] Stalin scattered camps across the Soviet Union starting in the 1920s in his push for totalitarian governance and industrialization. From 1929 until Stalin's death in 1953, around 11.3 million (Wheatcroft, 2013) prisoners passed through 474 camps devoted to various economic activities such as

[1] Gulag is an acronym for Main Camp Administration in Russian. In this paper we use camps and Gulags interchangeably to refer to camps within the Gulag system.

forestry, mining, manufacturing, or agriculture. While this dark episode in human history has been extensively detailed by historians, for example Khlevniuk (2004) and Applebaum (2012), and famously brought to light by Solzhenitsyn (1973), little economic research has been devoted to understanding its consequences on local development. We know from recent research that the population of cities where Gulag camps were located grew significantly faster from 1926 to 2010 than that of similar cities without camps (Mikhailova, 2012). We also know that Gulag districts were associated with anti-communist voting during the 1990s (Kapelko and Markevich, 2014), and lower levels of trust in 2016 (Nikolova et al., 2019). We also know that ethnic deportations in Stalin's era, notably of ethnic Germans to colonies across the USSR, led to the diffusion of gender norms (Jarotschkin et al., 2020). Yet the long-run economic effects of the Gulag, and more precisely that of the resettlement of *enemies of the people*, has not been explored yet.

Enemies of the people were the high skilled, educated elite (Miller and Smith, 2015), targeted by the authorities for they posed a threat to the propaganda-dependant regime.[2] Their re-location was on a massive scale. According to a 1954 report from the Ministry of Internal Affairs, from 1921 to 1953, 3,777,380 *enemies* had been found guilty of fomenting counter-revolution, 2,369,220 of which were sent to Gulags, 765,180 to exile colonies, and 642,900 executed (Applebaum, 2012).[3] One estimate suggests that 1.6 million (nearly 2.5%

[2]The expression *enemies of the people* originated in Roman times and has long been used by dictators and revolutionaries, from Robespierre to Mao Zedong, to describe political opponents. It was Lenin and Stalin however that made it stick, notably by formalizing it into law in 1927 (Article 58). It is also back into the political sphere, as part of the populist playbook which pitches ordinary people against established elite groups. For example, President Trump used it on twitter in 2017: "*The FAKE NEWS media (failing @nytimes, @CNN, @NBCNews and many more) is not my enemy, it is the enemy of the American people. SICK!*", and the British tabloid the Daily Mail used it as a headline in 2016 to describe judges from the High Court of England and Wales who had ruled that parliament would need to approve Brexit. Perhaps its dehumanizing usage is best captured by George Orwell in his novel 1984, in which the government has a required daily routine of two-minute hate: "*The Hate had started. As usual, the face of Emmanuel Goldstein, the Enemy of the People, had flashed on to the screen... a clever face, and yet somehow inherently despicable... The Hate rose to its climax. The voice of Goldstein had become an actual sheep's bleat, and for an instant the face changed into that of a sheep.*"

[3]J. Arch Getty (1993) also suggests that 17.9% of *enemies* were sent to colonies and not the Gulag. While we focus on Gulag locations in this paper, the resettlement to colonies is well detailed in Jarotschkin et al. (2020).

of the working population) had been arrested for counter-revolutionary violations during the Great Terror of 1937 and 1938 alone (Kozlov, 2004). And as educated *enemies* often ended up remaining in their camp's town after the Gulag's fall (Cohen, 2012), their forced re-location might have had persistent effects, notably via human capital channels. The forced re-location of *enemies* can hence be seen as a natural experiment that allows us to identify the long-run persistence of education and its effect on local growth. In doing so we aim to contribute to the growing body of natural experiments in macroeconomics (Fuchs-Schuendeln and Hassan, 2016) and further our understanding of the role of social structure in the uneven development outcomes we observe both across and within countries.

The heart of our empirical investigation is a dataset on Gulags we collect from microfilms at the State Russian Archive (GARF). Crucially, we collect data on the type of crimes committed by Gulag prisoners, allowing us to capture the *enemy* composition of the forced relocations, spread across the Soviet Union, and hence add data to the work of Solzhenitsyn (1973). We also collect data on Gulag prisoners by age, gender, education, ethnicity. We collect data on all camps in 1939, after the Great Terror, and in 1952, at the peak and end of the camp system.[4]

We first confirm the natural experiment nature of the relocation of *enemies*. Based on the historical narrative, we first note that the resettlement process was driven by political rather than industrial forces, which implies no strategic placement of *enemies* across camps by authorities. We then document the randomness of *enemy* roundups within the educated class, which allows us to rule out self-selection of *migrants*, while the *forced* nature of re-locations allows us to rule out endogenous location decisions. We then show that neither economic activities in Gulags nor favorable geographic attributes predict the share of *enemies* across camps, confirming the natural experiment features of our empirical setting.

We match spatially the camps' locations with current economic activity, which we

[4]We verify our archival data collection using data from Memorial, an organization in Moscow devoted to the memory of the Soviet Union's totalitarian history. This data provides information on the location, population, and economic activity of 474 camps from 1921 to 1960. This is detailed in Section 3.

measure using a data set covering the universe of Russian firms, as well as with the intensity of lights at night, captured by satellite pictures.[5] We also match the camps' locations with education data using household and firm surveys. This allows us to compare current economic outcomes across locations within the Gulag system affected by *shocks* of *enemies* of varying intensity.

We first show that in 2018, among firms located within 30km radius of Gulags, those nearby camps which were populated by a higher share of *enemies* pay higher wages and earn higher profits per employee. We show that this effect is also captured by night lights per capita. Moving from a town near a Gulag where *enemies* accounted for 19% of prisoners, i.e. the average across camps in 1952, to one near a camp with 47% *enemies*, or a one standard-deviation increase from the mean (28 percentage points), increases lights per capita by 58%, profits per employee by 65%, and average wages by 22%.[6]

Using data from a 2016 household survey which asked whether respondents had any grand-parents or relatives that were sent to camps for political reasons during Soviet times, we find that those who identify as the grandchildren and relatives of *enemies* are more educated, and they more likely to be located near *enemy-intensive* Gulags. Our results thus point in the direction of a long-run persistence of education via intergenerational transmission and a resulting positive effect on prosperity.

In providing evidence on the long-run effect of *enemies* on development, our paper contributes to the literature on long-run persistence, especially the subset that focuses on human capital and growth.[7] The role of human capital in growth is at the core of

[5]Lights per capita is a measure of prosperity akin to GDP per capita used by Pinkovskiy and Sala-i Martin (2016) and Pinkovskiy (2017). The use of nighttime lights to measure economic activity in general has been pioneered by Henderson et al. (2012).

[6]It is important to note that the Gulag system is one of the most atrocious episode in recent history. While we find that inflows of *enemies* had positive long-run effects on local development, we do not investigate the likely-tragic legacy of the Gulags on the economy as a whole.

[7]The volume by Michalopoulos and Papaioannou (2017) and the literature review by Nunn (2009) cover much of this new literature on the persistence of historical events, and Allen and Donaldson (2020) provide an economic geography framework that can quantify the conditions for long-run persistence. In their model local population shocks create externalities and lead to positive effects on long-run income per capita. We can

economics research yet its effect across locations has been hard to identify.[8] Many of the latest contributions rely on historical natural experiments of human capital allocation across space to identify its effect on development. Easterly and Levine (2016) for example document how the descendants of European colonizers are rich wherever they are in the world as colonizers brought their human capital with them and this made their host countries richer. Similarly, Rocha et al. (2017) show that high-skilled immigrants settled to specific regions of Brazil around 1900 via a state-sponsored policy have higher levels of schooling and income per capita today. Droller (2018) shows that European settlers raised literacy rates and helped industrialization in Argentinean counties. Hornung (2014) show that in the late 17th century Prussia, textile firms in areas receiving skilled Huguenots from France experienced increased productivity. In Latin America (Valencia Caicedo, 2018) and in Madagascar (Wietzke, 2015), human capital spillovers from missionary areas contributed to superior education outcomes in former settler districts. Bazzi et al. (2016) also show that farmers resettled by a policy experiment in Indonesia transferred their human capital and skills and thus contributed to their host region's development.[9] It is also worth noting that, while migrants have been shown to bring skills with them, the removals of skilled labor often has opposite, negative effects at their origin. Acemoglu et al. (2011) indeed shows that the severity of the

think of *enemies* as human capital shocks generating Marshallian externalities and having long-run effects on income per capita.

[8]The empirical literature here is largely based on Romer (1990). Barro and Lee (2010) suggest the cross-country rate-of-return to an additional year of schooling ranges from 5% to 12% across countries but these estimates are not published. More fine-grained estimations include Gennaioli et al. (2013), Ciccone and Papaioannou (2009), and Squicciarini and Voigtlander (2015). The latter present evidence that upper-tail knowledge was an important driver of city growth during the first industrial revolution in France, mainly through increased productivity in industrial technologies. There is also a long-established literature highlighting the importance of schooling in accounting for productivity heterogeneity across firms (Abowd et al., 2005; Ilmakunnas et al., 2004; Fox and Smeets, 2011).

[9]It is worth mentioning that the effect of migration on growth may not only be due to the selection of high-skilled migrants but also due to the fact that migration itself, especially forced migration, may give people an incentive to invest in human capital. For example, Becker et al. (2020) show that forced re-locations within Poland had an effect on education attainment, and Nakamura et al. (2016) show that being unlucky to have one's house destroyed by a volcano eruption on the Westman Islands and being forced to migrate, has been associated with a large increase in long-run labor earnings and education. Another example where this could be at play is the study by Murard and Sakalli (2018), which looks at the re-location of 1.2 million Greek Orthodox resettled from Turkey to Greece. While these refugees were not more educated than locals, they find that localities with a greater share of refugees in 1923 have higher educational attainments today.

persecution and mass murder of middle-class Jews during World War II is associated with worse long-run economic outcomes across Russian cities. Testa (2020) similarly shows that Czechoslovakia's expulsion of 3 million Germans after WWII produced persistent disparities in educational attainment across locations. Waldinger (2016) also shows that the dismissal of scientists in Nazi Germany resulted in lower production of scientific knowledge.

Our paper contributes to this literature on the long-run effect of educated migrants not only by bringing to light the case of the *enemies of the people*, but also by providing a natural experiment whereby educated migrants did not self select into migration, did not choose migration destinations, and whereby no strategic placement occurred across locations.

The persistence of human capital in the long-run is often attributed to intergenerational transmission. The mechanisms of transmission of skills or norms over time are well understood and documented. For example, Bisin and Verdier (2001) provide a model of intergenerational cultural transmission where parents transmit their preferences to their offspring motivated by a form of paternalistic altruism. Hvide and Oyer (2018) use *dinner table human capital* to refer to industry knowledge learned through parents. Gould et al. (2020) also provide convincing causal evidence of transmission of human capital from parents to children using variation in parental influence due to parental death, divorce, and the increasing specialization of parental roles in larger families. Lindahl et al. (2015) document persistence in educational attainments over four generations in Sweden, labelling this persistence as *dynastic human capital*. Valencia Caicedo (2018) puts it as occupational persistence and intergenerational knowledge transmission. Other examples include Grönqvist et al. (2016) who show that parents' cognitive and non-cognitive abilities are a strong predictor of their children's education and labor market outcomes. Peisakhin (2013) also provides evidence on the role of families in transmitting historical political identities using the split of Ukrainians between Austrian and Russian empires in the late 18th century. And while Gerber and Hout (1995) and Dobson and Swafford (1980) document such intergenerational transmission of education in the Soviet Union, we argue that this mechanism may explain the long-run effect of *enemies*

on prosperity, notably by showing that the descendants and relatives of *enemies* are today relatively more educated.

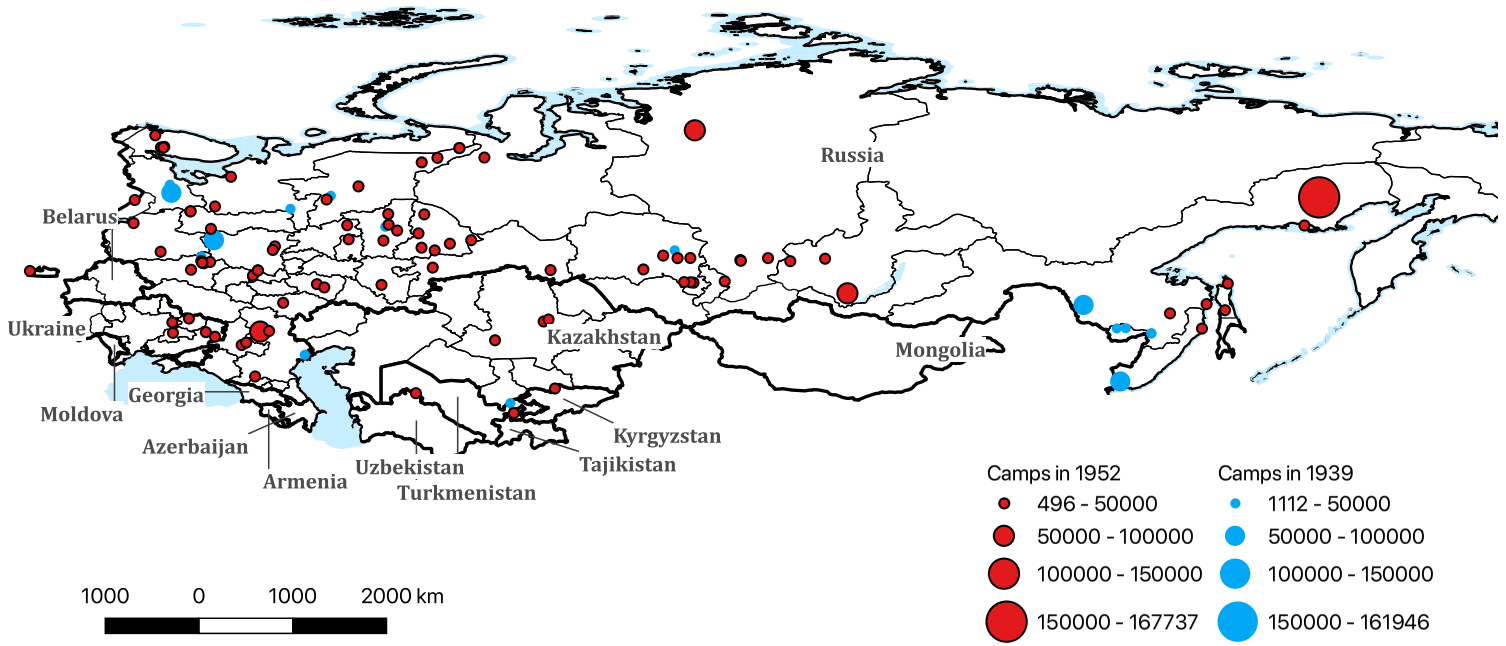
The rest of our paper is structured as follows. Section 2 provides the historical background, Section 3 presents the data, Section 4 the empirical strategy, Section 5 our results and robustness checks and finally Section 6 concludes.

2 HISTORICAL BACKGROUND

The Gulag was the Soviet system of corrective labor camps through which more than 11.3 million people (Wheatcroft, 2013), from petty criminals to political prisoners, were re-located from 1918 to 1956. Around 474 camps were scattered across the Soviet Union like a chain of islands (see Figure 1), what Aleksandr Solzhenitsyn called the Gulag Archipelago.[10] In this section we only scratch the surface on this dark episode in human history. We'll focus on the targeting of *enemies of the people*, often described as political prisoners, counter revolutionaries, or 58ers, arrested under the provisions of Article 58 of the Soviet penal code.

[10]The story of the massive and monstrous policy of the Gulag has been told and made famous by (Solzhenitsyn, 1973) and more recently by Applebaum (2012). The Gulag Archipelago is now the most cited work on the Soviet labor camp system and is common reading in Russian schools. It was a criminal offence to read it until the late 1980s.

Figure 1. Location and size of camps in the Soviet Gulag system



Notes: The circles are proportional to the prisoner population of camps. The data is from the State Archive of the Russian Federation (GARF) and Memorial.

The idea of the Gulag and of the targeting of *enemies of the people* can be traced back to Lenin. In a speech in 1917, he proclaimed that *"All leaders of the Constitutional Democratic Party, a party filled with enemies of the people, are hereby to be considered outlaws, and are to be arrested immediately and brought before the revolutionary court... No mercy for these enemies of the people, the enemies of socialism, the enemies of the working people! War to the death against the rich and their hangers-on, the bourgeois intellectuals; war on the rogues, the idlers and the rowdies!"* (cited in Courtois et al. (1999)). Applebaum (2012) notes that by 1918 Lenin was already targeting aristocrats, merchants, and "unreliable elements", and having them locked up in concentration camps outside major towns, and these were specifically designed for these first *enemies of the people*.

In the 1920s Stalin started combining terror with the fast industrialization of the Soviet Union, and this involved the mass re-locations of *enemies* and other prisoners to an expanding number of Gulags (see Figure 2). Article 58 of the Russian Penal Code put into force in 1927 formalized the criminality of *enemies*, defining a counter-revolutionary action as "*any action aimed at overthrowing, undermining or weakening of the power of workers' and peasants' Soviets and governments of the USSR and Soviet and autonomous republics, or at the undermining or weakening of the external security of the USSR and main economical, political and national achievements of the proletarial revolution.*" The 1928 Five-Year Plan on the use of forced labor explicitly stated that convicts receiving a sentence in prison exceeding 3 years, as most *enemies* did, should be allocated to labor camps.

The camps were of various types, from prisons surrounded with barbed wire to unguarded towns in remote locations, and were often devoted to a particular economic activity, from mining to manufacturing and agriculture. As Hosford et al. (2006) writes, "*the GULAG participated in every sector of the Soviet economy, including mining, highway and rail construction, arms and chemical factories, electricity plants, fish canning, airport construction, apartment construction and sewage systems. Among the items prisoners produced were missiles, car parts, leather goods, furniture, textiles, glass cups, lamps, candles, locks, buttons and even*

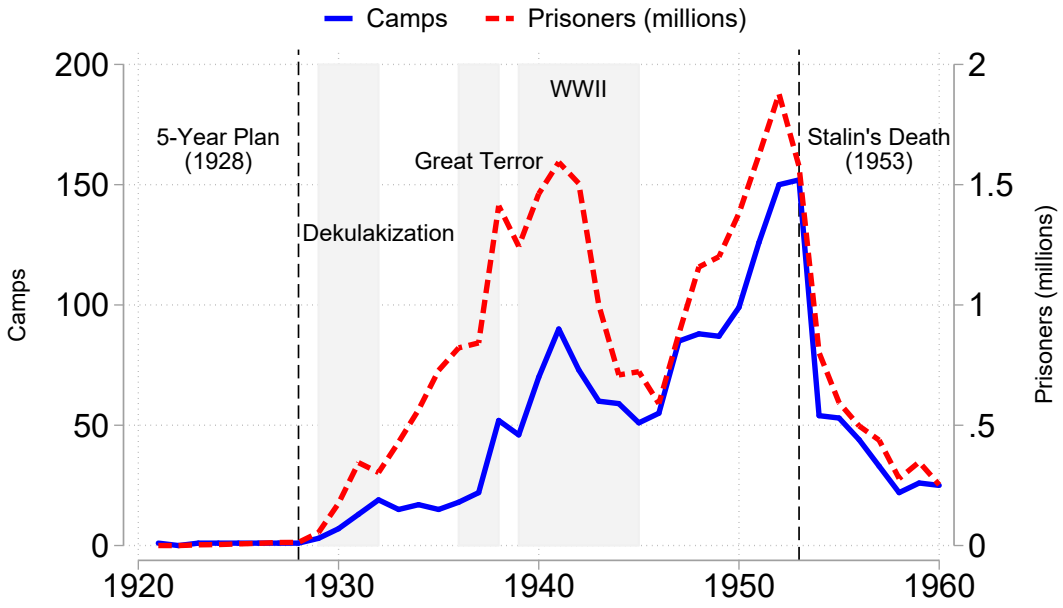
toys." The system expanded until Stalin's death in 1953, when the camps' total population reached 1,727,970, after which the system slowly came to an end.[11]

Despite the industrialization associated with the expansion of the Gulag, Ertz (2008) notes that, *"contrary to long-standing assumptions, arrests in the Soviet Union were never determined by a hypothetic need for forced laborers, but driven by political and ideological considerations. From the viewpoint of the camp system administrators, then, the number of inmates constituted a basically exogenous variable, often subject to unforeseeable vacillations that caused managerial problems."* This argument is also made by Khlevnyuk (2008), who writes that *"The main purpose of the Great Terror was declared at the very outset to be the physical annihilation of enemies rather than their use as cheap labor... The political motives for the Terror took absolute priority over economic ones."*

The mass arrests of *enemies*, that Lenin famously described as the *faeces of the nation*, began in 1919. These enemies of the people were not precisely defined. They included political opponents, journalists, *bourgeois intellectuals*, artists, professors, scientists, landowners, and *speculators* involved in trade. Class and education were often the key criteria to be identified as an *enemy*. As Martin Latsis, a Soviet politician, wrote in 1920 "*In the interrogation do not seek evidence and proof that the person accused acted in word or deed against Soviet power. The first questions should be: What is his class, what is his origin, what is his education and upbringing? These are the questions which must determine the fate of the accused.*" (cited in Solzhenitsyn (1973)). According to Hosford et al. (2006) however, the campaign against *enemies* started with the deportations and executions of millions of Kulaks,

[11] One example of such camp was KarLag, immortalised by Solzhenitsyn's *One Day in the Life of Ivan Denisovich*. Karlag was one the largest labor camps of the Soviet Union, located near Karaganda in Kazakhstan. The steppes surrounding Karaganda were transformed into a centre for metallurgical industry running on coal and labor (Harris, 1945). This required the mass relocation of thousands of workers. One estimate suggests that over 50% of Karlag's population were *enemies* (Memorial, 2016). As detailed in the book, living conditions in the camps were a traumatising experience. Prisoners often were forced into harsh physical labor while living in overcrowded camps with little food, insufficient clothing, and poor hygiene. Mortality rates were around five times higher than on average in the Soviet Union. Khlevniuk (2004) and Blyth (1995) estimated the number of deaths in camps to be between 9.7 and 16.7 million. Khlevniuk (2004) also notes that there were corrosive and violent measures to keep inmates in check and camps were told *not to spare bullets* when inmates attempted to escape.

Figure 2. The rise and fall of the Gulag



Notes: The solid line shows the number of Gulag camps while the dashed line shows the total number of prisoners in the Gulag. Source: Memorial. The two vertical dash lines indicate the years that can define the start and end of the Gulag, starting with Stalin's 5-year plan in 1928 and ending with Stalin's detah in 1953. The sahded areas show specific periods of marked change for the Gulag, starting with the dekulakization in 1929, or the relocation and execution of 1.8 million well-off peasants when Stalin announced the *liquidation of the kulaks as a class*. The Great Terror of 1936-1938, also referred to as the Great Purge, is the most brutal episode under Stalin's rule, when 1.5 million *enemies* were arrested, half of them executed (Harrison, 2008). The Gulag's prionsers population went down during WW2, as non-political prisoners were enlisted in the Red Army, and as the conditions in camps deteriorated and mortality increased.

or dekulakization, from 1929 to 1932. The Kulaks were the well-off peasants that used hired labor, or owned mills or other processing equipment. In reality any peasant who sold his surplus goods on the market could be classified as a Kulak. In his book Magnetic Mountain, Kotkin (1997) writes that in 1931-32, "*kulaks sent to Magnetic Mountain [Magnitogorsk] in packed boxcars, 40,000 of them, from Kazan... to transform the predominantly agricultural nation into a "country of metal.*"" Another major wave of arrests in 1934 is known as the *Kirov flood*, when around 40,000 residents of Leningrad were rounded up.

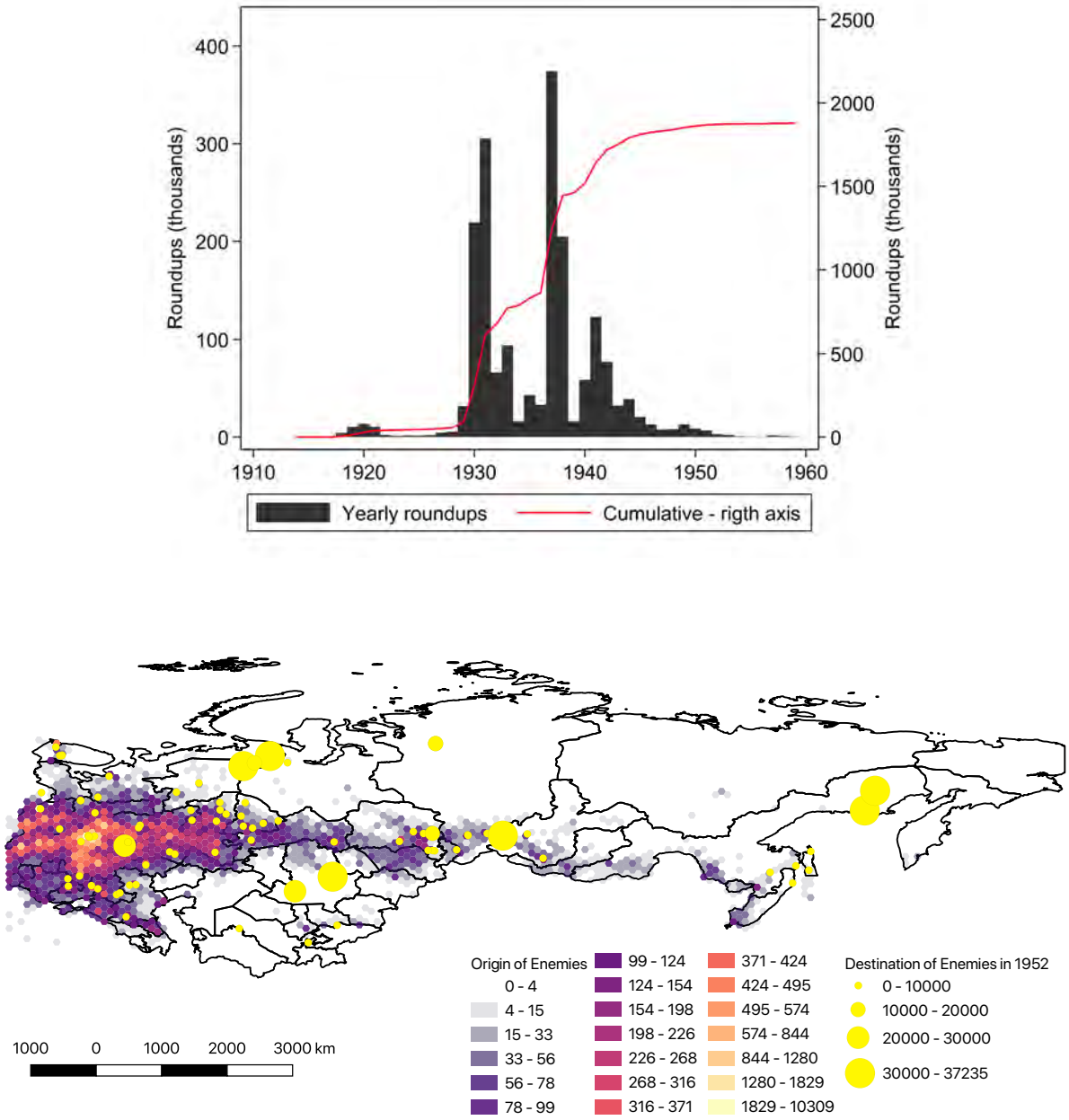
Yet the most brutal episode under Stalin's rule is the *Great Terror* of 1937-1938, when 1.5 million *enemies* were arrested, and half of them executed (Harrison, 2008). Hosford et al. (2006) cites a propaganda doggerel written in 1937 by Demian Bedny, a poet, dehumanizing *enemies* and supposed to serve as an apologia for the Great Terror: "*How disgraceful the sight of enemies among us! Shame to the mothers that gave birth To these vicious dogs of unprecedented foulness!*"

While it is difficult to know the exact numbers and locations of *enemy* roundups, Memorial put together a database covering a large number of individual roundups of enemies of the people, and this data has been geocoded by Zhukov and Talibova (2018). Figure 3 show the large number of roundups during the dekulakization and the Great Terror, as well as the geographic spread of roundups, concentrated around Moscow, Leningrad, and the European part of the Soviet Union.

2.1 *Enemies* as the educated elite

In this paper we stress the importance of the selection of highly educated *enemies* into the Gulag to explain its economic legacy. *Enemies* amounted to around one third of the Gulag population (J. Arch Getty, 1993). What this elite targeting implied was a higher education level on average in the Gulag than in society as a whole. Table 1 compares the education levels of the Gulag population to that of the Soviet Union as a whole in 1939. It suggests

Figure 3. Roundups of enemies of the people



Notes: The black bars in the top graph show the number of arrests, or roundups, of enemies of the people per year. The solid line shows the cumulative number, indicating that close to 1.9 million *enemies* were rounded up from 1917 to 1959. The source of the data is Memorial's *Political repression victims database*, which covers a large number of individuals sent to camps or executed for political reasons during Gulag times. We use the data geocoded and made available by Zhukov and Talibova (2018). Note that 427,143 enemy roundups in the database have no year data. The bottom map shows the locations of the roundups, or the origin of the *enemies*, as well as the locations of *enemies* in Gulags in 1952.

that the share of people with tertiary eduction was three times as high in camps than in the population, at 1.8%. The share of secondary educated was 50% higher in Gulags, at around 10.4% in 1939. And only 8.4% of the Gulag prisoners were illiterate compared to as much as 33% of the Soviet population. Individual-level data from Memorial on *enemies* suggest the latter were indeed the most educated, with as much as 14.7% of them having a tertiary education, and none of them being illiterate. Figure 4 shows the distribution of tertiary educated people across Gulags as well as across USSR regions in 1939, confirming the higher proportion of tertiary educated people in camps.

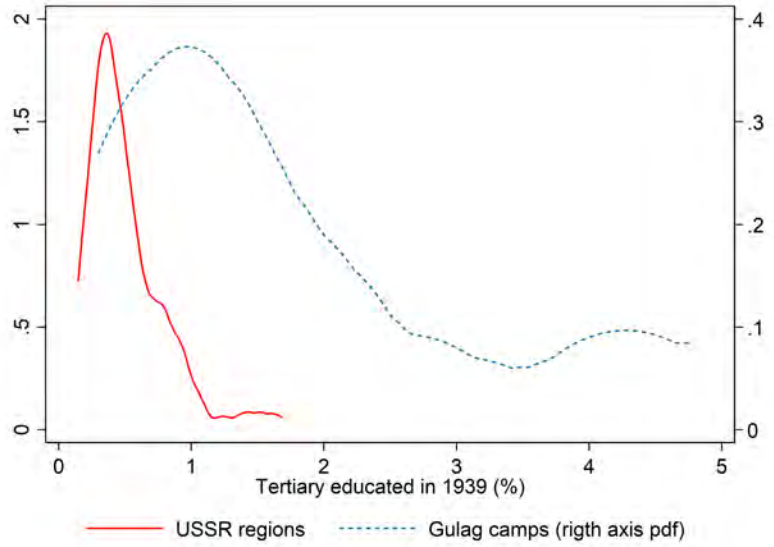
Table 1. Education levels: Gulag vs. USSR

Education	**Gulag 1939**	**Enemies* (1927-1953)**	**Census 1939**
Tertiary (%)	1.8	14.7	0.6
Secondary (%)	10.4	25.7	7.0
Primary (%)	79.4	59.5	58.8
Illiterate (%)	8.4	0	33.6

Notes: The data on education levels in the Gulag and the 1939 Soviet census is from J. Arch Getty (1993). *The data on the education of *enemies* is based on individual-level data from Memorial, also available from Zhukov and Talibova (2018). Note that data on education levels is available only for around 10% of individuals in the Memorial database, so these numbers may not be fully accurate.

The targeting of the educated, but also the randomness of being labelled an *enemy* and being sent away, can be understood from various sources. For example, Hoffman (1993) describes the purges in Moscow Factories that took place between 1936 and 1938, and notes that repression was almost exclusively against managers and technical specialists. In Kolyma Tales, Shalamov and Glad (1980) writes about the randomness in the arrests of *enemies. "Arrests of 1930s were arrests of random people. These were victims of false and chilling theory about kindling class warfare at the strengthening of socialism. Professors, party officials, military men, engineers, peasants, factory workers, who filled the prisons of that era to the fullest, ... were neither enemies of the government, nor state criminals, and*

Figure 4. Tertiary Education: Gulag vs. USSR



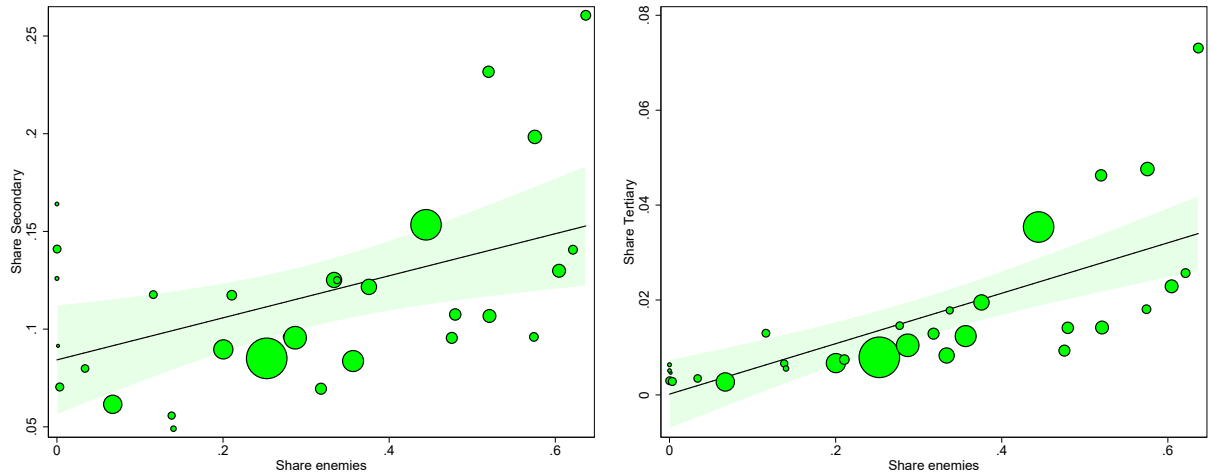
Notes: The solid line shows the distribution of the share of tertiary educated across USSR regions in 1939. The dash line shows the same dsitributin across Gulag camps in 1939. The data is from the 1939 Soviet census and the State Archive of the Russian Federation (GARF). In both cases, the share by education level is among all individuals for which education data is available.

dying they still did not understand why they had to die." Manning (1993) notes that purges in a rural district targeted leaders or bosses, including the heads of most local institutions of any importance. Other essays in Getty et al. (1993) highlight the focus of the terror on industrial managers, administrators, and engineers. According to a study from Moscow and Leningrad telephone directories of the 1930s by Fitzpatrick (1993), 60% of senior officials of the People's Commissariat of Heavy Industry (NKTP) present in 1937 were missing in 1939. Three percent of doctors disappeared, and 30% of lawyers. Getty and Chase (1993) suggest that 50 to 75% of the middle and top management echelons fell victim to the repressions.

The drawings of Baldaev (2010), a Gulag guard, also provide a vivid account of the roundups (as well as of the atrocities of the re-location process and the camps in general). In one drawing depicting the secret police rounding up *enemies* to be deported, one agent tells his colleagues: "*We've been instructed to round up twelve enemies of the people. With the engineer, the doctor woman and the old moron professor, we've only gotten ten. Take any two people from the apartments on the first floor, whoever you can get - workers or kolkhozniks (farmers) - it doesn't matter. We just need twelve people in all. That's an order. Off you go...*"

Eugenia Ginzburg, a teacher and member of the Communist party, sent to the Gulag for counter-revolutionary activity in 1937, also describes the various type of *enemies* who had been sent to camps in her memoir about Gulag survival, *Journey into the Whirlwind* (Ginzburg, 2002). She recounts how once in a camp hospital in Siberia she found herself among her own: "*I had seen no men of this sort; our sort - the intellectuals; the country's former establishment - since transit camp... The men here were like us. Here was Nathan Steinberger; a German Communist from Berlin. Next to him was Trushnov; a professor of language and literature from somewhere along the Volga; and over there by the window lay Arutyunyan; a former civil engineer from Leningrad... By some sixth sense they immediately divined that I was one of them and' rewarded me with warm, friendly; interested glances.*" (cited in Shatz (1984)).

Figure 5. *Enemies* and education levels across Gulags in 1939



Notes: The scatters show the relationship between the share of *enemies* and the share of secondary- and tertiary-educated across camps in 1939. Each circle is a camp, and the size of the circles is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. The data is from the State Archive of the Russian Federation (GARF).

The data on Gulags from the State Archive of the Russian Federation (GARF), which we describe in the next section, confirms that the camps that received the most *enemies* also have the largest shares of tertiary, as well as secondary, educated prisoners. This confirms the *educated elite* nature of enemies of the people.

2.2 The legacy

The legacy of the Gulag is not yet fully understood. From previous studies, we know that cities where Gulag camps were located grew significantly faster than similar cities without camps from 1926 to 2010 (Mikhailova, 2012). We also know that Gulag districts were associated with anti-communist voting during the 1990s (Kapelko and Markevich, 2014), but also with lower levels of trust in 2016 (Nikolova et al., 2019).[12]

Here we document that after the fall of the Gulag prisoners often had to settle down

[12] Varese (1998) and Lonsky (2020) also suggest that the Gulag system is at the origin of the Russian mafia as a national network.

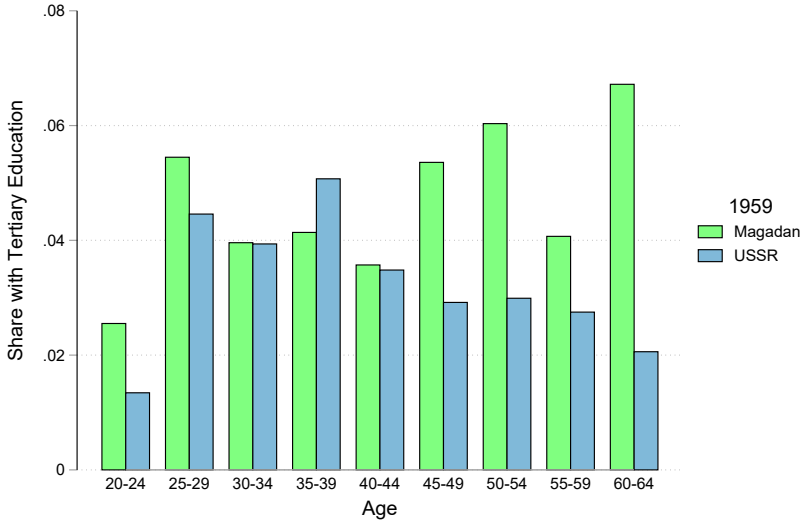
and continue working at the same industrial projects as outside options were heavily limited (Cohen, 2012). A number of major industrial cities in Russia and other ex-Soviet countries were originally camps built by prisoners and run by ex-prisoners. For example, Barenberg (2014) documents the case of Vorkuta, which had a large proportion of *enemy* prisoners. After the end of Gulag system, managers actively recruited and offered monetary incentives to ex-prisoners who belonged to production and engineering technical personnel and had the required technical skills. He suggests that this was common throughout the Gulag system. He also writes that former prisoners and families made up 33% of the city by the end of the 1950s, and that these would *"profoundly shape the character of the emerging company town"*. Vorkuta eventually became the largest coal mine in Europe in 1975, and by the turn of the 21st century, while the town had collapsed after 1989, there remained a small but significant group of former prisoners living in the tundra city. Another example is Magadan, *"one of the world's richest mining areas... centered on gold, silver, tin, tungsten, mercury, and copper"* (Pereltsvaig, 2014).[13]

Cohen et al. (1983) notes that during the 1956-57 mass liberation of Gulag inmates,"*millions of other survivors simply had nowhere to return. Years of imprisonment had destroyed everything associated with "home" - family, career, possessions, and their mental and physical health... Some exiles had already started new families with other exiles and "free" spouses*[14]*, which tied them to their remote locales; and some zeks and exiles, deprived of alternatives,*

[13]Higgins and Ducke (2020) provides a vivid account of Magadan's region development and legacy: "*The prisoners, hacking their way through insect-infested summer swamps and winter ice fields, brought the road, and the road then brought yet more prisoners, delivering a torrent of slave labor to the gold mines and prison camps of Kolyma, the most frigid and deadly outpost of Stalin's gulag. Their path became known as the "road of bones," a track of gravel, mud and, for much of the year, ice that stretches 1,260 miles west from the Russian port city of Magadan on the Pacific Ocean inland to Yakutsk*". It also tells of ex-prisoners who still live there. "*One Antonina Novosad, a 93-year-old who was arrested as a teenager in western Ukraine and sentenced to 10 years in Kolyma on trumped-up political charges, labored in a tin mine near the "road of bones.*"" Another is "*Vladimir Naiman, the owner of a gold mine off the Kolyma highway whose father, an ethnic German, and maternal grandfather, a Ukrainian, came to the area as prisoners.*"

[14]As Applebaum (2012) writes, "*if love, sex, rape, and prostitution were a part of camp life, so too, it followed, were pregnancy and childbirth. Along with mines and construction sites, forestry brigades and punishment cells, barracks and cattle trains, there were maternity hospitals and maternity camps in the Gulag too—as well as nurseries for babies and small children.*"

Figure 6. Magadan: Education in 1959



Notes: The bars show the share of the population with tertiary education, by age group, in both Magadan and in the USSR as a whole in 1959. The bars show that the share of tertiary educated, especially among those above 45 years old, was higher in Magadan, a Gulag with a large share of *enemies*, than in the USSR as a whole. The data on education is from the 1959 Soviet census.

had developed a strong psychological attachment to their areas of long-time imprisonment. Millions of survivors thus chose to remain, now as free citizens and paid employees, in the vast region of the dismantled Gulag empire... Indeed, so many did so that their liberated presence dramatically changed the demographic, social, and political character of several former administrative centers of the Gulag..." In another part of his report he highlights again that the prisoners remaining *"changed the demographic, economic, cultural, and political character of Magadan, Vorkuta, Karaganda, Tashkent, and other centers."*

Figure 6 shows the high share of tertiary educated in Magadan in 1959, a few years after the thaw. This is especially pronounced among those above 45 years old, in line with them being *enemies*. Among those above 60 years old, more than 6% in Magadan had tertiary education. In the whole USSR, that share was 2%.

The *thaw* after 1954 meant that prisoners were now able to live where they wanted

around the camp city, and were allowed to bring their families. For many, Gulag towns had become a way of life. Network and friends were important in making ex-prisoners stay and find jobs. It's worth noting also that it was always Stalin's plan that no *enemy* should ever to be allowed to return home. As Applebaum (2012) writes, "*no one who had received a sentence for spying, sabotage, or any form of political opposition was ever to be allowed to return home. If released, they would be given wolves passports, which forbade them from living anywhere near a major city, and would be constantly subject to re-arrests.*" She also writes that the large amnesty after Stalin's death in 1953 excluded *enemies*. Cohen et al. (1983) also notes that thousands of people with personal ties to sensitive political cases were banned from Moscow and other capital cities for several years. While we explore the population dynamics later in our paper, the persistence of the population in remote camps is sometimes thought of as a *Siberian Curse*, i.e. the idea of Russia's population being stuck in cold and hostile locations, hindering its development (Hill and Gaddy, 2003).

Balmforth (2013) tells the story of Krikun in Vorkuta: "*Freed in 1957 and joined by her mother, Krikun could not return home to the Crimean city of Sevastopol. The family house had been destroyed during World War II, their ownership documents were lost, and no friends or family had survived. Without the money or contacts to leave, she remained in Vorkuta and grew old.*"

Perhaps Solzhenitsyn (1973) sums it best, when explaining how Gulag towns had become a way of life: "*Exile relieved us of the need to choose a place of residence for ourselves, and so from troublesome uncertainties and errors. No place would have been right, except that to which they had sent us. This was the one and only place in the whole Soviet Union where no one could reproach us as intruders. Only there had we an assured and undeniable right to three square arshins of land. And if, like me, you were alone in the world when you left the camp, with no one, anywhere, waiting for you, exile was perhaps the only place where you could hope to meet a kindred spirit.*"

In the rest of our paper we investigate whether the share of *enemies* in camps may have

led to positive education and growth outcomes at the local level. The next section describes the data.

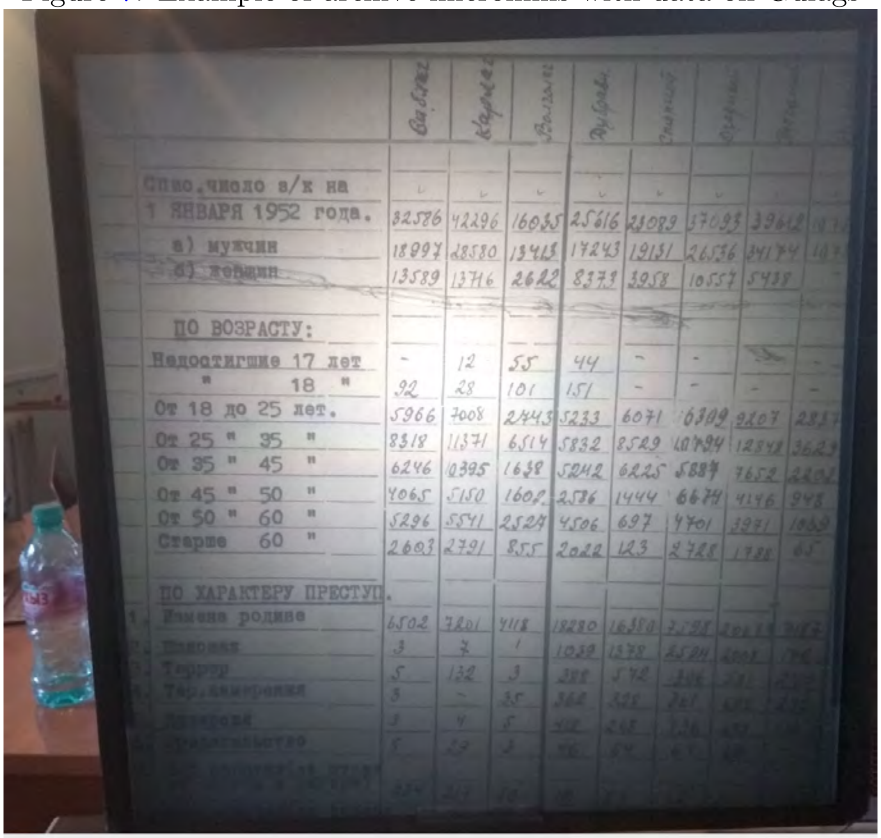
3 DATA

The heart of our empirical investigation is a dataset on Gulags that we collected from microfilms at the State Russian Archive (GARF) (see Figure 7 for a microfilm example). We collected data on the age, gender, education, ethnicity of Gulag prisoners as well as on the type of crime committed, in 1939 (right after the Great Terror) and 1952 (at the peak and end of the Gulag system).[15] Crucially, the data on type of crime committed allows us to measure the share of *enemies* among prisoners per camp. Indeed, the crime of *enemies* was that defined by Article 58 as counter-revolutionary activities. These included treason to the motherland, or espionage and sabotage, but "*In all truth, there is no step, thought, action, or lack of action under the heavens which could not be punished by the heavy hand of Article 58*" (Solzhenitsyn, 1973). As detailed in the previous sections, the real crime was that of being one of the educated elite. Table 2 summarizes the types of crimes Gulag prisoners had been arrested for. *Enemies* represented 33% of prisoners in 1939 and 28% in 1952. The other groups of prisoners were criminals of different types, classified as dangerous or arrested for disrupting the administrative order, or for crimes against property or persons. The other categories are misconduct in office and military offenses.

We collected data on camps in 1952 as this was when the camp system reached its peak, one year before Stalin's death, when the system started collapsing (see Figure 2). This cross section of 88 camps (79 of which in today's Russia) and 1.7 million prisoners gives us a good

[15]The information on 1939 camps was collected from "Summaries and references on the numbers, composition, and employability of prisoners in the corrective labor camps" (Russian: Svodki i spravki o hislinosti, sostave i trudovom ispolzobanii zaklyhonnyx ITL. The microfilms containing this information are stored under the following number GARF 9414 1 1140-1142. For 1952, the data is from "Summary of the numerical composition of prisoners in the corrective labor camps" (Russian: Svodnye zifrovye svedenie o sostave zakluchonyx ITL.) and the microfilm containing this information is: GARF 9414 1 1356.

Figure 7. Example of archive microfilms with data on Gulags



	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Спис.число з/к на 1 ЯНВАРЯ 1952 года.	32586	42296	16035	25616	23089	37093	39612	[illegible]
а) мужчин	18997	28580	13413	17243	19131	26536	34174	[illegible]
б) женщин	13589	13716	2622	8373	3958	10557	5438	-
ПО ВОЗРАСТУ:								
Недостигшие 17 лет	-	12	55	44	-	-	[illegible]	-
" 18 "	92	28	101	151	-	-	-	-
От 18 до 25 лет.	5966	7008	2443	5233	6071	6309	9207	2837
От 25 " 35 "	8318	11371	6514	5832	8529	10794	12348	3629
От 35 " 45 "	6246	10395	1638	5242	6225	5887	7652	[illegible]
От 45 " 50 "	4065	5150	1602	2536	1444	6674	4146	948
От 50 " 60 "	5296	5541	2524	4506	697	4701	3971	1059
Старше 60 "	2603	2791	855	2022	123	2728	1788	65
ПО ХАРАКТЕРУ ПРЕСТУП.								
1. Измена родине	6502	7801	4118	18280	16350	[illegible]	[illegible]	[illegible]
2. [illegible]	3	7	1	1039	1378	[illegible]	[illegible]	[illegible]

Notes: The picture provides an example of the microfilms in the State Archive of the Russian Federation (GARF). It shows the number of prisoners by gender, age, and crime comitted, in a specific camp in 1952.

Table 2. Offences of Gulag prisoners in 1939

	sum	mean	min	max
Enemies of the people	370,699	12,357	0	72,314
Dangerous crimes against the administartive order	36,146	1,205	0	9,189
Other crimes against the administartive order	169,012	5,634	369	50,747
Theft of public property	24,101	803	51	7,621
Misconduct in office, Economic crimes	85,286	2,843	243	25,421
Crimes against persons	61,003	2,033	150	18,289
Crimes against property	140,190	4,673	205	39,924
Socially harmful and dangerous elements	207,044	6,901	137	56,713
Military offences	8,705	290	18	2,595
Other delicts	28,062	935	55	6,996
Total prisoners	1,130,248	36,460	0	286,269

Notes: The table shows the number of Gulag prisoners in 1939 by type of offence. This classification allows us to measure the share of *enemies* among camps' prisoners. The data is from the State Archive of the Russian Federation (GARF). It suggests that in 1939 there were 1,130,248 prisoners, 370,699 of which *enemies*. Many of the non-political criminals were petty criminals. We do not have the same detail in offcences for 1952, but we know that there were 1,697,011 prisoners, 485,754 of which were *enemies*.

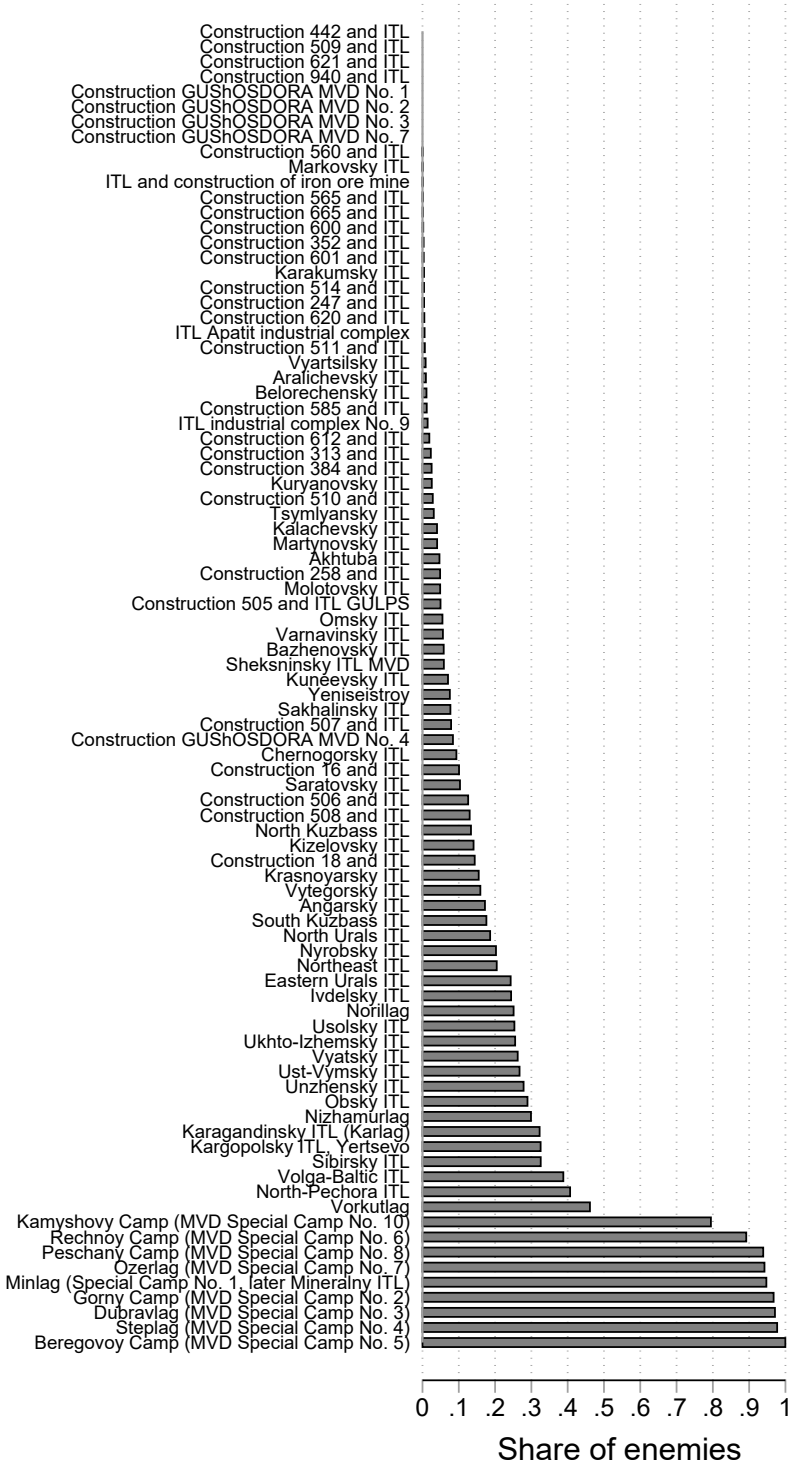
snapshot of how things were at the end of the Gulag and can thus be used to assess the persistence of the camps. Also, data on the internal movement of prisoners, which included transfers, release, deaths, escape, indeed confirms Solzhenitsyn's metaphor that this was a universe in *perpetual motion*. It is hence from the final distribution, at the end of the Gulag, that we expect to find persistence.

We also use data from 1939 as a robustness check as it gives us the distribution of *enemies* at the end of the Great Terror, when most enemies were arrested and first resettled. Importantly, we document that *enemy* relocations from 1939 do explain some of the variation we observe in 1952 (see Figure 9).[16]

Our variable of interest is the share of *enemies* among Gulags' prisoner populations in 1952, or *enemies (%)*, at the peak and end of the Gulag years. The distribution of *enemies (%)* across Gulags is depicted in Figure 8. The average share is 19% and the standard deviation is 28 percentage points.

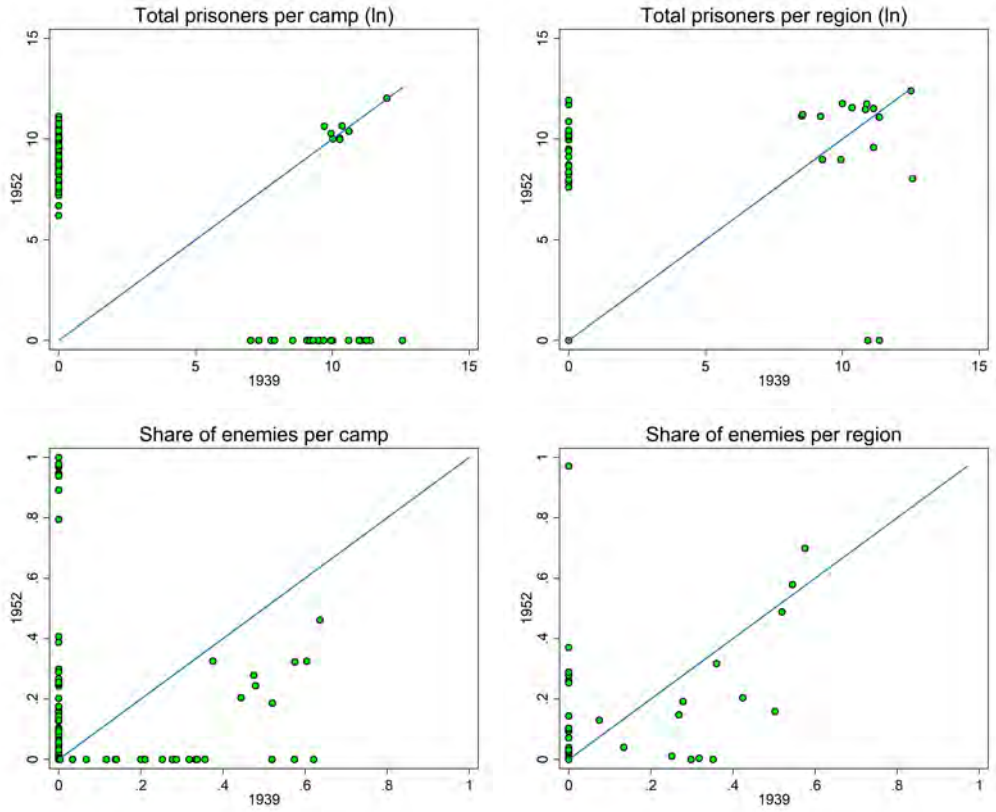
[16]The perpetual motion during Gulag times however did involve a constant closing and opening of camps, as well as the reshuffling of prisoners. We know for example that during WWII many prisoners were sent to the frontline while *enemies* were specifically barred from release to the military.

Figure 8. Share of *enemies* across camps in 1952



Notes: The bars show the share of *enemies* among prisoners by camp in 1952. The average share of *enemies* was 19% and the std. dev. .28. ITL stands for Ispravitelno-trudovoi lager, i.e. corrective labor camp. MVD is Ministry of Internal Affairs. Source: State Archive of the Russian Federation (GARF). We use Wikipedia for the translation of camp names.

Figure 9. Persistence of camp size and share of *enemies*: 1939-1952



Notes: The top scatterplots show the relationship between the number of prisoners in 1939 and 1952. On the left-hand side, each dot is a camp, on the right-hand side, each dot is a region. The solid lines are 45 degree lines. The figures show that for camps that existed in 1939 and persisted until 1952, the camp's size in 1939 persisted until 1952. This is also true is we consider persitence at the region level, where camps in 1952 may be near those in the same region in 1939. The average camp prisoner population (and standard deviation) was 36,580 (56,968) in 1939 and 19,284 (21,637) in 1952. The bottom scatters show that the share of *enemies* across camps in 1939 does show some persistence until 1952, both among camps that survived and across regions. The data is from the State Archive of the Russian Federation (GARF).

According to the aggregate data used in J. Arch Getty (1993) and shown in the top of Figure 10, *enemies*, amounted to around a third of the Gulag population. Our archival data by camp gives us similar yearly aggregated prisoner numbers. While we do not have sufficient yearly observation to estimate the share of *enemies* in each year, we do match closely the aggregate share for the years for which we have *enemy* numbers. In the bottom of Figure 10, we show that our aggregate numbers are also in line with data from Memorial, an organization in Moscow devoted to the memory of the Soviet Union's totalitarian history. This data provides information on the location, population, and economic activity of 474 camps from 1921 to 1960. Memorial also provides some data on the share of *enemies* on camp-specific webpages. But as seen in the bottom of Figure 10, these data are not complete.[17] Overall Figure 10 confirms that the data we use on the shares of *enemies* across Gulags, obtained from the archives, is in line with aggregate figures from previous studies such as J. Arch Getty (1993) and Memorial.

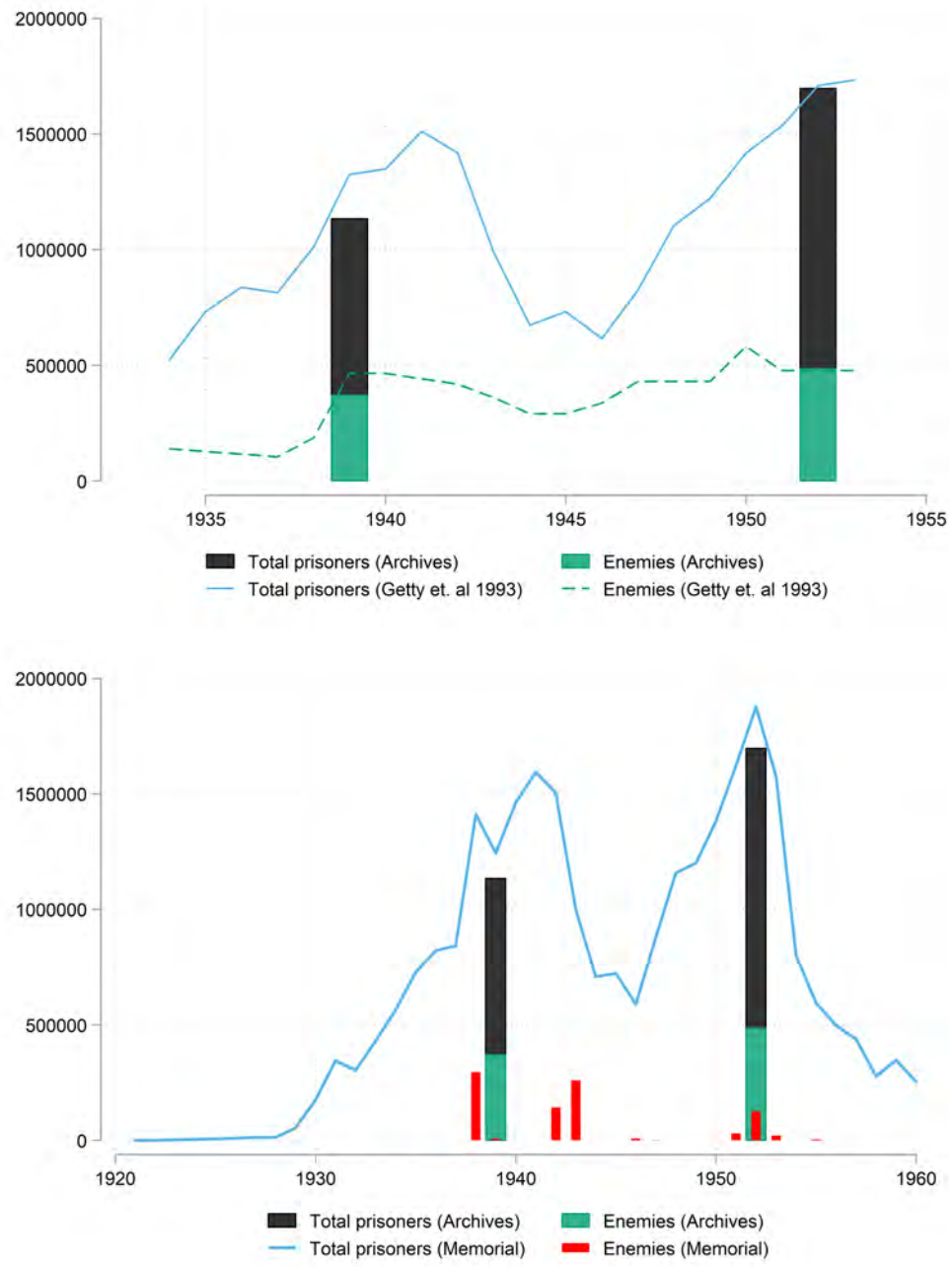
From Memorial we use data on the type of activities in Gulags, e.g. agriculture, mining, or manufacturing. These are summarized in Table 3.

We also have data on the age and gender composition in Gulags from the microfilms of the State Archive of the Russian Federation (GARF). The share of women across camps is very small at around 13% in 1952 (and only 9% in 1939), while women make up more than 50% in the census. Figure 11 shows the share of female across camps, and their relationship with *enemies*. Camps with a higher share of *enemies* have a slightly higher share of female prisoners, suggesting that the share of women among *enemies* might have been higher than among other prisoners.

The age distribution, as well as its relationship with *enemies*, is summarized in Figure 12. Gulag prisoners are older on average than the population as a whole. While children of *enemies* were also often arrested, they were often sent to orphanages in colonies rather than to Gulag camps Applebaum (2012). There is a positive relationship between *enemies* and

[17] The historical Memorial data on Gulags is also available from Tatiana Mikhailova online but this version does not contain information on *enemies*.

Figure 10. Gulag prisoners and *enemies*:
Comparing archive data to J. Arch Getty (1993) and Memorial



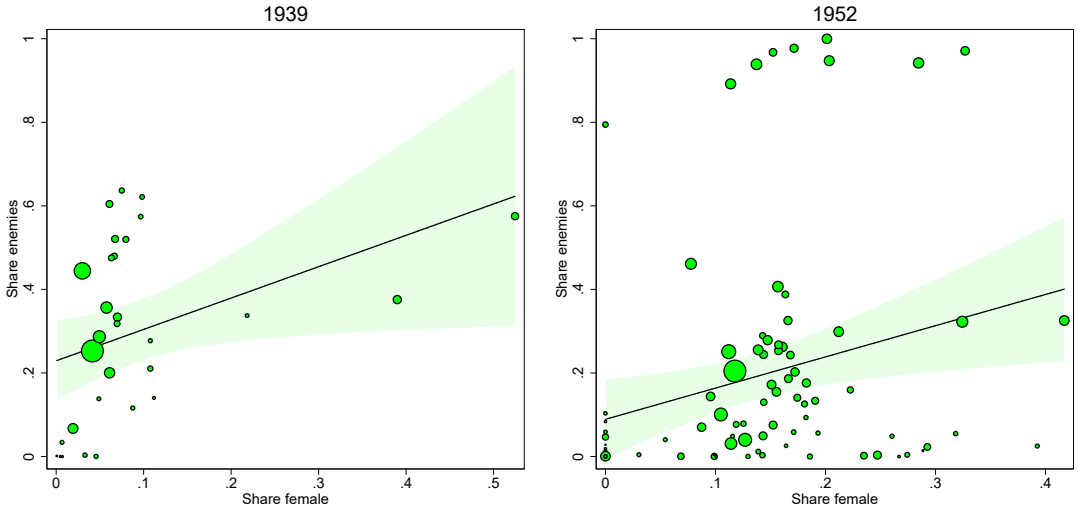
Notes: The graphs compare the number of Gulag prisoners and the share of *enemies* from the microfilms of the State Archive of the Russian Federation (GARF) to aggregate data from J. Arch Getty (1993), in the top graph, and data from Memorial, in the bottom graph. For 1939, the archives cover a total of 1.13 million prisoners, while J. Arch Getty (1993) reports 1.35 million and Memorial 1.26 million. For 1952, the archive data covers 1.69 million prisoners while J. Arch Getty (1993) reports 1.7 million and Memorial 1.9 million. Our lower numbers are due to prisoners that can't be matched to camps as they work on various infrastructure projects. The graphs show that the numbers from camp-specific microfilms match the aggregate numbers from J. Arch Getty (1993) and Memorial's, while *enemy* numbers are missing for many camps in Memorial's data.

Table 3. Economic activities across 88 Gulags in 1952

	sum	mean
Any resource	30	0.34
Calcium phosphate	1	0.01
Coal	7	0.08
Gold	2	0.02
Iron	1	0.01
Stone	24	0.27
Tin	1	0.01
Uranium	0	0.00
Agriculture	28	0.32
Arms industry	2	0.02
Construction Material	45	0.51
Energy industry	7	0.08
Forestry	53	0.60
Light Manufacturing	23	0.26
Mechanic industries	4	0.05
Metal industry	5	0.06
Research	8	0.09
Services	15	0.17
Construction of Mines	21	0.24
Construction of Housing	33	0.38
Construction of Infrastructure	72	0.82
Construction of Manufactures	48	0.55

Note: The table shows the number and share of Gulag camps by economic activity. For example, 30 camps among 88 in 1952, or 34%, were involved in the extraction of any natural resource. 60% were involved in forestry, 82% in infrastructure construction. The data on economic activities is from Memorial.

Figure 11. *Enemies* vs. gender in Gulags: 1939 and 1952



Notes: The scatters show the relationship between the share of *enemies* and the share of female prisoners across camps in 1939 and 1952. Each circle is a camp, and the size of the circles is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. Camps with a higher share of *enemies* have a slightly higher share of female prisoners, in line with the share of women being higher among *enemies* than among petty criminals. The data is from the State Archive of the Russian Federation (GARF).

Table 4. Ethnic groups: Gulag vs. USSR

	Camps 1939 (%)	Census 1939 (%)	Difference	Camps 1952 (%)	Census 1959 (%)	Difference
Russians	63.05	58.09	+4.96	53.55	54.64	-1.09
Ukrainians	13.81	16.47	-2.66	22.50	17.84	+4.66
Belorussians	3.40	3.09	+0.31	4.43	3.79	+0.64
Tatars	1.89	2.52	-0.63	1.95	2.34	-0.39
Uzbeks	1.86	2.84	-0.98	1.14	2.88	-1.74
Jews	1.50	1.77	-0.27	0.89	1.09	-0.20
Germans	1.41	0.84	+0.57	1.02	0.78	+0.24
Kazakhs	1.30	1.82	-0.52	0.92	1.73	-0.81
Poles	1.28	0.37	+0.91	1.09	0.66	+0.43
Georgians	0.89	1.32	-0.43	0.48	1.23	-0.75
Armenians	0.84	1.26	-0.42	0.81	1.33	-0.52
Latvians	0.58	0.07	+0.51	1.47	0.67	+0.80
Lithuanians	-	-	-	2.38	1.11	+1.27
Estonian	-	-	-	1.21	0.47	+0.74
Moldovans	-	-	-	0.96	1.06	-0.10
Azerbaijanis	-	-	-	0.68	1.41	-0.73

Notes: The table shows the share of ethnic groups among Gulag prisoners and compares it to the respective shares in the USSR population. The 1952 data is from the State Archive of the Russian Federation (GARF) and 1939 numbers are from J. Arch Getty (1993). We restrict ethnic groups to those accounting for at least 0.45% of the GUlag population in 1952. The other ethnic groups in 1952 are Turkmens, Tadjiks, Kyrgiz, Finns, Bashkirs, Udmurts, Romanians, Iranians, Afghans, Mongols, Chinese, Japanese, Koreans, Greeks, and Turks.

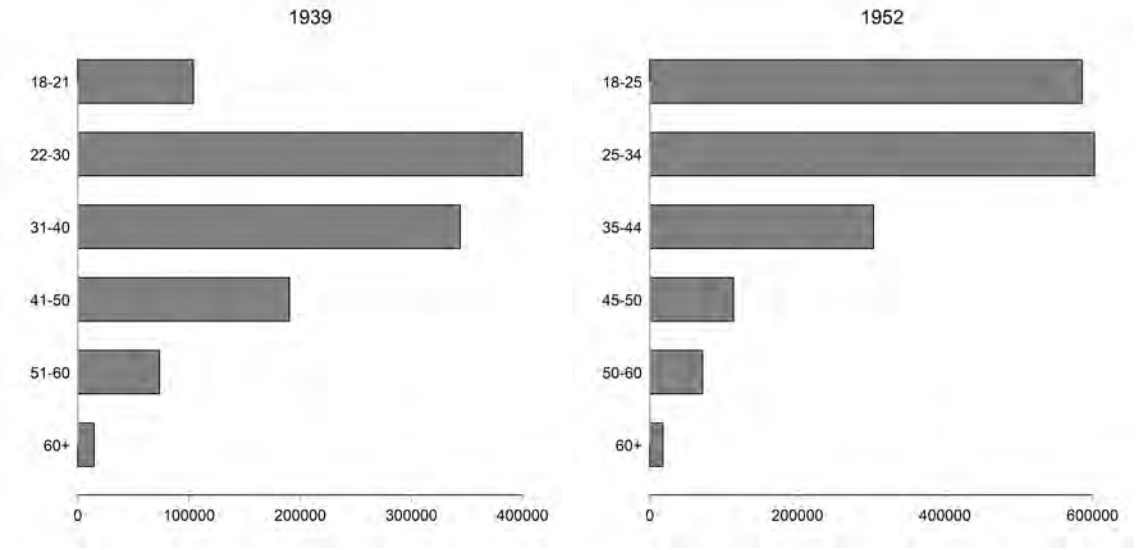
older prisoners, in line with *enemies* being the educated elite.

We compare the ethnic composition in camps to that in the Soviet Union population in Table 4. Overall the ethnic composition in camps was not that different from the Soviet Union as a whole. Russians were slightly over-represented in camps in 1939 while other ethnic groups are roughly in line with the distribution of the 1939 Census. In 1952 Ukrainians appear to be the most overrepresented in camps, while other ethnic groups are in line with the closest census in 1959.

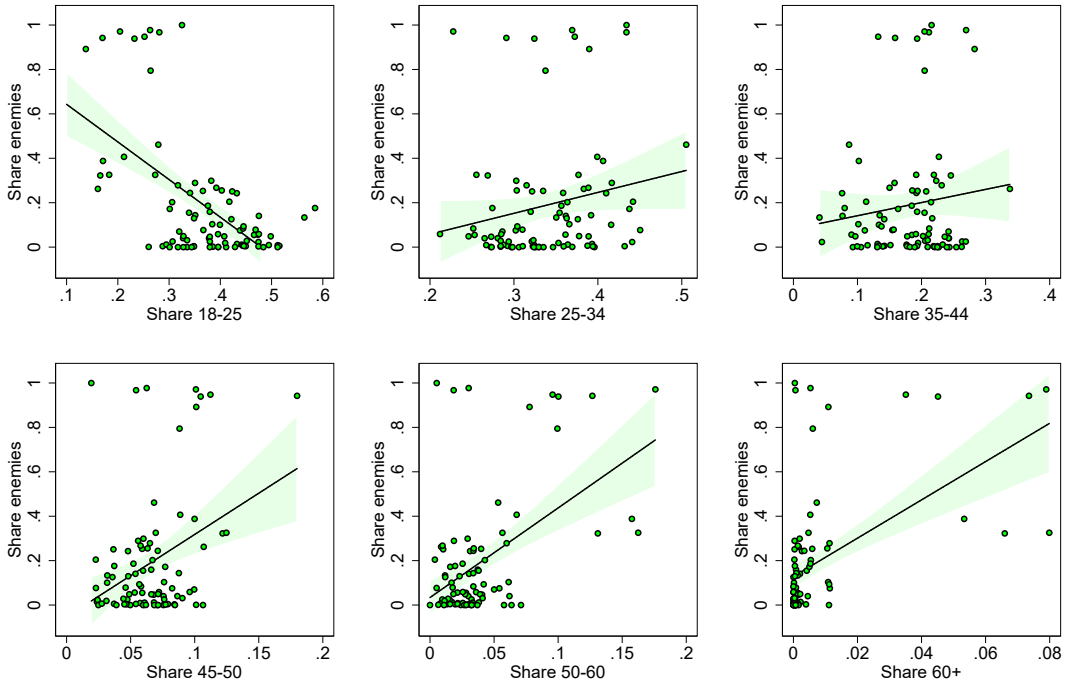
In Figure 13 we look at the relationship between the share of *enemies* and the ethnic composition of camps in 1952. It is worth noting that ethnic Russians, Ukrainians, and Belorussians, accounted for about 80% of the camp population, while none of the other ethnic groups accounted for more than 2% of the camps' population.[18] We find the relationship between *enemies* and most ethnic groups to be flat. We do find a negative relationship between *enemies* and the share of Russians, and a positive one between *enemies* and Germans, Poles, Ukrainians, Lithuanians, Latvians, and Estonians. This indicates that *enemies* themselves might have been more likely than other prisoners to be from these ethnic groups, even if in small proportion.

[18]Stalin's ethnic deportation were mostly to colonies rather than Gulags. See Jarotschkin et al. (2020).

Figure 12. Gulag prisoners by age bins: 1939 and 1952

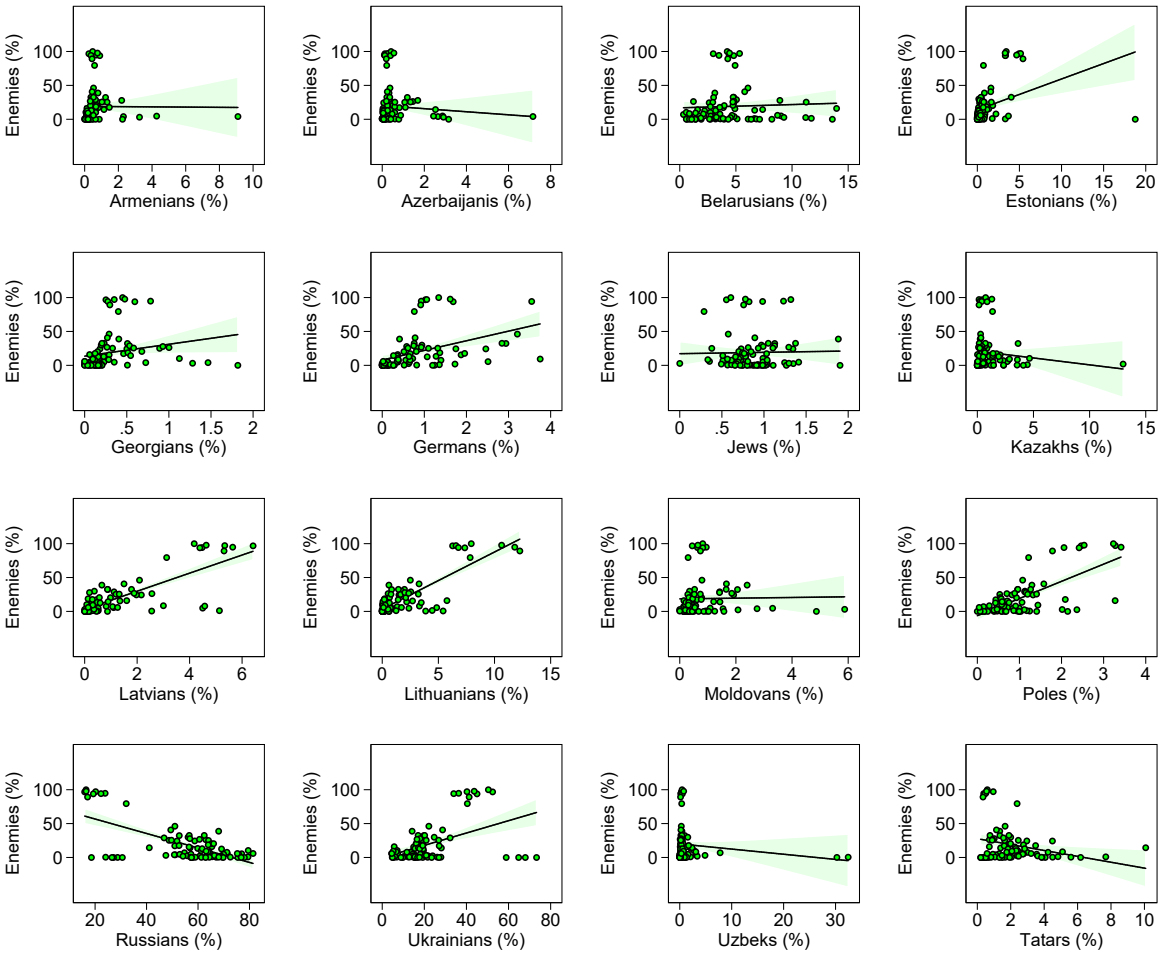


Share of *enemies* and prisoners by age bins: 1952



Notes: The bars in the top graphs show the number of prisoners by age group in all camps in 1939 and 1952. The scatters show the relationship between the share of *enemies* and the share of prisoners by age group across camps in 1952. Each circle is a camp. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. Camps with a higher share of *enemies* have a higher share of older prisoners, in line with *enemies* being the educated elite and having been arrested in the Great Terror years. The data is from the State Archive of the Russian Federation (GARF).

Figure 13. *Enemies* vs. ethnic groups in Gulags: 1952



Notes: The scatters show the relationship between the share of *enemies* and the share of prisoners by ethnic group across camps in 1952. Ethnic groups accounting for less than 0.45% of the Gulag's population are omitted. Each circle is a camp. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. The data is from the State Archive of the Russian Federation (GARF). According to J. Arch Getty (1993) the Gulag population was as diverse ethnically as that of the Soviet Union at large. In 1939 63% of prisoners were Russians, 13.8% Ukrainians.

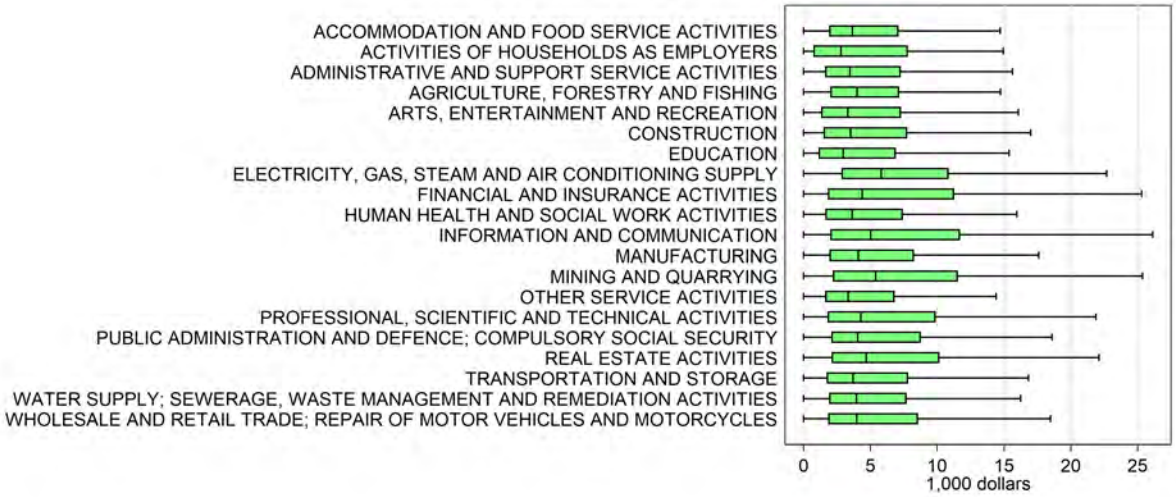
To examine the long-run effect of *enemies* on growth we merge spatially the camps' locations to information on economic activity from a dataset covering the universe of Russian firms, SPARK.

SPARK is a service part of Interfax, a private and independent major news agency in Russia. It collects data from financial reports but also from official agencies such as the Federal State Statistics Service, the Federal Financial Markets Services and its regional branches, the Federal Tax Service, the Central Bank, the Federal Property Management Agency, the Federal Insurance Oversight Service, the Federal Anti-monopoly Service, and the Chamber of Commerce and Industry. This allows for a coverage as accurate as possible of the distribution of economic activity across the country. In 2018, it offered information on more than 9 million companies, including entrepreneurs and firms that are not legal entities. What's more, due to recent legal changes in Russia regarding the requirement of firms to report their exact location, the spatial identifier of firms is particularly reliable.

We focus on two variables, wages and profits, to get a complete picture of local value added per employee. We use data on reported number of employees, net profits (as defined in corporate finance), and for wages we use data on compulsory health insurance payments, which unlike wages are reported by all firms in the data, and according to law amount to 5.1% of wages universally, without exception (Federal Law of 29.11.2010 N 326-FZ *On compulsory medical insurance in the Russian Federation*).

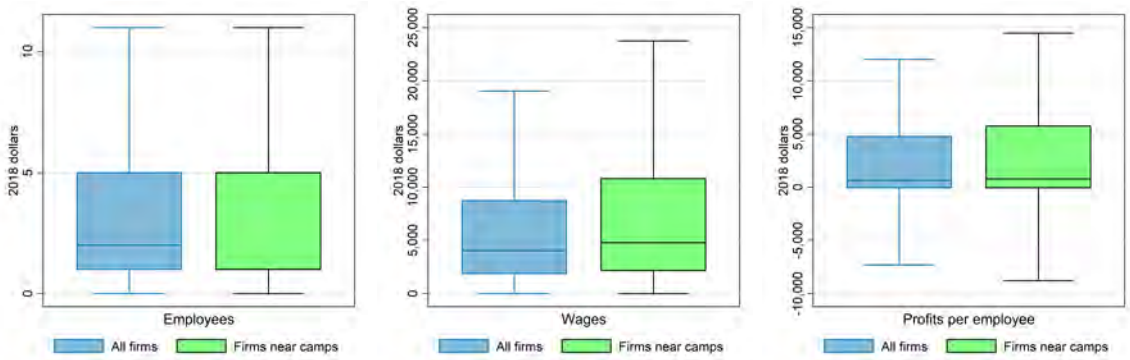
Average wages by sector across Russia in 2018, converted to 2018 US dollars, are summarized in Figure 14. Figure 15 summarizes firms' number of employees, wages, and net profits per employee, across all firms in Russia, as well as for those firms within 30 km of 1952 camps, the sample we use in our empirical strategy. The map in Figure 16 shows the geographic distribution of wages in 2018 across all firms in Russia at the grid level. The red circles indicate the locations of Gulags in 1952, and their size is proportional to the share of *enemies* among prisoners. It suggests wages may indeed be high in firms near camps with a large share of *enemies*.

Figure 14. Wages in Russia - 2018 - US dollars



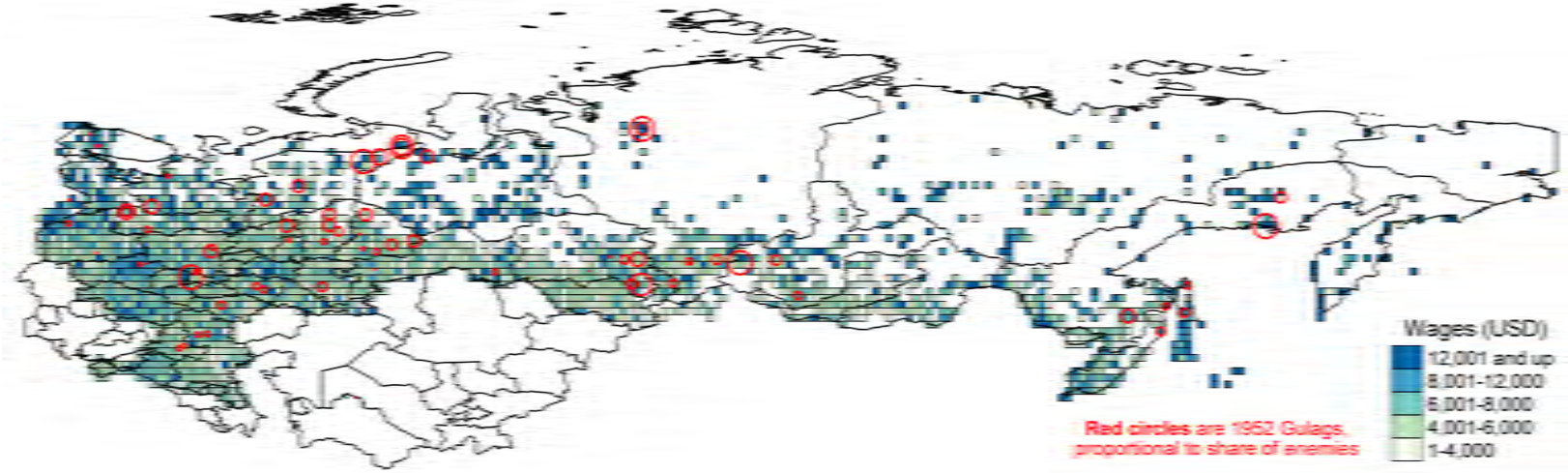
Notes: The boxplot gives the distribution of wages in US dollars in Russia in 2018 by sector (Level 1 Codes of the NACE classification). The data is from SPARK and wages are estimated from medical insurance payments which amount to 5.1% of wages and are mandatory across firms for all employees. Across sectors wages are around 4,000 dollars a year. Outside values are omitted.

Figure 15. Employees, wages, and profits in Russia: 2018



Notes: The boxplot gives the distribution of employees, wages, and net profits per employee in 2018 across all firms in Russia and for the subset of firms located within 30km of a Gulag. This is the subset we use in our regressions. The data is from SPARK and wages are estimated from medical insurance payments which amount to 5.1% of wages and are mandatory across firms for all employees. While the size of firms appears similar in our subset and across all firms, wages and net profits per employee appear higher in firms within 30km of Gulags. Outside values are omitted.

Figure 16. Average wages in Russia in 2018 and locations of Gulags in 1952



Notes: The map gives the distribution of average wages in 2018 across all firms in Russia at the grid level. The data is from SPARK and wages are estimated from medical insurance payments which amount to 5.1% of wages and are mandatory across firms for all employees. The red circles indicate the locations of Gulags in 1952, and their size is proportional the share of *enemies* among prisoners. The region borders correspond to Soviet administrative regions in 1939.

As a robustness check we also proxy for local GDP per capita using satellite data on night light intensity collected by the DMSP-OLS satellite program and made available by the Earth Observation Group and the NOAA National Geophysical Data Center[19]. We combine it with data on population from the grided population of the world from SEDAC.[20] Lights per capita are a good proxy for economic activity as consumption in the evening requires lights, and hence light usage per person increases with income (Henderson et al., 2012). Lights per capita have been used as a measure of prosperity akin to GDP per capita by Pinkovskiy and Sala-i Martin (2016) and Pinkovskiy (2017). The use of nighttime lights to measure economic activity in general has been pioneered by Henderson et al. (2012).

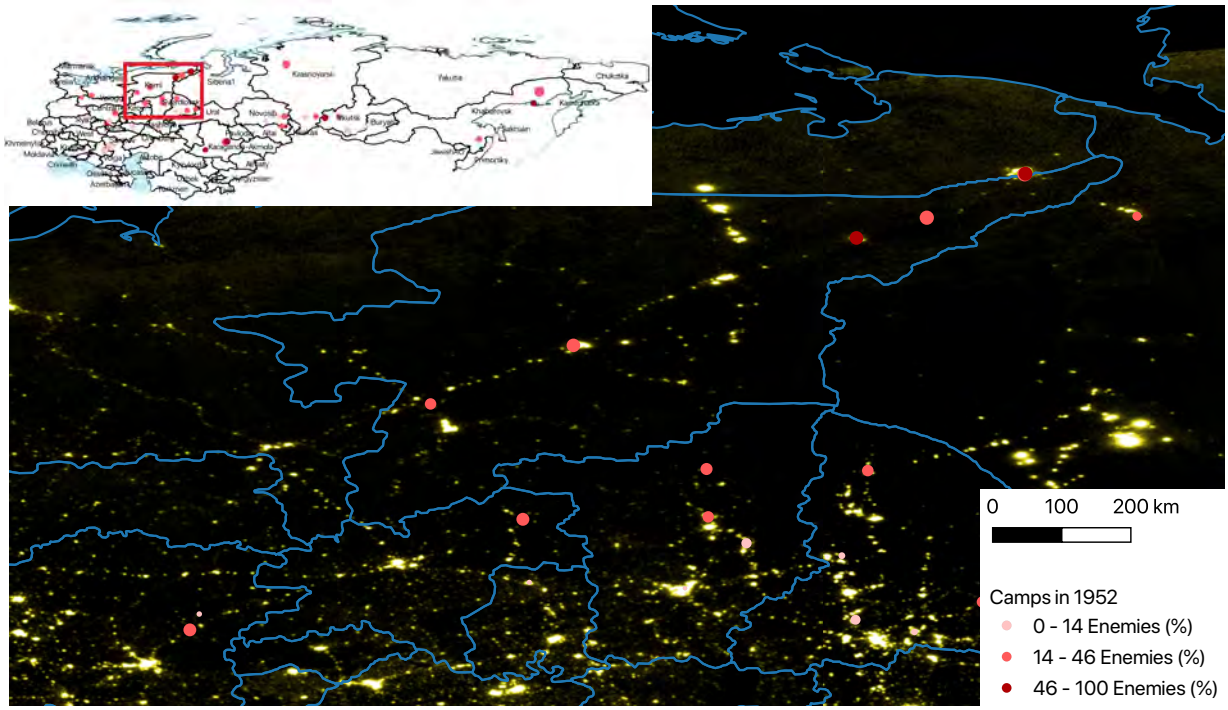
Figure 17 illustrates how our spatial matching of night lights and camp locations allows us to check whether *enemies* are an important predictor of night lights per capita across cities. By focusing only on cities within 30km of camps, we can compare whether those near camps with a higher share of *enemies* have more night light per capita. The map also shows that many remote cities today were not necessarily Gulag camps, and that there were often more than one camp per region. Data on night light intensity and population are for 2000, 2005, 2010, and 2015.

To investigate the long-run effect of *enemies* on education levels we use data from firm and household surveys, namely BEEPS and LiTS. These are firm and household surveys conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank. The firm-level survey is the Business Environment and Enterprise Performance Survey (BEEPS), which is a representative sample of an economy's private sector and is based on face-to-face interviews with managers. We use data from the fifth round of BEEPS in 2011-2014 which covers 4,220 enterprises in 37 regions in Russia. It includes questions on a broad range of business environment topics including the education of employees. The household survey is the third wave of the Life in Transition survey (LiTS 3) which surveyed

[19]Light intensity is measured on a scale between 0 and 63.

[20]The Gridded Population of the World (GPW) dataset is constructed using national censuses and maintained by the Socioeconomic Data and Applications Center (SEDAC) at the Center for International Earth Science Information Network at the Earth Institute at Columbia University.

Figure 17. Night lights in 2015 vs. 1952 Gulag locations



Notes: The map zooms in on the north west of Russia to show how we can match the location of Gulags and night light intensity in the surrounding 30km radius. The red dots are Gulags, with various share of *enemies*. The shining yellow areas are lights at night, as captured by satellite pictures, and made available by the Earth Observation Group and the NOAA National Geophysical Data Center. The blue lines are the administrative region borders.

almost 51,000 households in 34 countries in 2016 to assess public attitudes, well-being and the impacts of economic and political change. It includes question on education and income, as well as questions on whether respondents' grandparents have even been sent to camps for political reasons during Soviet times. The latter allows us to compare the education of the grandchildren of *enemies* to that of others. We also use BEEPS and LiTS data to measure education at the local level and match it spatially with the location of 1952 camps.[21] In robustness checks we also use education data from the censuses, which is only available at the Oblast level.

In various robustness checks we also use railroad data from 1937, based on the 1937 Bol'shoy Sovetskiy Atlas Mira, from Rozenas and Zhukov (2019). We also use data on the location of defence industries from (Dexter and Rodionov, 2017), and on the location of universities from Wikipedia. We also use climate and geography data on land quality for agriculture, altitude, precipitation, temperature from various sources indicated in Figure notes.

Last but not least, to measure the camps' remoteness and population dynamics we use data on population at the locality level from seven census waves, i.e. the 1897, 1926, 1939, 1959, 1989 Soviet censuses, as well as the 2002 and 2010 Russia censuses. This data was scraped from comprehensive Wikipedia pages and verified using Demoscope.[22]

4 EMPIRICAL STRATEGY

Before looking into the legacy of the enemies of the people we examine whether *enemies* were non-randomly sent to some specific regions or industries. Indeed *enemies* might have been allocated to more productive regions with better soil, to camps closer to productive cities

[21] We use BEEPS and LiTS instead of the Russia Longitudinal Monitoring Survey (RLMS-HSE) as the latter allows us to link Gulags to households in only 20 regions, or primary sampling units, and not at the town level.

[22] We collected population data on more than 92,500 localities from Wikipedia. Among those with more than 10,000 inhabitants, 95.7% matched the Demoscope data.

with skilled labor, or to skill-intensive or capital-intensive activities, themselves predicting long-run prosperity. They also might have been sent to the larger camps benefitting from agglomeration economies and higher productivity. In other words, we need to confirm that we can think of *enemies* as a natural experiment.

After going through the historical narrative of the Gulag, provided in particular by the books of Solzhenitsyn (1973) and Applebaum (2012), to check if there was any systematic bias in the allocation of *enemies*, we found no indication of such a system. The deportation process is rather described as rushed and disorganized, with random arrests and train packing. Solzhenitsyn (1973) notes that *enemies* were mixed with others as to avoid rebellious behaviors: "*58's were kept constantly mixed with the thieves and the nonpolitical offenders and were never allowed to be alone together—so they wouldn't look into one another's eyes and realize: who we are.*"

We also had numerous discussions with historians specialized in Russian contemporary history who did not know of any *enemy* allocation rule. The only exception are nine Special Camps created in 1948-49 specifically for *enemies*. These are labelled as MVD Special Camps in Figure 8, and we take these special cases into account in our empirical analysis.[23]

Perhaps a good way to capture the nature of the forced relocations of *enemies* is the following passage from Khlevnyuk (2008), who writes that "*The main purpose of the Great Terror was declared at the very outset to be the physical annihilation of enemies rather*

[23]Five prison-like special camps were set up in 1948 strictly for *enemies* as the Gulag bosses anticipated rebellion. The 1948 Order of the USSR Ministry of Internal Affairs No. 00219 "On the organization of special camps for the Ministry of Internal Affairs", notes that "*the Ministry of Internal Affairs of the USSR was entrusted with the organization of special camps in the Kolyma region, in the Far North, Norilsk, Komi ASSR, in the Karaganda region and in Temniki of the Mordovian ASSR for the maintenance of spies sentenced to imprisonment, saboteurs, terrorists, Trotskyists, rightists, Mensheviks, Socialist-Revolutionaries, anarchists, nationalists, White émigrés and members of other anti-Soviet organizations and groups and persons posing a danger for their anti-Soviet connections and enemy activities.*" As Applebaum (2012) notes, these were camps within existing camps. These new camps were populated by systematic re-arrests of *enemies* in alphabetical order in 1948 and 1949, as well as reshuffles from other camps. Solzhenitsyn (1973) describes the relocation process: "*Long red prisoner-transport trains were moved in, companies of brisk red-tabbed guards marched up with Tommy guns, dogs, and hammers, and the enemies of the people, as their names were called, meekly obeyed the inexorable summons to leave their cozy huts and begin the long transit.*"

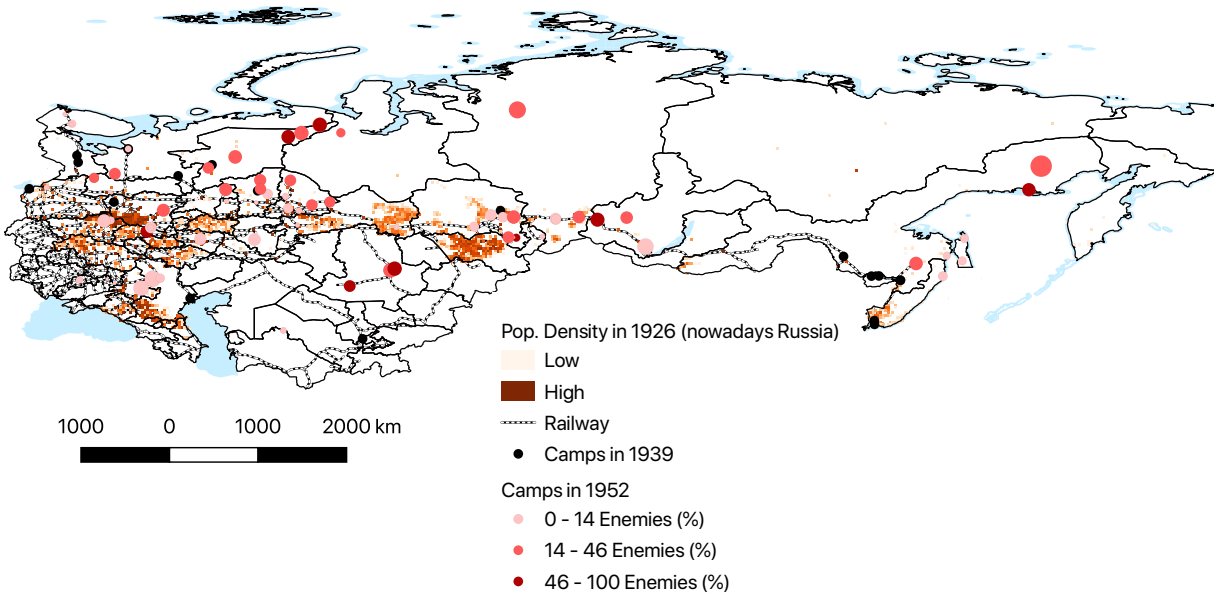
than their use as cheap labor... The political motives for the Terror took absolute priority over economic ones". Ertz (2008) also notes that, "*arrests in the Soviet Union were never determined by a hypothetic need for forced laborers, but driven by political and ideological considerations. From the viewpoint of the camp system administrators, then, the number of inmates constituted a basically exogenous variable, often subject to unforeseeable vacillations that caused managerial problems.*" He adds a lengthy footnote on the archive material on administrative correspondence that allows him to draw this conclusion, which he also bases on Khlevnyuk (2001), Alexopoulos (2005), Solomon (1980), J. Arch Getty (1993) and Joyce (2006). He even adds that "*against this welter of evidence, the hypothesis that economic plans influenced the number of arrests... must be considered obsolete*". See footnote 13 in his paper available online here.

To further investigate the possibility that *enemies* were not allocated randomly but rather to specific camps, we check whether Gulags with more *enemies of the people* differ statistically from other Gulags across geographic or industrial characteristics. We first look at the correlation between the share of *enemies* in camps and camps' remoteness, activities, geographic attributes, and size. We then estimate a LASSO model to determine which variables should be selected to best predict the shares of *enemies* across camps.

We first look at the correlation between the share of *enemies* in camps and their remoteness. The map in Figure 18 shows the locations of camps and the share of *enemies* in 1952, as well as population density in 1926, and the location of railway tracks in 1937. While camps are located both near population centers and tracks but also in remote locations, the share of *enemies* appear to be higher in remote locations.

This is confirmed in the scatter plots in Figure 19. We find that the further away the 1952 camps are from population centers, the higher the share of *enemies*. This is also true when we look at camps' distances from railway tracks. The further away from existing tracks, the higher the share of *enemies* in a camp. And this is also true if we look at the locations of *enemy* roundups. The latter likely captures the *best* locations for economic activity, and

Figure 18. USSR population in 1926 and Gulag locations in 1952



Notes: The map contrasts the locations of Gulags to the locations of people in 1926 across today's Russia, as well as the location of railway tracks in 1937. Population density is showed at the grid level and increases from light to dark brown. It is from town-level populations from the 1926 Soviet census. The red circles show the size and location of camps in 1952, as well as their share of *enemies* among prisoners. The black dots show the location of camps in 1939. The data on Gulag is from the State Archive of the Russian Federation (GARF). The railway tracks data is from Rozenas and Zhukov (2019).

a gravity model would predict a higher share of *enemies* in camps closer to roundups. Yet we find the opposite. The higher the share of *enemies* in camps, the fewer *enemy* roundups within 100 km. We also find that camps with a higher share of *enemies* are in locations with a lower population in 1926. Around half of the camps in 1952 were in *virgin lands*, i.e. locations with zero population within a 30 km radius in 1926.

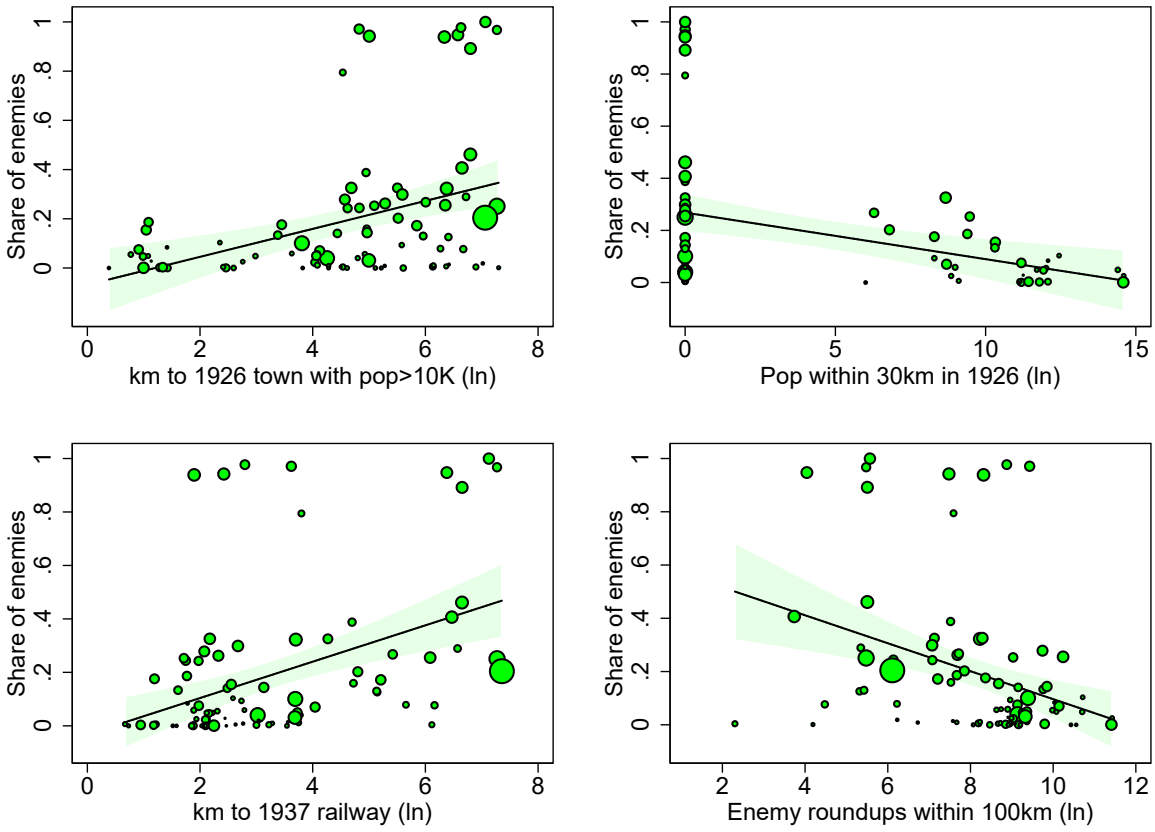
In the next scatterplots we look at the relationship between *enemy* shares and economic activities in camps. In Figure 20, we look at how the extraction of natural resources affects the share of *enemies*. The top left plot suggests that there is no relationship between *enemies* and resource extraction in camps. The other plots show the relationships between each natural resource and *enemies*. Across resources we find little to indicate a strategic allocation of *enemies*. In most cases, the relationship is flat or shaped by only a couple of camps. We find a potential positive relationship between coal extraction and the share of *enemies*, but there are only 5 camps with coal extraction in 1952, and this relationship is not robust, as we'll show below using a LASSO variable-selection model. Overall the correlations do not suggest a systematic relationship of *enemies* with natural resources.

In Figures 21 and 22 we look at the various economic activities in camps and their relationships with *enemies*. Figure 21 suggests there is no positive correlation between the share of *enemies* and any specific economic activity, i.e. energy production, metal industries, forestry, agriculture, *mechanical* engineering industries, light manufacturing, and even with R&D activities.[24] There appears to be a slight positive relationship with services, though again it does not appear to suggest a strategic allocation of enemies.[25] We investigate this further in a LASSO model below. Figure 21 focuses on the different type of infrastructure development across camps. We find no relationship between *enemies* and extractive, housing,

[24]Some of the camps hosted secret research and development laboratories, known as sharazki, where targeted scientists and engineers were assigned to work on aviation and military technologies. Only 3 of the 88 camps in 1952 had such a lab in 1952, and the share of *enemies* in those camps is relatively low. In his novel *In the First Circle*, Solzhenitsyn writes about his time in a sharashka in the Moscow suburbs.

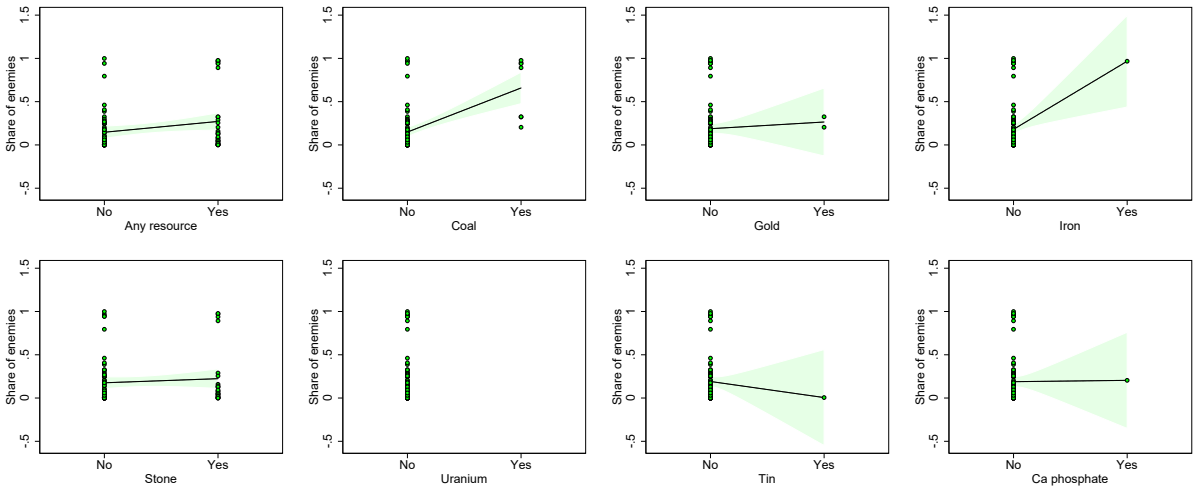
[25]Services industries in the Gulag included activities such as shipping operations, general maintenance and restoration, garage work, hydrometeorological services, or even management of social facilities. The online interactive map by Memorial provides details on the activities taking places in each camps.

Figure 19. Share of *enemies* in 1952 vs. remoteness across Gulags



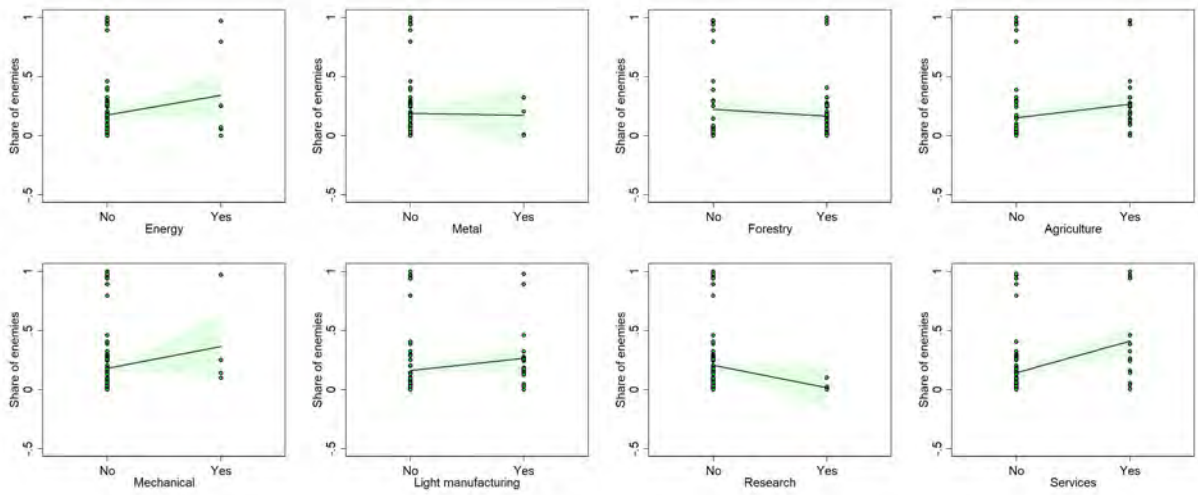
Notes: The scatters show the relationship between the share of *enemies* across camps in 1952 and four measures of remoteness. Each circle is a camp, and the circle size is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. The scatters show that camps with a higher share of *enemies* are further away from towns with at least 10,000 inhabitants in 1926, from railway tracks in 1937, and from locations with more roundups of *enemies*. They also show that there are fewer inhabitants within 30km of camps with a larger share of *enemies*. Overall they suggest that the share of *enemies* was higher in more remote locations. The Gulag data is from the State Archive of the Russian Federation (GARF). The railway tracks data is from Rozenas and Zhukov (2019). The population data is from the 1926 Soviet census.

Figure 20. Share of *enemies* in 1952 vs. natural resources across Gulags



Notes: The scatters show the relationship between the share of *enemies* across camps in 1952 and the type of natural resource extraction in camps. The top left scatter show that there is no relationship between the share of *enemies* in camps and the extraction of natural resources. The average share of *enemies* in camps where resource extraction takes place is the not statically different from that in camps where no resource extraction takes place. Each circle is a camp. The solid lines show the linear fit, or the estimated means in both types of camps, and the shaded areas show the 95% confidence interval. The Gulag data is from the State Archive of the Russian Federation (GARF). The data on resource extraction in Gulags is from Memorial.

Figure 21. Share of *enemies* in 1952 vs. economic activities across Gulags

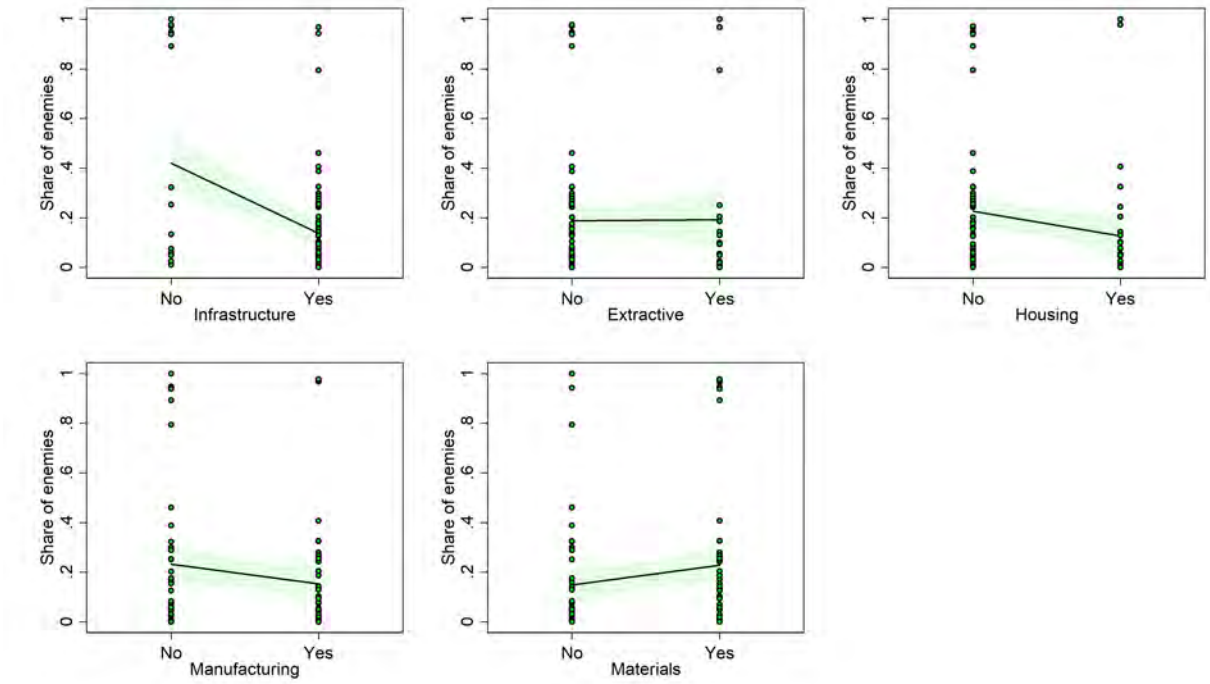


Notes: The scatters show the relationship between the share of *enemies* across camps in 1952 and the type of economic activity in camps. For example, the top right scatter shows that there is no relationship between the share of *enemies* in camps and agriculture. The average share of *enemies* in camps where agriculture takes place is the not statically different from that in camps where no agriculture takes place. Each circle is a camp. The solid lines show the linear fit, or the estimated means in both types of camps, and the shaded areas show the 95% confidence interval. The Gulag data is from the State Archive of the Russian Federation (GARF). The data on economic activities in Gulags is from Memorial.

manufacturing, or materials infrastructure development. Overall, we find the share of *enemies* to be negatively correlated with infrastructure development. This lack of connection between activities and the share of *enemies* is not so surprising given that the main administration of the camps was not in charge of the camps' enterprises and investment projects, which was left to the People's Commissariat for Internal Affairs (NKVD). Instead the Gulag administration was in charge of the surveillance, accommodation, and health of prisoners, as well as of disciplinary regulations and propagandistic activities (Ertz, 2008).

Another question is whether the skills of *enemies* were put to good use in camps. While this possibility does not seem to have affected the allocation of *enemies* across camps, *enemies* "jobs" within Gulags might have affected their legacy, by transferring skills in specific tasks for example. Both Applebaum (2012) and Solzhenitsyn (1973) suggest that political prisoners were often not allowed to be involved in skilled labor and were nearly always mixed with the non-political offenders doing unskilled work. In fact, according to

Figure 22. Share of *enemies* in 1952 vs. type of infrastructure across Gulags



Notes: The scatters show the relationship between the share of *enemies* across camps in 1952 and the type of infrastructure construction in camps. The top left scatter shows that there is a negative relationship between the share of *enemies* in camps and infrastructure construction in general. The average share of *enemies* in camps where infrastructure construction takes place is lower than in camps where no infrastructure construction takes place. Each circle is a camp. The solid lines show the linear fit, or the estimated means in both types of camps, and the shaded areas show the 95% confidence interval. The Gulag data is from the State Archive of the Russian Federation (GARF). The data on economic activities in Gulags is from Memorial.

an official decree released on the 7th of April 1930 by the Council of People's Commissars, prisoners convicted of counter-revolutionary activities were not allowed to occupy any administrative position. Applebaum (2012) illustrates how the matching of skills took place in this passage: "*Upon arriving at Ukhtizhemlag, Gliksman immediately realized that the "specialist" title he had been handed in the Kotlas transit camp —he was classified as a trained economist— had no meaning in the concentration camp itself... a genuinely qualified Polish doctor was sent to cut trees in the forest, while a former pimp was given an office job as an accountant.*"

Also, many of the *enemies*' professions were useless in camps. Professors couldn't teach. Journalists could't report. Lawyers' legal advice wasn't useful. Again, Solzhenitsyn (1973) writes it best: "*In camp it was advantageous to be a medical assistant, a barber, an accordion player—I daren't go any higher. You would get along all right if you were a tinsmith, a glass blower, or an automobile mechanic. But woe on you if you were a geneticist or, God help you, a philosopher, a linguist, an art historian—then you had had it! You would kick the bucket on general work in two weeks.*"

It is nonetheless a possibility that the matching of skills did occur over the years in camps, providing a way through which *enemies* might have transferred their knowledge to co-workers. But there is no indication that planners used the occupation of *enemies* in location decisions. In fact, it seems that Gulag administrators may not even have known about the professions of the prisoners. Solzhenitsyn (1973) illustrates this when writing that "*The Archipelago was a world without diplomas, a world in which the only credentials were one's own claims. The zek was not supposed to have documents with him, including educational records. In arriving at a new camp you yourself would invent who you would make yourself out to be this time.*" He adds, when writing about the Gulag registration cards that were distributed across camps after WW2, that "*the most important question on it was: "Trade or Profession." And the zeks would fill in the most precious Gulag trades to enhance their own value: "barber," "tailor," "storekeeper," "baker." As for me, I had frowned and filled in "nuclear physicist." I had never been a nuclear physicist in my life*".

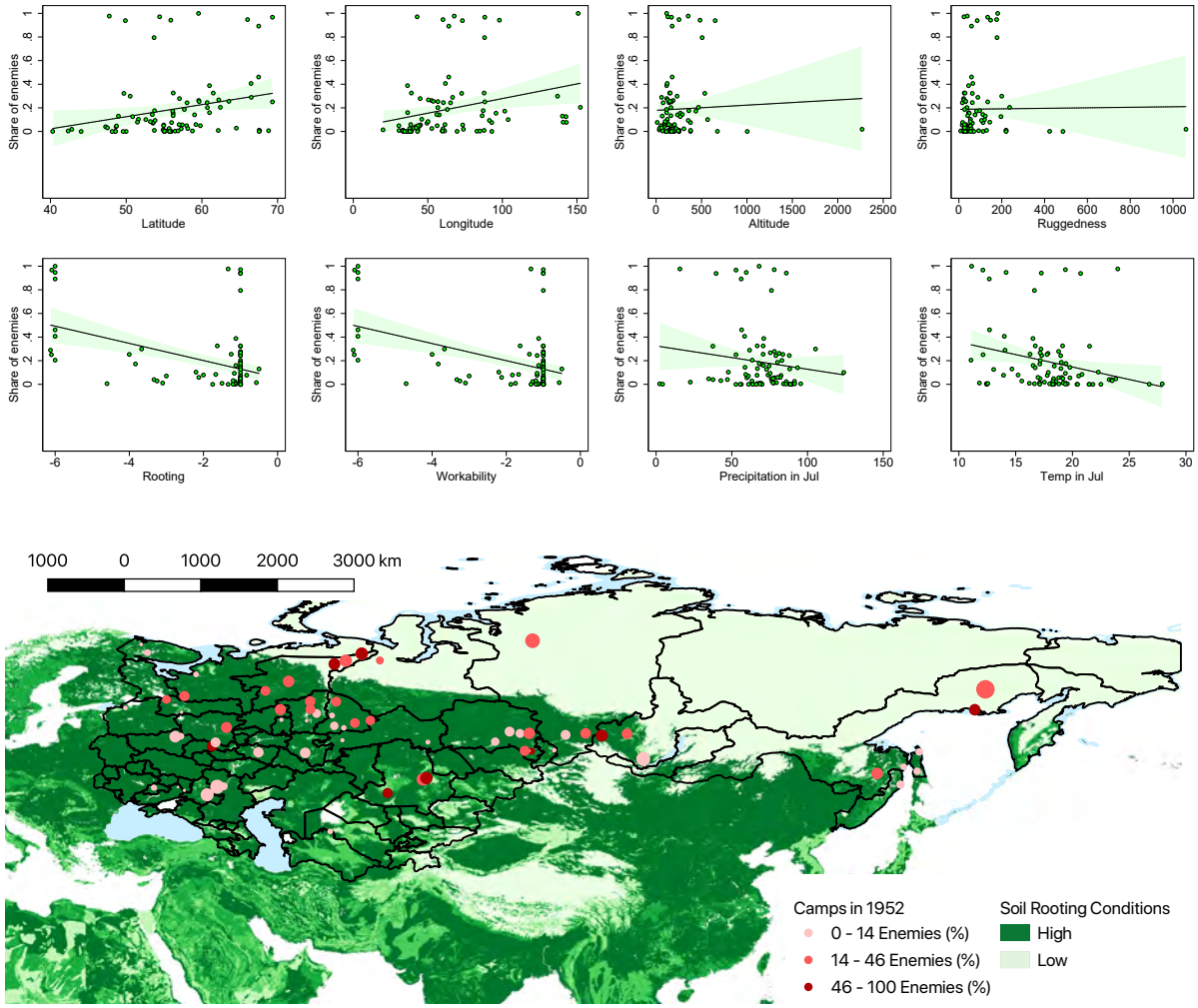
In Figure 23 we look at how geography affected the allocation of *enemies*. We find that the share of *enemies* increases as we move further north or further east, confirming that *enemies* were more likely to be sent to remote locations. These locations also seem to be drier and colder, and have lower quality soil for agriculture. This is also illustrated in the map in Figure 23 which shows how soil rooting conditions are bad in the north and east of Russia, where camps had a high share of *enemies*. The relationships with altitude and ruggedness on the other hand appear to be flat. Overall there is no indication that *enemies* were resettled in locations with favorable geography.

To further investigate whether any of the variables above, whether related to geography or economic activities, are robustly related to the share of *enemies*, we estimate a least absolute shrinkage and selection operator (LASSO, Ahrens et al. (2018)) model to determine the subset of variables that best predicts the share of *enemies* across camps. The results are summarized in Table 5. It shows the variables selected by the LASSO model and their conditional relationship with the share of *enemies*.

We find that camp size, measured by the total prisoner population, is an important predictor of *enemy* shares. This is also illustrated in Figure 24, which shows a clear positive relationship between the share of *enemies* and a camps total prisoner populations. Controlling for camp size in our regressions will thus be important. Nonetheless, despite the industrialization associated with the expansion of the Gulag, it is worth noting again that camp size itself might also be an exogenous factor. As Ertz (2008) writes, "*contrary to long-standing assumptions, arrests in the Soviet Union were never determined by a hypothetic need for forced laborers, but driven by political and ideological considerations. From the viewpoint of the camp system administrators, then, the number of inmates constituted a basically exogenous variable, often subject to unforeseeable vacillations that caused managerial problems.*" We also find that remoteness, here captured by distance from railways, also predicts a higher share of enemies. We control for remoteness in our regressions.

To sum up, *enemies* were more likely to be sent to less populated locations with worse

Figure 23. Share of *enemies* in 1952 vs. geography across Gulags



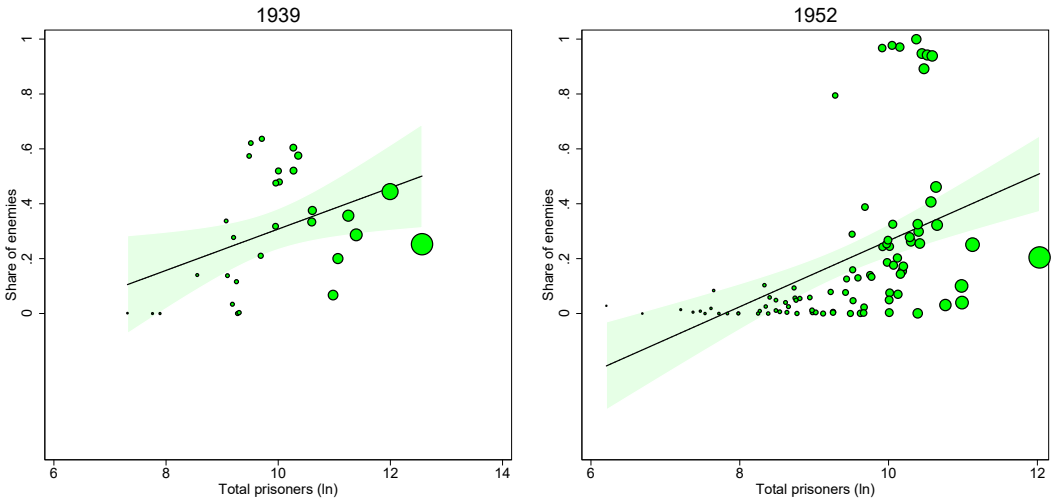
Notes: The scatters show the relationship between the share of *enemies* across camps in 1952 and local geography variables. Each circle is a camp. The solid lines show the linear fit, and the shaded areas show the 95% confidence interval. The share of *enemies* in camps increases with latitude and longitude, suggesting more *enemies* as we move north and east, and decreases with soil quality for agriculture, precipitation, and temperature. Overall the share of *enemies* seem to be higher in more hostile environments. The Gulag data is from the State Archive of the Russian Federation (GARF). Data on soil quality for agriculture (workability and rooting conditions) is from the FAO's harmonised world soil database 1.2. Rooting is an index (1-7) related to the presence of items in the soil which can potentially constrain rooting such as gravel or stones, as well to the texture of the soil, which in turn depends on climatic conditions. Similarly, workability is an index (1-7) of soil quality that includes physical hindrance to cultivation and limitations to cultivation imposed by texture and clay mineralogy. Temperature and precipitation is from the Millennium Ecosystem Assessment Climate and Land Cover Data set v1 provided by the Socioeconomic Data and Applications Center (SEDAC), part of NASA's Earth Observing System Data and Information System. Temperature is the average in July in the last 100 years, in degrees Celsius, while precipitation is in millimeters. The results do not differ if we use other months. Data on altitude (in meters) and ruggedness (standard deviations in altitude relative to the adjacent polygons) is from USGS' Global Multi-resolution Terrain Elevation Data (GMTED).

Table 5. The predictors of the share of *enemies* across Gulags

	(1) Enemies (%)	(2) Enemies (%)	(3) Enemies (%)	(4) Enemies (%)
Total prisoners (ln)	0.028	0.067***	0.007	0.092***
		(0.022)		(0.025)
Latitude	0.000		0.000	
Longitude	0.000		0.000	
Altitude	0.000		0.000	
Ruggedness	0.000		0.000	
Rooting	0.000		0.000	
Workability	0.000		0.000	
Precipitation in Jul	0.000		0.000	
Temp in Jul	0.000		0.000	
Pop within 30km in 1926 (ln)	-0.002	-0.004	0.000	
		(0.004)		
km to 1937 railway (ln)	0.010	0.062***	0.001	0.045**
		(0.023)		(0.020)
Coal (=1)	0.000		0.000	
Gold (=1)	0.000		0.000	
Iron (=1)	0.000		0.000	
Stone (=1)	0.000		0.000	
Uranium (=1)	0.000		0.000	
Tin (=1)	0.000		0.000	
Calcium (=1)	0.000		0.000	
Any resource (=1)	0.000		0.000	
Energy (=1)	0.000		0.000	
Metal Industry (=1)	0.000		0.000	
Forestry (=1)	0.000		0.000	
Agriculture (=1)	0.000		0.000	
Other Materials (=1)	0.000		0.000	
Mechanical (=1)	0.000		0.000	
Light Manufacturing (=1)	0.000		0.000	
R&D (=1)	-0.017	-0.087**	0.000	
		(0.034)		
Services (=1)	0.000		0.000	
Construction of Infrastructure (=1)	0.000		0.000	
Construction of Mines (=1)	0.000		0.000	
Construction of Housing (=1)	0.000		0.000	
Construction of Manufacturing (=1)	0.000		0.000	
Constant	-0.096	-0.610***	0.116	-0.816***
		(0.168)		(0.199)
N	75	75	75	88
R-sq		0.40		0.29
Model	LASSO	OLS	SQRT-LASSO	OLS

Note: The table shows the results of LASSO and OLS regressions (columns 2 and 4). The latter include the variables selected by the LASSO models. In column 1, we use absolute values of coefficient to determine the Lasso's penalty, while in column 3 we use the square root. Robust standard errors are in parentheses : *** p<0.01, ** p<0.05, * p<0.1. The LASSO's variable selection suggest the share of *enemies* is best predicted by the total number of prisoners in camps and distance from railways.

Figure 24. Share of *enemies* vs. total prisoner population across Gulags



Notes: The scatters show the relationship between the share of *enemies* and camps total prisoner populations across camps in 1939 and in 1952. Each circle is a camp, and the circle is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. The scatters suggest that in both 1939 and 1952, the share of enemies was higher in larger camps. The data is from the State Archive of the Russian Federation (GARF).

climatic conditions. These differences however do not point to a systematic allocation of enemies to camp location or industries that may be drivers of prosperity and firm productivity today. We nonetheless control for these factors in our regressions so that we identify as precisely as possible the effect of *enemies*. The allocation of *enemies* across Gulags can hence be thought of as a natural experiment that allows us to identify the effect of education persistence on long-run prosperity.[26]

To examine the differences in wages and profits across firms near Gulags with different

[26]Comparing outcomes across Gulag locations allows us to avoid arguing for or against the randomness of camp locations, as we focus instead on the distribution of *enemies* only across camp locations, and do not compare outcomes in camps vs. other locations. Nikolova et al. (2019) suggests that the locations of Gulag camps were not random, and not orthogonal to pre-development characteristics, noting for example that camps were nearby existing towns with labor shortages. Across camp locations, we show that if anything the share of *enemies* increases with remoteness.

shares of *enemies*, we estimate the following model at the firm level:

$$(1) \quad Y_i = \beta_1 Enemies(\%)_i + X_i'\delta + \epsilon_i,$$

where Y_i is a measure of wages or profits per employee reported by firm i, $Enemies(\%)_i$ is the share of *enemies* in Gulags within 30km of firm i; and X_i includes location specific controls, i.e. latitude, longitude, as well as region fixed effects. It also includes the number of prisoners in Gulags within 30km of firm i, as well as controls for remoteness, i.e. distance from 1937 railway tracks and population within 30km in 1926 to capture pre-Gulag development levels. We weight observations using the firms' number of employees, to capture their contribution to local wages. As many firms in particular locations are affected by the same Gulag or same combination of Gulags, we cluster the error term, ϵ_i by geographic clusters of Gulag exposure, i.e. at the treatment level. We present results in the next section.

5 RESULTS

5.1 The effect of *enemies* on local wages, profits, and night lights per capita

Our estimates of the effect of *enemies (%)* on firm-level wages are in Table 6. Across firms within 30km of Gulags today, those around camps with more *enemies* among prisoners in 1952 pay higher wages. If we take the lower bound estimate of column (6), we find that a one standard deviation increase in *enemy* share, i.e. a 28 percentage point increase, increases average wages by around 22.5% ($e^{.724\times.28}$). In columns 3-6 of Table 6 we exclude all firms within 100 km of Moscow as a robustness check. In columns 3 and 6 we control for local population in 1926 and distance to railway tracks in 1937, on top of latitude and longitude. The results are robust to these various specifications.

Table 6. The effect of *enemies* on local wages

	(1)	(2)	(3)	(4)	(5)	(6)
	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)
Enemies 1952 (%)	1.169***	0.823***	1.122***	1.305***	0.832***	0.724***
	(0.288)	(0.268)	(0.306)	(0.292)	(0.291)	(0.272)
Prisoners 1952 (ln)	0.036	0.023	0.006	-0.047	-0.078**	-0.087**
	(0.040)	(0.040)	(0.033)	(0.041)	(0.035)	(0.035)
Latitude		0.047***	0.051***		0.059***	0.060***
		(0.015)	(0.018)		(0.017)	(0.018)
Longitude		-0.005	-0.008		-0.000	0.002
		(0.006)	(0.006)		(0.006)	(0.007)
Pop within 30km - 1926 (ln)			0.020**			-0.012
			(0.009)			(0.008)
KM to 1937 railway (ln)			-0.001			-0.010
			(0.020)			(0.023)
N	566583	566583	566454	308800	308800	308671
R-sq	0.04	0.04	0.04	0.03	0.04	0.04
Moscow in	yes	yes	yes	no	no	no
Region FE	yes	yes	yes	yes	yes	yes
Sector FE	no	no	no	no	no	no
Weights	emp	emp	emp	emp	emp	emp

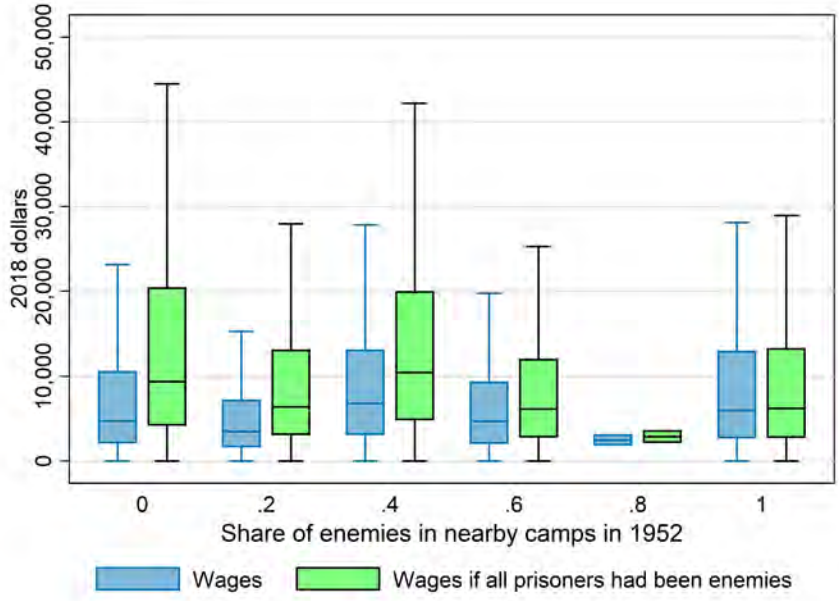
Notes: The table shows the results of regressions across 566,583 firms located within 30km of a 1952 Gulag, in Russia in 2018. Columns 4-6 exclude firms within 100km of Moscow. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that firms near Gulags with a larger share of *enemies*pay higher wages.

The magnitude of the effect is illustrated in Figure 25, where we show by how much wages, in dollars, would increase in each camp location if all prisoners had been *enemies*. Around camps with 0-10% *enemies*, replacing all non-*enemy* prisoners with *enemies* would result in wages around 10,000 dollars a year, rather than around 5,000 dollars. It would result in wages above 40,000 in the most high-paying firms, rather than just above 20,000.

In Figure 26 we show the results of estimating our regressions by industry, or NACE parent categories. We find positive and significant effects of *enemies* on wages in the main industries such as manufacturing, wholesale and retail, finance, construction, information and communication, but also in hotels and restaurants, administrative as well as transportation services. This suggests that our results are not driven by the composition of industries. This is also confirmed by including industry fixed effects, as we show below.

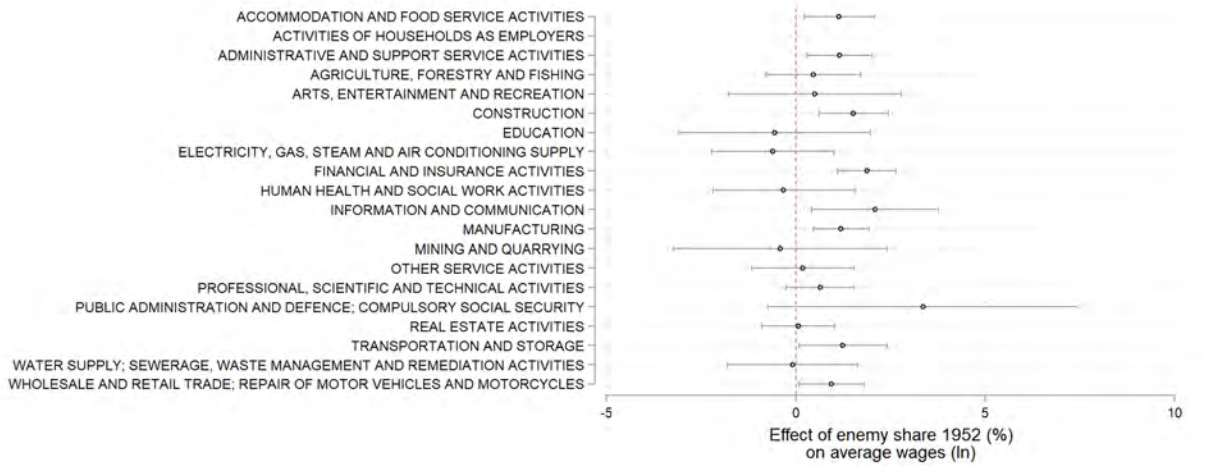
Figure 27 shows the robustness of the estimates across various alternative specifications, based on the specification with all controls (columns 3 and 6 in Table 6). The first check is to use camp locations and *enemy* shares in 1939 instead of 1952. While many of these

Figure 25. The magnitude of the effect of *enemies* on local wages



Notes: The figure summarizes the magnitude of the effect of the share of *enemies* on local wages, estimated in Table 6. It compares actual wages, summarized in blue boxplots across location affected by Gulags of different *enemy* shares, to hypothetical wages (the green boxplots) had all prisoners in every camp been *enemies*. For example, around camps with 0-10% *enemies*, replacing all non-*enemy* prisoners with *enemies* would result in wages around 10,000 dollars a year, rather than around 5,000.

Figure 26. Effect of *enemies* on wages by Industry



Notes: The figure shows the effects of the share of *enemies* on local wages when we estimate the specification of column(3) in Table 6 by industry (NACE categories). All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. The whiskers are 95% confidence intervals based on standard errors clustered by Gulag clusters (at the treatment level). The results suggest that in many industries such as manufacturing and retail, firms near Gulags with a larger share of *enemies* pay higher wages.

camps were dismantled during Gulag times, some did persist and so did the initial allocation of *enemies* that occurred during the Great Terror. These estimates thus provide a good robustness check focusing on the initial shares of *enemies* across camps. The second robustness check is to remove mining firms, as these might be paying higher wages, especially in the remote towns where many *enemies* were resettled. Excluding those firms do not change the results. The third robustness check here is to remove the Special Camps, those with more than 90% *enemies*. Again we find that our results are robust to this exclusion. This is important as those camps were created in 1948 purposefully for *enemies*, and they also had a larger share of Germans, Poles, Lithuanians, Latvians, and Estonians. In a fourth robustness check we add sector fixed effects, thus comparing, for example, only manufacturing firms across camp locations. The results are again robust to this specification. This is in line with the effect being at play in a large number of sectors, and not only driven by a few specific sectors. In a fifth check we remove employee weights and results remain positive and significant. Finally, in a sixth check we look at firms within 100km of camps rather than

Table 7. Using *Enemies* in 1952 (ln) (instead of *Enemies* (%))

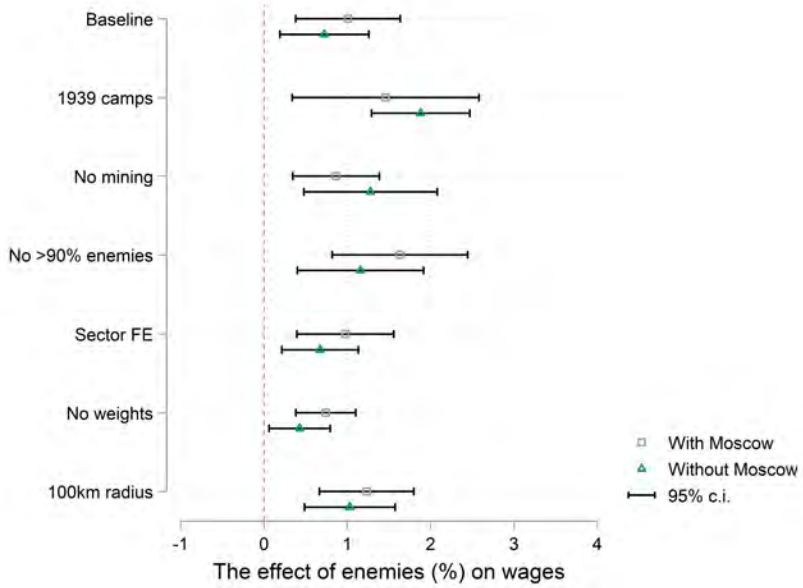
	(1) Average wage (ln)	(2) Average wage (ln)	(3) Average wage (ln)	(4) Average wage (ln)	(5) Average wage (ln)	(6) Average wage (ln)
Enemies 1952 (ln)	0.059***	0.067***	0.068***	0.066***	0.067***	0.059***
	(0.016)	(0.018)	(0.019)	(0.016)	(0.022)	(0.019)
Prisoners 1952 (ln)	-0.046	-0.082*	-0.095**	-0.117**	-0.169***	-0.177***
	(0.049)	(0.047)	(0.044)	(0.052)	(0.045)	(0.046)
Latitude		0.062***	0.068***		0.071***	0.068***
		(0.014)	(0.017)		(0.014)	(0.015)
Longitude		-0.012*	-0.012*		-0.008	-0.004
		(0.006)	(0.007)		(0.007)	(0.007)
Pop within 30km - 1926 (ln)			0.013			-0.016**
			(0.008)			(0.007)
KM to 1937 railway (ln)			0.003			-0.005
			(0.019)			(0.023)
N	566583	566583	566454	308800	308800	308671
R-sq	0.04	0.04	0.04	0.03	0.04	0.04
Moscow in	yes	yes	yes	no	no	no
Region FE	yes	yes	yes	yes	yes	yes
Sector FE	no	no	no	no	no	no
Weights	emp	emp	emp	emp	emp	emp

Notes: The table mimics the regressions in Table 6 but replaces the share of *enemies* with the log of *enemies*. The table shows the results of regressions across 566,583 firms located within 30km of a 1952 Gulag, in Russia in 2018. Columns 4-6 exclude firms within 100km of Moscow. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that firms near Gulags with more *enemies* pay higher wages.

30km, and the results are once again similar, and not statistically different from our baseline results. Across these robustness checks, we find our results to be robust to specifications wether we exclude firms within 100km of Moscow or not. As further robustness checks, Table 7 show that our results are robust to using the log of *enemies* rather than the share, and Figure 28 shows that randomly reshuffling *enemies* across camps 100 times does not generate any false positive effects, confirming that our results are unlikely to be driven by chance.

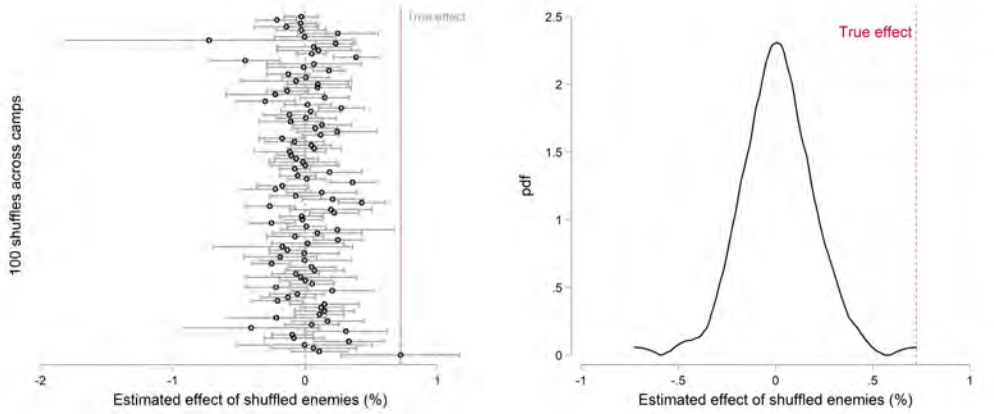
Before moving to the results on net profits per employee and night lights per capita, it is worth checking whether it is indeed *enemies* driving positive outcomes, rather than other *criminals* driving negative ones. In other words, what if it's not *enemies* that are good, but *criminals* that are bad for growth? This would mean that camps with a lower share of *enemies* are not conservative enough as a control group, as they are suffering from negative shocks rather than being a no-shock counterfactual. In Table 8 we check if wages are higher or lower on average in Gulag locations, compared to all non-Gulag locations. Since

Figure 27. The effect of the share of *enemies* on wages
Robustness to various specifications



Notes: The figure shows the effects of the share of *enemies* on local wages when we estimate alternative specifications akin to those of column 3 (with Moscow) and column 6 (without Moscow) in Table 6. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. The whiskers are 95% confidence intervals based on standard errors clustered by Gulag clusters (at the treatment level). The baseline effects are those in column 3 and 6 in Table 6. The second set of coefficients show the effect of enemy shares across camps in 1939 instead of 1952. In the third set of results we remove all mining firms from the sample. In the fourth set, we remove all firms affected by a share of enemies above 90%. in the firth set of results we include sector fixed effects. In the sixth set, we do not include employee weights and use OLS instead of WLS. In the last set of results we extend the radius around firms to include all firms within 100km of Gulags. Overall the results suggest that across alternative specifications we find firms near Gulags with a larger share of *enemies* to pay higher wages.

Figure 28. The effect of 100 placebo shares of *enemies* on wages



Notes: The left figure shows the effects of 100 placebo shares of *enemies*, which we obtain by shuffling actual shares of *enemies* across 1952 camps, and by estimating the specifications in column 3 of Table 6. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. The whiskers are 95% confidence intervals based on standard errors clustered by Gulag clusters (at the treatment level). The right figure shows the distribution of the 100 placebo effects, centred around zero. In both figures the vertical line shows the magnitude of the true effect. Overall the results suggest that the true effect of the share of *enemies* on wages is very unlikely to be due to chance.

we do not have a variable for *enemies* in non-camp locations, we use Gulag dummies. The dummies are for camps in the bottom 25%, in the top 25%, and those in between in terms of share of *enemies*. We find that firms near camp locations pay high wages on average, even if these camps had fewer than 1% of *enemies*. If we focus on regions outside Moscow, we find wages to be no statistically different in Gulags with less than 1% *enemies* when compared to non-Gulag locations. We also find that wages are higher in Gulags with *enemy* shares between 1 and 20%, compared with non-Gulag locations, and highest in Gulags with more than 20% *enemies*. Overall this suggests that the *enemy* effect is at play even when we include in the control group all non-camp locations, which unlike camps have not been affected by *criminal* negative shocks.

Our estimates of the effect of *enemies* on firms' net profits per employee are in Table 9. Here we mimic the specification of our baseline results (Table 6). Net profits are defined as in corporate finance as the difference between all revenues and gains and all expenses and losses

Table 8. The effect of 1952 *Gulag* locations on local wages

	(1)	(2)	(3)	(4)	(5)	(6)
	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)	Average wage (ln)
Gulag <1% enemies	0.167***	0.138**	0.046	0.054	-0.022	-0.049
	(0.056)	(0.059)	(0.059)	(0.077)	(0.091)	(0.098)
Gulag 1-20% enemies	0.217***	0.191***	0.139**	0.136**	0.098*	0.082
	(0.059)	(0.061)	(0.066)	(0.065)	(0.056)	(0.065)
Gulag >20% enemies	0.582***	0.263*	0.363***	0.526***	0.211	0.235*
	(0.170)	(0.139)	(0.126)	(0.167)	(0.132)	(0.126)
Latitude		0.059***	0.066***		0.058***	0.070***
		(0.014)	(0.017)		(0.014)	(0.019)
Longitude		-0.001	-0.002		-0.006	-0.003
		(0.006)	(0.007)		(0.007)	(0.007)
Pop within 30km - 1926 (ln)			0.021***			0.005
			(0.006)			(0.007)
KM to 1937 railway (ln)			-0.009			-0.033
			(0.023)			(0.029)
N	618720	618720	618589	354530	354530	354399
R-sq	0.04	0.05	0.05	0.03	0.04	0.04
Moscow in	yes	yes	yes	no	no	no
Region FE	yes	yes	yes	yes	yes	yes
Sector FE	no	no	no	no	no	no
Weights	emp	emp	emp	emp	emp	emp

Notes: The table mimics the regressions in Table 6 but replaces the share of *enemies* with 3 dummy variables, and extends the sample to all firms in Russia in 2018 for which data is available. The three dummy variables indicate whether the firm is within 30km of a Gulag with less then 1% *enemies*, between 1 and 20% *enemies*, or more than 20% *enemies*. The reference group is firms which are not within 30km of a Gulag. Columns 4-6 exclude firms within 100km of Moscow. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that firms near any Gulag pay higher wages than other firms, and that firms near Gulags with higher shares of *enemies* pay even higher wages.

Table 9. The effect of the share of *enemies* on net profits per employee

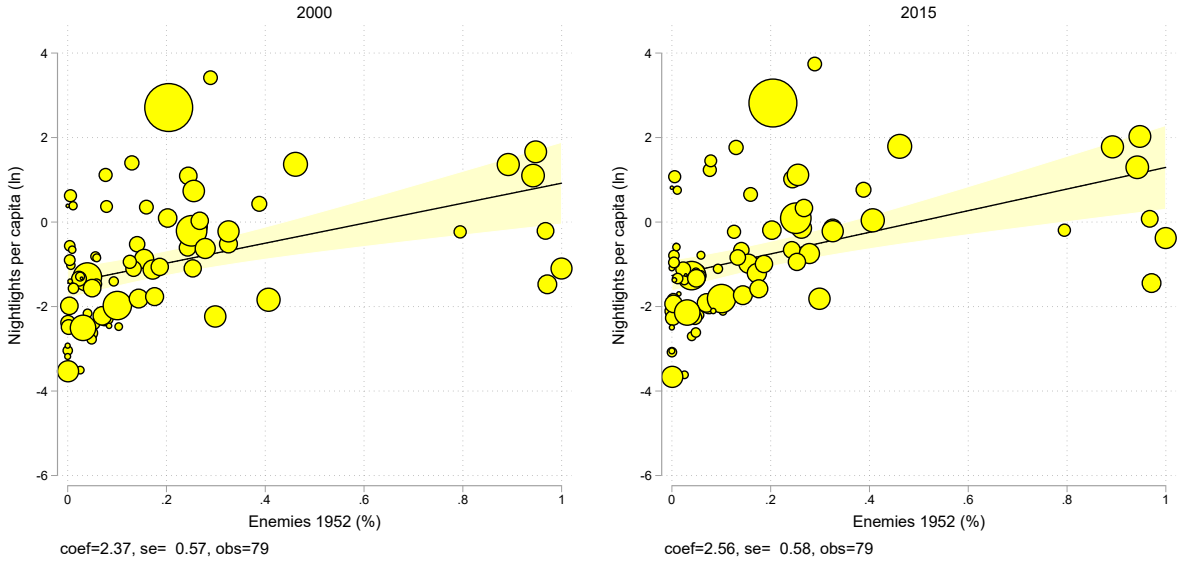
	(1)	(2)	(3)	(4)	(5)	(6)
	Profit per emp.(ln)	Profit per emp.(ln)	Profit per emp.(ln)	Profit per emp.(ln)	Profit per emp.(ln)	Profit per emp.(ln)
Enemies 1952 (%)	1.795***	2.852***	2.918***	2.045***	2.933***	2.263***
	(0.661)	(0.690)	(0.710)	(0.647)	(0.679)	(0.626)
Prisoners 1952 (ln)	0.063	0.092*	0.055	-0.032	0.013	-0.067
	(0.047)	(0.052)	(0.060)	(0.059)	(0.064)	(0.089)
Latitude		-0.057	-0.089*		-0.051	-0.063
		(0.043)	(0.047)		(0.045)	(0.054)
Longitude		-0.043**	-0.054***		-0.037**	-0.032
		(0.018)	(0.019)		(0.019)	(0.020)
Pop within 30km - 1926 (ln)			0.019			-0.042
			(0.021)			(0.029)
KM to 1937 railway (ln)			0.124**			0.057
			(0.048)			(0.051)
N	524928	524928	524804	289619	289619	289495
R-sq	0.01	0.01	0.02	0.01	0.02	0.02
Moscow in	yes	yes	yes	no	no	no
Region FE	yes	yes	yes	yes	yes	yes
Sector FE	no	no	no	no	no	no
Weights	emp	emp	emp	emp	emp	emp

Notes: The table mimics the regressions in Table 6 but replaces average wages with net profits per employee. The table shows the results of regressions across 566,583 firms located within 30km of a 1952 Gulag, in Russia in 2018. Columns 4-6 exclude firms within 100km of Moscow. All regressions are weighted least squares, with the number of employees per firms used as weights, and include region (oblast) fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that firms near Gulags with a higher share of *enemies* make higher profits per employee.

during the financial year. We find positive and robust effects. The lower bound in column (1) suggests that a one standard deviation in the share of *enemies*, a 28 percentage point increase, is associated with a 65% increase in net profits per employee. We also find that these effects are present in the main industries, namely wholesale and retail, manufacturing, and financial services (not shown).

As a further robustness check we estimate the effect of the share of *enemies* on night lights per capita in the 30km radius areas around camps. We do so for the years 2000, 2005, 2010, and 2015. While a crude measure of economic activity, night lights have the advantage of being impossible to fudge. The positive relationship is illustrated in Figure 29, and the regression results are in Table 10. In 2015, the lower bound estimate suggests that a 28 percentage point increase in the share of *enemies* is associated with a 58% increase in night lights per capita, which is in line with the 65% increase in net profits per employee. The relationship appears not to have changed much from 2000 to 2015.

Figure 29. Share of *enemies* vs. night lights per capita across Gulags



Notes: The scatters show the relationship between the share of *enemies* in camps in 1952 and night lights per capita within 30 km of camps in 2000 and 2015. Each circle is a 30km-radius area around a camp, and the size of the circles is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. Areas near camps with a higher share of *enemies* have brighter night lights per capita both in 2000 and 2015. The data on Gulags is from the State Archive of the Russian Federation (GARF) and the data on night lights is from the DMSP-OLS satellite program and made available by the Earth Observation Group and the NOAA National Geophysical Data Center. The data on population is from the grided population of the world from SEDAC.

Table 10. The effect of the share of *enemies* on night lights per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)	Light per capita (ln)
Enemies 1952 (%)	1.585*	1.793**	1.570**	1.721**	1.501**	1.689***	1.632**	1.690***
	(0.858)	(0.630)	(0.720)	(0.680)	(0.684)	(0.599)	(0.683)	(0.590)
Total prisoners 1952	0.209	0.042	0.181	0.049	0.150	0.039	0.187	0.027
	(0.154)	(0.069)	(0.148)	(0.081)	(0.158)	(0.091)	(0.167)	(0.091)
Latitude		0.032		0.026		0.032		0.046
		(0.066)		(0.071)		(0.062)		(0.055)
Longitude		0.005		-0.005		-0.001		0.017
		(0.038)		(0.037)		(0.029)		(0.025)
Pop within 30km - 1926 (ln)		-0.091***		-0.089***		-0.096***		-0.102***
		(0.026)		(0.028)		(0.034)		(0.034)
KM to 1937 railway (ln)		-0.047		0.003		-0.048		-0.071
		(0.133)		(0.135)		(0.136)		(0.134)
Constant	-3.315**	-3.465	-3.328**	-2.998	-2.466*	-2.789	-2.892*	-4.489
	(1.345)	(4.952)	(1.349)	(5.054)	(1.458)	(3.991)	(1.535)	(3.436)
N	67	61	67	61	67	61	67	61
R-sq	0.63	0.82	0.63	0.80	0.66	0.83	0.69	0.86
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Year	2000	2000	2005	2005	2010	2010	2015	2015

Notes: The table shows the results of regressions across 67 30km-radius areas around Gulags in Russia in 2000, 2005, 2010, and 2015. All regressions are ordinary least squares, and include region (oblast) fixed effects. Regions with only one Gulag are dropped due to region fixed effects. Standard errors clustered by region are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that areas near Gulags with a larger share of *enemies* have brighter night lights er capita.

5.2 Mechanisms - Investment

While we conjecture that *enemies* have had a persistent effect on economic prosperity via a human capital channel, here we explore further whether this or other mechanisms could be at play.

We first explore the possibility that locations around camps with a larger share of *enemies* are richer today because they attracted a larger amount of investment in Soviet times. In Table 11 we check whether *enemies* are associated with more investment in railways, defense factories, or universities between 1953 and 1989, and if they were more likely to become science cities, focused on R&D (see Schweiger et al. (2018). We mimic our baseline specification and focus on investment within 30km of camps as outcome variables. We find that Soviet planners did not invest more in camps with a higher share of *enemies*, but rather invested less. This is true for investment in railways, defense factories, or in universities, which was less likely to take place in locations with a higher share of *enemies*, and for science cities, which were less likely to be located near camps with a high share of *enemies*. Note also that in Gulag times, work processes were more labor intensive in camps than elsewhere due to a lower degree of mechanization (Ertz, 2008). Capital investment hence does not seem likely to have driven the relationship between *enemies* and long-run prosperity.

5.3 Mechanisms - Persistence of *enemy* locations

> Exile relieved us of the need to choose a place of residence for ourselves, and so from troublesome uncertainties and errors. No place would have been right, except that to which they had sent us.
>
> *Solzhenitsyn (1973)*

We next check if *enemies* did indeed stick around after the thaw and whether the descendants of *enemies* still live near camps with a higher share of *enemies*.

Table 11. The effect of the share of *enemies* on Soviet capital investments 1953-1989

	(1) Railway	(2) Railway	(3) Science city	(4) Science city	(5) Defense factory	(6) Defense factory	(7) University	(8) University
Enemies 1952 (%)	-0.040	-0.299	-0.324**	-0.291	-0.207	-0.341	-0.122	-0.346
	(0.118)	(0.250)	(0.130)	(0.204)	(0.234)	(0.275)	(0.212)	(0.227)
Total prisoners 1952	-0.013	-0.069	0.062*	0.070	-0.005	0.021	0.003	-0.026
	(0.050)	(0.047)	(0.037)	(0.049)	(0.052)	(0.056)	(0.052)	(0.058)
Latitude	0.009	0.026	0.004	-0.029	0.007	0.027	-0.007	0.039
	(0.006)	(0.020)	(0.008)	(0.029)	(0.010)	(0.031)	(0.007)	(0.029)
Longitude	0.003**	-0.002	0.001	-0.005	0.005***	0.025*	0.002	-0.005
	(0.001)	(0.009)	(0.002)	(0.011)	(0.002)	(0.014)	(0.002)	(0.011)
Pop within 30km - 1926 (ln)	-0.008	-0.013	0.017	0.022	0.025**	0.009	0.057***	0.039**
	(0.008)	(0.017)	(0.011)	(0.017)	(0.010)	(0.017)	(0.009)	(0.019)
KM to 1937 railway (ln)	-0.060*	-0.084	-0.026	0.035	-0.027	-0.045	0.078**	0.074
	(0.032)	(0.066)	(0.029)	(0.065)	(0.038)	(0.076)	(0.035)	(0.060)
Constant	-0.233	-0.196	-0.637	1.408	-0.004	-2.378	0.146	-1.701
	(0.372)	(1.214)	(0.487)	(1.693)	(0.715)	(1.962)	(0.613)	(1.645)
N	75	61	75	61	75	61	75	61
R-sq	0.11	0.42	0.16	0.37	0.21	0.50	0.37	0.55
Region FE	no	yes	no	yes	no	yes	no	yes
Moscow in	yes	yes	yes	yes	yes	yes	yes	yes

Notes: The table shows the results of regressions across 72 30km-radius areas around 1952 Gulags. The left-hand side variables are different measures of capital investment during 1953-1989. All regressions are ordinary least squares, and even columns include region (oblast) fixed effects. Robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that there was less investment in railways, defence factories, and universities near Gulags with a higher share of *enemies*, and the latter were less likely to be the locations of Soviet Science cities. The data on railway is from Zhukov and Talibova (2018), on defence factories from Dexter and Rodionov (2017), on science cities from Schweiger et al. (2018), and on universities from Wikipedia.

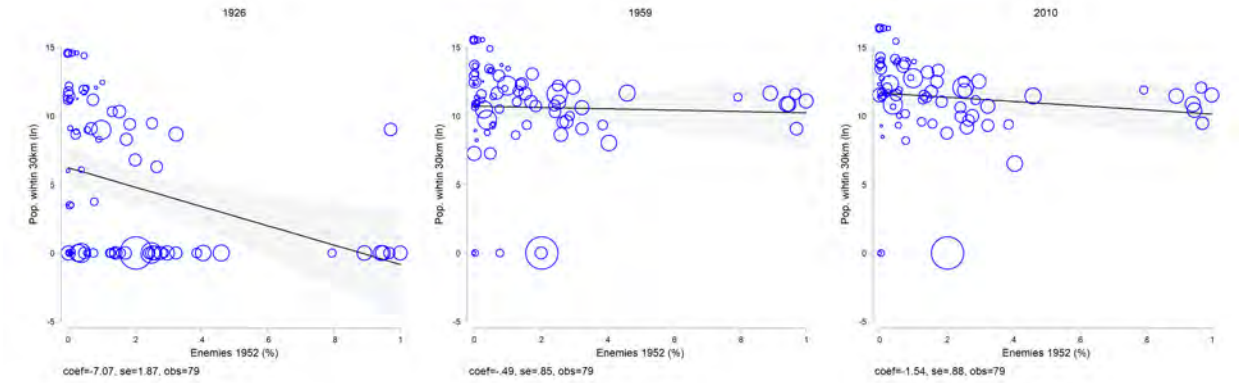
We first look at population data from five waves of censuses from 1926 to 2010. The top graphs in Figure 30 show the relationship between the share of *enemies* in camps and the population within 30 km in 1926, 1959, and 2010. It suggests that in 1926, locations that were to become camps with a larger share of *enemies* were less populated. Half of all camp locations had no population at all. This relationship disappears by the end of the Gulag in 1959, when there was no longer a relationship between *enemies* and population. This flat relationship persisted until 2010. In other words, we don't see locations with a larger share of *enemies* losing population at a faster rate than other locations, suggesting that *enemies* did stick around as much as anyone else. The bottom graphs show the relationships between the share of *enemies* and population growth, in Soviet times (1959-1989), in the aftermath of the fall of the Soviet Union (1989-2002), and in the last census years in more recent times (2002-2010). The scatters show a slightly negative relationship, if not completely flat, suggesting that remote locations with more *enemies* may have lost slightly more population than other locations, but the difference is not statistically significant. Overall it seems to suggest that the location of *enemies* did not fare too differently in terms of population dynamics.

To investigate the persistence of *enemy* locations more carefully we use data from the EBRD's Life in Transition Survey (LiTS) from 2016. This household survey asked respondents about their income and education but also whether their grand-parents or other relatives had been sent to labour camps or prisons for political reasons during Soviet times. And it also asked respondents whether they had moved locations and if so, in which year.

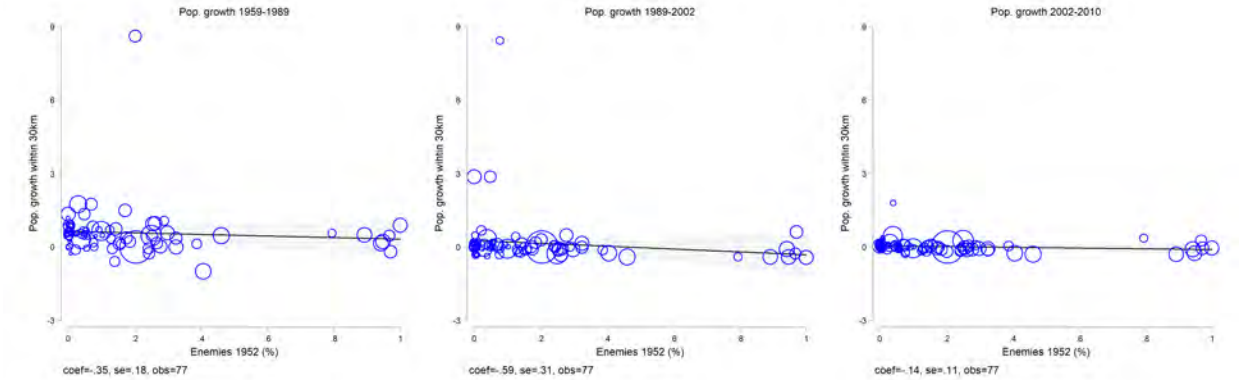
In Table 12 we check if those that identify as relatives or grand-children of *enemies* are more or less likely to have migrated. More precisely, we estimate the following model at the individual level:

$$(2) \quad Migrant_i = \beta_1 \text{Enemy grandchild}_i + X_i'\delta + \alpha_j + \epsilon_i,$$

Figure 30. Share of *enemies* vs. population within 30km of camps



Share of *enemies* vs. population growth within 30km of camps



Notes: The scatters show the relationship between the share of *enemies* in camps in 1952 and population within 30 km of camps in 1926, 1959, and 2010. Each circle is a 30km-radius area around a camp, and the size of the circles is proportional to the camp's prisoner population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. Areas near camps with a higher share of *enemies* have had a lower population in 1926, but similar populations in 1959 and 2010. The data on Gulags is from the State Archive of the Russian Federation (GARF) and the population data is from the 1926 and 1959 Soviet census and the 2010 Russian census and available on Wikipedia.

Table 12. The relatives and descendants of *enemies* are not more likely to be migrants

	(1) Migrant	(2) Migrant	(3) Migrant	(4) Migrant	(5) Migrant after 1990	(6) Migrant after 1990	(7) Migrant after 1990	(8) Migrant after 1990
Enemy grandparents	0.024	0.007			0.031	0.009		
	(0.020)	(0.021)			(0.021)	(0.022)		
Enemy relatives			0.015	0.018			-0.005	-0.018
			(0.018)	(0.020)			(0.018)	(0.020)
Female	0.060***	0.064***	0.060***	0.064***	0.038***	0.039***	0.037***	0.039***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)
Age	0.002***	0.002***	0.002***	0.002***	-0.006***	-0.006***	-0.006***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income		0.002		0.002		0.007		0.007
		(0.005)		(0.005)		(0.005)		(0.005)
N	19341	15933	19341	15933	19341	15933	19341	15933
R-sq	0.42	0.43	0.42	0.43	0.26	0.28	0.26	0.28

Notes: The table shows the results of regressions across 19,341 individuals in ex-USSR countries in 2016. The left-hand side variables are dummies indicating whether the individual had migrated since birth or since 1990, using answer to the question: *How long have you lived in this city/town/village?*. The right-hand side variables of interest are dummies indicating whether the individual had grandparents or relatives to labour camps or prisons for political reasons before 1990. All regressions are weighted least squares, using survey sample weights, and include latitude, longitude and primary sampling unit regions (PSU) fixed effects. Robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that those who identify as grandchildren or relatives of *enemies* are not more likely to have migrated since birth or since 1990.

where $Migrant_i$ is a dummy equal to 1 if individual i, at the time survey, lives in a different locality than where she was born, Enemy grandchild$_i$ is a dummy equal to 1 if individual i had grandparents or relatives sent to labour camps or prisons for political reasons during Soviet times; X_i includes individual specific controls, and α_j captures region fixed effects. We weight observations using survey weights and use robust standard errors for ϵ_i.

We find no indication of a relationship between having *enemy* grandparents or relatives and having migrated since birth or after 1990, when the Soviet Union collapsed. This is again in line with the descendants of *enemies* sticking around as much as any other people.

In Table 13 we check if survey respondents in 2016 living near camps which had a larger share of *enemies* are more likely to identify as the grandchildren or relatives of *enemies*. Here we use a specification akin to equation (1) but include respondents within a 100km radius of camps rather than 30km as, LiTS being a survey, we do not have enough households surveyed within 30km of camps. We find that respondents are indeed more likely to be relatives or grandchildren of *enemies* if they live near camps with a higher share of *enemies*.

Table 13. Respondents more likely to be grandchildren or relatives of *enemies* if near camps with a higher share of *enemies* in 1952

	(1) Enemy grandparents	(2) Enemy grandparents	(3) Enemy grandparents	(4) Enemy grandparents	(5) Enemy relatives	(6) Enemy relatives	(7) Enemy relatives	(8) Enemy relatives
Enemies 1952 (%)	0.238***	2.283***	0.187***	2.062***	1.610***	1.451	1.618***	3.310***
	(0.086)	(0.820)	(0.043)	(0.559)	(0.170)	(1.110)	(0.160)	(1.071)
Total prisoners	-0.029	-0.159**	-0.018*	-0.153***	-0.161***	-0.153*	-0.175***	-0.332***
	(0.019)	(0.065)	(0.009)	(0.046)	(0.041)	(0.082)	(0.040)	(0.088)
Latitude	0.031*	0.110**	0.021***	0.121***	0.164***	0.170***	0.175***	0.320***
	(0.016)	(0.046)	(0.008)	(0.034)	(0.032)	(0.058)	(0.031)	(0.071)
Longitude	-0.012***	-0.039***	-0.010***	-0.032***	-0.006*	-0.001	-0.007*	-0.020
	(0.004)	(0.012)	(0.002)	(0.007)	(0.003)	(0.014)	(0.004)	(0.012)
Pop within 30km - 1926 (ln)		0.287**		0.249***		-0.034		0.195
		(0.111)		(0.072)		(0.150)		(0.138)
KM to 1937 railway (ln)		0.032		-0.025		-0.047		-0.132**
		(0.030)		(0.016)		(0.029)		(0.053)
N	809	809	622	622	809	809	622	622
R-sq	0.04	0.05	0.06	0.06	0.22	0.23	0.24	0.26
Moscow in	yes	yes	no	no	yes	yes	no	no
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Weights	survey	survey	survey	survey	survey	survey	survey	survey

Notes: The table shows the results of regressions across 809 individuals living within 30km of 1952 Gulags in Russia in 2016. The left-hand side variables are dummies indicating whether the individual had grandparents or relatives sent to labour camps or prisons for political reasons before 1990, i.e. whether they identify as grandchildren or relatives of *enemies*. The right-hand side variable of interest is as in our baseline in Table 6, the share of *enemies* among prisoners in 1952. All regressions are weighted least squares, using survey sample weights, and include regions (oblast) fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that individuals are more likely to identify as grandchildren or relatives of *enemies* in 2016 if they live near a camp with a higher share of *enemies* in 1952.

A one standard deviation increase in the share of *enemies*, a 28 percentage point increase, is associated with an increase in the share of being an *enemy* grandchild by 64 percentage points. This evidence reinforces the hypothesis that *enemies* remained in the locations they were forcedly relocated to, and so did their children and grandchildren. Overall this suggests that persistence of *enemies* and their descendants in camp locations may indeed be behind the effects on prosperity we observe.

5.4 Mechanisms - Persistence of *enemy* education

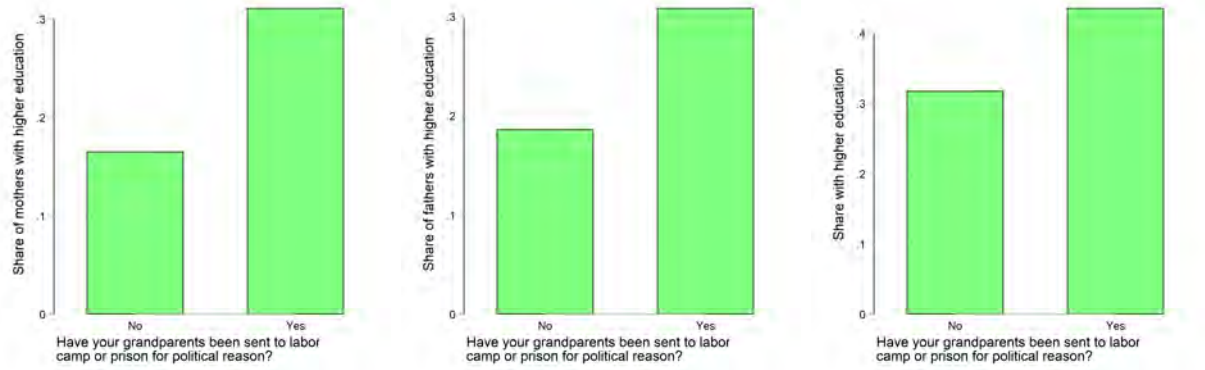
One way in which *enemies* may have contributed to higher wages and profits in 2018 is via the persistence of their relatively high education levels via intergenerational transmission. The Soviet system provided universal education at the secondary level. According to the censuses, in 1959, the average share of secondary educated was around 10%, in 1989 it had shot up to 60%. It is now above 70% in Russia. And in 2010, around 18% of Russians

had a tertiary education, up from around 2% in 1959. We know from previous studies that despite the equalization features of the Soviet system, there was still some intergenerational transmission of education. Gerber and Hout (1995) notes, based on data on around 20,000 eight and tenth graders in six Soviet regions in 1973, that 76.9% of tenth graders whose fathers' had higher education were planning to attend university. Among those whose fathers only had primary education, the share was 26%. They also showed that the probability of completing secondary, and entering university, increased with parents' education, and this was true in all survey years from 1929 to 1967. Dobson and Swafford (1980) also suggest, based on a 1968 survey of more than a thousand children in Syzran, that "*children of high-status origin not only earn higher average grades in school than the less advantaged but also tend to have higher expectations than their grades alone appear warrant.*"

To check whether the descendants of *enemies* are more educated than others today, we use data from the LiTS survey. Figure 31 shows that survey respondents that identify as the grandchildren of *enemies* are more likely to have tertiary education than others. The share of tertiary educated among grandchildren of *enemies* is above 40%, while it is around 30% for others. What's more, both the mothers and fathers of grandchildren of *enemies*, in other words, the children of *enemies*, are also more likely to be tertiary educated than other parents. This is in line with the intergenerational transmission of education from *enemies* to their grandchildren. The regression results in Table 14 confirm this effect. Here we use a specification akin to equation (2) but including education instead of migration on the left-hand side. We find that having *enemy* grandparents increases education by at least 0.244 points on a 1 to 8 scale, where 1 is no education, 4 is upper secondary, and 8 is a master's or PhD degree. This effect is robust and statistically significant across specifications.

To further investigate the hypothesis that today's populations near camps with a higher share of *enemies* are more educated we use data from BEEPS, a firm survey from the EBRD. This firm-level data allows us to check if firms near camps with a larger share of *enemies* are more likely to hire educated employees. Indeed it contains information on the average

Figure 31. The descendants of *enemies* are more educated, and so are their parents



Notes: The right bar chart shows the share of individuals with at least some tertiary education among individuals who identify as the grandchildren of *enemies* and among others. The sample consists of 19,341 individuals in ex-USSR countries in 2016. It shows that the grandchildren of enemies are more likely to have tertiary education. The bar charts on the left show the share of mothers and fathers with at least some tertiary education among individuals who identify as the grandchildren of *enemies* and among others. It shows that the grandchildren of enemies are more likely to have tertiary-educated parents. All bar charts are generated using sample survey weights. Source: LiTS 2016.

Table 14. Descendants of *enemies* are more educated

	(1)	(2)	(3)	(4)	(5)	(6)
	Education	Education	Education	Education	Education	Education
Enemy grandparents	0.264***	0.251***	0.244***			
	(0.068)	(0.068)	(0.071)			
Enemy relatives				0.222***	0.237***	0.244***
				(0.062)	(0.061)	(0.065)
Female		-0.009	0.015		-0.010	0.014
		(0.024)	(0.026)		(0.024)	(0.026)
Age		-0.009***	-0.007***		-0.009***	-0.007***
		(0.001)	(0.001)		(0.001)	(0.001)
Income			0.219***			0.219***
			(0.019)			(0.019)
N	19594	19594	16076	19594	19594	16076
R-sq	0.23	0.24	0.25	0.23	0.24	0.25

Notes: The table shows the results of regressions across 19,341 individuals in ex-USSR countries in 2016. The left-hand side variables indicate the level of education from 1 (no education) to 8 (master's or PhD). The right-hand side variables of interest are dummies indicating whether the individual had grandparents or relatives to labour camps or prisons for political reasons before 1990. All regressions are weighted least squares, using survey sample weights, and include latitude, longitude and primary sampling unit regions (PSU) fixed effects. Robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that those who identify as grandchildren or relatives of *enemies* have higher levels of education.

years of education of employees, as well as a variable indicating whether an inadequately educated workforce is an obstacle to operations. This firm survey complements the LiTS household survey nicely as the levels of education of employees here are not self-reported, thus providing a good robustness check. We use a specification akin to equation (1), using education outcomes at the firm-level on the left-hand side. In Table 15 we find that firms near camps with a larger share of *enemies* are indeed more likely to have tertiary educated employees. A 28 percentage point increase in *enemy* share increases the probability of being a tertiary educated employee by 63 percentage points. This effect is also true strictly for female employees. This result is also confirmed by firms near *enemies* camps being less likely to say that an inadequately educated workforce is an obstacle to operations, although the effects are not statistically significant here.

Overall the results suggest that the descendants of *enemies* have stuck around and are more likely to be tertiary educated, in line with the hypothesis that the education of *enemies* has persisted and may contribute to prosperity today. Indeed, our results suggest that areas around more *enemy-intensive* Gulags are richer today. They have more intense night lights per capita, here used as a proxy for GDP per capita, and local firms have higher net profits per employee and pay higher wages. This is in line with our conjecture that the education transferred from forcedly displaced *enemies* to their children and grandchildren do indeed matter in explaining prosperity across localities of Russia.

6 CONCLUSION

The Gulag is one of the darkest episodes in recent human history. To consolidate its power and push for industrialization, the Soviet regime killed and sent millions to forced labor camps scattered across the Soviet Union. In this paper we look at the long-run consequences of this relocation episode on local development outcomes. We first highlight the prevalence of *enemies of the people* as Gulag prisoners. *Enemies* were the educated elite, targeted

Table 15. Firms near camps with a higher share of *enemies* have a more educated workforce in 2014, and are less likely to say that an inadequately educated workforce is an obstacle to operations

	(1) Tertiary (=1)	(2) Tertiary (=1)	(3) Tertiary (=1) female	(4) Tertiary (=1) female	(5) Inadequate educ.	(6) Inadequate educ.
Enemies 1952 (%)	2.235**	2.547***	2.977**	3.013**	-0.531	-1.848
	(0.963)	(0.887)	(1.223)	(1.341)	(2.395)	(1.364)
Total prisoners	-0.162***	-0.105	-0.271***	-0.268*	0.204	0.541*
	(0.061)	(0.121)	(0.075)	(0.145)	(0.151)	(0.279)
Latitude	0.103	0.041	0.104	0.083	-0.208	-0.331
	(0.070)	(0.070)	(0.095)	(0.096)	(0.190)	(0.211)
Longitude	0.006	-0.012	0.010	0.007	0.024	-0.008
	(0.019)	(0.022)	(0.020)	(0.024)	(0.029)	(0.029)
Pop within 30km - 1926 (ln)	0.037	0.068	-0.008	0.012	-0.059	0.021
	(0.043)	(0.044)	(0.041)	(0.052)	(0.050)	(0.071)
KM to 1937 railway (ln)	-0.063	-0.024	-0.093*	-0.044	-0.144	0.048
	(0.044)	(0.037)	(0.050)	(0.050)	(0.177)	(0.086)
N	597	500	428	350	2129	1860
R-sq	0.13	0.22	0.28	0.25	0.10	0.13
Moscow in	yes	no	yes	no	yes	no
Region FE	yes	Yes	yes	Yes	yes	Yes
Sector FE	yes	Yes	yes	Yes	yes	Yes
Weights	survey	survey	survey	survey	survey	survey

Notes: The table shows the results of regressions across 2,129 firms located within 30km of 1952 Gulags in Russia in 2014. The left-hand side variables are dummies indicating whether the firm has employees with tertiary education (columns 1-2), or specifically female employees with tertiary education (columns 3-4), of if it identifies an inadequately educated workforce as an obstacle to operations. The right-hand side variable of interest is as in our baseline in Table 6, the share of *enemies* among prisoners in 1952. All regressions are weighted least squares, using survey sample weights, and include regions (oblast) and sector fixed effects. Standard errors clustered by Gulag clusters (at the treatment level) are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that firms are more likely to have tertiary-educated employees, and less likely to identify an inadequately educated workforce as an obstacle to operations, if near a camp with a higher share of *enemies* in 1952.

by the authorities for they posed a threat to the propaganda-dependent regime. We show that this massive and forced allocation of human capital had persistent effects. Sixty years after the death of Stalin and the demise of the Gulag, areas around camps which had a higher share of *enemies* are richer today, as captured by firms' wages and profits, as well as by night lights per capita. We also show that survey respondents who identify as the grandchildren of *enemies* are more likely to be tertiary educated. Our paper can be seen as a natural experiment that identifies the long-run persistence of higher education and its effect on long-run prosperity. Sadly, it also highlights how atrocious acts by mad individuals can shape the development path of localities over many generations.

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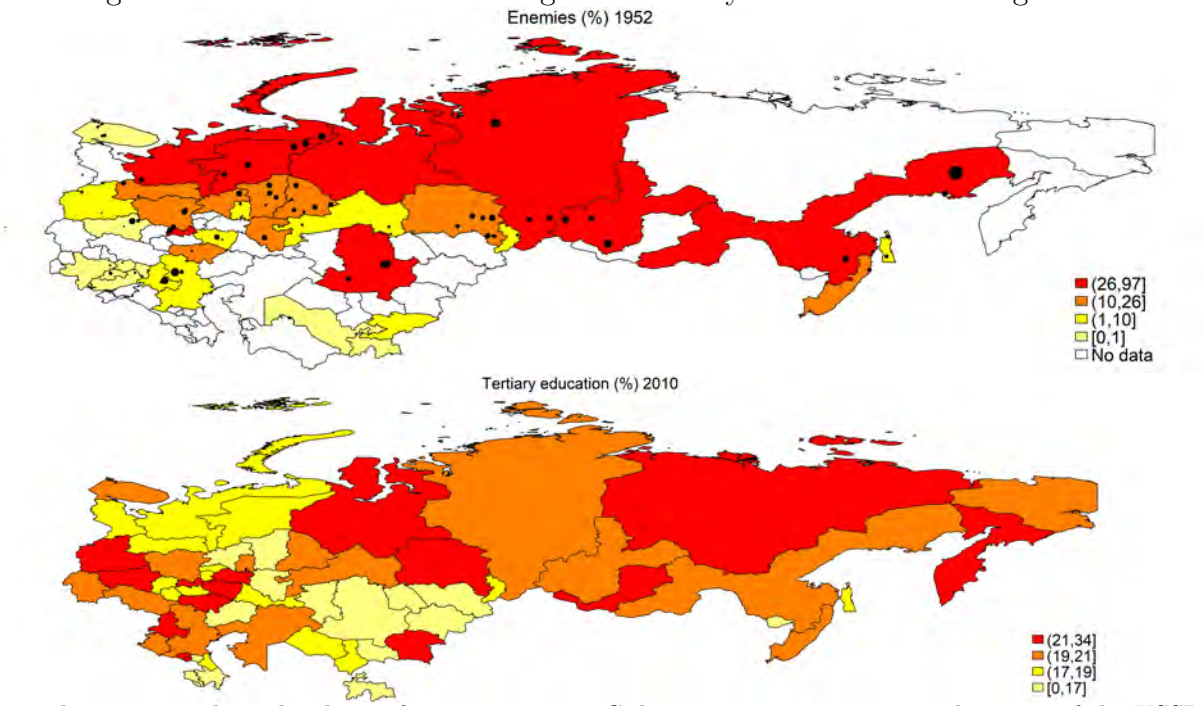
7 APPENDIX

7.1 Education at the region (Oblast) level

As a further robustness check on the legacy of *enemies* on the regions' average education levels, we estimate the effects of *enemies* on the share of primary, secondary, and tertiary educated in 1959, 1989, 2002, and 2010, across 92 administrative units knows as oblasts, using census data. To aggregate our *enemy* data at the oblast level we use the share of *enemies* among prisoners in all camps in each region. The top map in Figure 32 shows the aggregate *enemy* shares across regions, as well as the location of camps in 1952. The bottom panel shows the share of tertiary educated across regions in 2010 Russia. The maps suggests that tertiary education may be correlated with *enemies* resettlements, notably beyond the Ural Mountains in Siberia.

In Figure 33 we plot the share of *enemies* in 1952 in each region against the share of secondary and tertiary educated in 1959, 1989 and 2010. In 1959, the average share of secondary educated per region was around 10%, in 1989 it had shot up to 60%. It is now above 70% in Russia. In 2010, around 18% of Russians had a tertiary education, up

Figure 32. Share *enemies* in Gulags and tertiary education across regions



Notes: The top map show the share of *enemies* among Gulag prisoners in 1952 in each region of the USSR (defined in 1939). The heat (from yellow to red) indicates a higher share of *enemies*. The black dots are the locations of the Gulags, their size proportional to prisoner populations. The bottom map shows the share of tertiary educated in each region in Russia in 2010. The data on Gulags is from the State Archive of the Russian Federation (GARF) and the population data is from the 2010 Russian census.

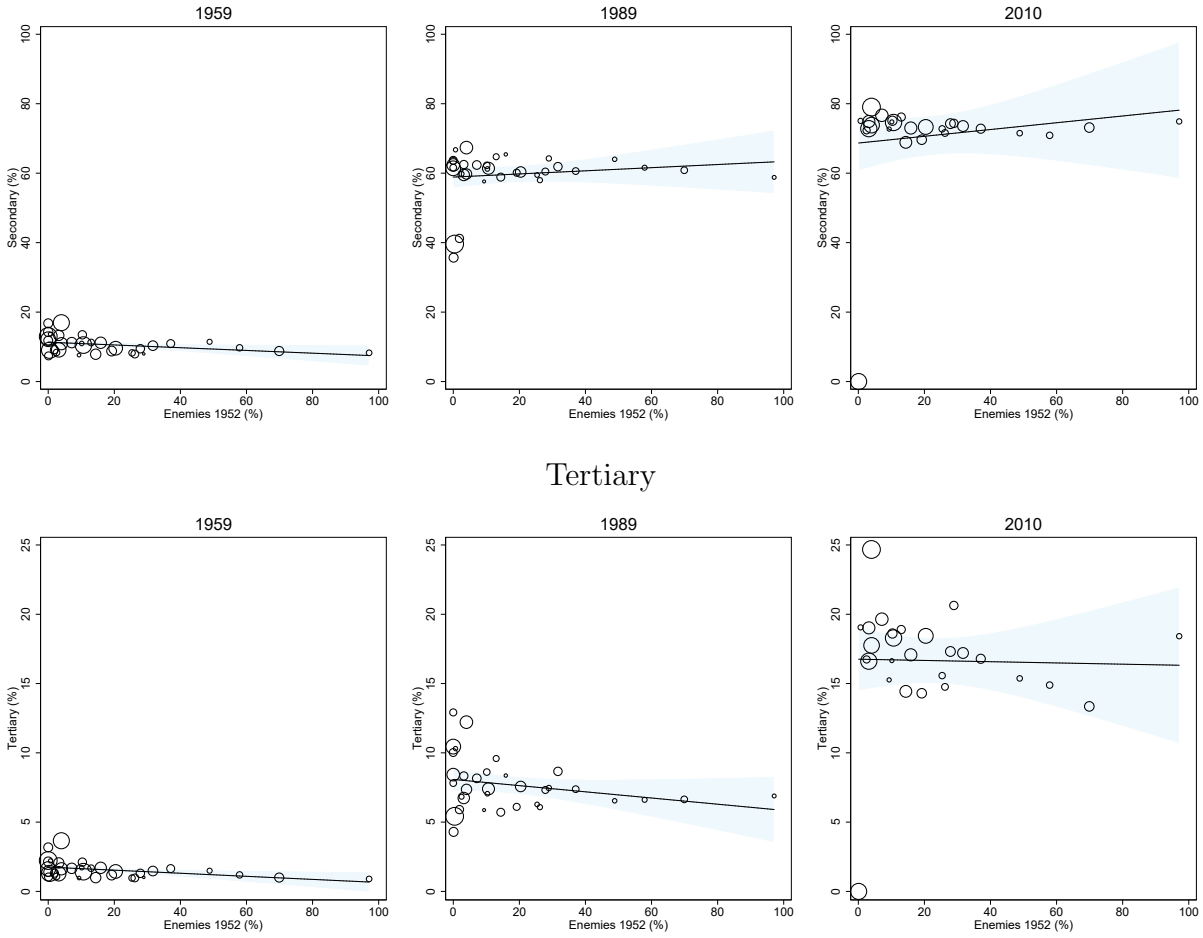
Table 16. The effect of the share of *enemies* on education levels across regions and period

	(1) Literate (%)	(2) Literate (%)	(3) Primary (%)	(4) Primary (%)	(5) Secondary (%)	(6) Secondary (%)	(7) Tertiary (%)	(8) Tertiary (%)
Enemies 1952 (%) × 1959	0.073**	0.086***	0.043	0.057**	-0.005	-0.001	-0.008***	-0.006***
	(0.034)	(0.029)	(0.028)	(0.024)	(0.012)	(0.010)	(0.003)	(0.002)
Enemies 1952 (%) × 1989	0.072*	0.093**	0.079**	0.096***	0.044	0.027	-0.020	-0.016*
	(0.038)	(0.040)	(0.033)	(0.029)	(0.035)	(0.023)	(0.013)	(0.008)
Enemies 1952 (%) × 2002	0.097**	0.110***	0.085**	0.104***	-0.016	0.000	-0.024	-0.012
	(0.040)	(0.036)	(0.036)	(0.031)	(0.026)	(0.018)	(0.020)	(0.013)
Enemies 1952 (%) × 2010	0.121**	0.138***	0.099**	0.121***	0.018	0.029	-0.021	-0.009
	(0.045)	(0.037)	(0.043)	(0.034)	(0.029)	(0.024)	(0.024)	(0.018)
Prioners 1952 × 1959		-0.541		-0.606*		-0.189		-0.056
		(0.751)		(0.336)		(0.240)		(0.057)
Prioners 1952 × 1989		-0.870		-0.721		0.687		-0.189
		(0.907)		(0.492)		(0.591)		(0.304)
Prioners 1952 × 2002		-0.563		-0.819		-0.767		-0.537*
		(0.866)		(0.549)		(0.486)		(0.290)
Prioners 1952 × 2010		-0.796		-1.072*		-0.595		-0.589
		(0.850)		(0.578)		(0.364)		(0.379)
N	132	132	132	132	132	132	132	132
R-sq	0.97	0.97	0.96	0.96	1.00	1.00	0.98	0.98

Note: The table shows the results of regressions across 132 regions in Russia and 5 periods, from 1939 to 2010. The left-hand side variables indicate the share of literate, primary-, secondary-, or tertiary-educated in each region in each year. The right-hand side variables of interest are the interaction of the share of *enemies* among prisoners in 1952, in each region, with year dummies. All regressions are ordinary least squares, and include region (oblast) and year fixed effects. Standard errors clustered by regions are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The results suggest that regions where camps had a higher share of *enemies* in 1952, have a higher share of literate and primary-educated population in all years since 1939, the base year, and the effect is highest in 2010. But those regions do not have a higher share of secondary- or tertiary-educated population.

from around 2% in 1959. The flat relationship between tertiary education and *enemies* suggests that the effect of enemies relocation may not extend to the region level. This is understandable given the size of Russian regions. Results in Table 16 confirm this. We find no significant effect of the share of *enemies* on the share of secondary or tertiary educated across regions in any of the census years, compared to 1939. We do find however positive effect of the share of literate and primary educated people. These shares have increased more since 1939 in regions that hosted a larger share of *enemies*. Given universal education in Soviet times, this could be due simply to the remoteness of these regions in 1939.

Figure 33. Share of *enemies* vs. share educated across regions



Notes: The scatters show the relationship across regions between the share of *enemies* among camp prisoners in 1952 and the share of secondary and tertiary educated in 1959, 1989, and 2010. Each circle is a region, and the size of the circles is proportional to the region's population. The solid lines show the linear fit and the shaded areas show the 95% confidence interval. The data on Gulags is from the State Archive of the Russian Federation (GARF) and the education data is from the 1959 and 1989 Soviet census and the 2010 Russian census.