

# Enemies of the people

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## Abstract

Enemies of the people were the millions of intellectuals, artists, businessmen, politicians, professors, landowners, scientists, and affluent peasants that were thought a threat to the Soviet regime and were sent to the Gulag, i.e. the system of forced labor camps throughout 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 prisoners are more prosperous today, as captured by night lights per capita, firm productivity, wages, and education. Our results point in the direction of a long-run persistence of skills and a resulting positive effect on local economic outcomes via human capital channels.

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Key Words: human capital, productivity, gulag, persistence, natural experiment.

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The FAKE NEWS media (failing @nytimes, @CNN, @NBCNews and many more) is not my enemy, it is the enemy of the American people. SICK!

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*Donald J. Trump, 2017*

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!

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*Lenin, 1917*

## 1 INTRODUCTION

Enemies of the people are back in the political sphere. The phrase has long been used by dictators and revolutionaries, from Robespierre to Fidel Castro, to describe political opponents. It was Lenin and Stalin however that made it stick. The enemies of the people, or *vragi naroda*, were the millions of intellectuals, artists, engineers, politicians, businessmen, professors, landowners, scientists, and affluent peasants that 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 allocation of enemies of the people, or *enemies*, on development outcomes across localities of the ex-Soviet Union. The Gulag was the forced labour camp system Stalin scattered across the Soviet Union starting in the 1920s in his push for industrialization and totalitarian governance. From 1928 until Stalin's death in 1953, possibly as many as 18 million prisoners and political exiles passed through 474

camps devoted to various economic activities such as forestry, mining, light and metal manufacturing, or agriculture. While this dark episode in human history has been extensively detailed by historians (e.g. [Solzhenitsyn \(1973\)](#), [Applebaum \(2012\)](#)) and is now in most history textbooks, little economic research has been devoted to understanding its consequences on the development of the countries' involved. We know from recent papers 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](#)), and that Gulag districts were associated with anti-communist voting during the 1990s ([Kapelko and Markevich, 2014](#)).

We investigate the long-run consequences of the Gulag focusing on the development impact of the forced displacement of enemies of the people. *Enemies* were the high-skilled, educated elite ([Miller and Smith, 2015](#)), targeted by the authorities for they posed a threat to the propaganda-dependant regime. For this reason we conjecture that their selection into Gulags might have affected local economic outcomes via human capital channels. The re-location of *enemies* was on a massive scale. One estimate suggests that 1.6 million (nearly 2.5% of the working population) had been arrested for counter-revolutionary violations during the Great Terror of 1937 and 1938 alone ([Kozlov, 2004](#)). And as people often ended up remaining in their Gulag's town after the Gulag's fall ([Cohen, 2012](#)), their forced re-location might have persistent effects. The forced re-location of *enemies* can hence be seen as a natural experiment that allows us to identify the long-run persistence of skills and its effect on growth. In doing so we aim to contribute to the growing body of natural experiments in macroeconomics ([Fuchs-Schndeln 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 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. Crucially, it provides information on the number of political

prisoners, or *enemies*, per camp and per year. This allows us to use the enemy share of the camps' population to capture the skill composition of the forced migration shocks, spread across the Soviet Union like a chain of islands, i.e. the Gulag Archipelago (Solzhenitsyn, 1973). We then match spatially the camps' locations with current economic activity and education outcomes, using a household- and firm-level data as well as night light intensity.

We first show that cities located within a 30km radius of Gulags which were populated by a higher share of *enemies* are richer today, as proxied by lights per capita (Figure 1).<sup>1</sup> We then show that in 2014 firms near those *enemy-intensive* Gulags are more productive and pay higher wages to more educated workers. Moving from a town near a Gulag where *enemies* accounted for 8% of prisoners, i.e. the average across camps, to one near a camp with 25% *enemies*, or a one standard-deviation increase from the mean (17 percentage points), increases lights per capita by 15%, value added per employee by 22%, revenue per employee by 26%, average wages by 14%, and the probability an employee is tertiary educated increases by 10 percentage points. The latter result is robust to using education data from a 2010 household survey and the 1989 census. Our results point in the direction of a long-run persistence of skills and a resulting positive effect on growth.<sup>2</sup>

In providing evidence on the long-run effect of *enemies* our paper contributes to the literature on long-run persistence, especially the subset that focuses on human capital and growth.<sup>3</sup> The role of human capital in growth is at the core of economics research but its effect has been hard to identify.<sup>4</sup>

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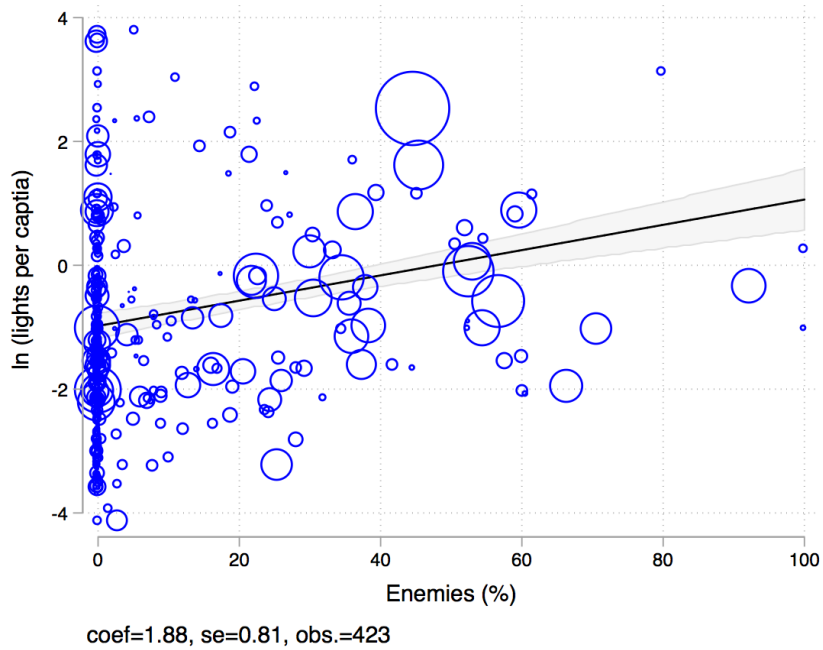
<sup>1</sup>Lights per capita is a measure of prosperity akin to GDP per capita used by Pinkovskiy and Sala-i Martin (2016) and Pinkovskiy (2017). The use of nighttime lights to measure economic activity in general has been pioneered by Henderson et al. (2012).

<sup>2</sup>It is important to note that the Gulag system is one of the most atrocious episode in recent history. And while we find that inflows of *enemies* had positive long-run effects on local development, we do not investigate the legacy of their mass removals on their home regions, for we do not have data on their origins.

<sup>3</sup>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. Examples include Dell (2010), who look at the persistence of extractive institutions in Peru, Nunn (2008) who look at the long run effect of the slave trade in African countries, Guiso et al. (2016) who look at the consequences of self-government in the Middle Ages in Italian cities, and Grosfeld and Zhuravskaya (2015) who look at the legacies of three past empires in Poland.

<sup>4</sup>Barro and Lee (2010) suggest the cross-country rate-of-return to an additional year of schooling ranges

Figure 1. Enemies of the people (%) vs. lights per capita



Notes: The figure depicts the relationship between the share of enemies across Gulags and the nightlight intensity within a radius of 30km of the Gulags. Individual observations are weighted by camp prisoner population (indicated by the size of the circles). The light intensity is calculated using average population and light emission estimates within a radius of 30km of the respective Gulag. The lights data is from the DMSP-OLS satellite program and the grided population data is from SEDAC. The Gulag data is from Memorial. See text for details.

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. \(2017\)](#) shows that high-skilled immigrants settled to particular regions of Brazil via a state-sponsored policy around 1900 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 \(2014\)](#) shows that in the late 17th century Prussia, firms in areas receiving skilled Huguenots from France experienced increased productivity. In Latin America ([Valencia Caicedo, 2015](#)) 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 transfer their human capital and skills and thus contribute to their host region development.<sup>5</sup>

A growing body of evidence thus suggests that migration has long-run effects as migrants take their human capital with them and transfer it to their children and colleagues. The mechanisms of transmission of social norms or skills 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*

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from 5% to 12% across countries but these estimates are absent from the latest version of their work. More fine-grained estimations include [Gennaioli et al. \(2013\)](#), [Ciccone and Papaioannou \(2009\)](#), and [Squicciarini and Voigtlander \(2015\)](#) who 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. [Waldinger \(2016\)](#) also provides evidence for the importance of upper-tail human capital in the production of scientific knowledge using the dismissal of scientists in Nazi Germany as a natural experiment. There is also a long-established literature highlighting the importance of human capital such as schooling in accounting for productivity heterogeneity across firms ([Abowd et al., 2005](#); [Ilmakunnas et al., 2004](#); [Fox and Smeets, 2011](#)).

<sup>5</sup>It is worth mentioning that the effect migration on growth may not only be due to the selection of high-skilled migrants but also to the fact that migration itself, especially forced migration, may give people an incentive to invest in human capital. See for example [Becker et al. \(2018\)](#) who show that forced re-locations within Poland had this effect on education attainment.

to refer to industry knowledge learned through parents. [Lindahl et al. \(2015\)](#) document persistence in educational attainments over four generations in Sweden, labelling this persistence as *dynastic human capital*. [Valencia Caicedo \(2015\)](#) puts it as occupational persistence and intergenerational knowledge transmission.<sup>6</sup> Our paper further adds to this literature by showing in additional results that the long-run effect of *enemies* on firm productivity is strongest in local industries that date back to Gulag times. This suggests that the intergenerational transmission of skills is strongest within specific industries and hence may be linked to industry knowledge.

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

## 2 HISTORICAL BACKGROUND

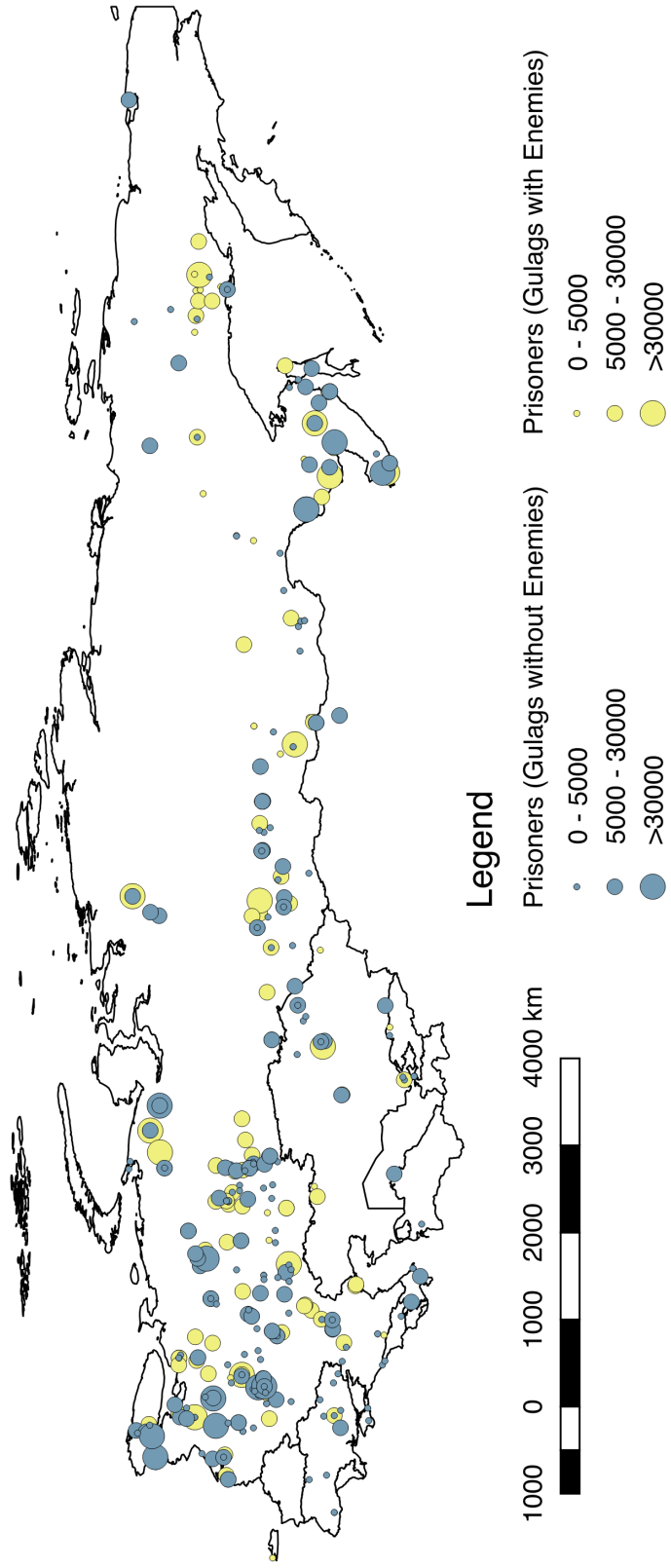
The Gulag was the Soviet system of corrective labor camps through which as many as 18 million people (the true figure remains unknown), from petty criminals to political exiles, were re-located from 1918 to 1956. Around 474 camps were scattered across the Soviet Union like a chain of islands (see Figure 2), what Aleksandr Solzhenitsyn called the Gulag Archipelago.<sup>7</sup> 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 or counter revolutionaries.

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<sup>6</sup>Other examples include [Grönqvist et al. \(2016\)](#) who show that parents cognitive and non-cognitive abilities are a strong predictor of their childrens education and labor market outcomes. Also [Peisakhin \(2013\)](#) 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.

<sup>7</sup>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 however.

Figure 2. Location and size of Gulags



Notes: Source: 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 [Albert et al. \(1999\)](#)). [Applebaum \(2012\)](#) notes that by 1918 Lenin was already targeting aristocrats and merchants and having them locked up in concentration camps outside major towns. She suggests that there were already as many as 84 camps in 43 provinces in 1921, and these were specifically designed for these first enemies of the people.

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 \(1973\)](#)).

The targeting of the educated, but also the randomness of being labelled an *enemy* and being sent away, can also be understood from the drawings by [Baldaev \(2010\)](#), a Gulag guard.<sup>8</sup> 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*

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<sup>8</sup>The drawings by [Baldaev \(2010\)](#) provide a vivid illustration of the atrocities of the re-location process and the camps.

or *kolkhozniks* (farmers) - it doesn't matter. We just need twelve people in all. That's an order. Off you go..."<sup>9</sup>

In the 1920s Stalin started pushing for 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 3). 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 proletarian 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.

According to [Hosford et al. \(2006\)](#), the campaign against enemies of the people that followed occurred through three major waves. The first was the deportations and executions of millions of Kulaks, 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. The second major wave of arrests is known as the *Kirov flood*, triggered by the assassination of Sergei Kirov, the head of the Communist Party in Leningrad, in 1934. In the months that followed his death, around 40,000 residents of Leningrad were rounded up. The third episode 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

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<sup>9</sup>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 \(1984\)](#)).

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!*”

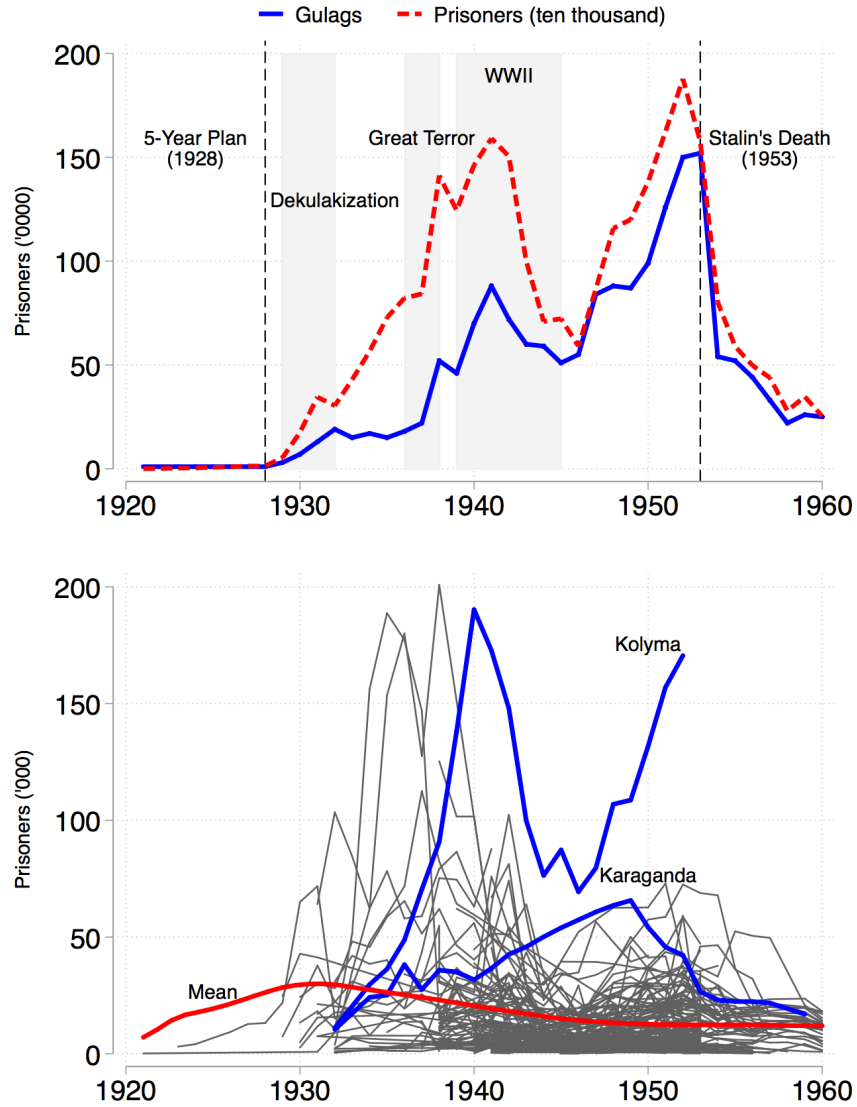
The Gulag played a central role in the Soviet economy, mining one-third of all the Soviet Union’s gold, and much of its coal and timber. The camps were of various types, from prisons surrounded with barbed wire to unguarded towns in remote locations, and were often devoted to a particular economic activity, 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.

One example of such camp was KarLag, immortalised by Solzhenitsyn’s *One Day in the Life of Ivan Denisovich*<sup>10</sup>. Karlag was one the largest labor camps of the Soviet Union (see [Figure 3](#)), located near Karaganda in the sparsely populated steppe of Kazakhstan. The choice of KarLag’s location was mainly determined by large coal deposits and an abundance of iron and nonferrous metals. 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. These were mostly involved in resource extraction

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<sup>10</sup>It is worth emphasizing again that, as detailed in *One Day in the Life of Ivan Denisovich*, 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. A memo from a procurator of the Soviet Union to the chief of the People’s Commissariat for Internal Affairs in 1938 stated that “*Among the prisoners there are some so ragged and lacerated that they pose a sanitary danger to the rest. These prisoners have deteriorated to the point of losing any resemblance to human beings. Lacking food . . . they collect orts [refuse] and, according to some prisoners, eat rats and dogs.*” ([Brent, 2008](#)). [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 3. The evolution of the Gulag



Notes: The top figure shows the number of Gulag camps and the total number of prisoners while the bottom one shows the number of prisoners in each camp. Each grey line is the prisoner population of one camp. The red line is the yearly average. Source: Memorial.

and processing but some were agricultural scientists publishing articles on fertilisation in the Kazakh steppe (Shaimuhanov and Shaimuhanova, 1997). One estimate suggests that over 50% of Karlag’s population were *enemies* (Memorial, 2016). Karaganda continued growing for several decades after KarLag’s closure, reaching a population above half a million within 40 years of its creation.

Table 1: **Share of prisoners by education**

<b>Education</b>	<b>Gulag 1937</b>	<b>Enemies* (1927-1953)</b>	<b>Pop. 1937</b>	<b>Pop. 1926</b>
Tertiary (%)	1.0	4.6	0.6	-
Secondary (%)	8.9	13.0	4.3	-
Elementary (%)	49.3	56.0	38.3	-
Semi literate (%)	32.4	-	-	-
Illiterate (%)	8.4	26.0	39.0	61.0

Notes: \*Author’s calculation based on individual-level data from Memorial. Other data from J. Arch Getty (1993) and 1926 Census.

The legacy of the Gulag is not yet fully understood. We do know that after the fall of the Gulag prisoners often had to settle down and continue working at the same industrial projects as outside options were heavily limited (Cohen, 2012). We also know that a number of major industrial cities in Russia and other ex-Soviet countries were originally camps built by prisoners and run by ex-prisoners. And finally, we know that cities where Gulag camps were located grew significantly faster than similar cities without camps from 1926 to 2010 (Mikhailova, 2012).<sup>11</sup>

In this paper we stress the importance of the selection of highly educated *enemies* into the Gulag to explain its economic legacy. *Enemies*, or educated dissidents, 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 camps 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 1926 and 1937. It suggests that the share of people with school achievement

<sup>11</sup>Mikhailova (2012) argues that the Gulag had a permanent effect on the economy’s spatial equilibrium, whereas WWII evacuations and enterprise relocations did not.

above secondary was twice as high in Gulags, at around 10% in 1937. And only 8.4% of the Gulag prisoners were illiterate compared to as much as 39% of the Soviet population. Individual-level data from Memorial on *enemies* suggest the latter were even more educated, with as much as 17.6% of them having at least a secondary education. In the rest of our paper we investigate whether the skill composition of camps captured by the share of *enemies* across camps may have led to positive education and growth outcomes.

### 3 DATA AND EMPIRICAL STRATEGY

The heart of our empirical investigation is a dataset on Gulags 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. Crucially, it provides information on the number of political prisoners, or *enemies*, per camp and per year, among other camp descriptors available on camp-specific [webpages](#).<sup>12</sup>

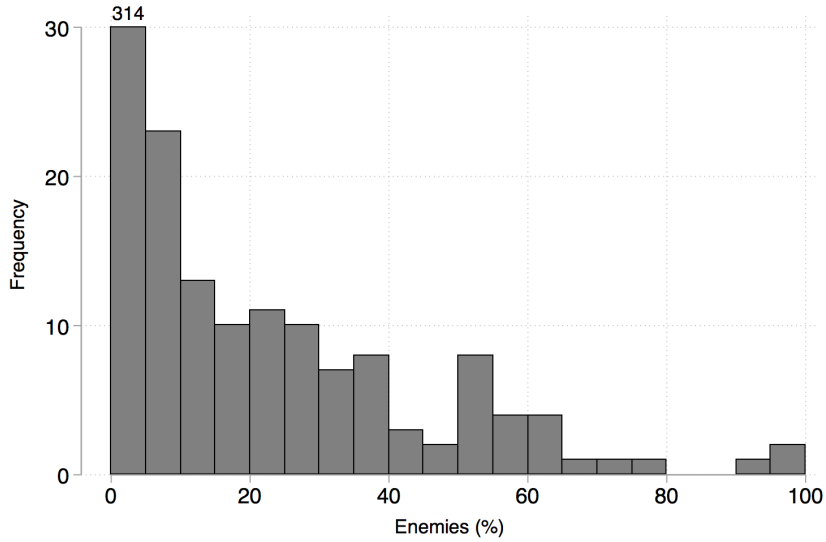
Our variable of interest is the enemy share of the Gulag’s prisoner population. The data provides yearly observations on total prisoners and *enemies* for the Gulag years but as we are interested in the geographic variation in *enemies* across Gulags, we take the median number of *enemies* and divide it by the median number of prisoners by camp. This gives us an indication of the Gulag’s skill composition during the whole period and is not driven by outlier years. It is also not affected by missing observations, i.e. camp-years with no information on *enemies*. We thus define our variable of interest, varying across Gulags  $g$ , as:

$$Enemies(\%)_g \equiv \frac{\text{Median number of Enemies}_g}{\text{Median number of Prisoners}_g}$$

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<sup>12</sup>The historical Memorial data on Gulags is also available from Tatiana Mikhailova [online](#) but this version does not contain information on *enemies*. While the memorial data does not provide information on the ethnicity of the prisoners, we know from [J. Arch Getty \(1993\)](#) that 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 while Belorussians, Tatars, Uzbeks, Jews, Germans, Kazakhs, Poles, Georgians, Armenians, Turkmen, Latvians, Finns accounted for the rest. If any ethnic group was at all over represented in camps, it was Russians.

Figure 4. The distribution of enemy shares across camps



Notes: The first column, including Gulags with zero *enemies*, adds up to 314 camps. Source: Memorial.

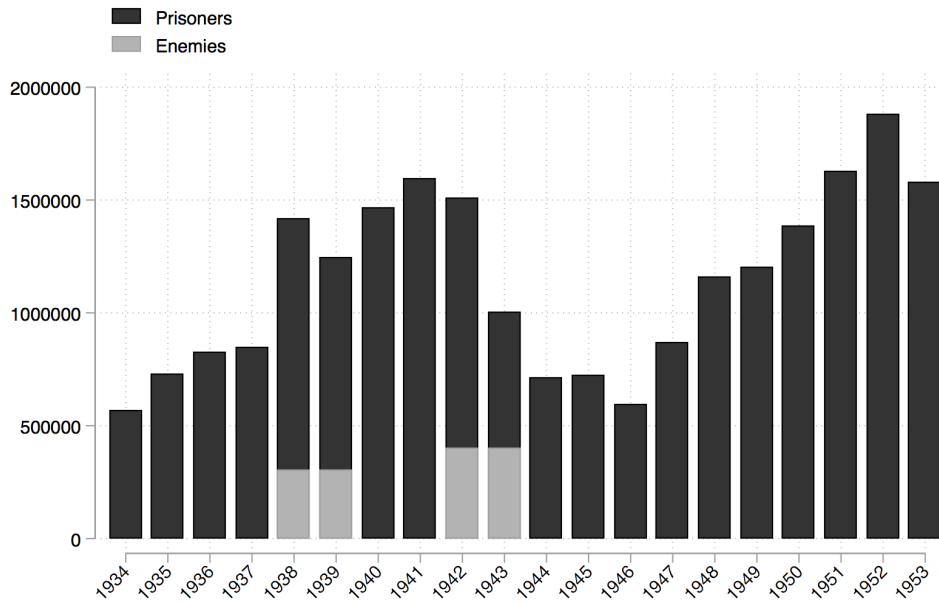
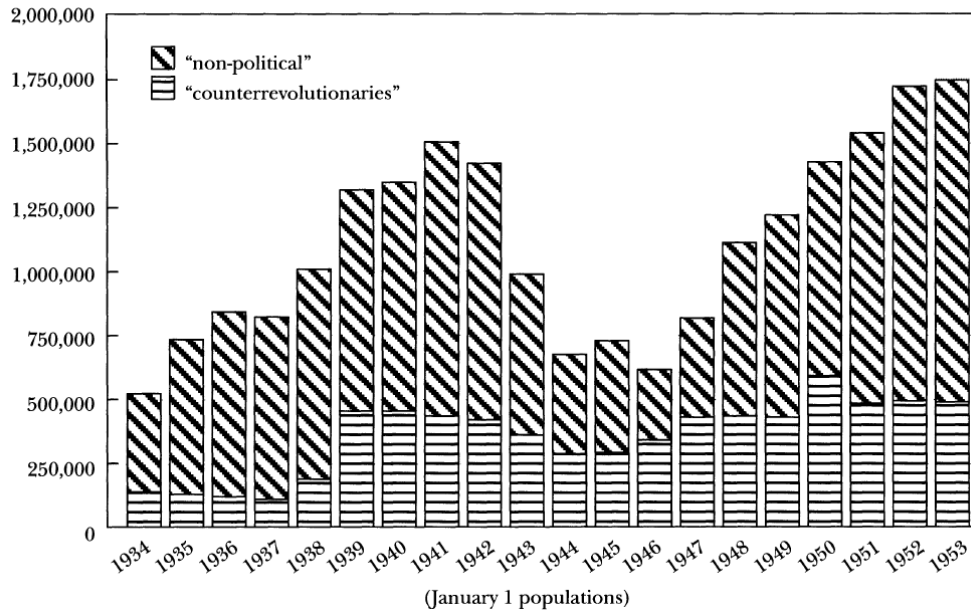
The distribution of *enemies (%)* across Gulags is depicted in Figure 4. Out of 423 camps, 314 have less than 5% *enemies* among their prisoner population. There is, however, a large number of camps with a large share of *enemies*. The average share is 8% and the standard deviation is 17 percentage points.

According to the aggregate data used in J. Arch Getty (1993) and shown in Figure 5, *enemies*, labeled here as counterrevolutionaries, amounted to around one third of the Gulag population. Our camp-level data, shown in the bottom panel of Figure 5, 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. This confirms that the data we use on the shares of *enemies* across Gulags, obtained using the years for which data is available, is in line with aggregate figures from previous studies.

For our analysis we will test the robustness of our results to two samples of Gulags.

Figure 5. The *enemy* share of Gulag prisoners

**FIGURE B: “Political” Crimes as Proportion of GULAG Population, 1934–1953**



Notes: The top panel is from [J. Arch Getty \(1993\)](#). The bottom panel graphs our estimates from Memorial data. The number of *enemies* is available for a large number of camps for the years 1938/1939 and 1942/1943 so we focus on this period to estimate aggregate numbers. For most camps we only have data on *enemies* for one of the two years in these two periods. We use numbers from the first year if available and numbers from the second year otherwise.



The baseline sample of 423 Gulags include all Gulags for which we have information on the number of *enemies* and total prisoners. The robustness sample includes a subset of 238 Gulags that existed for at least 2 years. This subset of camps has more information on the number of *enemies* across years and hence will allow us to check if our results are sensitive to the quality of our enemy data. Also, the reduced sample might be a less noisy a measure of enemy exposure as short-lived camps might not have the same persistence effects. We include estimates based on these two samples throughout our results section.

To examine the long-run effect of *enemies* on growth we merge spatially the camps' locations to information on economic activity and education from three datasets.

First we 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<sup>13</sup>, which we combine with data on population from the gridded population of the world from SEDAC.<sup>14</sup> Data on light intensity and population is for 2010. 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 6 illustrates how our spatial matching of night lights and camp locations allows us to check whether *enemies* are an important predictor of lights per capita across cities. It shows how in the far east of Russia for example, Gulags, whether they hosted *enemies* or not, are more often located near economic activity.

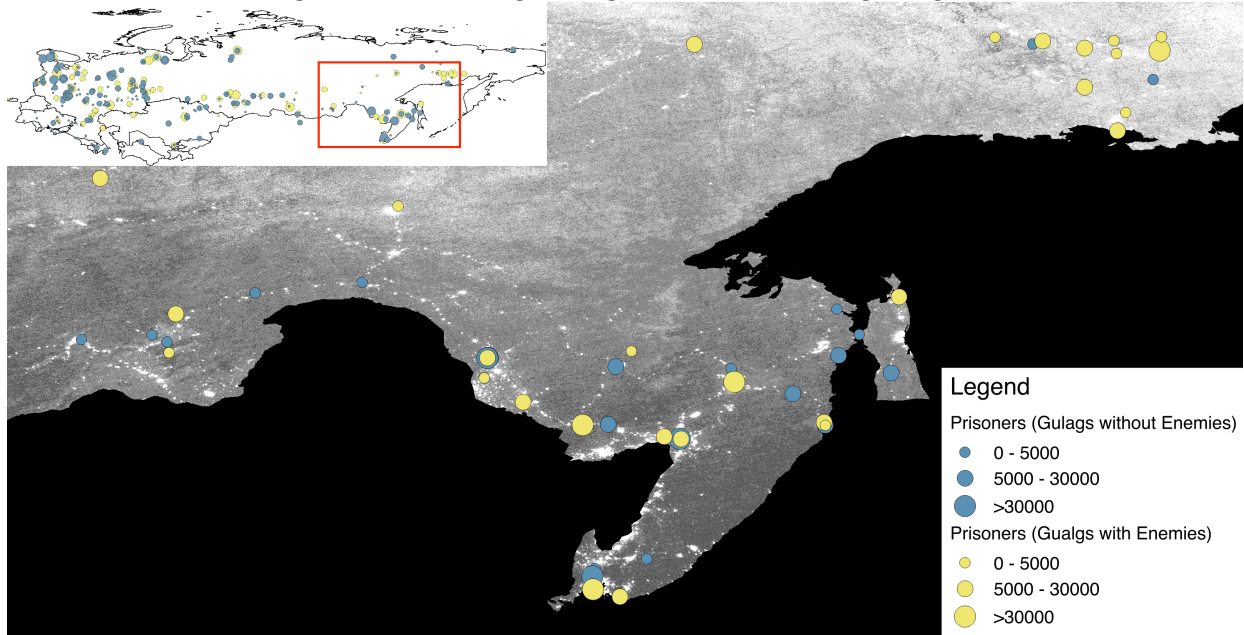
The other two datasets we use are firm and household surveys conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank. The firm-level

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<sup>13</sup>Light intensity is measured on a scale between 0 and 63.

<sup>14</sup>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 6. Matching Gulag locations with night lights



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 almost 16,000 enterprises in 30 countries, including 4,220 enterprises in 37 regions in Russia. It includes questions on a broad range of business environment topics including sales, costs, and employees. The household survey is the second Life in Transition survey (LiTS 2) which surveyed almost 39,000 households in 34 countries in 2010 to assess public attitudes, well-being and the impacts of economic and political change. We use BEEPS data to measure firm productivity as sales per employee or value-added per employee, average wages, and workforce education. We use LiTS data to measure household's education and corroborate the firm-level data. We thus examine the long-run effect of *enemies* on development by linking the location of Gulags to firms in 2014 and households in 2010 in all countries of the former Soviet Union. The geographic coverage of the firms and households which we were able to link to the location of Gulags (radius of 30km) is summarized in Table 2. The descriptives of the main outcome variables on education are summarized in Table 3.

Table 2: Gulags, firms, and households

	Number of Observations			Enemies (%)	
	Gulags (1)	Firms (2)	Households (3)	Mean (4)	SD (5)
Azerbaijan	4	248	240	0	0
Georgia	1	176	300	0	0
Kazakhstan	17	270	200	7	15
Kyrgyzstan	2	152	40	0	0
Russia	374	2397	398	8	17
Tajikistan	3	117	20	0	0
Ukraine	16	185	166	0	0
Uzbekistan	2	208	80	6	12
Sum	423	3753	1444		
Average				8	17

Notes: Gulags with insufficient information on location or economic activity have been excluded from the analysis. Only firms and households within a radius of 30km of a camp have been included in our analysis.

Table 3: Descriptive Statistics on Education

<b>variable</b>	<b>mean</b>	<b>sd</b>	<b>max</b>	<b>min</b>	<b>obs.</b>
Years of education (Firm Level)	12.37	2.18	20	0	985
>13 years education (Firm Level)	0.29	0.45	1	0	985
Tertiary education (Household Level)	0.33	0.46	1	0	824
Primary Education 1926 (Census)	0.35	0.14	0.71	0.04	92
Tertiary Education 1989 (Census)	0.09	0.03	0.21	0.04	92

Source: Calculations based on BEEPS, LiTS and Census data

Before investigating the legacy of the *enemies of the people* it is important to ask whether *enemies* were systematically sent to some specific regions or industries. Indeed *enemies* might have been allocated to more productive regions with better soil, or to skill-intensive or capital-intensive activities. They also might have been sent to the larger camps benefitting from agglomeration economies and higher productivity.

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. Both authors also 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 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-economic position.

We nonetheless check whether Gulags with *enemies of the people* differ statistically from other Gulags across geographic or industrial characteristics. The relevant summary statistics are in Table 4. As we explain above, we use two samples of Gulags. The *All Gulags* sample includes the 423 camps for which we have at least one year of enemy data. The *> 2 years* sample includes only the Gulags that were active for at least 2 years for which we have more years of data. Across economic activities, we find *enemy* Gulags more likely to focus on agriculture and the food industry. Interestingly, enemy Gulags are less likely to focus on research or energy. Across resource extraction sectors we find no statistical difference between enemy and non-enemy Gulags except for gold, which is more prevalent in enemy Gulags. Across climate and land characteristics, we find enemy Gulags to be located further East on average, to be colder and drier in winter, and to have inferior soil (higher numbers for workability and rooting). *Enemy* Gulags are also more likely to be further away from densely populated urban areas. To sum up, *enemies* were more likely to be sent to less populated

locations with worse climatic conditions and be employed in sectors such as agriculture and food processing. 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 sources of variation in our regressions so that we identify as precisely as possible the effect of *enemies*' skills.

In Table 5 we check if the share of *enemies* in a camp is conditionally correlated with any of these characteristics. We run a regressions with all variables included on the right at the same time to estimate conditional relationships:

$$Enemies(\%)_g = c + X'_g\gamma + e_g$$

We run both a standard cross-section OLS with Conley standard errors (30km) and a weighted regression in which individual observations are weighted by the median number of prisoners by camp. We find that conditional on other variables, the share of *enemies* increases significantly as we move north and away from urban centers. We also find the share of *enemies* to be higher in Gulags with a food industry and lower in Gulags with a research industry. These slight differences across Gulags do not suggest any type of systematic allocation of *enemies* that might affect their legacy. The allocation of *enemies* across Gulags can hence be thought of as a natural experiment that allows us to identify the effect of skill persistence on growth.

To examine the differences in lights per capita across 30km-radius areas around Gulags with different shares of *enemies*, we start by estimating the following model at the Gulag level:

$$(1) \quad Lights_g = \beta_1 Enemies(\%)_g + X'_g\delta + \epsilon_g,$$

where  $Lights_g$  is night light intensity within a 30km radius around Gulag  $g$ ,  $Enemies(\%)_g$

Table 4: Gulag characteristics for the period 1927-1953

	All Gulags		p-value (1)=(2) (3)	Gulags (> 2 years)		p-value (4)=(5) (6)
	No Enemies (1)	Enemies (2)		No Enemies (4)	Enemies (5)	
Enemies ('000)	0	3.8	0.00	0	4.3	0.00
Share Enemies (%)	0	23	0.00	0	24	0.00
Population						
Prisoners ('000)	8	12	0.01	12	14	0.29
Population Den.	25	13	0.01	23	12	0.00
Urbanisation (%)	25	19	0.04	23	19	0.05
Climate and Land						
Longitude	64	79	0.00	66	78	0.03
Latitude	55	56	0.22	55	56	0.54
Elevation	269	305	0.38	255	305	0.22
Ruggedness	97	106	0.47	90	110	0.25
Rooting	1.7	2.4	0.00	1.78	2.23	0.05
Workability	1.7	2.3	0.00	1.81	2.25	0.05
Precip. (Jan.)	30	26	0.00	29	26	0.03
Precip. (July)	75	75	0.78	75	76	0.63
Temp. (Jan.)	-14	-18	0.00	-15	-18	0.00
Temp. (July)	18	17	0.08	17	17	0.26
Resource Extraction						
Calciumph. (%)	1	2	0.43	1	3	0.28
Coal (%)	4	6	0.44	7	7	0.92
Gold (%)	2	6	0.05	3	8	0.06
Iron (%)	1	1	0.40	1	2	0.52
Stone (%)	11	9	0.44	16	9	0.09
Economic Activity						
Agriculture (%)	14	38	0.00	21	43	0.00
Forestry (%)	28	45	0.00	45	49	0.49
Infrastructure (%)	58	66	0.09	60	67	0.23
Metal (%)	4	6	0.20	5	8	0.34
Material (%)	18	24	0.09	29	27	0.62
Mechanical (%)	3	6	0.15	6	7	0.67
Food Industry (%)	7	20	0.00	11	25	0.01
Energy (%)	7	6	0.86	6	5	0.68
Research (%)	5	3	0.36	6	3	0.42
Services (%)	13	18	0.16	19	20	0.90
Number of Gulags	284	139		124	114	

Note: Column 3 and 6 display the p-value of a mean comparison test of columns 1 and 2 and 4 and 5 respectively. Note that 34 Gulags are located in Moscow. Excluding these does not significantly affect our main conclusions.

Table 5: The correlates of *enemies*  
 Dependent variable: Share of *enemies* among prisoners

	All Gulags		Gulags (> 2 years)	
	Conley50km (1)	Weighted (2)	Conley50km (3)	Weighted (4)
Prisoners ('000)	0.001*	0.000	0.001	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Population Den.	0.000	0.001	0.001	0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Urbanisation	-0.115**	-0.223**	-0.184*	-0.329**
	(0.056)	(0.104)	(0.107)	(0.162)
Longitude	0.001	0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)
Latitude	0.007**	0.007	0.008**	0.009
	(0.003)	(0.004)	(0.003)	(0.006)
Elevation	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Ruggedness	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Rooting	-0.014	-0.169	-0.079	-0.270
	(0.100)	(0.167)	(0.148)	(0.167)
Workability	0.008	0.167	0.072	0.262
	(0.102)	(0.167)	(0.150)	(0.167)
Precip. (Jan.)	-0.000	-0.001	-0.001	-0.004
	(0.001)	(0.001)	(0.001)	(0.003)
Precip. (July)	-0.000	-0.001	-0.000	-0.001*
	(0.000)	(0.001)	(0.000)	(0.001)
Temp. (Jan.)	-0.002	-0.001	-0.003	0.000
	(0.002)	(0.004)	(0.003)	(0.006)
Temp. (July)	0.008**	0.006	0.009**	0.005
	(0.004)	(0.006)	(0.004)	(0.008)
Calciumph.	-0.114	-0.018	-0.021	0.052
	(0.070)	(0.093)	(0.080)	(0.120)
Coal	-0.019	0.012	-0.034	-0.030
	(0.034)	(0.062)	(0.041)	(0.069)
Gold	0.013	0.027	0.023	0.046
	(0.034)	(0.078)	(0.048)	(0.085)
Iron	-0.028	-0.086	-0.030	-0.116
	(0.050)	(0.087)	(0.062)	(0.103)
Stone	-0.018	-0.082***	-0.033	-0.109**
	(0.021)	(0.031)	(0.030)	(0.044)
Agriculture	0.022	0.037	0.030	0.025
	(0.020)	(0.032)	(0.026)	(0.038)
Forestry	0.016	0.056*	0.004	0.044
	(0.020)	(0.033)	(0.030)	(0.039)
Infrastructure	0.013	0.034	0.010	0.034
	(0.014)	(0.026)	(0.022)	(0.036)
Metal	0.034	0.083	0.028	0.090
	(0.035)	(0.050)	(0.043)	(0.063)
Mechanical	0.025	0.010	0.012	0.012
	(0.040)	(0.044)	(0.049)	(0.050)
Material	-0.006	-0.008	-0.027	-0.018
	(0.020)	(0.035)	(0.025)	(0.043)
Food Industry	0.077**	0.070*	0.103***	0.075*
	(0.031)	(0.039)	(0.035)	(0.043)
Energy	-0.026	-0.043	-0.039	-0.064
	(0.022)	(0.040)	(0.040)	(0.057)
Research	-0.048**	-0.088**	-0.051	-0.072*
	(0.023)	(0.035)	(0.040)	(0.042)
Service	0.027	0.020	0.033	0.007
	(0.028)	(0.039)	(0.043)	(0.051)
N	423	423	238	238
R-sq	0.30	0.26	0.40	0.30

Note: Conley standard errors are in parentheses : \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Mean and Median of LHS variable are 0.08 and 0 respectively.

is the share of *enemies* among all prisoners in Gulag  $g$ ; and  $X_g$  is a set of control variables which include fixed effects capturing Gulags' economic activities, the number of prisoners in the Gulag, as well as location specific variables, i.e. country fixed effects, latitude, longitude, ruggedness, and elevation. We account for spatial correlation across nearby Gulags using Conley standard errors for  $\epsilon_g$ .

To examine the differences in performance and education outcomes across firms and households near Gulags with different shares of *enemies*, we estimate the following model at the firm or household level:

$$(2) \quad Y_i = \beta_1 \text{Enemies}(\%)_i + X_i' \delta + \epsilon_i,$$

where  $Y_i$  is a measure of labor productivity or human capital reported by firm or household  $i$ ,  $\text{Enemies}(\%)_i$  is the share of *enemies* in Gulags within 30km of firm or household  $i$ ; and  $X_i$  includes location specific controls, i.e. country fixed effects, latitude, longitude, ruggedness, elevation, as well as fixed effects capturing the firms' industries or the occupation of household heads as well as gender, age, and age squared. It also includes the number of prisoners in Gulags within 30km of firm or household  $i$ , and fixed effects for the Gulags' economic activities. We cluster the error term,  $\epsilon_i$  by geographic clusters of Gulag exposure.

To measure labor productivity we use the firms' value added per employee but also a measure of revenues per employee which allows us to include the entire sample of firms, as some firms drop out when we compute value added due to missing data on inputs. It is worth noting that revenues per employee is a common metric used by investors and industry analysts to understand how efficiently a firm uses its employees. We also compute the firms' average wages by dividing total labor costs by the number of employees. Finally the firm data also contains information on the average years of education of production employees which allows us to measure education in years and also as a tertiary education dummy, which we define as equal to 1 if education years is above 13, and zero otherwise. We also



use household survey data on the tertiary education of household heads to check for the robustness of the effect of *enemies* on education outcomes.

## 4 RESULTS

### 4.1 BASELINE

The estimates of the effect of *enemies* (%) on lights per capita are in Table 6. In our benchmark specification which includes all controls and fixed effects (Panel A, column 2), we find that a one standard deviation increase in *Enemies* (%) increases lights per capita by 15% ( $e^{.819 \cdot .17}$ ). Results are twice as big in a specification without geographic controls or Gulag activity indicators (column 1). In column (3) we focus only on Russia, where almost 90% of Gulags were located, and find similar results. Results in columns 4 to 6 replicate columns 1 to 3 but focusing on our restrained sample of Gulags, i.e. those active for more than two years. While the number of observations falls by almost half, the results are of the same magnitude as in the full-Gulag sample specifications. In the bottom panel (Panel B), we include robustness checks where we measure enemy exposure using a dummy variable equal to one if *enemies* were sent to that Gulag, and zero otherwise, instead of the actual share of *enemies*. The coefficients in these specifications are positive though not statistically significant at the 90% level. Nonetheless they are in line with our baseline. Column (2) in Panel B suggests that in Gulags with *enemies* light intensity per capita is 14% higher. It is also worth noting that Gulags that did not survive, i.e. those that became pitch black on the lights map, have a lower share of *enemies*.

Our estimates of the effect of *Enemies* (%) on firm-level revenues per employee, value added per employee, average wages, and employee education are in Tables 7, 8, 9, 10, and 11. We find that a one standard deviation increase in enemy share, i.e. a 17 percentage point increase, increases revenues per employee by 26%, value added per employee by 22%,

Table 6: Dependent Variable: Lights per capita (ln)

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	1.559*** (0.470)	0.819** (0.402)	0.925** (0.411)	1.252** (0.501)	0.728* (0.437)	0.925* (0.506)
N	423	423	386	238	238	217
R-sq	0.34	0.44	0.41	0.31	0.43	0.40
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.296* (0.178)	0.141 (0.162)	0.163 (0.171)	0.090 (0.210)	0.030 (0.189)	0.079 (0.199)
N	423	423	386	238	238	217
R-sq	0.33	0.43	0.41	0.29	0.42	0.39
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Conley standard errors in parenthesis, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country fixed effects as well as the the total number of prisoners. In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

average wages by 14%, years of education by 3 months, and the probability to have a tertiary education by 10 percentage points. The statistical significance of these effects is robust across specifications except for the wage regressions, where we obtain less precise though still positive estimates.

In Table 12 we confirm the effect of *enemies* on the areas' share of tertiary educated people using household survey data from LiTS. Here the industry dummies are occupation dummies but the specification is similar otherwise. We find robust positive effects of *enemies* on the probability of a nearby household's head to have a tertiary education. In our baseline, a 17 percentage point increase in enemy share increases the probability of being tertiary educated by 6 percentage points. Focusing only on Russia suggests a larger effect. Here a similar increase in *enemies* increases the the probability of being tertiary educated by 13.5 percentage points.

These 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 levels of labor productivity and pay higher wages to more educated workers. This is in line with our conjecture that the skills transferred by forcedly displaced *enemies* do indeed matter in explaining prosperity across regions of the ex-Soviet Union.

## 4.2 ROBUSTNESS TO CENSUS DATA

As a further robustness check on the legacy of *enemies* of the people on the areas average education levels, we estimate the effects of *enemies* on the share of tertiary educated in 1989, using data from the last Soviet census at the regional level, i.e. across 92 administrative units known as oblasts. To aggregate our enemy data at the oblast level we use *enemies* as a share of the oblast's 1926 population (before most of the forced resettlements), to which we add the camp prisoner population. This allows us to measure how big a shock the *enemies'* relocation was relative to the initial oblast's population as well as the camp's populations.

Table 7: Dependent Variable: Revenues per employee (ln)

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.990** (0.471)	1.373*** (0.407)	1.864*** (0.465)	1.117** (0.486)	1.824*** (0.419)	2.189*** (0.487)
N	2645	2645	1735	2323	2323	1614
R-sq	0.66	0.67	0.16	0.62	0.62	0.16
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.355*** (0.098)	0.308*** (0.069)	0.305*** (0.076)	0.407*** (0.103)	0.357*** (0.066)	0.316*** (0.080)
N	2645	2645	1735	2323	2323	1614
R-sq	0.67	0.67	0.16	0.62	0.63	0.16
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country and industry fixed effects as well as the the number of prisoners (ln). In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

Table 8: Dependent Variable: Value Added per employee (ln)

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.598 (0.444)	1.176** (0.472)	1.633*** (0.542)	0.656 (0.460)	1.560*** (0.513)	1.985*** (0.557)
N	1848	1848	1337	1657	1657	1255
R-sq	0.67	0.67	0.25	0.61	0.62	0.26
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.296*** (0.110)	0.222** (0.096)	0.240** (0.100)	0.330*** (0.118)	0.254*** (0.098)	0.249** (0.104)
N	1848	1848	1337	1657	1657	1255
R-sq	0.67	0.67	0.25	0.62	0.62	0.25
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country and industry fixed effects as well as the the number of prisoners (ln). In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

Table 9: Dependent Variable: Average wages (ln)

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.236	0.762*	0.960*	0.439	0.600	0.699
	(0.480)	(0.422)	(0.522)	(0.621)	(0.452)	(0.574)
N	2588	2588	1531	1723	1723	1141
R-sq	0.74	0.75	0.09	0.64	0.65	0.10
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.233*	0.087	0.150	0.270**	0.106	0.103
	(0.120)	(0.090)	(0.107)	(0.137)	(0.099)	(0.126)
N	2588	2588	1531	1723	1723	1141
R-sq	0.74	0.75	0.09	0.64	0.65	0.10
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country and industry fixed effects as well as the the number of prisoners (ln)]. In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

Table 10: Dependent Variable: Years of Education

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.931 (0.781)	1.595* (0.933)	3.466*** (1.030)	1.108 (0.790)	1.676 (1.139)	3.986*** (1.030)
N	985	985	549	856	856	520
R-sq	0.13	0.15	0.09	0.11	0.12	0.10
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.572*** (0.199)	0.597*** (0.173)	0.728*** (0.180)	0.635*** (0.213)	0.644*** (0.195)	0.775*** (0.183)
N	985	985	549	856	856	520
R-sq	0.14	0.15	0.09	0.12	0.13	0.10
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country and industry fixed effects as well as the the number of prisoners (ln). In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

Table 11: Dependent Variable: &gt; 13 Years of Education Dummy

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.321 (0.211)	0.623*** (0.202)	0.854** (0.342)	0.417* (0.229)	0.623** (0.270)	1.012*** (0.367)
N	985	985	549	856	856	520
R-sq	0.15	0.17	0.11	0.10	0.13	0.10
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.087 (0.055)	0.115*** (0.044)	0.145*** (0.055)	0.116** (0.059)	0.126*** (0.048)	0.151*** (0.057)
N	985	985	549	856	856	520
R-sq	0.15	0.17	0.10	0.11	0.13	0.09
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country and industry fixed effects as well as the the number of prisoners (ln). In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.



Table 12: Dependent Variable: Tertiary Education (Dummy=1)

Panel A: Share of Enemies of the People						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.585*	0.350	0.798**	0.778*	0.852**	1.800***
	(0.337)	(0.252)	(0.313)	(0.404)	(0.413)	(0.340)
N	822	822	224	573	573	198
R-sq	0.35	0.39	0.52	0.40	0.44	0.55
Panel B: Dummy Variable						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (=1)	0.182***	0.131**	0.079	0.201***	0.142**	0.102
	(0.061)	(0.059)	(0.081)	(0.060)	(0.070)	(0.093)
N	822	822	224	573	573	198
R-sq	0.36	0.39	0.51	0.40	0.44	0.52
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Standard errors in parenthesis clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In column 1-3 we use the full sample of Gulags. In column 4-6 we use only Gulags which remained active for more than 2 years. In column 1 and 4 we present the results with country fixed and occupation fixed effects, gender, age and age squared of the household head as well as the the number of prisoners (ln). In column 2 and 5 we control for additional geographical variables as well as dummies indicating the main economic activities of Gulags. In column 3 and 6 we focus only on Russia, using the full-control specification of column 2 and 5.

We also control for the share of primary educated people in 1926. The logic here is that the relocation of *enemies* altered the allocation of skills, but not necessarily in oblasts with large and educated population. We thus also interact *enemies* with the share of primary educated in 1926, assuming that enemy relocations would matter most where they altered the skill level composition.

Results in Table 13 show that *enemies* do matter a lot in oblasts that had a low share of primary educated populace in 1926. This is illustrated in Figure 7. In regions with few primary-educated people in 1926, where around 15% of people had a primary education, we find a 17 percentage point increase in the share of *enemies* to increase the probability of being tertiary educated in 1989 by 3.4 percentage points ( $.2 \cdot 17$ ). This is in line with the firm-level and household-level evidence.

These results are also illustrated in the maps in Figure 8. The maps show how the distribution of educated people, captured by the share of primary educated in 1926 and the share of tertiary educated in 1989 (secondary education was compulsory in the Soviet Union), changed from 1926 to 1989. It also suggests that the changes are correlated with the *enemies* resettlements, notably beyond the Ural Mountains in Siberia. These maps also highlight the loss of human capital in the region around Moscow and Saint Petersburg, maybe as a consequence of it being a source rather than a destination of *enemies* of the people.

### 4.3 INDUSTRY-KNOWLEDGE TRANSMISSION

To investigate further the possible intergenerational transfers of industry specific knowledge within locations, we compare the effect of *enemies* on firm performance in firms active in the *same* sector as a Gulag within 30km was active in, to that on firms in *other* sectors in the same area. This allows us to test if the effect of *enemies*' skill persistence is stronger in Gulag-era industries, i.e. if the transfers of knowledge are mostly industry specific. These

Table 13: Tertiary Education in 1989

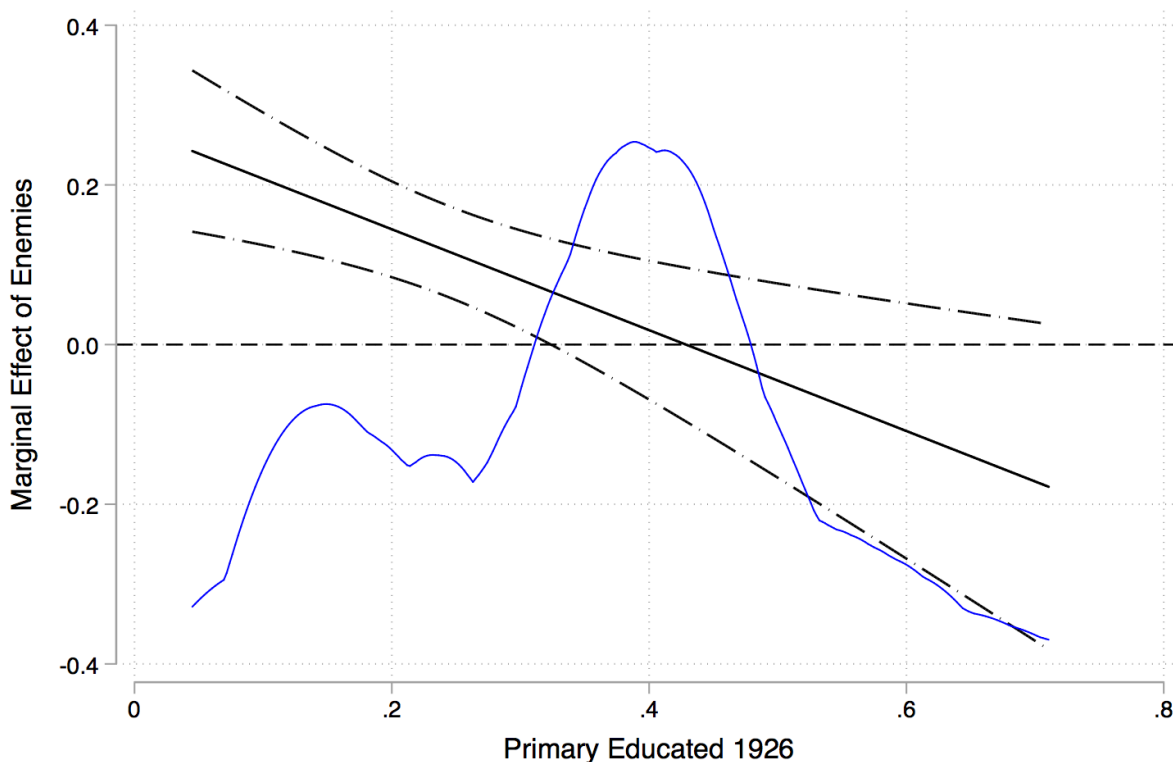
	(1)	(2)	(3)
	Tertiary 1989 (%)	Tertiary 1989 (%)	Tertiary 1989 (%)
Primary 1926 (%)	0.097*** (0.023)	0.096*** (0.023)	0.105*** (0.024)
Enemies (%)		0.061 (0.069)	0.271*** (0.059)
Interaction			-0.631*** (0.211)
N	92	92	92
R-sq	0.27	0.28	0.30

Notes: Robust standard errors in parenthesis with \* standing for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. In every regression we control for the population in 1989 (ln).

Table 14: Firm industries matched to Gulag-era industries

Firm	Gulag
Wood	Forestry and Woodworking
Paper & Paper products	Forestry and Woodworking
Food	Light and Food Manufacturing
Textiles& Garments	Light and Food Manufacturing
Tanning & Leather	Light and Food Manufacturing
Machinery & Equipment	Machinery & Equipment
Basic metals	Metallurgy & Coal
Fabricated metal products	Metallurgy & Coal
Construction	Construction

Figure 7. The effect of enemies on 1989 tertiary education



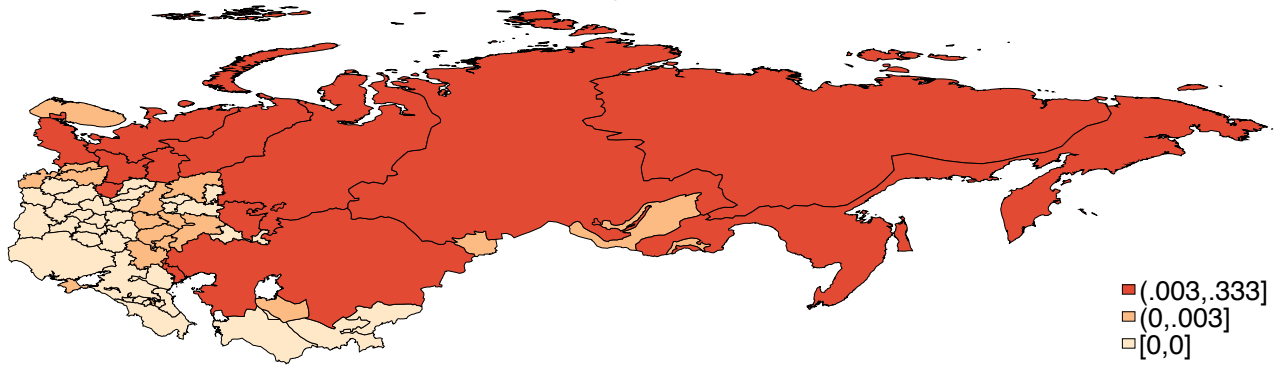
The figure illustrates the effect of *enemies* on the regions' share of tertiary educated in 1989. The black solid line is the estimate of the effect while the dashed lines capture the 95% confidence interval. The solid blue line is the density estimate of the distribution of primary education in 1926. The figure indicates a positive and statistically significant effect of *enemies* but only when the share of primary educated in 1926 is below 32%. This figure is based on estimates in column (3) of Table 13.

transfers may be due to industry knowledge passed on across colleagues and then learned through parents, i.e. *dinner table human capital*. We generate a dummy equal to 1 if the firm is active in an industry which was also a nearby Gulag-era industry, and zero otherwise. The matched industries are summarized in Table 14. We then estimate our baseline specification to which we add an interaction of *enemies* with the the Gulag-era industry dummy.

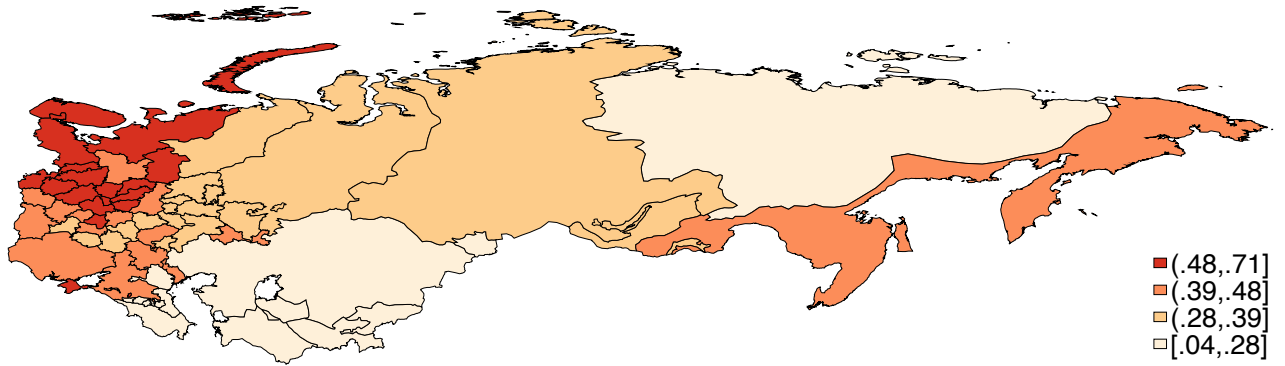
Results are in Table 15. We find a positive and significant coefficient on the interaction of *Enemies (%)* and the Gulag-era dummy, suggesting that the effect of *enemies* on firm

Figure 8

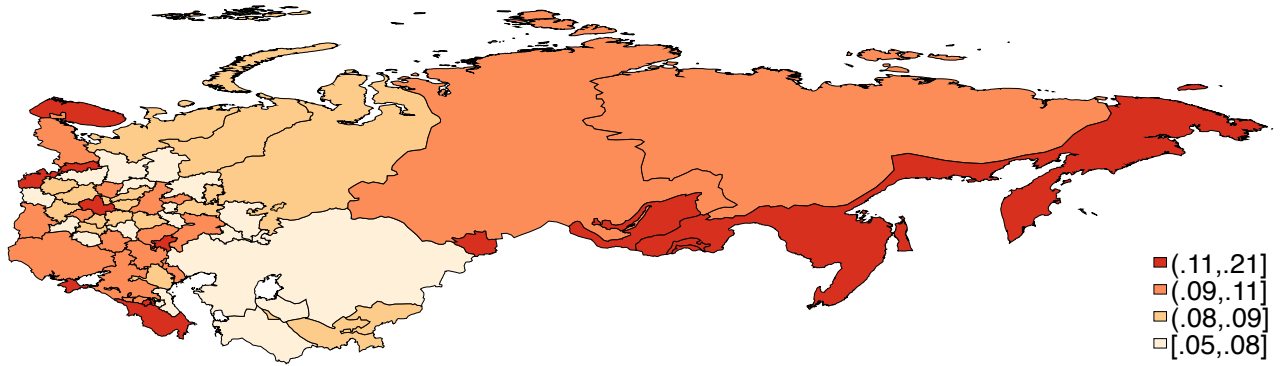
Share of enemies in Gulags relative to population in 1926



Share of population with primary education 1926



Share of population with tertiary education 1989



productivity, measured here in revenues per employee and value added per employee, is even larger for firms in Gulag-era industries. Our baseline estimates (column 2 of Panels A and B) suggest that a one standard deviation in the share of *enemies* (17 percentage points) increases revenues per employee by 49% ( $e^{(1.102+1.261)*.17}$ ) and value added per employee by 39% if the firm is active in a nearby Gulag-era industry. For firms in different industries the effects on both variables are half the size, i.e. around 20%. The effect of *enemies* on firm productivity is thus twice as large for firms in a Gulag-era industry. This suggests that the intergenerational transmission of skills is strongest within specific industries and hence that the *enemies* effect might operate via the passing of industry knowledge across generations.<sup>15</sup>

## 5 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 policy on local development outcomes. We first highlight the prevalence of *enemies of the people* as Gulag prisoners. *Enemies* were the educated elite, targeted 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, as captured by night lights per capita, and are home to firms with higher levels of labor productivity, that pay higher wages to more educated workers. We show that these productivity effects are strongest for firms in sectors that existed in nearby camps during the Gulag-era, hereby highlighting the transmission not only of human capital but also of industry-specific knowledge. Our paper can thus be seen as a natural experiment that identifies the long-run persistence of skills and its effect on growth. But most importantly

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<sup>15</sup>We find that the effect of *enemies* on wages however does not differ significantly across industries. This may be due to wages equalizing across industries within locations.

Table 15: The long-run effect of skills within industry

Panel A: Revenues per employee						
	All Gulags			Gulags (>2 years)		
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.714 (0.454)	1.102*** (0.395)	1.714*** (0.321)	0.862* (0.478)	1.566*** (0.350)	2.047*** (0.325)
Interaction	1.224*** (0.318)	1.261*** (0.359)	0.815*** (0.213)	1.161*** (0.280)	1.232*** (0.340)	0.776*** (0.121)
N	2645	2645	1735	2323	2323	1614
R-sq	0.67	0.67	0.16	0.62	0.63	0.16
Panel B: Value added per employee						
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.518 (0.349)	1.099*** (0.200)	1.580*** (0.342)	0.588 (0.365)	1.488*** (0.270)	1.939*** (0.372)
Interaction	0.761*** (0.261)	0.843** (0.342)	0.594*** (0.123)	0.658* (0.352)	0.759** (0.385)	0.526*** (0.159)
N	1996	1996	1367	1774	1774	1283
R-sq	0.68	0.69	0.25	0.63	0.63	0.25
Panel C: Wages						
	(1)	(2)	(3)	(4)	(5)	(6)
Enemies (%)	0.211 (0.464)	0.744 (0.456)	1.023* (0.548)	0.451 (0.506)	1.072** (0.467)	1.227* (0.630)
Interaction	0.001 (0.500)	0.105 (0.550)	-0.081 (0.498)	-0.055 (0.545)	-0.111 (0.508)	-0.181 (0.465)
N	2588	2588	1531	2189	2189	1440
R-sq	0.74	0.75	0.05	0.66	0.67	0.10
Total prisoners	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Geography	N	Y	Y	N	Y	Y
Gulag activity	N	Y	Y	N	Y	Y

Notes: Interaction is that between *Enemies (%)* and a dummy equal to 1 if the firm is active in an industry which was also a nearby Gulag-era industry. Standard errors in parenthesis are clustered by geographic exposure to *enemies*, and \* stands for statistical significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% percent level. For more details see notes in Table 8.

it highlights how atrocious acts by mad individuals, here for example the destruction of human capital during Soviet times, can shape the development path of countries over many generations.



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