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Abstract

This paper employs newly-collected historical data from Finland to present evidence of historically contingent, long-run consequences of a famine. We document high levels of local inequality in terms of income and land distribution until a violent uprising in 1918. These inequalities partly originated from the famine of 1866-1868 which increased the concentration of land and power to large landowners. We further show that regions with more exposure to the famine had more labor coercion by the early 1900s. These inner tensions led to violent conflict following the Russian Revolution and the Finnish independence from the Russian Empire. Using micro-data on all the casualties of the 1918 Finnish Civil War, we demonstrate that the famine plausibly contributed to local insurgency participation through these factors. Although unsuccessful in replacing the government, the insurgency led to significant policy changes, including radical land redistribution and a full extension of the franchise. These national reforms led to a more drastic shift towards equality in locations more affected by the famine with greater pre-conflict inequality. Our findings highlight how historical shocks can have large and long-lasting, but not straightforward impacts. (JEL: D63, D74, H11, J47, P16)

1. Introduction

Famines have caused great human suffering and societal turmoil (Ó'Gráda, 2009; Sen, 1981), but the persistent mark they may leave on the equality of societies is less well understood. While Scheidel (2018) posits that famines have generally not been significant enough to have major impacts on inequality, there has been a long-running debate on the importance of labor shortages on local power relations and labor coercion (Acemoglu and Wolitzky, 2011; Brenner, 1976).

This paper studies the consequences of a famine on inequality, elite power, and conflict in Finland which, despite being one of the most equal countries today, still had

extremely high economic inequality in the early 1900s.¹ In particular, we explore the repercussions of the *great hunger years* of 1866-1868—a devastating famine during which 8% of the Finnish population perished—and present evidence that this shock set in motion a long-running “tug of war” between local elites and non-elites. The primary purpose of our paper is to trace out historically contingent long-run effects of the famine and document how it contributed to inner conflict and the rise and fall of local inequality.

We begin our empirical analysis by studying the unequalizing effects of the famine using a newly-collected historical dataset that spans over seven decades. We find that municipalities with a greater exposure to the famine of 1866-1868 had greater inequality in the five decades that followed, as measured by the income and land ownership Gini coefficients. To provide exogenous variation in famine exposure, we use information on local crop failures in 1867. Importantly, we find that differentially exposed municipalities had similar pre-famine characteristics, which gives us confidence in our estimation.

At least two factors were behind the developments in famine-struck municipalities. Following the famine, land ownership became more concentrated due to speculation and farm foreclosures, and this pattern persisted into the early 20th century (Gylling, 1917). The increased concentration of land ownership plausibly concentrated local power in the hands of a few large landowners enabling them to pay lower wages

1. The Finnish Gini coefficient in the early 1900s was around 0.6 which is on par with inequality in the most unequal African and Latin American countries today (Roikonen and Heikkinen, 2020).

and increase coercive tenant farming contracts.² Consistent with these mechanisms, we show that locations that were more affected by the famine had considerably more tenant farmers and lower agricultural wages in the early 1900s than less exposed areas. These labor market impacts further exacerbated the widening inequalities of the time.

Fifty years after the famine, the Russian Revolution of 1917 paved the path for Finnish independence from the empire, but it also led to a crisis of legitimate state power within the newly-independent country. Subsequently, the prevailing social disparities triggered a violent backlash against the elites. The violence escalated into a civil war between socialist insurgents and conservative Senate-led forces in 1918. We document that participation in the insurgency was more substantial in municipalities that were more affected by the famine half a century earlier, i.e., in places that had greater pre-war inequality and resulting animosity between laborers and landowning elites.³

2. In tally with Brenner (1976) and Acemoglu and Wolitzky (2011), having more tenant farmers instead of wage labor was logical due to upward pressure on wages. Tenant farmers usually paid their rent in workdays, and the number of days was generally at the landowner's discretion (Peltonen, 1990, 1992). As the landowners could ask the tenant to perform tasks at will, there was less demand for wage labor. However, it is plausible that even without increasing labor coercion, the worse outcomes were due to fewer landowners offering less favorable terms (Banerjee et al., 2002).

3. To proxy participation in the insurgency, we use detailed information on the universe of civil war casualties. Of course, participation in the civil war captures an extreme form of expressing discontent. We complement our analysis by further documenting evidence of non-violent resentment in the more affected municipalities before the civil war. Municipalities that were hit harder by the famine voted more for

We conclude our exploration by studying the development of local inequality and redistribution after the civil war. Despite the victory of the government forces, an array of institutional and redistributive reforms occurred to appease the societal inequalities after 1918. Although these reforms were enacted at the national level, they had a more pronounced impact on locations more exposed to the famine and with resulting greater pre-conflict inequality. We show that these more exposed locations experienced a greater shift toward equity after the conflict.

According to our results, a key factor behind the sudden decrease in local inequality was the comprehensive land reform put in place shortly after the conflict which especially affected the locations with highly concentrated land ownership. A major franchise reform arguably played a critical role in keeping the peace as well. Merely a year after the conflict, municipalities held their first fully democratic elections with equal voting rights. Prior to this, the number of votes that each voter could cast depended on the amount of taxes paid, which further accumulated political power to the economic elite. We find that policies reacted to the larger and poorer electorate: municipal spending in health and welfare increased more in locations with higher pre-conflict inequality and greater famine exposure fifty years before.

Figure 1 provides a graphical summary of our main findings. Panel A illustrates the positive impact of experiencing a crop failure in 1867 on economic inequality in 1904, after controlling for various geographical and population variables. Panel B

the Social Democratic Party—the largest opposition party—and had more workers' association members before the onset of the Finnish Civil War.

then shows that the same shock affected insurgency participation in the Finnish Civil War in 1918. While the famine increased pre-civil war inequality and insurgency participation, municipalities that were hit by a crop failure and unaffected localities had similar levels of economic inequality already twenty years after the Civil War. Panel C demonstrates how the municipalities that experienced crop failures also saw the most significant inequality decrease between 1904 and 1938.

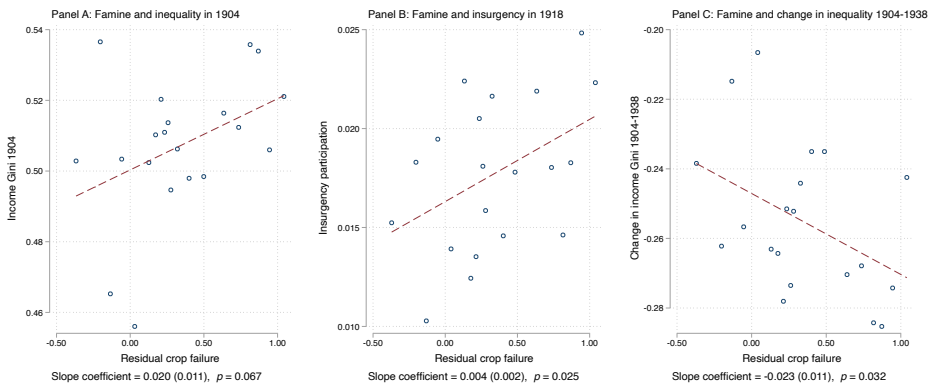


FIGURE 1. Effect of crop failure on inequality and civil war participation. The figures illustrate the effect of crop failure on economic inequality in 1904 (Panel A), insurgency participation in 1918 (Panel B), and change in economic inequality between 1904 and 1938 (Panel C), after netting out baseline controls (latitude, longitude, log distance from Russia, log suitability for rye, log suitability for barley, log elevation, and log population in 1865) and region fixed effects. For further information on our data, see Section 3. Robust standard errors of the slope coefficients are reported in parentheses. Dots are binned averages computed within twenty bins with an equal number of observations.

Our findings speak to the burgeoning literature on historical persistence in economic and political development (Arroyo Abad and Maurer, 2021; Cantoni and Yuchtman, 2021; Cirone and Pepinsky, 2022). More specifically, we present evidence of the consequences of famines over time (Chen and Yang, 2019; Meng et al., 2015; Ó'Gráda, 1995; Rozenas and Zhukov, 2019). In the short and medium run, we find empirical support for the notable thesis of Brenner (1976) that under coercive

labor market institutions, a large decrease in population—in our case induced by the famine—can worsen labor market outcomes and strengthen elite rule. More generally, we present new evidence on detrimental effects that famines may have on equality. In the long run, we find that the famine affected participation in the Finnish Civil War plausibly through its impacts on pre-conflict inequality. Thus, our within-country evidence also contributes to the literature on the drivers of civil wars (Blattman and Miguel, 2010). The existing evidence on the relationship between inequality and conflict is mixed and often comes from analyses of cross-country data (Collier and Hoeffler, 1998, 2004; Fearon and Laitin, 2003; Muller and Seligson, 1987). Being able to link greater economic inequality with agricultural labor coercion and strengthened political exclusion, we can pinpoint potential mechanisms that could explain the connection between inequality and insurgent activity.

Lastly, although we consider an extreme case where a country rapidly moves from high inequality to persistent equality, our results show similarities to narratives from several other settings where violent uprisings against the ruling elites have been followed by reductions in inequality and further social change (Acemoglu and Robinson, 2000; Aidt and Franck, 2015; Scheidel, 2018; Wood, 2003). We add to this line of research with our novel data set, and by considering an understudied region. Furthermore, our study offers new evidence on the origins of the Nordic welfare states (Arts and Gelissen, 1990; Baldwin, 1990; Bengtsson, 2019; Rasmussen and Knutsen, 2020). The Nordic countries are often regarded as model societies that couple high per capita incomes with low levels of inequality. We demonstrate that equality and

consensus politics have not been historical fundamentals, at least in Finland, but they are instead an outcome of institutional changes sparked by unrest and revolutionary forces. Our case study thus favors the more general assertion that institutions are fundamental in shaping the long-run outcomes of countries (Acemoglu et al., 2005; Dell, 2010; North, 1990).

In the following section, we discuss the historical background of our case that links the events to trends in local inequality and power relations. We then present our newly collected data and our findings from the empirical investigation. Finally, we discuss alternative mechanisms that could have driven the trends we observe. The final section concludes the paper.

2. Historical Background

This section gives a brief overview of the historical background of our study to lay the foundation for our empirical analysis. More specifically, we discuss the famine of 1866-1868, the Civil War of 1918 and its aftermath, and how these events may have impacted Finnish inequality and agricultural labor markets in the long run.

2.1. Famine and Inequality

The famine of 1866-1868 originated from catastrophic weather conditions which caused severe crop failures across the country. Due to excessive rain during the summer of 1866, root vegetables rotted in the fields, and sowing rye became extremely

difficult in the autumn.⁴ The rainy summer and autumn were followed by a hard and long winter which severely affected the 1867 harvest in large parts of the country (Turpeinen, 1986). Overall, the harvest of rye was cut in half relative to previous years' normal harvest (Panel A in Figure 2).

The famine resulted in about 270,000 deaths. This was about 150,000 in excess relative to the normal mortality, that is, almost 8% of the entire Finnish population (Panel B of Figure 2). However, there was significant variation in the severity of famine deaths and crop failures across the country that we will exploit in our empirical analyses. As shown in Panels C and D of Figure 2, areas in central and southern Finland were hit harder by the famine. In some heavily affected municipalities, as much as one-third of the population died during the famine years. It is also clear that excess deaths often occurred in the same municipalities that experienced crop failures. Still, some municipalities experienced large population shocks despite not having a crop failure, at least partly due to contagious diseases that spread during and immediately after the famine years (Häkkinen et al., 1991; Turpeinen, 1986).

One channel through which the famine could have influenced inequality is its effect on land distribution. Indeed, in the aftermath of the famine, land ownership became increasingly concentrated. Many households were either forced to sell their

4. Rye was the by far most important source of calories in Finland in the 1800s. However, also other, less important types of crops such as barley were similarly affected by the poor weather conditions. We illustrate this in Online Appendix Figure A1. Online Appendix Figure A2 shows that the output of other agricultural products was less affected but did not increase either during the famine years.

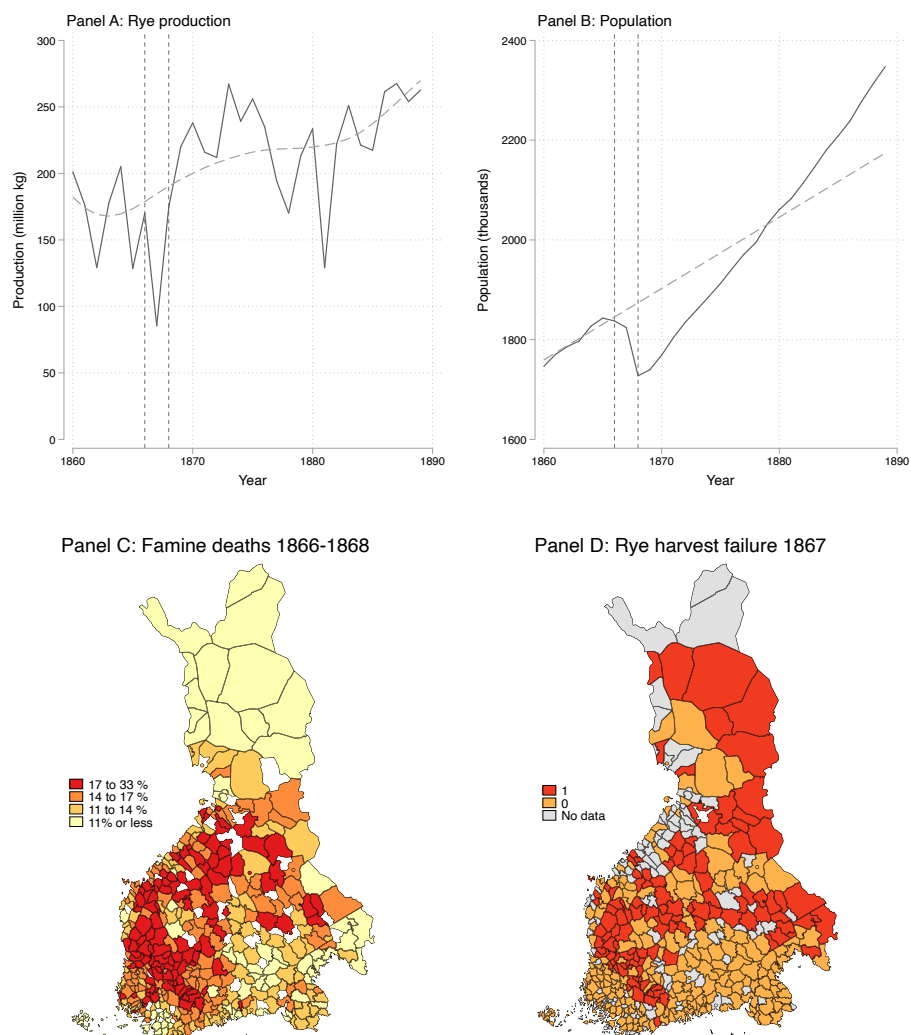


FIGURE 2. Illustration of the famine shock. Panel A shows rye production in Finland as documented in Viita (1965). Panel B shows the Finnish population between 1860-1890 and a linear prediction based on the prior four decades of population growth. The population decrease was 7.8% during the famine years 1866-1868 relative to the predicted population. Panel C plots the famine casualties relative to the 1865 population in each municipality. The map in Panel D plots the geographical distribution of crop failures.

farms and other property to feed their family, abandon their homes to find food elsewhere, or their farms had to be auctioned off to pay off debts accumulated

during these successive bad harvest years (Häkkinen et al., 1991).⁵ This mechanism is well illustrated by Dr. Edvard Gylling who writes in the *Workers' Almanac* of 1918 (Gylling, 1917):

Wheat was largely bought with debt money. Farms and houses were used as a collateral. When the famine continued, farmers could not pay back their debts. On the contrary, new debt would have been needed. Payments were dunned despite the extreme distress. [...] Hundreds and thousands of houses were foreclosed because of even small debts, unpaid rents, or unpaid taxes. [...] Many farms changed hands, and ownership became more concentrated than before.

The second mechanism that we can assess is the labor market impact of the famine. The famine induced a considerable decrease in labor supply. Standard economic theory suggests that this should have increased workers' bargaining power and wages. However, the same logic is not likely to apply in the presence of coercive labor market institutions which we consider more descriptive of the Finnish labor markets in the era. For example, Domar (1970) and Brenner (1976) argued that elites might respond to labor scarcity by engaging in more labor coercion instead of raising wages. This could increase inequality further. Acemoglu and Wölitzky (2011) construct a theoretical framework where the equilibrium impact of labor scarcity on coercion depends on

5. Using data on the universe of Finnish newspapers, we provide descriptive evidence which is consistent with this mechanism. Online Appendix Figure A3 shows that there were much more newspaper mentions of bankruptcy and auctions after the famine. The share of pages containing hits for bankruptcy and auction increased five and two fold, respectively. We also find evidence suggesting that a gap in advertisements on sales and purchases emerges around the famine years.

workers' outside options and the price of the good produced by the elites. Acemoglu and Wolitzky's theory predicts a tendency towards tightening coercion in the Finnish case; the prices of agricultural products increased due to famine, and workers lacked outside options. The latter point was because there were merely a few cities and few employment opportunities in industrial production. Even when the country started industrializing eventually, pursuing outside opportunities was difficult due to negative attitudes towards migration, low social mobility, and various geographical mobility restrictions, such as passport requirements (Lento, 1951). Free movement of labor was banned until 1898 (Happonen, 2004).

A particular feature of the Finnish case was the prevalence of tenant farming, which was an essential part of rural labor markets in the late 19th and early 20th centuries. The number of tenant farmers increased through the late 1800s and early 1900s, with tenant farms constituting nearly half of all farms in 1912.

The poor position of tenant farmers and agricultural laborers was one of the most contentious policy issues in the Finnish public debate in the early 1900s (Rasila, 1970). In the Finnish system, tenant farmers paid their rent mainly in day labor (*taksvärkki*), and monetary rent for the land was rare.⁶ While tenant farming was not serfdom per se, it was a coercive labor relationship as the large landowners had significant power over their tenants; see also Naidu and Yuchtman (2013). It was arguably more beneficial for the landed elites to increase tenant farming instead of hired labor when there was

6. Monetization of the Finnish agriculture slowly increased through the 1800s. But still in 1912, 72% of the tenant farmers paid their rent in day labor according to the land rent statistics of Statistics Finland.

upward wage pressure due to labor scarcity. In many cases, the demand for farmable land was high but no land was made available for sale, making tenant farming the only option (Peltonen, 1990, 1992).

Tenant farmers seldom had written contracts, and the landowners could easily make additional, sometimes arbitrary, demands to their tenants. Particularly taxing was the landowners' right to require extra day labor (*ylipäivät*) and employ the tenant farmer's family. As contract termination was also entirely in the hands of the landowners, the tenant farmers typically had no other choice than to agree with the unilateral changes in the contract terms. Otherwise, tenants could have lost their home, employment, and source of income (Rasila, 1970).

2.2. Inequality and Civil Conflict

Key factors behind the emergence of the civil war were the Russian Revolution and the following social turbulence within Finland. We propose that conditional on this national-level shock, the famine of 1866-1868 ultimately contributed to insurgency participation during the Finnish Civil War of 1918, conceivably by boosting local economic inequalities and political exclusion.

The civil war was a battle between the *Reds* and *Whites* for the control of Finland following its declaration of independence from Russia (Alapuro, 1988; Upton, 1980). The social backgrounds of their members distinguished the two sides of the civil conflict. The Red Guards were led by a section of the Social Democratic Party, and they mainly consisted of industrial and agricultural workers. Soviet Russia provided

the Red Guard with arms, and many Russians also fought along with the Reds. The insurgents controlled most of Southern Finland and many of its industrial centers. The conservative Senate led the White Guards. The Whites were mostly volunteering members of the middle and upper social classes, but they also organized a draft in their controlled areas during the war and received support from the German Imperial Army.

The hostilities of 1918 lasted from late January until mid-May resulting in the victory of the better-organized Senate-led troops. In total, about 39,000 people died in the conflict, and most of the casualties were insurgents. Many of these casualties were not battle deaths but either executed or died of diseases in prison camps after the war.

What encouraged the insurgents to fight? Social scientists have established that economic underdevelopment and poverty are important predictors of civil conflict (Blattman and Miguel, 2010). In discontent theories of conflict, economic inequality is considered to be among the fundamental economic preconditions of insurgency and revolution (Huntington, 1968; Muller and Seligson, 1987; Paige, 1975). In our context, economic inequality also directly translates to political inequality, which may have similarly bolstered revolutionary tendencies which may equally have contributed to civil war participation (Buhaug et al., 2008; Wimmer et al., 2009).

Universal suffrage was adopted in the national elections already in 1906, but the voting rights in municipal elections were still tied to income. In most municipalities, voters would get one vote for every 100 Marks of taxes paid. Only about one-fifth of the working-age population paid enough local taxes to be granted voting rights.

A large share of the working class was not allowed to vote and was left without representation in many municipalities. For example, Hjerpe and Lefgren (1974) suggest that 70% of the population did not pay a minimum amount of taxes to be eligible to vote in the early 1900s.⁷ Their chances of influencing policies decided at the municipal level—poor relief, taking care of unemployment, public safety, primary education, primary health care, and so forth—were extremely limited.

Historical Contingency. It is likely that the nature of civil conflict in Finland would have been very different without the Russian Revolution and the sudden Finnish independence. High inequality is an important yet alone not a sufficient explanation for the Finnish Civil War. As Upton (1980) puts it: “There wasn’t anything inherent in the pre-WWI Finnish society that made the revolution necessary or even probable.” The changing circumstances in which groups competed for power, especially the weakness of the state, also mattered. It was the interaction of these internal and external factors—the sources of historical contingency—that caused the conflict.

7. In an essay from 1932, future Finnish President Urho Kekkonen describes the municipal voting rights before universal suffrage as follows:

[...] only a handful of municipality’s wealthiest citizens became elected, and it could even be the case that the richest few percent could overrule everyone else in this voting system. Participation in municipal decision-making was the right of merely a few, and working and middle class members in the countryside and cities had no way of influencing municipal policy-making. The public opinion was strictly against voting rights based on income for a good reason [...]

During the first world war, the previously law-abiding Finns began to revolt against the Russian government that put forward many wartime “Russification” policies such as censoring newspapers, creating a Russian police force, and limiting parliament assembly (Alapuro, 1988; Haltzel et al., 1981; Upton, 1980). The wartime habit of revolting against the ruling elites endured after Finland became independent of Russia.

At the same time, a power vacuum emerged within Finland. After the independence, there was no national police or army presence to upkeep order, which had always been provided by the powerful empire (Alapuro, 1988). Labor organizations formed a municipal militia that took the role of holding peace, while right-wing groups created their own guards to control the increased striking and turmoil. The line between private and state forces became increasingly diluted; in other words, the state lost its monopoly on violence. This development led to the arming of political organizations, greatly facilitating the civil war. The ambiguity in power relations at the national level exacerbated the situation even further. Even though the Social Democrats gained the majority of parliamentary seats before the civil war, they were uninterested in dissolving their militias or relinquishing control to the government, as the strong bureaucracy was controlled by non-socialists. This hesitance stemmed from general mistrust among the workers’ movement that the election results would be upheld.⁸

8. The fact that the revolution was not a top-down process further speaks for the importance of the power vacuum. Although there surely were revolutionary elements within the Social Democratic Party leadership, the revolution was not well organized or widely desired. After the 1917 independence, the

Finally, the Russian Revolution made revolting seem like a more specific route to social change. Since the late-1800s, there had been a political discussion and movement to push forward critical social policies such as eight-hour workdays, more equal land distribution, and franchise extension. These movements had, however, stayed non-violent and non-revolutionary for several decades. Finns had organized into parties and labor unions which had slowly made headway in these issues through political means (Upton, 1980). This did not seem enough anymore, and people started to demand faster social change.

2.3. Redistribution after the Civil War

After the civil war, significant policy changes affected both economic and political inequality. We argue that the famine positively contributed towards this development, contingent on the outcome of the civil war. Without the civil war, the slow process of social movement might have continued, possibly yielding the same societal results but more slowly. But it is also possible that many of the reforms would not have been implemented, and Finland would have become even more unequal.

party leaders lost control as local strikes and meetings started to turn violent and revolutionary (Upton, 1980). For example, Edvard Gylling, one of the leading members of the working-class movement, spoke against further revolting before the civil war (Upton, 1980):

“The revolution [...] endangered all that the workers’ movement had accomplished so far; organizations, property, its status in the parliament, where new victories could be taken. [...] The revolution should be avoided in all ways.”

A particularly important form of redistribution was the large land reform implemented after the civil war (Jørgensen, 2006). Legislation passed in the year 1918 made it possible for the tenant farmers to buy the land they were renting at a discounted price. Four years later in 1922, the Parliament approved the *Act on the acquisition of land for settlement purposes* (278/1922) that gave the state and local authorities the right to facilitate the acquisition of land for citizens for cultivation and residential settlement. The government could redeem fractions of larger farms and redistribute the land to individuals who did not own any land before, but still had the knowledge and resources to start practicing agriculture on the newly acquired land.

Another crucial change was that the central government implemented a major electoral reform that established universal suffrage in municipal elections.⁹ The law was passed in the parliament after the declaration of independence, some months before the conflict onset in late 1917, and after years of debate in the parliament and significant resistance from the elite and landowners. In practice, however, municipal elections with universal and equal suffrage were not organized until after the conflict. The first democratic municipal elections with universal suffrage were held only half a year after the civil war. The reform extended municipal voting rights to some of those

9. The threat of revolution hypothesis put forward by Acemoglu and Robinson (2000) suggests that extending the franchise can act as a commitment to future redistribution to prevent social unrest. Extended suffrage will eventually result in increased redistribution and consequently lower inequality. Acemoglu and Robinson (2006) present case studies that follow such a pattern. For example, in Germany, the United Kingdom, and France, franchise reforms were preceded by increasing inequality. This eventually led to social unrest and then to direct or indirect democratization.

who fought with the government forces, but the poorer insurgent side was undoubtedly most affected.

The seminal Meltzer and Richard (1981) model predicts that extending political power to poorer segments of society leads to more redistribution and less inequality.¹⁰ But in general, democracy may not always change fiscal policy and the distribution of income. Counteracting forces such as the capture of democracy or a middle-class bias can also play an important role (Acemoglu et al., 2015; Acemoglu and Robinson, 2008). However, in Finland in 1918, the conditions were ripe for changes—and the overall consensus was that changes were needed to prevent a new conflict from emerging. After the civil war and franchise extension, previously unrepresented segments of society gained political representation in local governments. The conservatives, who typically represented the landowners and other members of upper social classes, rarely had enough seats to get decisions through on their own. This served as a catalyst for collaboration between the conservatives and the left (Aatsinki, 2009; Kettunen, 1986).

10. For empirical evidence that franchise extension leads to changes in public policies, see for example Husted and Kenny (1997) and Lott and Kenny (1999). On the other hand, Mulligan et al. (2004) offer cross-country evidence suggesting that democracies and non-democracies are not that different in terms of their economic policies.

3. Data

We have collected and digitized an extensive amount of historical data to trace out the long-run consequences of the Finnish famine of 1866-1868 and assess the underlying mechanisms. This section discusses these data and their sources. We also evaluate the exogeneity of the famine exposure, as this is crucial for our empirical investigation.

3.1. *Main Variables*

We start by characterizing our main dependent and independent variables. Summary statistics on the data that we use in our main analyses are presented in Online Appendix Table B1.

Exposure to the Famine. We construct two measures to capture the geographical variation in exposure to the famine. Our first measure is the number of deaths between 1866 and 1868 relative to the 1865 population. The number of deaths in each municipality is documented in the Official Statistics of Finland publication *Syntyneet, vihityt ja kuolleet vuosina 1865-1868* from the year 1871. On average, around 15% of the population perished between these years.¹¹ We consider the famine deaths to serve as a proxy for the local severity of the famine shock, including economic and social hardship and not only the demographic change. Second, we use information on the quality of the 1867 rye harvest from Hirvonen (2013). These data were originally

11. This figure is larger than the 8% reported by, e.g., Turpeinen (1986). This is because our measure includes all deaths during the period, instead of capturing only excess mortality.

collected for reports sent to the Russian Finance Ministry by regional governors of Finland. Hirvonen (2013) quantifies the information in the reports on a scale from 1 to 5, where 1 corresponds to a complete crop failure, and 5 corresponds to a good harvest. We create an indicator variable for a crop failure using these data. It gets the value 1 if a municipality had a crop failure in 1867, and it is equal to 0 otherwise.¹² Overall, a striking 35% of the municipalities covered in our data experienced a crop failure in 1867.

Inequality Measures. To measure both economic and political inequality, we use extensive data on incomes and land ownership. First, we use the Official Statistics of Finland tables on incomes for the years 1865, 1881, 1932, 1935, and 1938 to measure income inequality in each municipality. These statistical tables include the number of people in each income tax bracket in a given municipality which allows us to estimate a Gini coefficient for each municipality.¹³ While Statistics Finland did not publish any data on income and property between 1881-1920, we are able to estimate

12. Municipalities can have multiple reports for the year 1867. We take the average of these reports and consider any value below 2 as a crop failure. In that case, at least one report must have stated that a municipality experienced a complete crop failure (value 1).

13. The income statistics are binned by tax groups, and a large part of the population did not pay any taxes. We estimate the Gini coefficient using a robust Pareto midpoint estimator suggested by von Hippel et al. (2016) which takes into account the binned nature of the data and the open-ended largest tax bracket. This implementation is available in the `rpme` package in Stata. Alternative metrics for income inequality are highly correlated with the Gini coefficient for the years for which we can measure them.

income inequality closer to the 1918 civil war by using corresponding statistics on incomes drawn from Hjelt and Broms (1904). The Hjelt and Broms data only include information on rural municipalities. On average, the income Gini was 0.50 in 1904 and 0.24 in 1938, twenty years after the Finnish Civil War.

Given that Finland at the time relied heavily on agriculture, much of the income inequality was closely linked with land inequality. As an alternative measure of inequality measured slightly closer to the conflict, we estimate land inequality for each municipality using farm size information from the 1910 Finnish Agricultural Census. The Gini coefficient for land ownership averaged at 0.39 in 1910.

Labor Coercion Outcomes. We measure the extent of labor market coercion in the rural municipalities by using the information on the share of tenant farmers, the share of terminated tenant contracts, and daily agricultural wages. Tenant farming was a prevalent form of farming, and the lack of land ownership is often attributed as a sign of labor coercion as discussed above. In our data, 45% of all farms were tenant farms. These data come from the 1910 Finnish Agricultural Census. The quality of land given to the tenant farmers was often poor and making the land suitable for cultivation required additional work and effort. Historical accounts suggest that landowners sometimes terminated tenant farmers' contracts after they had put lots of effort into turning their rental land productive (Rasila, 1970). We thus also measure agricultural labor coercion by the amount of terminated tenant leases. The amount of terminated tenant leases in each municipality comes from Haataja (1916). We scale the number of terminated contracts by all farms in 1910. The resulting variable

averages at 4 %. We also collect information on the average daily wages paid to farm laborers. These are available in Statistics Finland's publication on farming and animal husbandry in the year 1908. We use the daily male wage during the summer as a proxy for farm labor wages. On average, this wage was 3.07 Finnish Marks (about 12 USD today).

Insurgency and Pre-Conflict Discontent. We use a unique data set of all Finnish Civil War casualties, collected by the Finnish government in the *Suomen sotasurmat 1914-22* project, to approximate Civil War participation. These data include the side of the conflict (Red or White), the occupation, and the municipality of birth of each individual who died in the civil war. There are about 39,550 individuals in the dataset.¹⁴ We use the revolutionary side deaths as a measure of insurgency participation. More precisely, we use the municipality of birth of the insurgents to calculate the number of casualties in each municipality and divide this number by the municipal male population in 1910 to obtain the insurgent death rate. On average, the insurgent casualty share was around 2% of the male population. The casualty share of Whites was considerably lower, around 0.3%.

We implicitly assume that our insurgency participation metric is proportional to actual participation in a municipality. Using the municipality of birth allows us to capture also those rural workers who migrated to the cities before the civil war

14. The Finnish National Archive has made these data publicly available online at <http://vesta.narc.fi/cgi-bin/db2www/sotasurmaetusivu/main> (accessed May 31, 2019).

but whose decision to fight in the war was potentially driven by the conditions in their home municipality. As the majority of the insurgency casualties documented in the data set occurred in prison camps after the cease fire, and as we are using the municipality of birth rather than the municipality of residence, the casualties capture the local insurgency participation more broadly and not only the severity of local battles.

Moreover, we measure pre-conflict discontent in three different ways. First, we have collected municipality-level information on voting in Parliamentary elections. We focus on the average vote share of the Social Democratic Party—the largest opposition party with an average vote share of 41%—between 1907 and 1917. Second, we have gathered information on local workers' associations and their membership numbers from statistics published by the Social Democratic Party (Turkia, 1907). Third, we use data on the occurrence of strikes and participation in them collected from 1917 and 1918 issues of *Työtilastollinen aikakauslehti* and *Sosiaalinen aikakauskirja* (the Journal of Employment Statistics and the Journal of Social Issues).

Redistribution. We measure redistribution after the conflict using information on the inter-war land reform, and Statistics Finland's statistics on municipal spending. The land reform data are taken from Statistics Finland's land survey for the years 1919-1923. This publication includes a statistical map of new farms created in the land reform in each municipality. We have digitized and georeferenced the contents of this map and measure the land reform intensity by the number of new farms created by the

land reform during the years 1919-1923, relative to the total number of farms in 1910. For public spending, we have gathered the information on how much each municipal government spent on poor relief, health care, and schooling—the main redistributive policies of local governments—for the years 1912 and 1932. Spending in these areas did not rely on the national budget, and decisions on the policies were entirely up to the municipal governments.

Covariates. Finally, we use an extensive set of covariates to capture potentially important differences in municipal labor markets and other characteristics. In particular, we have collected information on population in 1865 from Statistics Finland's publication *Suomen väestö joulukuun 31 p:nä 1865*. We measure the soil suitability for different crops and terrain slope in each municipality using data from the Global Agro-Ecological Zones (GAEZ) database.¹⁵ Our econometric analyses also control for the latitude and longitude of the centroid of each municipality, and distance to the Russian border.

3.2. *Pre-Famine Characteristics*

Before proceeding to the main analysis, we study whether the municipalities that were more exposed to the famine were somehow different from those that were less affected already before the famine. Table 1 describes the various pre-famine characteristics

15. We take a logarithm of crop suitability without adding a constant to zeros. This means that areas that are not suitable for cultivation are left out of our analyses.

of municipalities. First, we report the means and standard deviations of the pre-determined covariates in column (1). Column (2) presents regression coefficients and the corresponding standard errors from univariate regressions where we regress pre-famine characteristics one by one on the population share of famine deaths. We see that there are some potentially important pre-existing differences. For example, municipalities that experienced more deaths were, on average, more populous, poorer, located in particular parts of the country, and less suitable for barley and rye farming. These associations suggest that it is important to control for these characteristics in the empirical analysis.

Next, columns (3)-(5) compare municipalities by their crop failure status. According to our classification, 112 municipalities in our data experienced a crop failure, and 223 did not. Columns (3) and (4) present the means (and standard deviations) of our covariates for these two groups. We compare the means in the groups by regressing each covariate on the crop failure dummy. We condition these comparisons on the suitability for rye cultivation. The logic behind this is that many locations were less suitable for rye cultivation and frequently experienced crop failures. Even after adjusting for rye suitability, we see that crop failure captures something meaningful in terms of famine exposure. Overall, we find municipalities that experienced a crop failure had a significantly higher death rate during the famine years. The difference is around 4 percentage points which is about half of the excess mortality observed at the national level. In contrast, we do not detect any statistically significant differences in pre-famine characteristics between

municipalities that experienced a crop failure and those that did not, with merely one exception. Municipalities that experienced a crop failure were further away from the Russian border than those that did not, although this difference is small in magnitude and vanishes if we control for region fixed effects. We further control for the distance to the Russian border in all of our specifications.

TABLE 1. Famine deaths and pre-famine municipal characteristics.

	Mean (1)	$\beta^{Famine\ deaths}$ (2)	No failure (3)	Crop failure (4)	$\beta^{Crop\ failure}$ (5)	Observations (6)
Famine deaths 1866-1868	0.15 [0.05]		0.14 [0.04]	0.18 [0.04]	0.04*** (0.01)	409
log(Population 1865)	8.06 [0.74]	0.19** (0.08)	8.24 [0.69]	8.17 [0.60]	-0.10 (0.08)	420
Population density 1865	1.57 [1.92]	0.02 (0.15)	1.73 [2.01]	1.84 [2.18]	0.07 (0.28)	420
Rainfall	5.96 [0.42]	-0.09** (0.05)	6.07 [0.38]	5.92 [0.34]	0.02 (0.04)	451
ln(Slope)	9.00 [0.08]	0.01 (0.01)	8.99 [0.08]	8.99 [0.08]	-0.00 (0.01)	451
Income Gini 1865	0.31 [0.12]	-0.03** (0.01)	0.32 [0.11]	0.30 [0.10]	-0.00 (0.01)	349
Mean income 1865	14.40 [6.58]	-2.69** (1.05)	14.26 [5.99]	13.51 [4.24]	-0.22 (0.64)	349
ln(Distance to Helsinki)	5.39 [0.65]	0.13** (0.05)	5.24 [0.65]	5.57 [0.57]	-0.06 (0.06)	451
ln(Distance to Russia)	5.10 [0.97]	0.40*** (0.09)	4.87 [1.18]	5.22 [0.73]	0.23** (0.10)	451
ln(Distance to Turku)	5.26 [0.91]	0.17** (0.08)	5.14 [0.94]	5.56 [0.57]	0.01 (0.07)	451
Latitude	61.98 [1.49]	0.75*** (0.15)	61.51 [1.30]	62.53 [1.14]	-0.03 (0.09)	451
Longitude	24.80 [2.70]	-0.33 (0.28)	25.01 [2.88]	25.17 [2.70]	-0.09 (0.33)	451
ln(Barley suitability)	8.23 [0.57]	-0.24*** (0.05)	8.39 [0.61]	8.00 [0.40]	0.06 (0.07)	451
ln(Cereal suitability)	7.70 [0.31]	-0.01 (0.03)	7.77 [0.33]	7.69 [0.26]	0.02 (0.03)	450
ln(Rye suitability)	6.63 [0.50]	-0.22*** (0.05)	6.81 [0.46]	6.39 [0.41]		451

Notes: Column (1) shows the mean of famine deaths and other pre-famine characteristics across municipalities. Column (2) shows the correlation between famine deaths and pre-famine characteristics. Columns (3) and (4) show the famine deaths and pre-famine characteristics by the occurrence of crop failure in 1867. Column (5) shows the correlation of famine deaths and pre-treatment characteristics with crop failure, conditional on rye suitability. Standard deviations and robust standard errors are reported in brackets and parentheses, respectively. ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

4. Main Findings

This section presents our main results. We first study the effects of the famine shock on inequality and labor coercion in the early 1900s. Then, we proceed to analyze how these factors influenced participation in the Finnish Civil War. Building upon these analyses, we conclude by examining changes in inequality and redistribution after the conflict and the subsequent national-level reforms.

4.1. *Famine, Inequality and Labor Coercion in the Early 1900s*

Empirical Strategy. We begin by assessing the claim that the famine of 1866-1868 was associated with higher inequality and worse labor market outcomes in the early 1900s. Our main specification takes the form

$$y_m = \alpha + \beta \text{Famine exposure}_m + X'_m \gamma + \varepsilon_m, \quad (1)$$

where y_m is an inequality or labor coercion outcome in municipality m . Famine exposure_m is either the death rate during the famine years or an indicator for a crop failure in 1867, X'_m is a vector of controls, and ε_m is an error term. The coefficient of our interest is β which captures the effect of the famine shock on the grievance outcome. All our specifications include a set of baseline control variables. We also report results from a specification that is augmented with region (*lääni*) fixed effects

for eight regions to control for any unobservable region-specific attributes.¹⁶ We use heteroskedasticity robust standard errors throughout the paper, although we also report Conley (1999) standard errors that correct for possible spatial autocorrelation among municipalities within 50 kilometers of each other. These two standard errors are close in magnitude.

Effects on Inequality. Columns (1)-(4) of Panel A of Table 2 correlate the famine casualty share with measures of economic inequality, and the corresponding columns in Panel B shows causal estimates obtained using crop failures as a measure of famine exposure. When we control for region fixed effects, the estimates for the famine severity are 0.214 for income inequality (column 2) and 0.253 for land inequality (column 4). This means that a negative population shock equal to one standard deviation (or 5% of the population) is associated with an increase of about 0.01 in both income and land inequality. In Panel B, the results from regressions that control for county fixed effects suggest that experiencing the crop failure increased the income Gini coefficient by 0.020 points (column 2) and the land Gini coefficient

16. We choose these baseline controls to maximize the number of observations that we have available for our estimations, including the subsequent analyses. Online Appendix Tables B2-B4 document that our results are robust to including all the predetermined covariates that we observe as control variables in our regressions. However, this considerably cuts down the number of observations that we have available. Our results are also robust to an approach that uses the crop failure indicator as an instrumental variable for famine deaths. We refer to Online Appendix Tables B5-B7 and the associated discussion for further information. Moreover, we show that all our crop failure results are robust to a randomization inference approach (Online Appendix Figures B1-B3).

by 0.021 points (column 4). These point estimates are statistically significant across specifications and economically meaningful, although not very large relative to the means of 0.51 (income Gini) and 0.40 (land Gini).

Effects on Labor Coercion. Columns (5)–(10) of Table 2 then focus on labor market outcomes. We find that greater famine exposure substantially increased the share of tenant farms (columns 5 and 6). The point estimate reported in column (6) of Panel A is 1.063. Thus, a one-standard-deviation increase in famine severity is associated with a 0.05 higher tenant farmer share in 1910. This is a significant shift also relative to the mean of 0.47. Panel B similarly shows that municipalities that experienced a crop failure had 5.4 – 6.5% higher tenant farm shares than those that did not.

The evidence on other measures of labor coercion is slightly weaker. For instance, after controlling for county fixed effects, the statistically non-significant impact of a crop failure on the share of terminated leases is around 0.002 (column 8), the average share being about 5%. The daily wage of workers was about 0.078 Finnish Marks lower in locations that experienced a crop failure, again after controlling for county fixed effects (column 10). This effect is relatively small compared to the average daily wage which was about three Finnish Marks. The results on wages are robust to scaling the daily wages by land prices (hectares per 100 Finnish Marks). Running a regression with the full set of controls yields a point estimate of -5.978 ($p = 0.008$) for famine deaths per capita, and a point estimate of -0.398 ($p = 0.065$) for crop failure.

Taken together, we interpret these results as indicative evidence of an increase in labor coercion. This interpretation aligns with previous work by, for example, Naidu

(2010), Naidu and Yuchtman (2013), and Tyrefors Hinnerich et al. (2017) in other historical contexts.

4.2. Famine, Insurgency and Discontent before the Civil War

Next, we turn to the effects of the famine on insurgency in 1918, proxied by the insurgency casualty rate. We also study civil war participation on the government side as well as discontent before the Civil War. The famine could have affected these outcomes through its impact on inequality and labor coercion.

From Famine Exposure to Civil War Participation. Columns (1) and (2) of Table 3 report our estimates on famine exposure and insurgency participation. Municipalities that were more severely affected by the famine experienced more insurgent deaths in the 1918 Civil War. The regression results for famine deaths per capita reported in Panel A suggest that an increase of one standard deviation in famine deaths is associated with around five more insurgent deaths per thousand people, respectively. The magnitude of these estimates is meaningful compared to the mean of 0.016. The corresponding results in Panel B imply that experiencing a crop failure in 1867 resulted in a similar increase in insurgent deaths per capita. The size of the effect is again considerable relative to the mean, about one quarter.¹⁷

17. The effect magnitude is comparable to estimates reported in previous literature. In particular, Dell (2012) finds in her study that one standard deviation increase in a drought shock increased the probability of local insurgency in Mexico by 17 percentage points which is around 30% relative to the mean.

TABLE 2. Famine's lasting impact on local inequality and labor coercion.

	Income Gini 1904		Land Gini 1910		Tenant farm share		Terminated leases share		Daily wage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A										
Famine deaths per capita	0.305*** (0.088)	0.214** (0.088)	0.260*** (0.078)	0.253*** (0.080)	1.218*** (0.187)	1.063*** (0.179)	0.062 (0.058)	0.039 (0.060)	-3.970*** (0.611)	-3.437*** (0.645)
Conley SE	0.106	0.111	0.091	0.082	0.293	0.296	0.065	0.059	0.679	0.622
N	409	409	403	403	403	403	390	390	382	382
R ²	0.214	0.287	0.134	0.233	0.442	0.568	0.274	0.326	0.294	0.390
Outcome mean	0.496	0.496	0.392	0.392	0.464	0.464	0.046	0.046	3.076	3.076
Panel B										
Crop failure	0.018* (0.011)	0.020* (0.011)	0.024*** (0.009)	0.021** (0.008)	0.065*** (0.023)	0.054** (0.022)	0.006 (0.007)	0.002 (0.007)	-0.178** (0.078)	-0.078 (0.073)
Conley SE	0.012	0.011	0.010	0.009	0.029	0.024	0.007	0.006	0.085	0.079
N	328	328	324	324	324	324	314	314	306	306
R ²	0.147	0.241	0.136	0.223	0.464	0.599	0.252	0.318	0.164	0.278
Outcome mean	0.507	0.507	0.396	0.396	0.468	0.468	0.048	0.048	3.011	3.011
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County FE		✓		✓		✓		✓		✓

Notes: Baseline controls included in all estimations are latitude, longitude, log distance to Russia, log suitability for rye, log suitability for barley, log elevation, and log population in 1865. Robust standard errors are reported in parentheses. Conley standard errors allow for spatial autocorrelation among municipalities that are within 50 kilometers of each other. ***, **, and * denote statistical significance at 1%, 5% and 10% level, respectively.

We then assess the association between the famine shock and White casualties in columns (3) and (4) of Table 3. While Panel A indicates a positive correlation between famine casualties and White casualties, Panel B suggests that crop failures had no impact on civil war participation on the government side.

Figure 3 offers correlational evidence in support of one potential mechanism, namely that the famine could have affected insurgency through its effect on inequality which we demonstrated in the previous section. We see that increasing inequality by one standard deviation is also associated with about 0.004 more per capita insurgent deaths (Panel A) after controlling for our baseline covariates and county fixed effects. However, there appears to be no statistically significant relationship between economic inequality and casualties on the government side of the conflict (Panel B). We provide further proof of this mechanism in the supplementary materials, where we show that land inequality and labor coercion are also positively associated with higher insurgent death rates but not with White casualty rates (Online Appendix Figures B4-B7).

Furthermore, we take advantage of the rich individual-level dataset to further describe the socioeconomic status of those who perished—and thus participated in—the civil conflict. The occupations of the deceased are potentially a good proxy for the occupations of those who participated in the conflict. If the conflict truly was about demanding more redistribution and equality, we would expect that the insurgents disproportionately represent lower socioeconomic groups. The occupational structure of the deceased in Online Appendix Figure B8 echoes this.

Discontent before the Civil War. We corroborate our general argument that the famine led to discontent in the long run by studying additional outcome variables. There were signs of resentment and backlash against inequality already before the civil war. For instance, industrial action and strikes became more and more common alongside with the increasing popularity of the labor movement. For some time, the elites were able to make concessions to hold major conflicts at bay. The general strike of 1905 is a good example (Alapuro, 1988). In October 1905, many factories, government offices, schools and stores were closed for a few days in different parts of the country. To appease the working classes who were disgruntled by poor working and living conditions, the elites carried out major reforms such as ending the era of Russification in Finland and granting universal suffrage in the Parliamentary elections.

The first Finnish Parliament was elected in 1907 in an election where almost all men and women older than 24 years were allowed to vote. While the reform did not change the fact the Russian Emperor held the ultimate political power in the country, it allowed, for the first time in Finnish history, parts of the population to vote and express their political preferences.

Did the voting behavior in pre-conflict elections exhibit any signs of discontent? To better understand this, we examine the electoral support of the Social Democratic Party. Due to the universal suffrage, the Social Democratic vote share also captures more moderate tendencies than direct insurgency participation, as some individuals may have been supporters of a non-violent revolution. The Social Democratic Party was actively advocating for tenant farmers' rights, a land reform, improving the

working conditions of laborers, and limiting the number of working hours, among other things. In the early 1900s, the Social Democratic Party was the largest individual party but the bourgeois parties held more than half of the seats for most of the first two decades.

In columns (3) and (4) of Table 3, we quantify the relationship between Social Democrats' average vote share in elections held between 1910 and 1917, and our measures of famine exposure. The positive connection is clear. For instance, Panel B shows that Social Democrats' vote share was about 5 – 8 pp. higher in municipalities that had a crop failure in the year 1867. The magnitude of the point estimates seems sizeable also compared to the average vote share of about 40%.

Close to the Social Democratic party were so-called workers' associations that became increasingly popular in the late 1800s and early 1900s among agricultural, industrial, and other workers. They were organizations that were distinct from labor unions, and they were intended to foster cooperation among the working classes and improve their working conditions. Alapuro (1988), among others, has highlighted the importance of workers' associations in organizing the insurgent groups and arming them during the civil war.

Columns (5) and (6) of Table 3 indicate that there were more workers' association members per capita in municipalities that were hit harder by the famine. For example, municipalities that experienced a crop failure had almost 0.02 higher workers'

association membership rates—which corresponds to almost one-third of the mean value.¹⁸

Workers' associations also had an important role in mobilizing workers during strikes. Strike activities continued actively even after the general strike of 1905, and the year preceding the Civil War the number of strikes hit a new record. For example, during the previous peak year of 1907, there had been slightly less than two hundred strikes with around 20,000 participants. In the year 1917, the number of strikes rose close to five hundred. Almost 140,000 workers joined the protests, and about one and a half million working days were lost in total (Tilastokeskus, 1990). According to Aatsinki (2009), the largest occupational groups that took part in strikes were agricultural workers (about 16,000 participants) and log drivers (about 17,000 participants).

We find some evidence suggesting that agricultural workers were participating more in municipalities that were hit harder by the famine in columns (9) and (10) of Table 3. However, while systematically positive and robust to different specifications,

18. To put this magnitude into the context of previous literature, we can contrast our results with Karadja and Prawitz (2019) who study the same time period as we do but focus on emigration as the driver of societal change. Karadja and Prawitz (2019) find that a one standard deviation increase in their instrumental variable increases the Swedish labor organization rate by one third of the mean.

the regression results do not suggest that there is a statistically significant relationship between the famine and strike participation.¹⁹

We complement these findings in Panels C-E of Figure 3 which visualizes the positive correlation between inequality in the early 1900s and our alternative dependent variables. Moreover, the evidence in Online Appendix Figures B4-B7 reveals that municipalities that had higher land inequality or more coercive labor markets also voted more for the Social Democrats, and had more workers' association members and strike participation.

4.3. *Famine and Long-Run Evolution of Inequality*

We have shown that economic inequality increased towards the early 1904. But what happened after the Civil War? To illustrate the dynamic, long-run relationship between inequality and the famine of 1866-1868, we now estimate an event-study specification of the form

$$Gini_{mt} = \sum_{s \neq 1865} \delta_s (Famine\ exposure_m \times \mathbf{1}(t = s)) + \lambda_m + \lambda_t + \eta_{mt}. \quad (2)$$

Here $Gini_{mt}$ is income inequality in municipality m in the year t , and $Famine\ exposure_m$ is either the death rate during the famine years or a dummy for a crop failure in 1867. δ_s are year-specific coefficients that we plot in Figure 4, setting

19. Focusing on the occurrence of strikes or all strikes (and not just those of agricultural workers) yields similar results.

TABLE 3. Effects of the famine on insurgency and pre-conflict discontent.

	Insurgent casualty share		White casualty share		SDP vote share		Workers' association members		Strike participation	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A										
Famine deaths per capita	0.107*** (0.018)	0.079*** (0.015)	0.008*** (0.003)	0.009*** (0.003)	1.258*** (0.203)	0.940*** (0.196)	0.199*** (0.067)	0.160** (0.072)	1.752 (1.160)	1.438 (1.222)
Conley SE	0.035	0.024	0.003	0.003	0.285	0.267	0.088	0.086	0.845	1.105
<i>N</i>	408	408	408	408	366	366	404	404	409	409
<i>R</i> ²	0.451	0.620	0.113	0.291	0.401	0.496	0.178	0.214	0.015	0.028
Outcome mean	0.016	0.016	0.003	0.003	0.410	0.410	0.056	0.056	0.161	0.161
Panel B										
Crop failure	0.005** (0.002)	0.004** (0.002)	0.001 (0.000)	0.000 (0.000)	0.078*** (0.023)	0.054** (0.022)	0.017** (0.008)	0.015* (0.009)	0.274 (0.239)	0.254 (0.206)
Conley SE	0.003	0.002	0.000	0.000	0.030	0.028	0.008	0.009	0.224	0.182
<i>N</i>	327	327	327	327	297	297	324	324	328	328
<i>R</i> ²	0.415	0.583	0.079	0.229	0.284	0.423	0.174	0.203	0.018	0.036
Outcome mean	0.018	0.018	0.003	0.003	0.443	0.443	0.060	0.060	0.159	0.159
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County FE		✓		✓		✓		✓		✓

Notes: Baseline controls included in all estimations are latitude, longitude, log distance to Russia, log suitability for rye, log suitability for barley, log elevation, and log population in 1865. Robust standard errors are reported in parentheses. Conley standard errors allow for spatial autocorrelation among municipalities that are within 50 kilometers of each other. ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

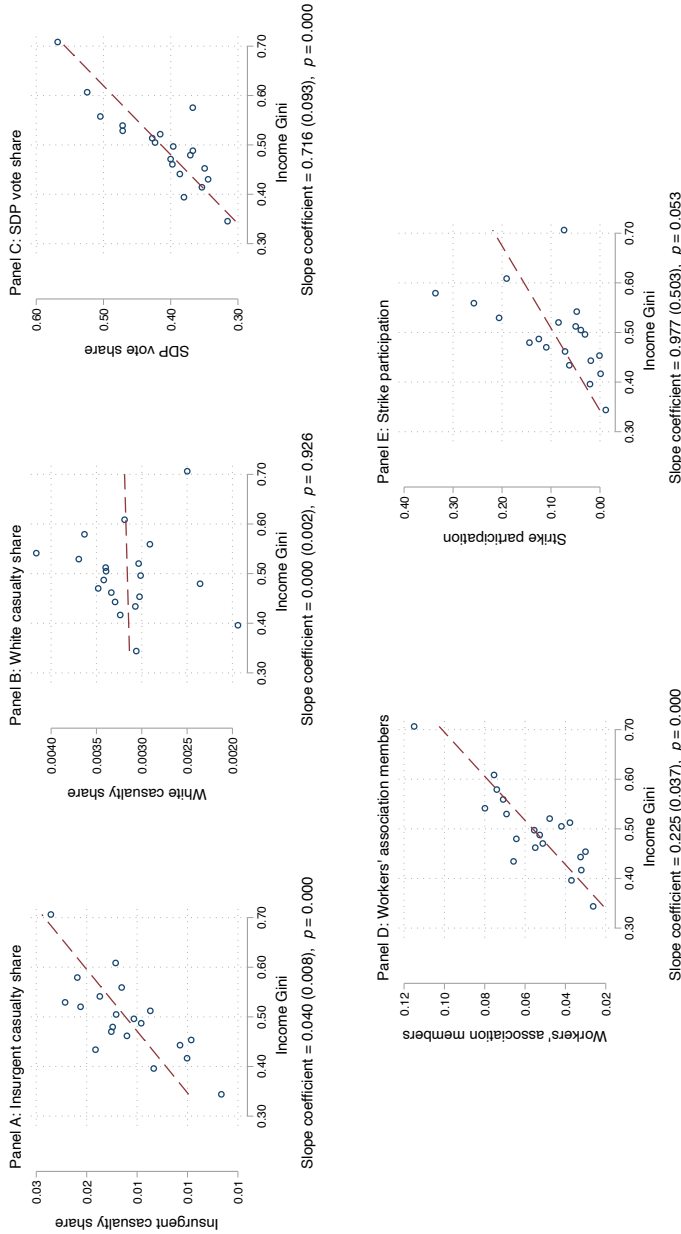


FIGURE 3. The relationship between inequality, civil war participation and pre-conflict discontent. The figures illustrate the relationship between income inequality and insurgent casualties (Panel A), White casualties (Panel B), SDP vote share (Panel C), workers' association membership rates (Panel D), and strike participation (Panel E). We net out baseline controls (latitude, longitude, log distance from Russia, log suitability for rye, log suitability for barley, log elevation, and log population in 1865) and region fixed effects. Robust standard errors of the slope coefficients are reported in parentheses. Dots are binned averages computed within twenty bins with an equal number of observations.

1865 as the base year. λ_t and λ_m are the county-specific year and municipality fixed effects, respectively, and η_{mt} is the error term. The standard errors are clustered by municipality. We include our baseline controls interacted with year fixed effects.²⁰

The pattern of the event-study estimates shows that the famine caused an inverted U-shaped response in Finnish inequality, where the turning point appears after the 1918 Civil War and after the extension of the franchise. Panel A of Figure 4 illustrates that inequality was first increasing more in areas with more deaths during the famine years. Furthermore, inequality also decreased the most in these areas after the Civil War of 1918 was over. The estimated impact of famine deaths on inequality in 1904, relative to the base-year 1865, is 0.533 ($p < 0.05$). This means that a one-standard-deviation increase in the famine severity is associated with approximately a 0.03 point increase in the Gini index.

Panel B shows a similar relationship between inequality and the crop failure in 1867, albeit less strong in terms of statistical significance ($p < 0.10$), with a crop failure causing a 0.03 points higher inequality in 1904. However, the positive effect is no longer present after the 1930s: the point estimates are very close to zero and statistically insignificant. What is more, we can reject the hypothesis that $\delta_{1904} = \delta_{1931}$

20. More detailed regression results from the event-study specification are available in Online Appendix Table B8. To study even longer term impacts, we add municipality-level information of income inequality in 1954 to the main analysis and re-estimate the event-study regression. Note, however, that we observe a more limited number of municipalities after the Second World War due to municipal mergers and border changes. Results from the event-study specification that uses the extended time period are shown in Online Appendix Figure B9. The estimates for the year 1954 are similar to the estimates for the year 1938.

for both measures (with $p < 0.05$ in the specification with all controls). Thus, after the peak year, inequality declined more in areas with a more severe famine exposure. This echoes the message of Panel C of Figure 1 (see also Online Appendix Table B9 for detailed regression results).

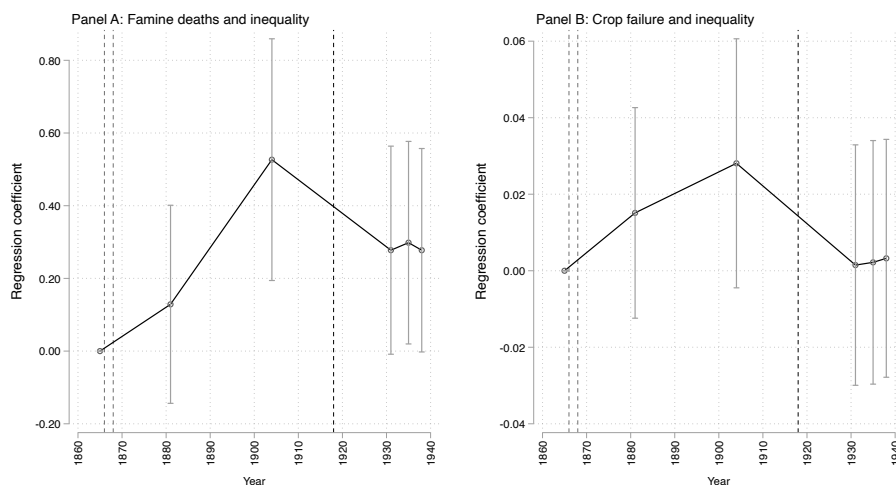


FIGURE 4. Event-study estimates. The figures plot the event-study estimates and their 95% confidence intervals that are constructed using standard errors clustered at the municipality level. We use 1865 as the base year. Estimations include county fixed effects and baseline controls interacted with year fixed effects. The first two vertical lines mark the famine years, and the third vertical line shows the civil war year.

4.4. *Inequality and Redistribution after the Civil War*

The last step of our empirical exploration concerns the mechanics in the turn in inequality and the increase in redistribution after the Civil War of 1918. After the conflict, the national government implemented a large-scale land reform that allowed tenant farmers to buy the land they occupied and other lands they required. In addition to the land reform, the franchise was extended in the municipal councils to all citizens

and votes were no longer tied to taxable income. This arguably affected differentially regions with different pre-conflict distributions of income and political power. On the other hand, these were also municipalities with more revolutionary tendencies, which the government potentially wanted to alleviate by redistributing more.

We present evidence on potential determinants of the downward turn in local inequality in Table 4. Let us first consider the regression results on land redistribution in columns (1) and (2). We find that the number of farms created in the 1920s land reforms (relative to the number of farms in 1910) is significantly higher in municipalities that were hit by a more severe famine shock, that had a more unequal distribution of income before the conflict, and that saw more insurgency. For instance, the estimate in column (2) of Panel B implies that experiencing a crop failure led to an increase of 0.05 – 0.07 in land redistribution which is about one fourth of the mean.

Columns (3)-(8) then look at the association between the famine shock and municipal spending growth. The estimates are positive and statistically significant for the famine deaths per capita (Panel A), but the evidence is weaker in the case of the crop failure variable (Panel B). We see that municipalities that were more exposed to the famine might have experienced greater growth of municipal health care spending. While there is some indication that policies changed after the democratization, the changes in public spending were not overwhelming. But as discussed by Acemoglu et al. (2015), democracy does not change inequality quickly by affecting policies. The main reason why inequality decreased rapidly in Finland seems to be the extensive land reform which plausibly had a more immediate effect on inequality in an agrarian

society. Yet, our results do suggest some changes in social policies, especially in health spending at the municipal level which can be expected to be targeted to the very lowest socioeconomic classes.

Online Appendix Figures B10 and B11 provide correlational evidence on the plausible mechanisms by plotting the relationship between the redistribution outcomes, and inequality and insurgency. First, we see that there was more land redistribution in locations that had higher pre-conflict inequality or more insurgency participation.²¹ Second, income inequality in 1904 has a clear positive association with the change in welfare spending, but there is no statistically significant relationship between initial inequality and municipal school spending growth. However, it appears that increases in health spending are greater in municipalities that were more unequal before the civil war. The regression results for insurgency per capita are largely in line with these remarks.

21. Dell (2012) finds similar effects of insurgency on land reform in her study of Mexican development after the Mexican Revolution. However, she argues that a more even distribution of agricultural land came at a cost. The agrarian reform created fruitful groundings for a clientelistic political system with little political competition. Dell also shows that areas that were exposed to insurgency during the revolution have lower wages today. Furthermore, more households are without electricity and running water in such locations.

TABLE 4. Changes in redistribution after the civil war by famine exposure.

	Land redistribution		Δ Welfare spending		Δ School spending		Δ Health spending	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Famine deaths per capita	1.062*** (0.178)	0.773*** (0.181)	0.853* (0.449)	0.877* (0.477)	1.143** (0.481)	0.899* (0.529)	3.000*** (0.826)	2.612*** (0.918)
Conley SE	0.281	0.251	0.446	0.413	0.571	0.615	0.908	1.007
<i>N</i>	398	398	398	398	397	397	394	394
<i>R</i> ²	0.340	0.419	0.083	0.153	0.106	0.134	0.042	0.066
Outcome mean	0.276	0.276	3.220	3.220	1.871	1.871	3.791	3.791
Panel B								
Crop failure	0.066*** (0.020)	0.050** (0.022)	-0.040 (0.053)	-0.022 (0.055)	0.053 (0.047)	0.064 (0.052)	0.206** (0.097)	0.194* (0.104)
Conley SE	0.023	0.021	0.051	0.050	0.047	0.048	0.134	0.136
<i>N</i>	320	320	322	322	321	321	322	322
<i>R</i> ²	0.417	0.498	0.083	0.180	0.113	0.142	0.062	0.089
Outcome mean	0.278	0.278	3.248	3.248	1.853	1.853	3.824	3.824
Controls	✓	✓	✓	✓	✓	✓	✓	✓
County FE		✓		✓		✓		✓

Notes: Baseline controls included in all estimations are latitude, longitude, log distance to Russia, log suitability for rye, log suitability for barley, log elevation, and log population in 1865. Robust standard errors are reported in parentheses. Conley standard errors allow for spatial autocorrelation among municipalities that are within 50 kilometers of each other. ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

5. Alternative Mechanisms

There are a number of factors that could explain the increasing and decreasing trends of inequality—and the regional variation thereof—in Finland. We will next discuss a few alternative mechanisms and illustrate that the famine was less likely to matter for later outcomes through these channels.

5.1. Industrialization before the Civil War

The original argument of Kuznets (1955) was that inequality first rises with economic development as countries industrialize and then falls as the fruits of industrialization and productivity growth trickle down to the working classes. We believe that this is unlikely to explain the pattern that we see in Finland. Importantly, we do not find any

evidence that the famine would have been associated with local industrialization in Finland (Online Appendix Tables C1 and C2). Thus, it is unlikely that industrialization would be driving our results in the way that in Kuznets argued. This could have been the case, for instance, if the famine had stimulated the migration of cheap rural labor force to cities.

The lack of any significant relationship is perhaps not surprising. Finland was primarily an agrarian country in the early 20th century: almost 70 % of households were employed in agriculture, and almost half of the value added was generated in the agricultural sector (see Online Appendix Figure C1). The rise in manufacturing was modest before the civil war. Large-scale industrialization followed only much later and truly kicked off after WWII (Mitrunen, 2020).

5.2. Famine and Emigration

Another alternative explanation relating famines to democratization emphasizes the role of emigration and outside options. Indeed, in many parts of the European continent, people expressed discontent after large negative shocks by emigrating to the Americas, in particular to the United States. Narciso et al. (2020) find that the Great Irish Famine was a significant long-run driver of Irish individuals' migration choices. In Sweden, the same weather shock that caused the Finnish famine triggered the first wave of emigration to North America. Karadja and Prawitz (2019) show that the mass emigration increased the remaining workers' bargaining power and paved the way for increased demands for political change. Importantly, welfare expenditures went up in

Swedish municipalities that also became more likely to adopt more inclusive political institutions.

A large number of Finns also emigrated during the Age of Mass Migration. However, emigration from Finland truly kicked off much later than in Sweden: there was no first wave in the aftermath of the famine, and the peak of emigration was only in 1902 when a total of 25,000 emigrants left the country. More importantly, looking at the geographic distribution of emigrants across municipalities, we do not find any compelling evidence that emigration would have been driven by the famine shock (Online Appendix Table C3).

5.3. Political Behavior before and after 1918

We have argued that the leveling of the local income distribution was at least partially due to the municipal franchise extension that happened after the 1918 Civil War. Also other types of political forces might have influenced the declining trend in inequality. It could be that there was a shift in the demand for left-wing politicians.

Online Appendix Figure C2 shows regression results from an event-study specification where we look at the connection between famine exposure and voting for the Social Democratic Party in Parliamentary elections. Qualitatively, it appears that there was a drop in Social Democrats' electoral support after the Civil War in locations hit harder by the famine, but our point estimates are not statistically significant at any conventional levels. There could also be effects on voter turnout which could have downstream effects on policymakers' incentives and their policy output. For instance,

greater exposure to the civil conflict induced by the famine could have hindered political participation, for instance, by undermining trust in the government. Online Appendix Figure C3 again presents point estimates from an event-study specification. We do not find any apparent indications that voter turnout would have reacted notably to the famine after 1918. Thus, effects on voter turnout also seem like a less plausible channel.

6. Concluding Remarks

This paper demonstrates that the famine of 1866-1868 had a persistent impact on local inequality and labor coercion in Finland until the early 1900s. We then argue that by boosting these inequalities, the famine was a substantial driver of participation in the Finnish Civil War in 1918. The civil war was triggered by the interaction of these social disparities and the Russian Revolution, a nation-wide shock that led to the Finnish independence. Exploiting individual-level data on civil war casualties, we document that insurgency was higher in places that were more affected by the famine and had higher levels of inequality and more labor coercion. Finally, we show that, given the civil war and the outcome thereof, the shift towards equality after the civil war was more substantial in municipalities that were more affected by the famine and had higher levels of inequality before the conflict. Significant in this shift was the land reform enacted after the conflict. Furthermore, after the Civil War, previously unrepresented segments of society gained political representation in local governments and were able to participate in decision-making. Forces such as middle

class bias or elite capture were less likely to play an important role, paving the path for more equality and redistribution.

Although the Finnish experience shows similarities with many other countries and reflects Acemoglu and Robinson's idea of the political Kuznets curve (Acemoglu and Robinson, 2000, 2006), our results exhibit an interesting contrast with other Nordic countries where, due to different historical circumstances, the state successfully renegotiated the social contract making many social changes without any violent conflict. For instance, Finland's western neighbor Sweden had high inequality and similar voting institutions until the year 1919 (Bengtsson, 2019). Yet Sweden did not experience a civil war, but reformed its institutions more peacefully. In Norway, the state successfully suffocated the perceived revolutionary threat by reducing working hours and expanding social transfer programs (Rasmussen and Knutsen, 2020).

An important lesson from our case study is that areas that once appear poor and backward may not be destined—perhaps because of culture, deep institutions, or adverse historical shocks—to be trapped in a low-development, high-inequality equilibrium. As of today, Finland is considered to be among the most equal and the most democratic societies. But merely a hundred years ago, extreme economic inequality and exclusive political institutions were defining characteristics of the Finnish society. Our paper sheds light on some of the historically contingent forces that were locally behind the drastic transformation of the country.

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