The Legacies of Atrocities and Who Fights*

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Abstract

How do the legacies of atrocities shape who fights? We argue that past atrocities shape local grievances and economic incentives. Increasing grievances make individuals more likely to rebel, and less likely to fight for the perpetrator. When organizations use material incentives to recruit, worsening economic conditions increase the incentives to fight. We study how the atrocity of the 1845–1849 Great Famine affected whether Irishmen fought for or against Britain. Leveraging data on over 150,000 Irish combatants, we show that individuals in places more severely affected by the Famine fought in the pro-British Irish Militia and the WWI British military at *lower* rates. However, they rebelled against Britain at *higher* rates. Additional quantitative evidence suggests that historical grievances shaped the choice to fight for both sides, while increasing opportunity costs only mattered when organizations paid combatants. We demonstrate how the memories of the past, and economic conditions in the present, shape who fights.

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1 Introduction

The establishment and maintenance of empires is frequently accompanied by horrific atrocities perpetrated against conquered populations. In the Algerian War of Independence, the French engaged in the systemic use of torture and forced disappearances (Al Jazeera 2018). During the Second Boer War, the British burned farms and poisoned wells (Pakenham 2015: 516–523), while during the Mau Mau rebellion they tortured and sexually assaulted suspected rebels (Elkins 2005). At the same time that empires engage in atrocities against the populations over whom they rule, they also concurrently rely on these same communities to defend against both internal and external threats. To combat the Mau Mau rebels in Kenya, the British depended on the Kikuyu Home Guard—a government paramilitary force drawn from the same community as the Mau Mau (Anderson 2017). In both Ireland and India the British relied upon local combatants to fight against internal uprisings, such as during the Irish Rebellion of 1798 (McAnally 1949: ch. 8) and Indian Rebellion of 1857 (Spilsbury 2008: 78–79). Colonial subjects were also commonly used to combat foreign adversaries. For example, during World War I the British relied on approximately 1.5 million Indian soldiers (Morton-Jack 2018: 3) while the French recruited almost 500,000 troops from their colonies in West Africa, Madagascar, Indochina, Algeria, Tunisia, and Morocco (Das 2011: 4). The successful maintenance of empires commonly depends upon the willingness of their colonial subjects—the same populations against whom they perpetrate atrocities—to be willing to fight in the empire's defense. How do government-perpetrated atrocities affect the likelihood individuals fight in defense of, or opposition to, the government deemed responsible?

We argue that historical atrocities affect the choice to fight in two main ways. First, memories of past atrocities are transmitted across generations by families and local communities (Dell and Querubin 2018; Gilligan, Pasquale, and Samii 2014; Rozenas, Schutte, and Zhukov 2017). Local memories of the past shape individual grievances toward the government perpetrator (Lupu and Peisakhin 2017; Rozenas, Schutte, and Zhukov 2017; Wang 2019). Consistent with grievance-based accounts of rebellion, we argue that these relatively stronger grievances in places where past atrocities occurred make individuals more likely to rebel against the government deemed responsible, and less likely to fight in its defense. Second, atrocities reshape local economies by reducing available labor and destroying infrastructure (Dell and Querubin 2018; Harada, Ito, and

Smith 2020). Past research documents how this death and destruction can at times worsen, and at other times improve, local wages and individuals' job prospects in the long-run. We argue that whether and how atrocity-induced economic changes shape the choice to fight depends on (1) whether the atrocity improves or worsens local economies, and (2) whether combat organizations use material incentives to recruit. When organizations recruit using material incentives, worsening economic conditions increase the incentives for individuals to fight since doing so provides a stable and secure job. Taken together, we argue that both the local memories of the past, and the economic incentives individuals face in the present, shape who fights.

In this paper we assess whether and how historical atrocities shape conflict behavior by studying how differences in the severity of the Irish Potato Famine affected the likelihood subsequent generations of Irishmen joined the British Empire's military forces, or rebelled against them. The Famine was a horrific atrocity for which the British were largely perceived to be responsible. As John Mitchel, a leader of the 1840s revolutionary Young Ireland movement asserted, "The Almighty, indeed, sent the potato blight, but the English created the famine" (Mitchel 1861: 219). We argue that local grievances in places where the Famine was more severe should make individuals more likely to rebel against the British, and less likely to fight in their defense. Perhaps counter-intuitively, research in economics suggests that places more severely affected by the Famine ended up economically better off in the long run. Economic-based explanations for conflict participation suggest that individuals in places harder hit by the Famine should be *less* likely to participate in the British military, since they will find the material incentives for fighting less attractive. By contrast, we argue that economic-based explanations yield indeterminate predictions for participation in the Irish rebel forces; since rebels were not recruited to participate with material incentives, improving local economic prospects should not affect the choice to fight. Putting the two mechanisms together, both grievances and economic incentives suggest that individuals in places more severely affected by the Famine should be less likely to fight for the British military. By contrast, only grievances yield clear predictions for participation in the Irish rebel forces.

We assess these potential explanations by compiling a new dataset to compare how differences in the severity of the Famine affected the rates of participation in the British military and Irish

rebel forces. We treat the barony as the unit of analysis.[1] This approach follows past research in political science that conceptualizes the legacies of violence as being transmitted through local communities (Dell and Querubin 2018; Gilligan, Pasquale, and Samii 2014; Rozenas, Schutte, and Zhukov 2017), while also mirroring empirical research in economics seeking to better understand the long-run consequences of the Famine (Goodspeed 2016; Ó Gráda 1999). We collected detailed individual-level information on over 150,000 Irish combatants—including combatants' birthplaces and residences—who fought either for or against the British Empire between 1880–1922. We geolocated the birthplace and residence of combatants using a *GoogleMaps* API algorithm and combined this individual-level data with population counts from the 1901 and 1911 censuses of Ireland to calculate barony-level rates of participation in the (1) pro-British Militias in Ireland, (2) British Military in WW1, and (3) Irish rebel forces. We next proxy for the severity of the Famine within each barony by leveraging the local change in population between 1841 and 1851. The measure is intended to capture at a local level the widespread death and destruction we expect to determine grievances and local economies, and thus ultimately the choice to fight.

Using the newly compiled data, we first demonstrate that places more severely affected by the Famine were less likely to have soldiers fight for pro-British Irish Militia in 1880–1900s Ireland. Baronies that lost a quarter of their population during the Famine have 1.9 percentage point fewer men fight for the Irish Militia. We next demonstrate that places more severely affected by the Famine were less likely to have soldiers fight, and die, in British forces in World War I. Baronies that lost a quarter of their population during the Famine have 0.6 percentage point fewer men enlist and 0.45 percentage point fewer men die for the British in WW1. These three results are substantively large and suggest that the Famine had a demobilizing influence on the likelihood that Irishmen fought in defense of the British Empire. Consistent with research in economics (Narciso and Severgnini 2019), we next show that the Famine also led to higher rates of fighting *against* the British.[2] Baronies that lost a quarter of their population during the Famine have 0.15 percentage point more men fight in the Irish rebel forces, an increase of 50%. Taken together, the findings suggest that individuals in places more severely affected by the Famine were both less likely to fight to defend the British Empire and more likely to mobilize against it.

[1] Baronies were geographically defined historical units used for cadastral purposes until 1898, comprising 330 subdivisions within Ireland.

[2] In contrast to Narciso and Severgnini (2019), we use a different empirical approach and sample for our analyses.

We next leverage a range of additional evidence to better understand whether grievances, opportunity costs, or a combination of the two explain these findings. We start by considering whether there is additional evidence in favor of grievance-based accounts using constituency-level data from the 1918 parliamentary election. Constituencies more severely affected by the Famine voted at higher rates for the pro-Irish and anti-British Sinn Féin party. Famine-induced grievances thus shaped individual attitudes toward the British, rather than simply making individuals more "violence-prone" as past research might suggest (Humphreys and Weinstein 2008). While this finding provides further evidence for how grievances shaped the choice to fight, local economic incentives could still have also mattered. We therefore use comprehensive data from the 1911 Irish census to consider how recruitment practices interacted with local economic conditions to shape whether individuals fought for or against Britain. Places more severely affected by the Famine had higher rates of literacy, a lower percentage of general laborers, and a higher percentage of farmers in 1911. This evidence suggests that places more severely affected by the Famine were economically better off in the long-run. However, differences in these economic measures are only predictive of the choice to fight in the British forces; economic indicators are largely uncorrelated with the choice to rebel against the British. In summary, both grievances and economic incentives shape the choice to fight, though the latter is moderated by how organizations recruit their combatants.

The paper makes at least two main contributions to research in political science. The first is studying a distinct outcome variable—the choice to fight for or against the government perpetrator of past atrocities—as part of a growing body of research considering how the legacies of the past shape behavior in the present (Charnysh and Finkel 2017; Homola, Pereira, and Tavits 2020; Lupu and Peisakhin 2017; Rozenas and Zhukov 2019; Wang 2019). We extend this prior work on the non-violent legacies of the past, by focusing on political behavior in one of its most extreme forms: the choice to engage in violence both for and against the state. In doing so, we provide a new theoretical argument for how both the past and present combine to shape the choice to fight. The second contribution is bringing new empirical evidence to bear on classic debates about whether and how grievances shape the choice to participate in violence and rebellion (Cederman, Gleditsch, and Buhaug 2013; Collier and Hoeffler 2004; Fearon and Laitin 2003; Gurr 1970; Humphreys and Weinstein 2008; Olson 1965). Theoretically, this work commonly considers grievance or economic-based explanations as mutually exclusive, while empirically relying on rough proxies for the underlying

concepts (e.g., Collier and Hoeffler 2004; Fearon and Laitin 2003). Instead, by both measuring an extreme form of an atrocity along with collecting a host of new data to understand its consequences, we demonstrate how *both* grievances and economic considerations shape the choice to engage in violence for or against the state. Grievances and opportunity costs are thus not mutually exclusive concepts; rather, they operate in tandem to shape conflict behavior. Our paper thus provides a new answer to the classic question of why individuals fight.

2 How The Legacies of Atrocities Shape Conflict Participation

We argue that both the memories of the past and the economic conditions in the present shape the choice to fight. Throughout, our conceptual framework focuses on individuals' *locations* as the main channel for how past events shape grievances and economic conditions. The memory of an atrocity is kept alive locally through families and local communities (Lupu and Peisakhin 2017; Wang 2019). Through death, migration, and destruction, atrocities reshape the economic conditions of localities, which will then affect individuals' economic opportunities (Dell and Querubin 2018; Harada, Ito, and Smith 2020).

2.1 How Past Atrocities Shape Local Grievances and Conflict Participation

We argue that past atrocities shape local grievances toward the actor deemed responsible. Scholars of the historical legacies of conflict document how information transmitted through families and communities over time shape attitudes toward the government. For example, Lupu and Peisakhin (2017) demonstrate how individuals whose families were exposed to violence during the deportation of Crimean Tatars in 1944 have lower levels of outgroup trust. Similarly, Rozenas, Schutte, and Zhukov (2017) demonstrate how state violence perpetrated by the Soviet Union in Ukraine shapes contemporary voting behavior; individuals in places where Soviet violence was worse are less supportive of parties associated with Russia. Wang (2019) explores the long-run consequences of state terror during China's Cultural Revolution, documenting how individuals who were raised in localities that experienced more state-violence are less trusting of China's contemporary political leaders and government system. Collectively, this work shows that past atrocities perpetrated by the state shape local grievances and nonviolent political behavior.

A second body of research on the determinants of conflict participation demonstrates how these types of grievances influence the choice to participate in violence and rebellion (Cederman et al. 2020; Cederman, Gleditsch, and Buhaug 2013; Paige 1978; Schubiger 2021; Wood 2003). Grievance-inducing events shape conflict behavior by increasing anger (Balcells 2010, 2017), hatred (Petersen 2002; Post 2005), or rage (Petersen 2002). Anger, hatred, and rage motivate individuals to fight. For example, focusing on the case of El Salvador, Wood (2003) demonstrates how moral outrage at past atrocities caused individuals to derive personal benefits from participating in opposition to the state. In a similar spirit, Schubiger (2021) argues that state violence generates grievances, which increase the number of potential recruits for rebel organizations. Prior research also documents how information about past government atrocities transmitted through families and local communities can cause grievances. For example, Post (2005) argues that information about past atrocities causes hatred to be "bred in the bone" and this shapes the choice to join militant groups such as Fatah.

Integrating these two bodies of research suggests that past atrocities should shape the likelihood individuals fight in defense of, or opposition to, the perpetrating state. Individuals in places where past atrocities occurred have stronger grievances against the government deemed responsible. These stronger grievances make individuals more likely on average to rebel against the perpetrator and less likely to mobilize in their defense. Of course, the long-run implications of past atrocities for conflict behavior also depend on whether and how other mechanisms which affect the choice to fight are operative. For this reason, we next turn to considering a second major determinant of conflict participation in the form of economic incentives.

2.2 How Past Atrocities Shape Local Economic Conditions and Conflict Participation

We argue that whether and how differences in local economic conditions affect the choice to fight depends on two core factors. The first factor entails the economic ramifications of the atrocity itself. Past research has documented how widespread death and destruction, which commonly accompanies government-perpetrated atrocities, can have heterogeneous effects on local economic conditions. The second factor entails whether combat organizations use material incentives to recruit individuals to fight.

At times, the death and destruction accompanying past atrocities worsens local economies. In the case of the Vietnam War, Dell and Querubin document how bombing reduced the availability of manufacturing, surplus goods, and access to vehicles (Dell and Querubin 2018: 745). Harada, Ito, and Smith (2020) demonstrate how the negative economic consequences of past violence can persist in the long run. By focusing on the indiscriminate firebombing of Tokyo during World War II, they demonstrate how decades after the bombings, damaged neighborhoods had lower rates of employment and education, and fewer executive and professional workers (Harada, Ito, and Smith 2020: 27–29). Prior work also documents how widespread disease and famine can have similar long-run negative economic consequences. For example, in Eastern Europe the Black Death decreased the economic well-being of peasants (Aston and Philpin 1987). In Finland, the 1866–68 wheat famine worsened local economic conditions (Meriläinen, Mitrunen, and Virkola 2020). And as Dell and Queribin note: "economic destruction could reduce the opportunity cost of joining the insurgency" (Dell and Querubin 2018: 713).

By contrast, a second body of research documents how places more severely affected by atrocities and violence can "catch up" economically post-conflict. Building on the neoclassical growth model, Bellows and Miguel (2009) show how chiefdoms which saw more violence during the civil war in Sierra Leone had similar levels of postwar economic conditions. They find that per capita consumption expenditures, the proportion of children enrolled in school, and child body mass index, are not significantly associated with conflict victimization (Bellows and Miguel 2009: 1154–1155). Pushing this logic to the extreme, a third body of work shows how places more severely affected by atrocities can end up better-off in the long run. For example, Brenner (1976) argues that the Black Death improved the bargaining power of peasants across Western Europe resulting in higher wages and better working conditions. Similarly, as we discuss more fully below, economic historians argue that the Famine in Ireland increased living standards in the long-run by increasing the bargaining power of labor (Ó Gráda 2006: 21).

We argue that whether and how these economic changes shape the choice to fight is moderated by a crucial second factor: namely, whether combat organizations use material incentives to recruit combatants. Prior research highlights at least two different strategies organizations employ when recruiting combatants (Weinstein 2006). The first entails providing individuals material benefits or selective incentives for their service (Lichbach 1998; Popkin 1979). Intuitively, these incentives

attract individuals who decide to be combatants based at least in part on the material benefits their service will provide. The second strategy entails appealing to ideologies, ethnicity, or cultural identities as a means of mobilizing recruits (Weinstein 2006: 98–100). Thus, when organizations do not recruit using material incentives they are trying to attract individuals who are either (1) sufficiently motivated by non-material factors that the are willing to pay the material costs associated with fighting, or (2) sufficiently financially secure that these costs are negligible. This is not to say that opportunity costs do not matter for individuals in this latter category; rather their consequences are either muted or overridden in rebels' cost-benefit calculation.

Table 1 – How Local Economic Changes and Group Recruitment Strategies Shapes Who Fights.

		Org Recruits w/ Material Incentives	
		Yes	**No**
Economic Conditions	**Improved**	Less likely to fight	Fight at similar rates
	Worsened	More likely to fight	Fight at similar rates

Taken together, these two bodies of prior research suggest that differences in the recruitment strategies employed by combat organizations should moderate the long-run economic effect of past atrocities. The divergent empirical implications are depicted in Table 1. The first column indicates that when organizations use material incentives to recruit, we should expect their recruits to be influenced by local differences in economic conditions. Improving local economic conditions decrease the incentives to fight; worsening these conditions increase these incentives. However, when organizations do not use material incentives to recruit, the non-material motivations of their potential combatants should make it such that they are not influenced by local differences in economic conditions. Importantly, for the case of historical Ireland we will be in the top row of Table 1, with variation in recruitment strategies across combat organizations. Of course, it could be the case that these local changes in economic conditions also influence grievances. While throughout this section we focused on the independent effect of each mechanism for theoretical simplicity, we return to discussing this possible interaction in Section 7.

3 How the Legacies of the Great Famine Shaped Participation in the British Military and Irish Rebel Forces

In 1845, Ireland was struck by the fungus *Phytophthora infestans*, more commonly known as the potato blight. The blight led to widespread failure of the potato crop. This failure was a monumental disaster given that a large majority of Ireland's poor relied upon the potato for their daily subsistence (Bourke 1993: 97–100). From 1845–1849 the crop failure led to the death of approximately one million people, and the emigration of another million. How did differences in the severity of the Great Famine affect the likelihood Irishmen fought in the British Empire's defense, or instead rebelled against it?

3.1 How Famine-Induced Grievances Shaped Conflict Participation

The links between grievances caused by the Famine and conflict participation are pervasive throughout research on historical Ireland. Both contemporary and historical accounts of the Famine document how the starvation, disease, and death was largely perceived to be attributable to British rule. As the Famine ravaged Ireland between 1845 and 1849, the British generally took what was perceived to be a "hands-off" approach in which they emphasized parsimony and making the Irish pay for "their crisis" (Ó Gráda 2006: 15). For some in the British government, this policy was justified by "Malthusian providentialism—the conviction that the potato blight was a divinely ordained remedy for Irish overpopulation" (Ó Gráda 2006: 15). Authorities evicted indebted tenants and workhouses, which were supposed to provide relief, were left underfunded and overcrowded. This British attitude, and the perceived under-provision of aid and support, did not go unnoticed. At the time, many throughout the island of Ireland were horrified and disgusted with the underwhelming British response. For example, describing the starvation and destruction in West Clare, the Reverend Sidney Godolphin Osborne "looked on the Crystal Palace and thought of Kilrush Workhouse, as I have seen it and now know it to be, I confess I felt, as a Christian and subject of a Christian government, utter disgust" (Murphy 1996: 79).

This idea that the British were responsible for the Famine carried into the early 20th century. Indeed, a range of qualitative accounts suggest that the famine played an important role in shaping revolutionary attitudes against British rule. Edward "Ned" Neville describes his choice to join the

Irish rebel forces, stating that "it was often I listened to stories of the Famine... The stories of the treatment meted out by the British to our ancestors made a deep impression on me, and my greatest ambition was that, some day, I could do some little thing to avenge their sufferings" (Neville 1954: 1). Phil Fitzgerald, the Adjutant of the 3rd Battalion of the 3rd Tipperary Brigade, similarly recounts how the Famine shaped his decision to rebel. Fitzgerald describes how his grandfather:

> ... and his large family fought the hunger and poverty and degradation that followed the artificial famine of 1847. Exorbitant rents, and all the economic ills that accompany occupation by enemy forces, drove two of my aunts and four uncles to Australia. That was my background as I grew to manhood, and, in a dim sort of way, my heart rebelled against the system that drove my kith and kin beyond the seas (Fitzgerald 1955: 1).

Similarly, in a biography of Irish rebel brothers Sean and Tom Hales, Liz Gillis writes how their childhood experiences of hearing about the Famine shaped their choice to fight. Gillis notes how "the young men and women there had grown up hearing stories of the Famine of the 1840s, which had a devastating effect on that area of the country, most notably in Skibbereen..." Gillis argues that these "stories helped instill in them a belief that only Irish people, and not a foreign government, should determine Ireland's future, and that future could be achieved only by severing the link with Britain completely" (Gillis 2016: 24). Historical accounts also highlight how grievances reduced the likelihood Irishmen fought in British forces. In a speech at an Anti-Conscription rally in 1918 in Ireland, Friar O'Flanagan argued that Irishmen should refuse to fight since "The quarrel between Germany and England began four years ago. The fight to the death between Ireland and England began 700 years ago" (O'Flanagan 1918: 1). Sean McDermott, a leading member of the Irish rebel forces who would eventually be executed in the aftermath of the Easter Rising, similarly expressed his opposition to Irishmen fighting in British forces, stating "The Volunteers were not brought into existence to fight for England. To hell with England! Let her fight her own battles" (MacAtasney 2004: 74). Building on these historical accounts, we argue that grievance-based accounts suggest that individuals in places more severely affected by the Famine should be more likely to rebel against the British Empire, and less likely to fight in its defense.

3.2 How Famine-Induced Economic Changes Shaped Conflict Participation

Perhaps counterintuitively, research from economics and history suggest that in the long-run the Famine *increased* the living standards of those in places more adversely affected. The improvement was driven by two main forces. First, the costs of the famine were borne unequally among local populations. Those who suffered most—and thus were more likely on average to either die or emigrate—were generally the relatively poorer individuals in a given location (Ó Gráda 2006: 17). This mechanically shaped the local demography in places harder hit by the Famine. Second, this reduction in the overall number of individuals who lived in places more adversely affected by the Famine improved the economic prospects of those who remained. Fewer individuals improved the relative bargaining power of workers which in turn increased their wages (Boyer, Halton, and Rourke 1994; O'Rourke 1994). Taken together, these two forces suggest that in the long-run places more adversely affected by the Famine were actually better off economically than places less severely affected. How then do these improved economic conditions shape the choice to fight?

A range of research highlights how financial incentives shaped the choice to join the British military forces. As Mark Cronin notes in his study of enlistment in County Cork, "One fairly steady source of employment for Blackpool men, and central to this study, was, of course, the British army and navy" (Cronin 2014: 19). Similarly, in his seminal work studying Irish participation in WWI, Jeffery documents how Jim Donaghy in Derry was fired from his job and thus decided to enlist, while another individual named James English "found that, with separation allowances, he and his family were 154 percent better off once he was soldiering" (Jeffery 2000: 19). These examples show how when the financial benefits from "soldiering" outweigh those from remaining a civilian, we should expect individuals to be on average more likely to fight. Reflecting on the choice to participate in the British military, James Connolly, one of the leaders of the rebel Irish Citizen Army argued that for those fighting at the front "there are many thousands whose soul revolts against what they are doing, but who must nevertheless continue fighting and murdering because they were deprived of a living at home, and compelled to enlist that those dear to them might not starve" (Jeffery 2000: 19). Taken together, an economic-based argument suggests that we should expect individuals in places more severely affected by the Famine to be less likely to fight in British forces.

By contrast, economic-incentives should not directly shape the choice to fight in the Irish rebel forces due to the fact that Irish rebel combatants were "volunteers" and thus not generally paid for their participation.[3] Moreover, many combatants continued working while the conflict was ongoing.[4] The ability to keep working meant that individuals were not forced to forego their wages in the same way as in other rebel organizations. In contrast to participation in the British military forces, this means that (1) individuals did not have to abandon their jobs or farms when they chose to fight, and (2) individuals did not benefit financially by fighting. Given this, we argue that differences in local economic conditions as shaped by the Famine—insofar as they shaped rebels' economic incentives—should not translate into differential participation in the Irish rebel forces.

3.3 Empirical Implications

Table 2 presents the main empirical implications of the argument. There are two main mechanisms shaping the choice to fight. First, the Famine was a grievance-inducing atrocity. Grievance-based explanations suggest that individuals in places more severely affected by the Famine should be less likely to participate in the British military and more likely to fight in the Irish rebel forces. Second, the Famine counterintuitively improved local economies. We argue these economic consequences have divergent theoretical implications depending on the recruitment processes of combat organizations. Since the British encouraged individuals to fight with monetary incentives, we expect individuals in places harder hit by the Famine to be less likely to fight. By contrast, the fact that individuals were not paid for their participation in the Irish rebel forces means that varying local economic conditions should have a negligible effect on the choice to fight.

4 Historical Data on the Famine and Irish Combatants

The empirical task at hand is to assess how differences in exposure to the Famine affected differences in conflict behavior. Following our theoretical focus on how individuals' *locations* shape their memories of the past and the economic conditions they face in the present, we use the barony as

[3]For a discussion of the organization and recruitment of Irish rebels along nationalist grounds among local communities, see (Augusteijn 1996: ch. 1).

[4]First hand accounts of rebel combatants commonly note how maintaining a job was vital for conflict participation. For example, the pension file for Edward John Moore notes how losing his job made him stop fighting; the file states: "On his return to Dublin he rejoined, but he dropped out in October 1917, when he was obliged to leave Dublin to seek employment elsewhere" (Moore 1940: 51).

Table 2 – How the Theorized Mechanisms Affect the Likelihood Individuals Fight

Mechanism	Causal Pathway	Empirical Implications	
		Participation in British Military	Participation in Irish Rebellion
Grievances	Famine-induced grievances *increase* anger/hatred toward British.	*Decreased* likelihood of fighting for British.	*Increased* likelihood of fighting against British.
Economic Incentives	Famine-induced wage surplus *decreases* attractiveness fighting for British outside option. Famine-induced wage surplus indeterminate for rebelling against British since not paid for fighting.	*Decreased* likelihood of fighting for British.	*No effect* on fighting against British.

the unit of analysis. Empirically, this approach mirrors recent research in economic history seeking to better understand the consequences of the Great Famine in Ireland (Goodspeed 2016; Ó Gráda 1999).

4.1 Explanatory Variable: Population Loss from 1841 to 1851

We start by constructing an empirical measure of the severity of the Famine. The Famine was above all a demographic tragedy. Not only did many die of starvation and diseases (Mokyr and Ó Gráda 2002), it also caused a large increase in migration to the other British Isles and the New World (Fitzpatrick 1989). The total population of Ireland shrank from 8.2 million in 1841 to 6.5 million in 1851 (Ó Gráda 1979: 283). Following research in economic history, we use these changes in population as a measure for assessing differences in the severity of the Famine (Ó Gráda 1999; Meriläinen, Mitrunen, and Virkola 2020). We calculate this by comparing the population of a barony in 1841, four years before the Famine, to the population in 1851, two years after the Famine. Population data by barony come from the 1841 and 1851 Irish censuses which have been compiled by the Irish Historical Data Base (Crawford et al. 1997). This leads to the following equation for our main explanatory variable, *Population Loss from 1841–1851* in barony i:

$$PopulationLoss_i^{1841\text{–}1851} = \frac{Population_i^{1841} - Population_i^{1851}}{Population_i^{1841}} \tag{1}$$

Panel A of Figure 1 maps the population loss from 1841 to 1851 by barony. The map shows that the population loss is most heavily concentrated toward the west half of Ireland, while the north and southeast suffered relatively less. This geographic distribution of our main treatment variable accords with other work exploring the spatial variation in the consequences of the Famine (Kennedy, Ell, and Clarkson 1999: 26–29), providing face validity to our empirical measure.[5] Panel B of Figure 1 plots the distribution of the variable. While most baronies had a population loss, others had a population gain. This population gain was most heavily concentrated in more urban areas such as Dublin and Belfast. Panel B demonstrates how relatively few baronies saw a population gain, with most places experiencing a population loss of some kind up to an extreme of almost 50%. Given the vast differences in experiences with the Famine between urban and rural localities, throughout our main analysis we restrict our sample to baronies with a 1841 population density of below 250 inhabitants per square kilometer (dropping 14 out of 323) and exclude those that experienced a population gain from 1841 to 1851 (dropping a further 13). However, as we demonstrate in the Appendix our results our robust to a broader sampling frame.

4.2 Dependent Variables: Participation in the Irish Militia, World War I, and Irish Rebel Forces

We focus on participation in three main types of combat forces: the pro-British Irish Militia, the British Army during World War I, and the Irish rebel forces from 1916–1922. To construct our dependent variable of barony-level fighting rates, we require information for both the number of combatants for each of the respective combatant forces—our numerator—and the the number of potential combatants—our denominator.

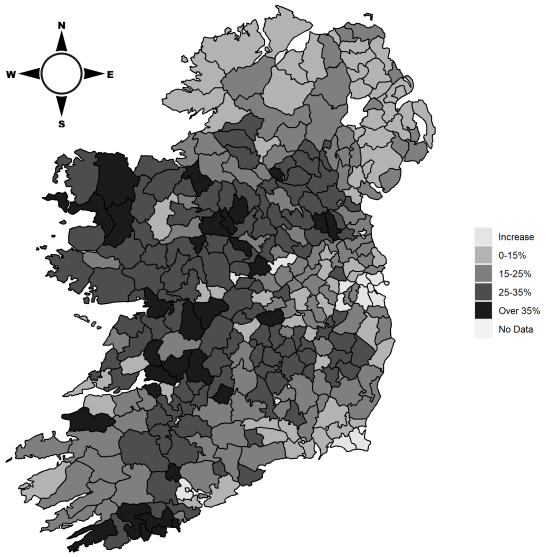
We relied on four different sources to collect individual-level information on Irish combatants. First, we collected information on participation in the Irish Militia from the Militia Attestation Papers compiled and digitized by the National Archives.[6] The full sample includes information on over 156,845 members of the Scottish, Welsh, and Irish Militias from 1800 to 1915. We restrict our sample to post 1881, when militia service became full time and comprises the vast majority of our

[5] When aggregating to the county level, the population loss measure also correlates with county-level excess death data, with a correlation of 0.5.

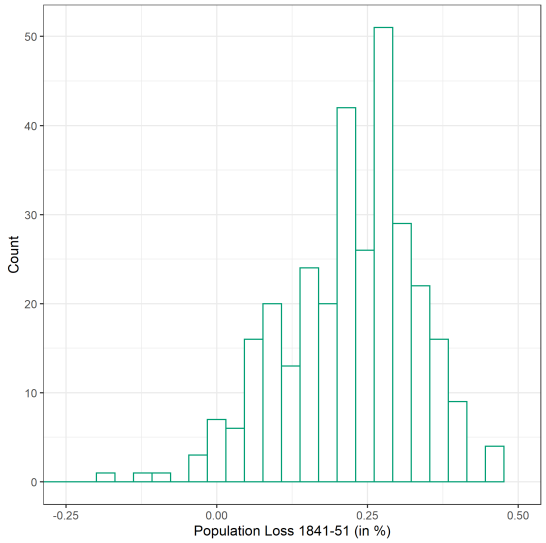
[6] The National Archives. "War Office: Militia Attestation Papers." available at `https://discovery.nationalarchives.gov.uk/details/r/C14304`.

Figure 1 – Population Loss from 1841 to 1851

Panel A: Map



Panel B: Histogram



Notes: The distribution of population loss during the Famine. Population loss is calculated by $\frac{Population_i^{1841} - Population_i^{1851}}{Population_i^{1841}}$. For legibility an outlier of -1.035 (Drogheda) has been removed from the histogram.

data. We use individuals' listed birthplaces to identify 62,782 Irish individuals serving in the Irish Militia.

Second, we collected information on Irishmen who fought in the British Military in WWI. This information is drawn from digitized British Service records, which contains information on non-commissioned officers and other ranks that served in the WW1 British military.[7] The dataset contains information about each service member's year and place of birth, enlistment year, residence place, regiment, and family information. Using birthplace, residence, and membership in Irish regiments we identify 56,952 Irish service members. It is estimated that about 200,000 Irishmen served in in WW1 out of which we thus have data on almost a third.[8] Third, using combatants' place of birth in a dataset of 703,810 British service members who died in WW1,[9] we identify 29,905 Irish casualties. It is estimated that about 35,000 Irishmen died during WW1. We are thus able

[7]The National Archives. "War Office: Soldiers' Documents, First World War 'Burnt Documents'." available at `https://discovery.nationalarchives.gov.uk/details/r/C14567`

[8]5 million men served in the British Army in WW1. However, a fire in 1940 destroyed about 60% of the records of which the records of 1.9 million individuals survived.

[9]Naval, and Military Press. "British and Irish Military Databases." available at `http://www.nmarchive.com/`.

to identify roughly 80% of the casualties (Myers 2011). While each of these three datasets vary in their completeness and depth of information, combined they provide unique information on over 100,000 combatants across different time periods and combatant bodies. The fact that we observe substantively similar results across each of them should help assuage concerns that our findings are unique to any given source of data.

Finally, we collected information on participation in the Irish rebel forces from digitized information from the Military Archives of the Defense Forces of Ireland. As part of an application process to obtain military pensions, individuals from several Irish rebel forces—the Irish Volunteers, Irish Citizen Army, or Cumman na mBan—provided their backgrounds and combat experience. Consistent with the Militia and WW1 data we focus our analyses on rebel men, resulting in a dataset containing 8,916 successful pension applicants.

After collecting the individual-level information on conflict participation, we next need to place individuals within baronies. We do so using a *GoogleMaps* API algorithm to find the locations for all addresses using *GoogleMaps*.[10] The algorithm takes the birth place and residences of all combatants for whom we have this information, searches for the addresses on *GoogleMaps*, and outputs the coordinates of successful searches.[11] Such *GoogleMaps* API algorithms are frequently used when geo-coding a large number of addresses (Larsen et al. 2019; Selb and Munzert 2018). After completing the geo-coding process, we count all combatants in a given barony to obtain our numerator for each of the respective organizations.

The final step in constructing our data entailed gathering information on the pool of individuals who could have in principle fought, which serves as our denominator. We collect information on the number of men within each barony from the 1901 and 1911 censuses of Ireland available at the National Archives of Ireland.[12] Given the temporal differences across combatant organizations, we use counts from the 1901 census when the Irish Militia is our numerator, and the 1911 census for the remainder of the calculations.

[10] An alternative option would be to merge combatant information with the 1901 and 1911 censuses and thus obtain their place of residence. However, past studies using this approach have only been able to identify roughly 24% of combatants (Narciso and Severgnini 2019: 15), meaning they are discarding over three-quarters of the data.

[11] In case of a non-perfect match, the algorithm either suggests coordinates for a closely related address or no coordinates at all. We test the accuracy of the algorithm by handcoding all addresses in the Irish rebel data for one county and find that the algorithm correctly identifies the barony in 91% of cases. See Appendix Section B.

[12] National Archives of Ireland. "1901 and 1911 Censuses." `http://www.census.nationalarchives.ie/`

Table 3 – Conflict Participation Data

Dataset	Time Frame	Total # of individuals	# of Irish individuals	Individuals with addresses	Denominator Source
Militia members	1881-1915	156,845	62,782	60,473	1901 census
WW1 Service members	1914-1919	1,900,000	56,952	45,213	1911 census
WW1 Casualties	1914-1919	703,810	29,905	28,836	1911 census
Irish rebel forces	1916-1923	8,916	8,916	7,989	1911 census

The data construction process for our dependent variables is summarized in Table 3. After combining these sources of data, we now have four different dependent variables for each barony: the proportion of individuals within a given barony who fought in the pro-British Irish militia, the proportion who served in British forces in WWI, the proportion who died in WW1, and the proportion of individuals who fought in the Irish rebel forces. The first three allow us to assess how differences in the severity of the Famine affected the likelihood that individuals fought in British forces. The approach of leveraging distinct military bodies over different time periods provides important evidence for the external validity of the findings, while also allowing us to alleviate concerns that any given source of data is driving the results. The final dependent variable on rates of participation in the Irish rebel forces allows us to importantly assess how the severity of the Famine affects the willingness of individuals to rebel. Figure 2 shows the distribution of the conflict participation variables.

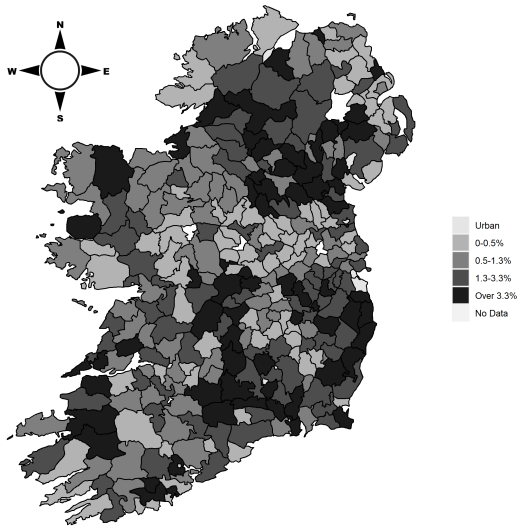
4.3 Pre-Famine Characteristics

There are at least two classes of empirical concerns for assessing the empirical consequences of the Famine. The first and perhaps most important type relates to the strategic behavior of the British. For example, we might be concerned that differences in population loss would be measuring Britain's ex-ante beliefs about how likely a given barony was to rebel, rather than the consequences of the population loss. We tackle this concern in a number of ways. Perhaps most importantly given the long-standing religious divisions within Ireland between Catholics and Protestants, we digitized new data on the religious composition of baronies.[13] This digitization relied on a special 1834

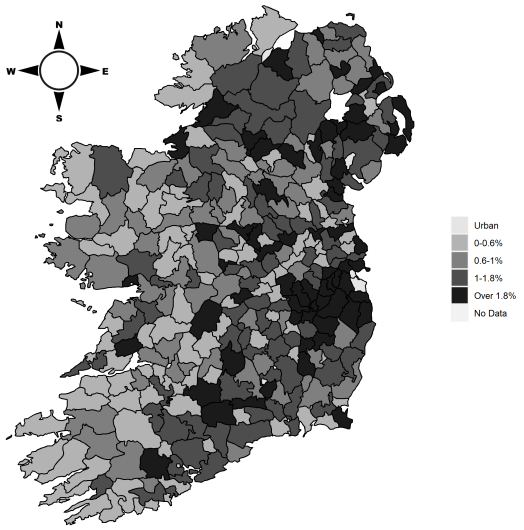
[13]Previous studies have either used the larger diocese level (Gregory and Cunningham 2016) or used post-famine measures from 1861 (Goodspeed 2016) or 1911 (Fernihough and Ó Gráda 2018).

Figure 2 – Conflict Participation Rates by Barony

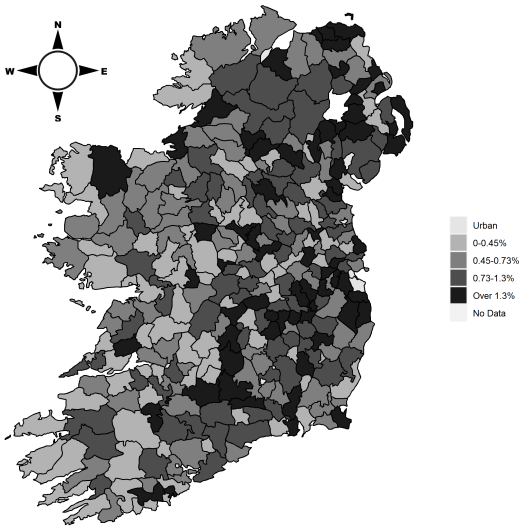
Panel A: Militia



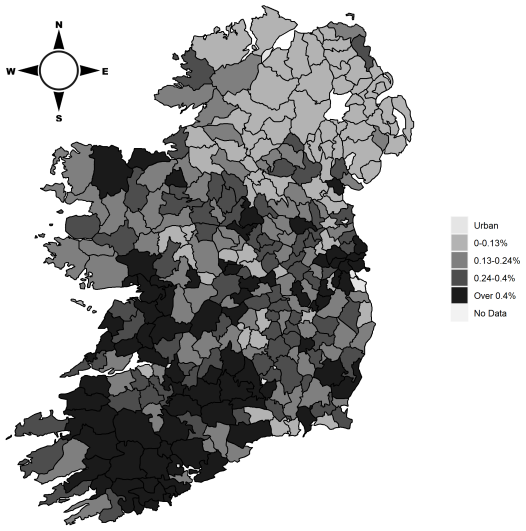
Panel B: WW1 Enlistment



Panel C: WW1 Casualties



Panel D: Irish Rebels



Notes: The distribution of conflict participation as a percentage of the male population fighting in the Irish Militia, WW1, and Irish rebel forces.

enumeration of the religious denominations by parish, the administrative unit below barony.[14] We then merged the new data with shapefiles of 1841 parishes and baronies. This allows us to calculate the percentage of Catholics by barony in 1834. While creating a new measure of a barony's religious composition provides a good starting point, it might still be the case that the British were able to discriminate their aid based upon additional information about a region's latent rebelliousness. To address this concern we leverage information on the location of the 1798 rebellion as a measure of pre-famine hostility towards the British. The 1798 rebellion was the largest Irish uprising against British rule before the Famine and resulted in 34 battles or skirmishes between British and rebel forces. We calculate each barony's distance to the closest battle.

The second class of empirical concerns relates to whether there are other confounding variables driving both the levels of population loss from the Famine and conflict participation. For example, as we show in the Appendix, the Famine was more severe in poorer places (Mokyr 1983), and we have strong theoretical reasons to expect that individuals' economic incentives affected the choice to fight. To address this potential concern, we control for a number of pre-Famine measures of poverty drawn from the 1841 census. These include barony-level literacy rates and the percentage of households living in fourth class housing (houses made from mud and containing only one room). Similarly, we might imagine that both the severity of the Famine and the ease with which individuals can enlist in the respective military forces was shaped by the rurality of the baronies. For this reason, we control for population using information from the 1841 census. We also use information from a shapefile of all baronies available at the Irish Historical Database (Crawford et al. 1997), which allows us to calculate each barony's area in square kilometers and its population density.[15] Relatedly, we might be concerned that other geographic factors lead to spatial clustering in both the famine severity and conflict participation. We therefore also include a range of geographical controls such as each barony ruggedness, its distance to the main population centers (and seats of power) Belfast and Dublin, as well as its distance to the coast.

Following recent research on the economic consequences of the Famine, we also control for factors which potentially affected the severity of the Famine itself (Fernihough and Ó Gráda 2018).

[14] The results of this enumeration were published at the parish level in "State of religious and other instruction now existing in Ireland: first report and appendix" (1835) available at `http://www.dippam.ac.uk/eppi/documents/10933`

[15] We updated the shapefile using more detailed maps of the boundaries between some baronies.

Since the Famine was caused by a failure in the potato harvest we use FAO data[16] to calculate each barony's potato suitability. From Met Éireann, the Irish meteorological services, we obtain the average temperature in July and July rainfall,[17] two factors that have been linked to the severity of the potato blight. Summary statistics of the explanatory variable, conflict participation, and covariates can be found in Table 4.

Table 4 – Summary Statistics of Treatment and Outcome Variables

Statistic	N	Mean	St. Dev.	Min	Max
Population Loss from 1841–1851 p/c	296	0.23	0.10	0.01	0.47
Conflict participation:					
Militia Participation p/c	296	0.02	0.03	0.00	0.20
Enlistment WW1 p/c	296	0.01	0.01	0.00	0.13
Casualties WW1 p/c	296	0.01	0.01	0.00	0.07
Irish Rebels Participation p/c	296	0.003	0.004	0	0.06
Covariates:					
Population 1841	296	25,017.82	17,033.64	2,723	127,051
Area 1841	296	68,919.38	49,550.98	7,784	310,656
Population Denisty 1841	296	95.46	34.74	24.43	243.97
Read and Write 1841 p/c	296	0.23	0.07	0.05	0.47
Fourth Class Housing 1841 p/c	296	0.37	0.14	0.12	0.85
Catholic 1841 p/c	296	0.83	0.23	0.05	1.00
Agriculture 1841 p/c	296	0.71	0.11	0.35	0.87
Potato Suitability	296	48.29	15.35	4.24	77.71
Mean July Temperature (°C)	296	15.21	0.44	13.60	16.11
Mean July Rainfall (mm)	296	77.38	14.40	53.39	134.83
Ruggedness	296	0.08	0.10	0.00	0.68
Distance to Coast (log km)	296	3.01	1.09	−0.93	4.50
Distance to Belfast (log km)	296	5.06	0.71	1.72	6.03
Distance to Dublin (log km)	296	4.76	0.60	2.66	5.72
Distance to 1798 Battle (log km)	296	3.41	0.89	−0.70	4.80

Notes: This table shows summary statistics of the explanatory variable, all outcome variables, and all covariates. The sample is restricted to rural baronies with a 1841 population density below 250 inhabitants per square kilometer and excludes baronies which had a population gain from 1841 to 1851.

4.4 Empirical Design

As discussed in Section 4.1, we use local changes in population as our main means of empirically testing the consequences of the Famine. We implement this using the following specification:

[16]FAO. "GAEZ v3.0." available at `http://www.gaez.iiasa.ac.at/`

[17]Met Éireann. "Long-term climate averages for Ireland 1981–2010." available at `http://edepositireland.ie/handle/2262/74915`

$$Y_i = \beta PopulationLoss_i^{1841–1851} + \chi_i + \eta_j + \epsilon \quad (2)$$

where Y_i is the rate of conflict participation in barony i; $PopulationLoss_i^{1841–1851}$ is the percentage loss in population from 1841 to 1851; χ_i is a vector of geographical and pre-famine covariates listed in Section 4.3; η_j are county fixed effects; we include robust standard errors ϵ. β is the coefficient of interest and denotes the effect of 1841–1851 population loss. For a broader discussion of the potential strengths and weaknesses of the empirical design, see Appendix Section A.

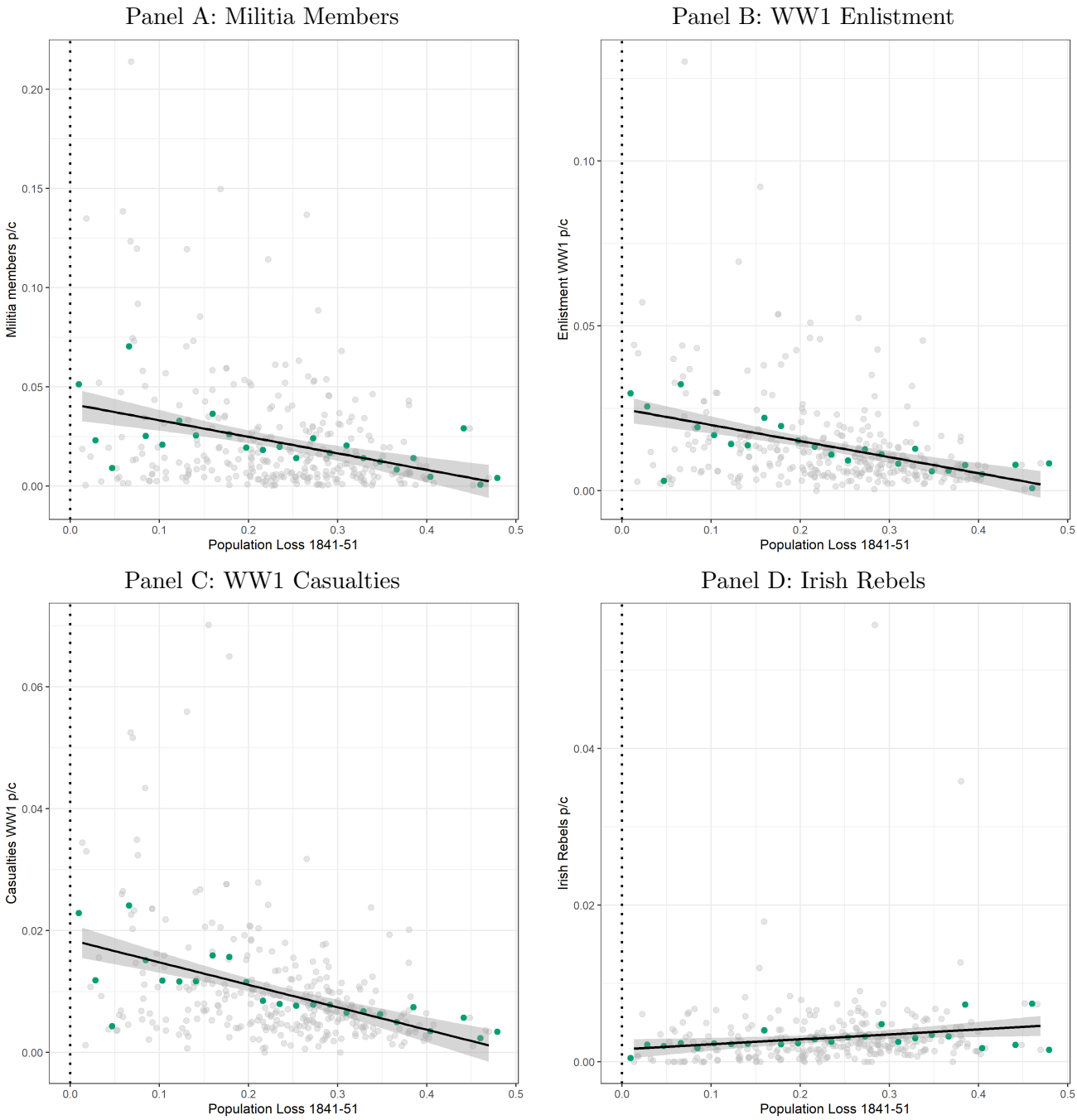
5 Results

In order to gain a descriptive sense of the relationship between differences in Famine severity and fighting behavior, Figure 3 shows the correlation between 1841–1851 population loss and the four participation measures in the raw data. There is a clear negative correlation for enlistment in the Irish Militia, the British WWI Military, and WWI casualties (Panels A-C). The descriptive plots provide preliminary evidence consistent with the theoretical argument that both grievances and opportunity costs had a demobilizing influence on the likelihood individuals fought in the British forces. By contrast, Panel D demonstrates that the correlation between population loss and participation in the Irish rebel forces is positive. This descriptive trend is consistent with the theoretical argument that individuals in places more severely affected by the Famine had stronger grievances, and this increased the likelihood they rebelled.

Table 5 shows our main effects. All models use OLS with robust standard errors. Following Specification 2, it regresses conflict participation on barony-level 1841–1851 population loss. Column (1) has per capita barony 1880–1910 enlistment in Irish militias as the outcome measure, Column (2) barony WW1 enlistment, Column (3) barony WW1 casualties, and Column (4) barony 1916–1923 participation in the Irish rebel forces.

Columns 1-3 show a clear negative effect of 1841–1851 population loss on the probability of the barony population fighting for the British. Furthermore the estimated effects of the Famine on fighting for the British are large. On average, baronies in our sample lost 23% of their 1841 population during the Famine. Baronies that lost a quarter of their population during the Famine,

Figure 3 – Raw Data



Notes: This figure shows the relationship between 1841–1851 population loss and the four conflict participation measures in the raw data. Bold green dots show the binned average using 25 bins. The linear relationship between population loss and participation is added.

Table 5 – Effect of 1841–1851 Population Loss on Conflict Participation

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	-0.076^{***}	-0.024^{***}	-0.018^{**}	0.006^{*}
	(0.024)	(0.009)	(0.008)	(0.003)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	296	296	296	296
Adjusted R^2	0.423	0.317	0.324	0.092

Notes: This table shows the results of regressing barony 1841–1851 population loss on conflict participation following specification 2. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

have 1.9 percentage point fewer men fight for the pro-British Irish Militia, which equals the variable mean of militia participation (Column 1). The effects on WW1 participation are of similar magnitude. Baronies that lost a quarter of their population during the Famine, have 0.6 percentage point fewer men enlist and 0.45 percentage point fewer men die for the British in WW1, a decrease of 50% with respect to the variable means (Column 2-3). Again, these three findings are consistent with the theoretical argument that both grievances and opportunity costs had a demobilizing influence on the likelihood that individuals in places more severely affected by the Famine fought in the British military forces. Importantly, the similarity in findings across the three different outcome variables show that this effect persisted temporally, though the magnitude of the effect somewhat dissipated over time.

Column (4) shows that individuals in places more severely affected by the Famine fought in the Irish rebel forces at *higher* rates. Baronies that lost a quarter of their population during the Famine, have 0.15 percentage point more men fight in the Irish rebel forces, an increase of 50%. These results mirror Narciso and Severgnini (2019), who use an individual-level matching approach with a county-level measure of Famine excess mortality. Substantively, this finding is consistent with the theoretical argument that Famine-induced grievances mobilized conflict participation.

6 Further Considering Evidence for Grievances and Opportunity Costs

We now turn to further assessing the mechanisms underpinning these findings. We start by considering whether there is evidence in favor of a grievance-based account of conflict participation. We sought out observable measures of non-violent political attitudes toward the British to better understand how differences in the severity of the Famine affected how individuals thought about the adversary deemed responsible. We found such a measure for early 20th century grievances in the form of the 1918 parliamentary election. The 1918 election brought about a seismic shift in Irish politics, with the emergence of the previously little-known pro-Republican and anti-British Sinn Féin party (de Bromhead, Fernihough, and Hargaden 2020). If grievances are higher in places more severely affected by the Famine, then we would expect these places to also vote for Sinn Féin at higher rates. Based on vote totals published by Walker (1978), we calculate the vote share Sinn Féin received at the constituency level.[18] Importantly, the constituency comprises a higher level of aggregation than the barony.[19]

Table 6 shows the effect of 1841–1851 population loss on vote share of Sinn Féin in the 1918 election. We aggregate the barony population data to calculate the population loss during the Famine in 90 non-urban 1918 constituencies. Across all specifications, we see that constituencies which lost a greater share of their population between 1841 and 1851 voted for Sinn Féin at higher rates. This provides further evidence that grievances were stronger in places more severely affected by the Famine; individuals in these places were willing to support a political party whose platform was directly opposed to British rule over Ireland. Additionally, it is worth emphasizing that the fact that we observe additional evidence consistent with the theoretical argument and previous findings should help assuage concerns that the results presented in the previous section are being driven by either the sources of data or the way in which it is constructed. The data for these election results come from a different source, require no geo-coding, and rely upon a different unit of analysis.

While the previous paragraphs provided additional evidence for how grievances shaped the choice to fight, they by no means ruled out economic-based explanations. In order to better

[18] In Table A14 in the Appendix we provide robustness using different ways of assigning Sinn Féin vote share to unopposed candidates.

[19] A map and histogram of the Sinn Féin vote share can be found in Figure A2 in the Appendix.

Table 6 – Effect of 1841–1851 Population Loss on 1918 Election

	Dependent variable:			
	Vote Share Sinn Féin			
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	1.239***	0.800***	0.847***	0.786***
	(0.300)	(0.228)	(0.232)	(0.293)
Fixed effects	No	No	Province	Province
Cluster	Constituency	Constituency	Constituency	Constituency
Controls	No	Yes	Yes	Yes
Observations	81	81	81	77
Adjusted R^2	0.228	0.789	0.786	0.790

Notes: This table shows the results of regressing constituency 1841–1851 population loss on Sinn Féin vote share in the 1918 parliamentary election. Column 4 removes constituencies with 1841–1851 population gains. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

understand whether and how opportunity costs shaped the choice to fight, we proceed in two steps. First, we collected economic indicators to assess the long-run economic consequences of the Famine. Second, given our theoretical argument that we should expect different relationships depending on whether organizations recruited with material incentives, we look at the correlation between our economic indicators and fighting in each of the combat organizations.

We start by leveraging information from the 1911 census to investigate the impact of the Famine on the economics of early 20th century Ireland. This approach builds directly on an important body of work in economic history which similarly seeks to assess the long-run consequences of the Famine (Boyer, Halton, and Rourke 1994; Ó Gráda 1999). We focus on three main variables. The first measure includes the percentage of individuals who can read and write in a given barony, which prior research uses as a proxy for economic well-being (Ó Gráda 1999: 27).[20] Second, we consider the percentage of the population classified as "Labourers." Prior research demonstrates how these low-skilled workers were a common pool of recruits for the British military (Jeffery 2000: 18–20). Third, we look at the percentage of the population reporting farming as their main occupation. Prior research documents how the nature of farming and agriculture changed in the aftermath of the Famine (Turner 2002), and that farm wages increased leading up to World War I (Boyer, Halton, and Rourke 1994: 228). Moreover, prior research within political science documents the

[20]Dooley (1995) postulates that there might be a direct link between literacy and the decision to fight for the British (Dooley 1995: 8).

relatively high opportunity costs associated with abandoning ones farm to fight (Hall, Huff, and Kuriwaki 2019).

Table 7 shows the effect of 1841–1851 population loss on literacy rates and the percentage of the population having farming and labourer as their occupation in the 1911 census. 1841–1851 population loss leads to an increase in the percentage of the population that can read and write (Column 1). A 25% loss in population during the Famine translate into a 3 percentage point increase in literacy by 1911. Column (2) reveals that baronies harder hit by the Famine have a lower proportion of the population engaged as labourers. Column (3) shows that baronies with a larger population loss have a higher proportion of the population working in the agricultural sector. Taken together, the evidence suggests that individuals in places more severely affected by the Famine ended up better-off in the long-run and had higher opportunity costs.

Table 7 – Effect of 1841–1851 Population Loss on Occupations in 1911

	Dependent variable:		
	Perc. Read and Write 1911	Perc. Labourer	Perc. Farmer
	(1)	(2)	(3)
Population Loss 1841-1851	0.101^{***}	-0.032^{**}	0.176^{***}
	(0.022)	(0.013)	(0.032)
Fixed effects	County	County	County
Unit of observation	Barony	Barony	Barony
Controls	Yes	Yes	Yes
Observations	296	296	296
Adjusted R^2	0.718	0.513	0.755

Notes: This table shows the results of regressing barony 1841–1851 population loss on the percentage of the population that can lists "farmer" as their occupation (Column 1) or "labourer" (Column 2) in the 1911 census. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

Recall that our theoretical argument suggested that these differences in local economic conditions should only affect the choice to fight when organizations use material incentives to recruit combatants. In order to assess this argument, Table 8 shows the correlations of the main covariates and conflict participation in WW1 and the Irish rebel forces.[21] Baronies with a higher percentage of farmers were indeed less likely to have soldiers fight for the British in WW1, while there is little

[21]Tables A15 and A16 in the Appendix provide the full table with all covariates included and all conflict outcomes.

correlation with Irish rebel participation. Similarly, the percentage of labourers in 1911 is a strong predictor for WW1 enlistment but not Irish rebel participation.

Table 8 – Correlates of Conflict Participation

	Dependent variable:			
	Enlistment WW1 p/c		Irish Rebels p/c	
	(1)	(2)	(3)	(4)
Perc. Catholic 1841	0.017		0.006*	
	(0.013)		(0.003)	
Perc. Farmer 1841	−0.032***		−0.001	
	(0.009)		(0.003)	
Literacy 1841	0.146***		0.016*	
	(0.028)		(0.009)	
Perc. Catholic 1911		−0.001		0.007*
		(0.013)		(0.004)
Perc. Irish Speaking 1911		0.006		0.002
		(0.006)		(0.003)
Perc. Farmer 1911		−0.108***		−0.004
		(0.030)		(0.012)
Perc. Labourer 1911		0.110*		0.023
		(0.060)		(0.017)
Literacy 1911		0.045*		0.023*
		(0.025)		(0.012)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Observations	296	296	296	296
Adjusted R^2	0.303	0.256	0.085	0.100

Notes: This table shows the correlations of the main covariates and conflict participation in WW1 and the Irish Rebel forces. Tables A15 and A16 in the Appendix provide the full table with all covariates included and all conflict outcomes. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

Putting the evidence together the following picture emerges. First, the Famine created long lasting local grievances which manifested themselves through voting behavior in the 1918 election. We argue these grievances also increased participation in the Irish rebel forces and decreased participation in the British military. Second, there is also considerable evidence for an economic channel of how the Famine reduced participation in the British military. Harder hit baronies suffered a

huge and long-lasting population loss. The remaining population in 1911 was more educated, more likely to be farmers, and less likely to be labourers. All these indicators suggest a higher average opportunity cost to fighting in baronies more severely affected by the Famine, translating into lower rates of fighting for the British. The evidence suggests that participation in the Irish rebel forces was not affected by potential differences in opportunity costs shaped by the Famine; rather, stronger grievances appear to have boosted participation in harder hit baronies.

Section D in the Appendix describes a range of robustness checks we undertake. Specifically, we run our specifications with additional covariates and without any controls. We check robustness on different data generating decisions for the explanatory variable, the 1918 election data, and the Irish rebel data. We also replicate our results for fighting for the British, as well the economic impacts of the Famine using a lower level administrative division, the parish level. We also run a specification where we adjust the standard errors to account for potential spatial clustering. Lastly, we run our main specification with total conflict participation instead of rates. Throughout our robustness checks the results remain qualitatively the same: places harder hit by the Famine fight for the British at lower rates and against the British at higher rates and we find evidence for both the grievance and opportunity cost channels.

7 Conclusion

In this paper we considered how government-perpetrated atrocities affected the likelihood individuals fought in defense of, or opposition to, the government deemed responsible. We presented a theoretical argument for how the memories of the past and economic incentives in the present shaped the choice to fight. We then applied the argument to the case of the Great Famine in Ireland, and collected a range of new data to better understand the choice to fight for or against the British Empire. Using the newly compiled data, we first demonstrated that individuals in places more severely affected by the Famine were less likely to fight in the Irish Militia, and British Military in WWI. By contrast, they participated in the Irish rebel forces at higher rates. We next leveraged data from the 1918 election and 1911 census to provide evidence consistent with both grievance and opportunity-cost accounts of conflict participation. On the first point, we showed that places more severely affected by the Famine voted for Sinn Féin at higher rates. These places also had

higher rates of literacy, a lower percentage of labourers, and a higher percentage of farmers. We went on to demonstrate how proxies for opportunity costs were only related to the choice to fight for the British.

The findings of our paper challenge past research which finds that grievances equally motivate individuals to fight both for and against the state (Humphreys and Weinstein 2008). There are at least two plausible reasons for this difference. The first reason is due to differences in how we measure both the causes and consequences of grievances. Prior quantitative research seeking to understand how grievances shape conflict participation commonly relies upon rough proxies which measure multiple theoretical concepts simultaneously, and faces difficulties in collecting comprehensive information on who fights. Theoretically, focusing on the legacies of the Famine provided a unique opportunity to study a large-scale atrocity which was unequivocally perceived to be a grievance-inducing event. Empirically, focusing on the case of historical Ireland allows us to leverage recent advances in the digitization and release of individual combat records to compile the most comprehensive data ever constructed to study the choice to fight either for or against an occupying state. The second plausible explanation for the difference in findings is due to the strength of grievances induced by different types of experiences. While prior proxies for grievances—such as poverty, a lack of access to education, and political alienation (Humphreys and Weinstein 2008)—might be frustrating and the type of factors conducive to grievances, these are categorically different than losing 25% of your community due to widespread starvation, disease, and emigration.

Future research should consider at least two main factors when considering the external validity of our findings. The first factors entails whether the dual mechanisms of grievances and economic incentives play competing or complementary roles in shaping the choice to fight. In our case, we show how in places where the Famine was relatively more severe, grievances and opportunity costs lead to a similar empirical prediction that individuals should be less likely to participate in British forces. However, had the Famine made the local economic conditions worse—as has occurred in other famines throughout history (Meriläinen, Mitrunen, and Virkola 2020)—the mechanisms of grievances and opportunity costs would have generated competing hypotheses for how historical atrocities should shape the choice to fight in British forces. More generally, in conditions where atrocities lead to both stronger grievances and worse economic conditions, there will be a theoretical tension in how these mechanisms shape the likelihood individuals fight in defense of the perpetrator.

The second factor is the grievousness of the atrocity. Some might argue that massacres, sexual assault, torture, and forced disappearances might have an even larger effect on shaping grievances toward the actor deemed responsible; however, we might also expect these types of atrocities to have a lesser impact on local economic conditions. If the case, then we would expect the choice to fight for or against the perpetrator to be largely shaped by these relatively stronger grievances, rather than differences in local economic conditions. Ultimately, atrocities such as famines, massacres, and torture are among some of the most heinous actions governments and rebel groups take. Preventing these types of atrocities in the future depends both on better understanding the conditions under which they are most likely to occur, and how they fuel further violence and rebellion.

References

Al Jazeera. 2018. "France Admits Torture During Algeria's War of Independence." https://www.aljazeera.com/news/2018/9/13/france-admits-torture-during-algerias-war-of-independence.

Anderson, David. 2017. "Making the Loyalist Bargain: Surrender, Amnesty and Impunity in Kenya's Decolonization, 1952–63." *The International History Review* 39(1): 48–70.

Aston, Trevor H, and C. H. E. Philpin. 1987. *The Brenner Debate: Agrarian Class Structure and Economic Development in Pre-Industrial Europe*. Cambridge University Press.

Augusteijn, Joost. 1996. *From Public Defiance to Guerrilla Warfare: The Experience of Ordinary Volunteers in the Irish War of Independence, 1916-1921*. Irish Academic Press.

Balcells, Laia. 2010. "Rivalry and Revenge: Violence against Civilians in Conventional Civil Wars." *International Studies Quarterly* 54(2): 291–313.

Balcells, Laia. 2017. *Rivalry and Revenge: The Politics of Violence during Civil War*. Cambridge University Press.

Bellows, John, and Edward Miguel. 2009. "War and Local Collective Action in Sierra Leone." *Journal of Public Economics* 93(11-12): 1144–1157.

Bourke, Austin. 1993. *'The Visitation of God?' The Potato and the Great Irish Famine*. Lilliput Press Ltd.

Boyer, George R, Timothy J Halton, and Kevin O Rourke. 1994. "The Impact of Emigration on Real Wages in Ireland, 1850–1914." In *Migration and the International Labor Market 1850-1939*, ed. Timothy J Halton, and Jeffrey G Williamson. New York: Routledge pp. 221–239.

Brenner, Robert. 1976. "Agrarian Class-Structure and Economic-Development in Pre-Industrial Europe." *Past and Present* 70: 30–75.

Cederman, Lars-Erik, Kristian Skrede Gleditsch, and Halvard Buhaug. 2013. *Inequality, Grievances, and Civil War*. Cambridge University Press.

Cederman, Lars-Erik, Simon Hug, Livia Schubiger, and Francisco Villamil. 2020. "Civilian Victimization and Ethnic Civil War." *Journal of Conflict Resolution* 64(7-8): 1199–1225.

Charnysh, Volha, and Evgeny Finkel. 2017. "The Death Camp Eldorado: Political and Economic Effects of Mass Violence." *American Political Science Review* 111(4): 801–818.

Collier, Paul, and Anke Hoeffler. 2004. "Greed and Grievance in Civil War." *Oxford Economic Papers* 56(4): 563–595.

Crawford, E. Margaret, L. Kennedy, M. W. Dowling, and L. A. Clarkson. 1997. "Database of Irish Historical Statistics. UK Data Service." available at https://beta.ukdataservice.ac.uk/.

Cronin, Mark. 2014. *Blackpool To The Front*. Gill & Macmillan.

Das, Santanu. 2011. *Race, Empire and First World War Writing*. Cambridge University Press.

de Bromhead, Alan, Alan Fernihough, and Enda Hargaden. 2020. "Representation of the People: Franchise Extension and the "Sinn Féin Election" in Ireland, 1918." *Journal of Economic History* 80(3): 886–925.

Dell, Melissa, and Pablo Querubin. 2018. "Nation Building Through Foreign Intervention: Evidence from Discontinuities in Military Strategies." *The Quarterly Journal of Economics* 133(2): 701–764.

Dooley, Thomas P. 1995. *Irishmen or English Soldiers?* Liverpool University Press.

Elkins, Caroline. 2005. *Imperial Reckoning: The Untold Story of Britain's Gulag in Kenya.* Macmillan.

Fearon, James D, and David D Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97(01): 75–90.

Fernihough, Alan, and Cormac Ó Gráda. 2018. "Population and Poverty in Ireland on the Eve of the Great Famine." Working Paper.

Fitzgerald, Phil. 1955. "Statement by Witness: Document No. W.S. 1262." *Bureau of Military History, 1913–1921.*

Fitzpatrick, David. 1989. "Emigration, 1801-1870." In *A New History of Ireland, Volume V: Ireland under the Union 1801-1870*, ed. W. Vaughan. Clarendon Press pp. 562–607.

Gilligan, Michael J, Benjamin J Pasquale, and Cyrus Samii. 2014. "Civil War and Social Cohesion: Lab-in-the-Field Evidence from Nepal." *American Journal of Political Science* 58(3): 604–619.

Gillis, Liz. 2016. *The Hales Brothers and the Irish Revolution.* Mercier Press.

Goodspeed, Tyler Beck. 2016. "Microcredit and Adjustment to Environmental Shock: Evidence from the Great Famine in Ireland." *Journal of Development Economics* 121: 258–277.

Gregory, Ian N., and Niall A. Cunningham. 2016. "'The Judgement of God on an Indolent and Unself-Reliant People'?: The Impact of the Great Irish Famine on Ireland's Religious Demography." *Journal of Historical Geography* 51: 76–87.

Gurr, Ted Robert. 1970. *Why Men Rebel.* Princeton University Press.

Hall, Andrew B, Connor Huff, and Shiro Kuriwaki. 2019. "Wealth, Slaveownership, and Fighting for the Confederacy: An Empirical Study of the American Civil War." *American Political Science Review* 113: 658–673.

Harada, Masataka, Gaku Ito, and Daniel M Smith. 2020. "Destruction from Above: Long-Term Legacies of the Tokyo Air Raids." Working Paper.

Homola, Jonathan, Miguel M Pereira, and Margit Tavits. 2020. "Legacies of the Third Reich: Concentration Camps and Out-Group Intolerance." *American Political Science Review* 114(2): 573–590.

Humphreys, Macartan, and Jeremy M. Weinstein. 2008. "Who Fights? The Determinants of Participation in Civil War." *American Journal of Political Science* 52(2): 436–455.

Jeffery, Keith. 2000. *Ireland and the Great War.* Cambridge University Press.

Kennedy, Liam, Crawford P Ell, and Leslie A Clarkson. 1999. *Mapping the Great Irish Famine.* Four Courts Press.

Larsen, Martin V, Frederik G Hjorth, Peter T Dinesen, and Kim M Sønderskov. 2019. "When Do Citizens Respond Politically to the Local Economy? Evidence from Registry Data on Local Housing Markets." *American Political Science Review* 113(2): 499–516.

Lichbach, Mark Irving. 1998. *The Rebel's Dilemma*. University of Michigan Press.

Lupu, Noam, and Leonid Peisakhin. 2017. "The Legacy of Political Violence Across Generations." *American Journal of Political Science* 61(4): 836–851.

MacAtasney, Gerard. 2004. *Seán MacDiarmada: The Mind of the Revolution*. Drumlin.

McAnally, Henry. 1949. *The Irish Militia, 1793-1816: A Social and Military Study*. Taylor & Francis.

Meriläinen, Jaakko, Matti Mitrunen, and Tuomo Virkola. 2020. "The Violent Origins of Finnish Equality." Working Paper.

Mitchel, John. 1861. *The Last Conquest of Ireland (Perhaps)*. Cameron & Ferguson.

Mokyr, Joel. 1983. *Why Ireland Starved: A Quantitative and Analytical History of the Irish Economy, 1800-1850*. George Allen & Unwin.

Mokyr, Joel, and Cormac Ó Gráda. 2002. "What Do People Die of During Famines: The Great Irish Famine in Comparative Perspective." *European Review of Economic History* 6(3): 339–363.

Moore, Edward. 1940. "File Reference MSP34REF59230." *Bureau of Military History, 1913–1921*.

Morton-Jack, George. 2018. *The Indian Empire at War*. Hachette UK.

Murphy, Ignatius. 1996. *A People Starved: Life and Death in West Clare*. Irish Academic Press.

Myers, Jason. 2011. *The Great War and Memory in Irish Culture, 1918 -2010*. Academica Press.

Narciso, Gaia, and Battista Severgnini. 2019. "The Deep Roots of Rebellion: Evidence from the Irish Revolution." Working Paper.

Neville, Edward. 1954. "Statement by Witness: Document No. W.S. 1665." *Bureau of Military History, 1913–1921*.

Ó Gráda, Cormac. 1979. The Population of Ireland 1700-1900: A Survey. In *Annales de Démographie Historique*. pp. 281–299.

Ó Gráda, Cormac. 1999. *Black '47 and Beyond: The Great Irish Famine in History, Economy, and Memory*. Princeton University Press.

Ó Gráda, Cormac. 2006. *Ireland's Great Famine*. UCD Press.

O'Flanagan, Michael. 1918. *Father O'Flanagan's Suppressed Speech*. Sinn Féin.

Olson, Mancur. 1965. *The Logic of Collective Action*. Harvard University Press.

O'Rourke, Kevin. 1994. "The Economic Impact of the Famine in the Short and Long Run." *American Economic Review: Papers & Proceedings* 84(2): 309–313.

Paige, Jeffrey M. 1978. *Agrarian Revolution*. Simon and Schuster.

Pakenham, Thomas. 2015. *The Boer War.* Hachette UK.

Petersen, Roger D. 2002. *Understanding Ethnic Violence: Fear, Hatred, and Resentment in Twentieth-Century Eastern Europe.* Cambridge University Press.

Popkin, Samuel L. 1979. *The Rational Peasant: The Political Economy of Rural Society in Vietnam.* University of California Press.

Post, Jerrold M. 2005. "When Hatred is Bred in the Bone: Psycho-Cultural Foundations of Contemporary Terrorism." *Political Psychology* 26(4): 615–636.

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

Rozenas, Arturas, Sebastian Schutte, and Yuri Zhukov. 2017. "The Political Legacy of Violence: The Long-Term Impact of Stalin's Repression in Ukraine." *The Journal of Politics* 79(4): 1147–1161.

Schubiger, Livia. 2021. "One for All? State Violence and Insurgent Cohesion." *International Organization* Forthcoming.

Selb, Peter, and Simon Munzert. 2018. "Examining a Most Likely Case for Strong Campaign Effects: Hitler's Speeches and the Rise of the Nazi Party, 1927–1933." *American Political Science Review* 112(4): 1050–1066.

Spilsbury, Julian. 2008. *The Indian Mutiny.* Hachette UK.

Turner, Michael. 2002. *After the Famine: Irish Agriculture, 1850-1914.* Cambridge University Press.

Walker, Brian. 1978. *Parliamentary Election Results in Ireland 1801-1922.* Royal Irish Academy.

Wang, Yuhua. 2019. "The Political Legacy of Violence During China's Cultural Revolution." *British Journal of Political Science* 51: 463–487.

Weinstein, Jeremy M. 2006. *Inside Rebellion: The Politics of Insurgent Violence.* Cambridge University Press.

Wood, Elisabeth. 2003. *Insurgent Collective Action and Civil War in El Salvador.* Cambridge University Press.

Appendix

A Additional Information on Population Loss as an Explanatory Variable

A.1 The Strengths and Weaknesses of Using Population Loss

Our main specification uses population loss as the main measure of differences in the severity of the famine. This specification differs from other approaches used by economic historians that use crop failure, suitability or other environmental characteristics (Hornbeck 2012, 2020; Saleh 2020). There are a number of strengths associated with using population loss as our main measure of differences in the severity of the Famine. Perhaps most importantly, it provides a direct measure of the widespread death and destruction resulting from the Famine. The loss of human life due to both death and emigration are the types of factors that prior research has argued should be most likely to lead to increasing grievances and changes in the local economic conditions. From a measurement perspective, the fact that we able to observe population counts at the barony level both pre and post-Famine means that the measure is relatively fine-grained. This is useful for helping us understand the true depth of destruction wrought by the Famine.

That said, there are also a number of possible weaknesses associated with the measure. Perhaps most obviously, population loss captures both death and migration. Migration might be particularly concerning if individuals are extensively moving internally within Ireland; we would then have no idea whether the differences we observe in fighting behavior are a result of the Famine or migration, which may or may not be the result of the Famine. Three facts help assuage this concern. First, migration *within* Ireland was fairly limited during this period; the overwhelming majority of individuals leaving their barony of birth went to the other British Isles and the New World (Fitzpatrick 1989; Guinnane 1997). Second, the vast majority of people moving within Ireland went to cities. We thus remove cities from our main analyses to address this possible concern with internal migration. Finally, if individuals from places more severely affected areas migrated to those from places which were less severely affected, then this would downward bias our results.

A second potential concern with using population loss as our main measure is that baronies which were more severely affected by the Famine were somehow different than those which were less severely affected. Indeed, the fact that the Famine was perceived to be in part the fault of the British makes this particularly concerning. In the next section we directly assess how places where the population loss was more severe were different.

A.2 The Correlation Between Covariates and Population Loss

In order to better understand the determinants of which places suffered the most, we regresses pre-famine barony characteristics on 1841 to 1851 population loss. These results are presented in Table A1. In line with previous research (Ó Gráda 1999), Table A1 shows that baronies with larger population loss due to the Famine were poorer as measured by lower levels of literacy and a higher percentage of the population living in fourth class housing. Baronies more reliant on agriculture and those further away from the coast and from Dublin were also worse affected by the Famine. This suggests that the places which suffered the most during the Famine years were those with a relatively poorer population which was more reliant on the potato. We control for all the covariates in Table A1 in our analysis.

Table A1 – 1841–1851 Population Loss and 1841 Characteristics

Variables	Obs	Coefficient
Area (km^2)	296	7,978.506
		(26,577.690)
Population	296	208.089
		(9,932.993)
Population Density (per km^2)	299	−19.105
		(23.497)
Perc. Literacy	296	−0.085**
		(0.034)
Perc. Fourth Class Housing	296	0.303***
		(0.086)
Perc. Catholic	296	0.083
		(0.051)
Perc. Agriculture	296	0.409***
		(0.074)
Potato Suitability	296	4.195
		(8.628)
Mean July Temperature	296	−0.213
		(0.251)
Mean July Rainfall	296	−2.515
		(7.885)
Ruggedness	296	0.028
		(0.075)
Distance to Coast	296	1.504**
		(0.725)
Distance to Belfast	296	0.136
		(0.151)
Distance to Dublin	296	0.283*
		(0.165)
Distance to 1798 Battles	296	−0.005
		(0.403)

Notes: This table shows the coefficients on regressing 1841 barony characteristics on 1841–1851 population loss. Each row is a separate specification which includes County fixed effects. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

B Verifying the GoogleMaps Algorithm Via Handcoding

A potential concern with our data generating process is that the *GoogleMaps* algorithm consistently misassigns certain addresses. This would be particularly concerning if this were to be correlated with Irish or Catholic place names which could be correlated with treatment intensity. To check this possibility we handcode all addresses in the Irish rebel dataset for one county, Cavan. The *GoogleMaps* algorithm identifies 67 locations, for which our handcoding assigns the same barony for 61 of them (91%). Out of the 6 misassigned addresses, three were assigned to neighboring barony and three to a different county. There was no bias against Irish or Catholic place names. This exercise increases our confidence in the accuracy of the *GoogleMaps* algorithm.

C Additional Results

C.1 How the Famine Affected Long-Run Population Loss

Table A2 shows the effect of 1841–1851 population loss on subsequent barony population. 1841–1851 population loss leads to a further population loss that persists from 1861 until 1911. The lasting effect on population are sizable. Baronies that lost 25% of their population during the famine have 5,000 fewer inhabitants in 1911, which represents 50% of the variable mean.

Table A2 – Effect of 1841–1851 Population Loss on Population

	Dependent variable:					
	Barony Population					
	1861	1871	1881	1891	1901	1911
	(1)	(2)	(3)	(4)	(5)	(6)
Population Loss 1841–1851	−21,877.260***	−21,823.670***	−22,432.310***	−21,301.410***	−20,405.980***	−23,033.370***
	(2,451.079)	(3,142.143)	(3,303.896)	(3,167.451)	(3,855.834)	(4,276.873)
Fixed effects	County	County	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	286	283	282	282	296	296
Adjusted R^2	0.966	0.949	0.940	0.927	0.774	0.736

Notes: This table shows the results of regressing barony 1841–1851 population loss on the barony population according to the 1861 to 1911 censuses. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

C.2 How the Famine Affected the Percentage of Catholics and Irish Language Speakers

Next, opposition to British rule was often correlated with Irish nationalism and Catholicism. The 1911 census includes a question of whether the individual can speak or write in the Irish language. It also gives each respondent's religious denomination.

Column (1) in Table A3 shows the effect of 1841–1851 population loss on the percentage of the population that can speak the Irish language in 1911. 1841–1851 population loss leads to a decrease in the proportion of Irish speakers among the population. Baronies that lost 25% of their population during the famine have about 5 percentage point fewer Irish language speakers in 1911, which represents 37% of the variable mean. Column (2) shows no effect on the percentage of Catholics living in the barony in 1911.

Table A3 – Effect of 1841–1851 Population Loss on Irish language and Catholicism 1911

	Dependent variable:	
	Perc. Irish Language 1911	Perc. Catholic 1911
	(1)	(2)
Population Loss 1841–1851	-0.179^{**}	0.022
	(0.088)	(0.031)
Fixed effects	County	County
Unit of observation	Barony	Barony
Controls	Yes	Yes
Observations	296	296
Adjusted R^2	0.828	0.968

Notes: This table shows the results of regressing barony 1841–1851 population loss on the percentage of the population that speak the Irish language (Column 1) and identify as Catholic (Column 2) in the 1911 census. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

C.3 How the Famine Affected Literacy Rates Over Time

Table A4 – Effect of 1841–1851 Population Loss on Literacy

	Dependent variable:			
	Perc. Read and Write			
	1851	1861	1901	1911
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	0.099***	0.093***	0.052**	0.101***
	(0.015)	(0.023)	(0.024)	(0.022)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	286	286	296	296
Adjusted R^2	0.959	0.921	0.805	0.718

Notes: This table shows the results of regressing barony 1841–1851 population loss on the percentage of the population that can read and write according to the 1851, 1861, 1901, and 1911 census. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

D Robustness

D.1 Including Baronies with Population Gain

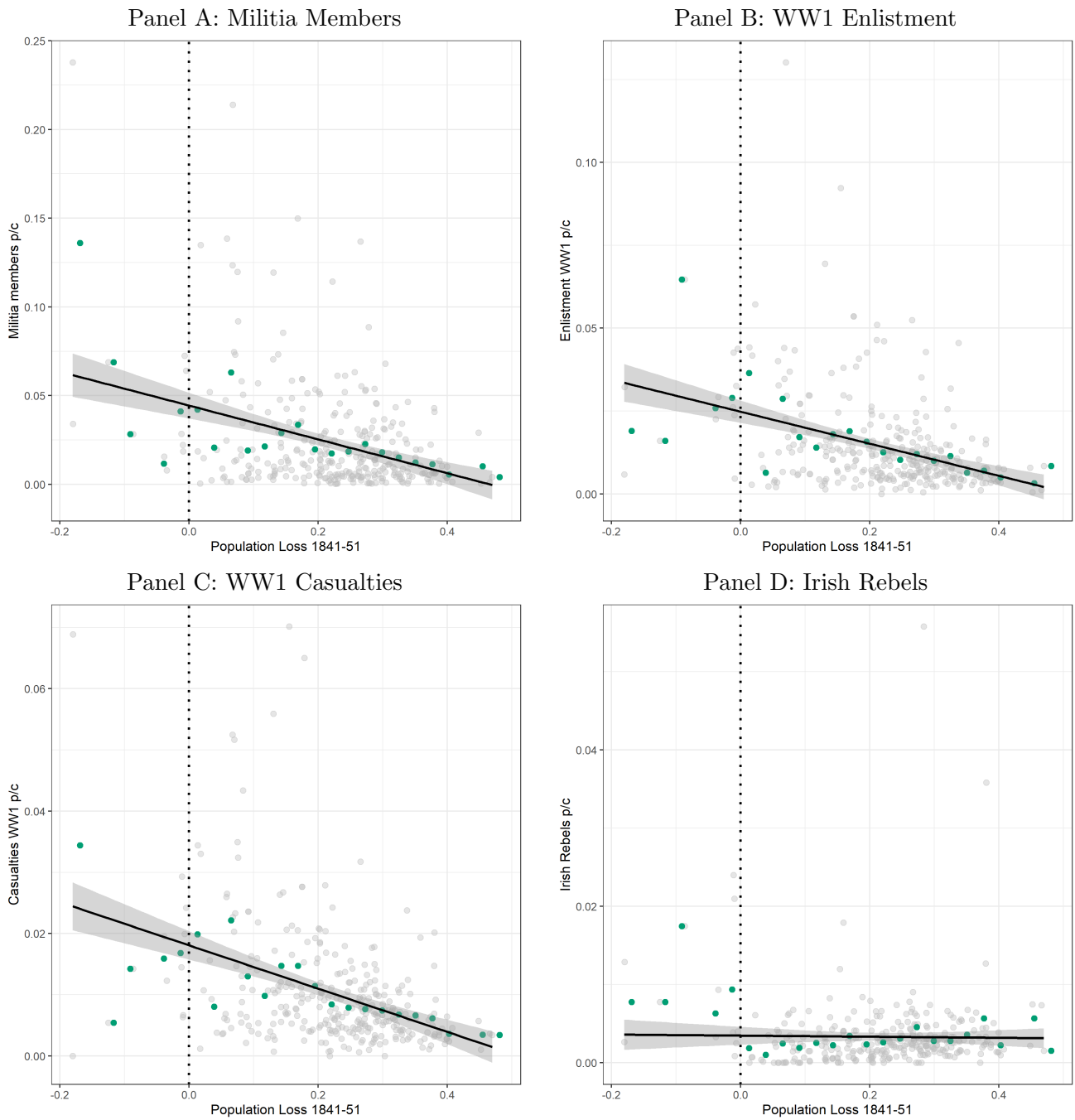
We assess the robustness of several decisions made when constructing the data. In our main specification we have removed baronies that experienced population gain from 1841 to 1851. In Figure A1 we show the raw data of conflict participation and 1841–1851 population change including such baronies. Next, in Table A5 we include baronies with a population gain in our specification. The results on fighting for the British remain consistent. The coefficient on the Irish rebel forces loses significance which is not surprising since rebel activity was concentrated in urban areas which were also less affected by the Famine.

Table A5 – Effect of 1841–1851 Population Loss on Conflict Participation Including Baronies with Population Gain

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	-0.062^{***}	-0.020^{**}	-0.014^{*}	0.003
	(0.023)	(0.008)	(0.008)	(0.004)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	299	306	306	306
Adjusted R^2	0.375	0.352	0.304	0.135

Notes: This table replicates Table 5 but includes baronies with a 1841–1851 population gain. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

Figure A1 – Raw Data with Population Gain



D.2 Alternative Specifications of Main Results

We run the specification without any controls (Table A6). Then, we include 1845 baronial valuations to additionally control for pre-famine agricultural significance (Table A7). we do not include this variable in our main specification since it is only available for a subset of baronies and thus reduces the sample size significantly.

Table A6 – Effect of 1841–1851 Population Loss on Conflict Participation Without Controls

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	-0.096^{***}	-0.038^{***}	-0.028^{***}	0.003
	(0.025)	(0.009)	(0.007)	(0.003)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	No	No	No	No
Observations	296	296	296	296
Adjusted R^2	0.301	0.147	0.163	0.092

Table A7 – Effect of 1841–1851 Population Loss on Conflict Participation including Valuation as Control

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	-0.069^{**}	-0.025^{*}	-0.017	0.003
	(0.030)	(0.014)	(0.012)	(0.002)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	195	195	195	195
Adjusted R^2	0.412	0.254	0.275	0.314

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

D.3 Alternative Specification with Number of Combatants as Dependent Variable

Next, we also run our main specification with total conflict participation instead of rates of participation (Table A8). The results for fighting for the British are consistently negative and significant. Fighting against the British is not significantly affected. Yet, given that the Famine had large and persistent effects on the population size by barony (Table A2) the results suggests that baronies more severely impacted by the famine fielded a similar amount of Irish rebels even though they drew from fewer potential recruits.

Table A8 – Effect of 1841–1851 Population Loss on Total Conflict Participation

	Dependent variable:			
	Militia count	Enlistment WW1 count	Casualties WW1 count	Irish Rebels count
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	−623.945***	−302.080***	−189.062***	−1.119
	(173.273)	(65.635)	(59.101)	(16.961)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	296	296	296	296
Adjusted R^2	0.493	0.419	0.472	0.336

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

D.4 Alternative Approach Using the Parish as the Unit of Analysis

Our main explanatory variable, 1841–1851 population loss, is also available at the parish level, the administrative unit below baronies, via the Irish Famine Project (Fernighough 2020). We use this more fine-grained data in two ways. First, we repeat our analysis of the economic consequences of the Famine in Table A9. Parishes more severely impacted by the famine have higher literacy, more farmers and less general labourers in 1911, mirroring the results when using baronies as the unit of observation. Second, we leverage fine-grained data on Irish Militia and WW1 enlistment to replicate our findings of lower rates of fighting for the British (Table A10).[22]

Table A9 – Effect of 1841–1851 Population Loss on Parish Level Economic Outcomes

	Dependent variable:				
	Population 1911	Literacy 1911	Irish Language 1911	Perc. Farmer 1911	Perc. Labourer 1911
	(1)	(2)	(3)	(4)	(5)
Population Loss 1841–1851	−1,371.390***	0.019	−0.043**	0.054***	−0.015**
	(285.029)	(0.014)	(0.020)	(0.015)	(0.007)
Fixed effects	Barony	Barony	Barony	Barony	Barony
Unit of observation	Parish	Parish	Parish	Parish	Parish
Controls	Yes	Yes	Yes	Yes	Yes
Observations	2,258	2,258	2,258	2,258	2,258
Adjusted R^2	0.584	0.431	0.852	0.576	0.225
Robust s.e. in parentheses					*p<0.1; **p<0.05; ***p<0.01

Table A10 – Effect of 1841–1851 Population Loss on Parish Level Conflict Outcomes

	Dependent variable:	
	Militia p/c	Enlistment WW1 p/c
	(1)	(2)
Population Loss 1841–1851	−0.037***	−0.015
	(0.013)	(0.009)
Fixed effects	Barony	Barony
Unit of observation	Parish	Parish
Controls	Yes	Yes
Observations	1,701	2,258
Adjusted R^2	0.571	0.070
Robust s.e. in parentheses		*p<0.1; **p<0.05; ***p<0.01

[22]The addresses given in the WW1 casualty data are not detailed enough to geolocate combatants below the barony level. The Irish rebel data in turn is too sparse to be used at the parish level.

D.5 Alternative Approach for Measuring 1798 Battle Locations

The severity of the Famine is often attributed to British policies or inaction. One concern might be that our findings are not the results of grievances or economic changes but instead the British simply let the Famine be worse in locations that they perceived as more hostile for them which then later correlates with lower fighting for and higher fighting against the British. Two pieces of evidence speak against this concern. First, our analysis of the mechanisms provides evidence of increased grievances and changed economic conditions in areas with higher population loss. Second, we leverage the 1798 rebellion to control for pre-famine "hostility towards the British." The 1798 rebellion was the largest Irish uprising against British rule before WW1 and resulted in 34 battles or skirmishes between British and rebel forces. We calculate each barony's distance to the closest battle which we include our main specification. We also create a dummy for whether a battle took place in the barony. Including this dummy as a control instead of the distance variable does not change the results (Table A11).

Table A11 – Effect of 1841–1851 Population Loss on Conflict Participation Controlling for 1798 Battle Indicator

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841–1851	-0.075^{***}	-0.026^{***}	-0.018^{**}	0.006^{*}
	(0.025)	(0.009)	(0.008)	(0.003)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	296	296	296	296
Adjusted R^2	0.414	0.328	0.323	0.095

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

D.6 Replicating Results with Conley Standard Errors

Since our unit of analysis is a geographical unit and the severity of the famine might be correlated with geographical factors a potential concern is spatial clustering. In our main specification we include a range of geographical variables to control for factors that could plausibly create spatial clustering. Still some spatial clustering might remain. We address this concern by implementing Conley spatially clustered standard errors in Table A12. Across all specifications the standard errors are in fact smaller when correcting for spatial clustering.

Table A12 – Effect of 1841-1851 Population Loss on Conflict Participation with Conley Standard Errors

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Population Loss 1841-1851	-0.076^{***}	-0.024^{***}	-0.018^{***}	0.006^{***}
	(0.005)	(0.009)	(0.007)	(0.002)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Controls	Yes	Yes	Yes	Yes
Observations	296	296	296	296
Adjusted R^2	0.423	0.317	0.324	0.092

Clustered s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

D.7 Alternative Specifications and Approaches for Measuring Irish Rebel Participation

We also consider different specifications for our result on fighting against the British in the rebel forces in Table A13. Results are robust to using no controls and no fixed effects (Column 1), no fixed effects (Column 2), and including both (Column 3). The data of pension applications is not yet complete and does not contain all individuals who fought in the Irish civil war. This missingness could be biased in a way that is difficult to assess. Fortunately, the pensions data is complete for all individuals who took part in the Easter Rising in 1916. Column 4 restricts our sample to only these individuals. Encouragingly the results are the same in this sample. Including medal applications as well as successful pension applications also shows a significant negative correlation (Column 5) but the result loses significance when including controls and county fixed effects (Column 6). This is likely due to the fact that the application process for a medal was much less onerous than that for a pension,[23] with an overall rejection rate of only 4% for medal applications when compared with 77.5% for pension applications (Coleman 2016: 20). This meant that the system for medals was "open to greater abuse" than that of the pension applications, the latter of whose applicants had to "undergo a rigorous and time-consuming investigation procedure" (Coleman 2016: 20–21).

Table A13 – Different Specifications for Irish Rebel participation

	Dependent variable:					
	Irish Rebels p/c					
	(1)	(2)	(3)	(4)	(5)	(6)
Population Loss 1841-1851	0.006**	0.006*	0.006*	0.005*	0.026***	−0.0003
	(0.002)	(0.003)	(0.003)	(0.003)	(0.007)	(0.008)
Fixed effects	No	No	County	County	No	County
Controls	No	Yes	Yes	Yes	No	Yes
Sample	Pensions Only	Pensions Only	Pensions Only	Easter Rising Pensions	Pensions & Medals	Pensions & Medals
Observations	296	296	296	296	293	290
Adjusted R^2	0.017	0.091	0.092	0.033	0.037	0.489

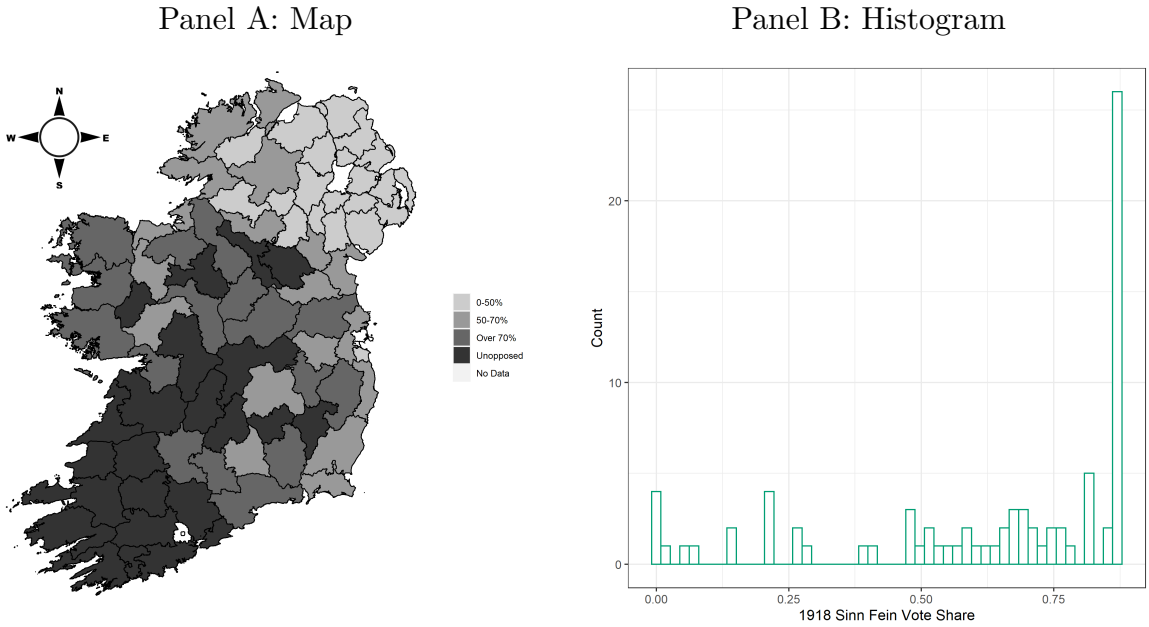
Notes: This table provides different specifications for effect of 1841–1851 population loss on participation in the Irish rebels as seen in Column 4 of Table 5. Robust standard errors are shown in parentheses. *p<0.1; **p<0.05; ***p<0.01

[23] For an overview of the medals collection, including the important differences in the application criteria, see (The Military Service (1916-1923) Pension Collection: The Medal Series 2016).

D.8 Robustness of 1918 Election Results

Next, we show robustness of our result on the 1918 elections. In the 1918 election, Sinn Féin candidates won 25 constituencies unopposed. In the paper we put the Sinn Féin vote share for these cases at the sample max (87%). Table A14 shows the results when setting the Sinn Fènn vote share in uncontested constituencies to 100% (Column 2), dropping these observations (Column 3), or including county fixed effects (Column 4).

Figure A2 – Sinn Féin Vote Share 1918



Notes: Geographic distribution and histogram of Sinn Féin Vote share in 1918.

Table A14 – Effect of 1841–1851 Population Loss on 1918 Election Robustness

	Dependent variable:		
	Vote Share Sinn Fein		
	(1)	(2)	(3)
	Main Specification	Uncontested Removed	Uncontested=100%
Population Loss 1841–1851	0.847***	0.648**	0.989***
	(0.232)	(0.285)	(0.271)
Fixed effects	Province	Province	Province
Unit of observation	Constituency	Constituency	Constituency
Controls	Yes	Yes	Yes
Observations	81	56	81
Adjusted R^2	0.786	0.761	0.761

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

D.9 Correlates of the 1841 and 1911 Censuses with Conflict Participation

Lastly, we show the correlation of all 1841 barony characteristics and our four conflict participation variables in Table A15 and the correlation with 1911 characteristics in Table A16.

Table A15 – 1841 Correlates of Conflict Participation

	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Perc. Catholic	0.025	0.017	0.011	0.006*
	(0.031)	(0.013)	(0.015)	(0.003)
Perc. Farmer	−0.069**	−0.032***	−0.023***	−0.001
	(0.028)	(0.009)	(0.008)	(0.003)
Area	0.000	0.000	0.00000	−0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Pop Density	0.0003**	0.0001**	0.0001***	−0.00001
	(0.0001)	(0.00005)	(0.00003)	(0.00002)
Literacy	0.198***	0.146***	0.093***	0.016*
	(0.062)	(0.028)	(0.023)	(0.009)
Population	0.00000	0.00000	−0.00000	0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Fourth Housing	0.008	0.022**	0.007	0.001
	(0.018)	(0.010)	(0.005)	(0.003)
Potato Suitability	−0.0003	0.00004	0.00002	0.0001
	(0.0002)	(0.0001)	(0.0001)	(0.00004)
July Temp	0.009	−0.001	−0.0003	0.001
	(0.010)	(0.005)	(0.004)	(0.002)
July Rain	0.0003	0.0002	0.00004	0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Ruggedness	0.022	0.006	0.010	−0.002
	(0.023)	(0.014)	(0.009)	(0.002)
Dist Coast	0.001	−0.0003	0.0001	−0.001
	(0.002)	(0.001)	(0.001)	(0.001)
Dist Belfast	0.020**	0.007	0.009**	0.001
	(0.008)	(0.006)	(0.004)	(0.001)
Dist Dublin	−0.008	−0.001	−0.0005	−0.0002
	(0.011)	(0.004)	(0.003)	(0.001)
Dist 1798 Battle	−0.004	−0.002	−0.0004	−0.0003
	(0.004)	(0.002)	(0.001)	(0.0004)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Observations	293	296	296	296
Adjusted R^2	0.393	0.303	0.307	0.085

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

Table A16 – 1911 Correlates of Conflict Participation

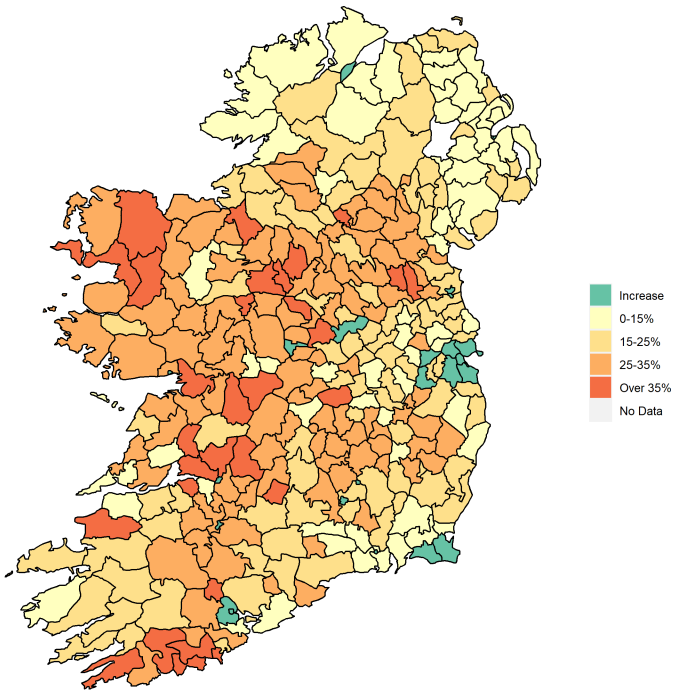
	Dependent variable:			
	Militia p/c	Enlistment WW1 p/c	Casualties WW1 p/c	Irish Rebels p/c
	(1)	(2)	(3)	(4)
Perc. Catholic	−0.028	−0.001	−0.005	0.007*
	(0.033)	(0.013)	(0.014)	(0.004)
Perc. Irish Speak	−0.013	0.006	0.003	0.002
	(0.015)	(0.006)	(0.005)	(0.003)
Perc. Farmer	−0.134**	−0.108***	−0.049**	−0.004
	(0.063)	(0.030)	(0.021)	(0.012)
Perc. Labourer	0.419**	0.110*	0.147***	0.023
	(0.180)	(0.060)	(0.050)	(0.017)
Literacy	0.005	0.045*	0.025	0.023*
	(0.047)	(0.025)	(0.016)	(0.012)
Perc. Male	−0.384***	−0.071*	−0.059*	0.006
	(0.116)	(0.041)	(0.033)	(0.014)
Population	0.00000	−0.00000	−0.00000*	0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Potato Suitability	0.00004	0.0002	0.0001	0.0001*
	(0.0002)	(0.0001)	(0.0001)	(0.00004)
July Temp	0.002	−0.004	−0.003	0.001
	(0.009)	(0.005)	(0.003)	(0.002)
July Rain	−0.0001	0.00003	−0.0001	0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Ruggedness	0.033	0.011	0.012	−0.002
	(0.021)	(0.013)	(0.009)	(0.002)
Dist Coast	0.002	0.001	0.0005	−0.001
	(0.002)	(0.001)	(0.001)	(0.001)
Dist Belfast	0.024**	0.003	0.006	0.001
	(0.010)	(0.007)	(0.004)	(0.001)
Dist Dublin	−0.001	0.005	0.002	−0.001
	(0.010)	(0.003)	(0.002)	(0.001)
Dist 1798 Battle	−0.005	−0.003*	−0.001	−0.0003
	(0.004)	(0.002)	(0.001)	(0.0004)
Fixed effects	County	County	County	County
Unit of observation	Barony	Barony	Barony	Barony
Observations	293	296	296	296
Adjusted R^2	0.429	0.256	0.282	0.100

Robust s.e. in parentheses *p<0.1; **p<0.05; ***p<0.01

E Maps in Color

Below we provide maps of the distribution of population loss, conflict participation, and Sinn Féinn vote share by barony in color instead of black and white.

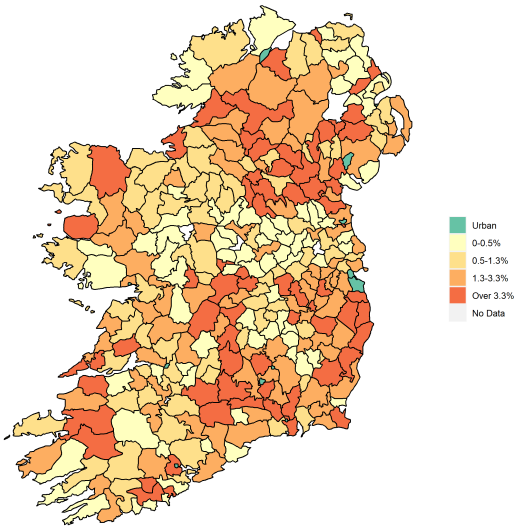
Figure A3 – Map of Population Loss from 1841 to 1851



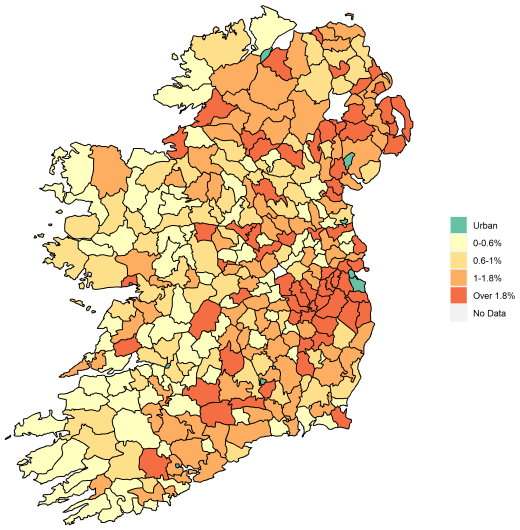
Notes: The distribution of population loss during the Famine. Population loss is calculated by $\frac{Population_i^{1841} - Population_i^{1851}}{Population_i^{1841}}$.

Figure A4 – Conflict Participation Rates by Barony

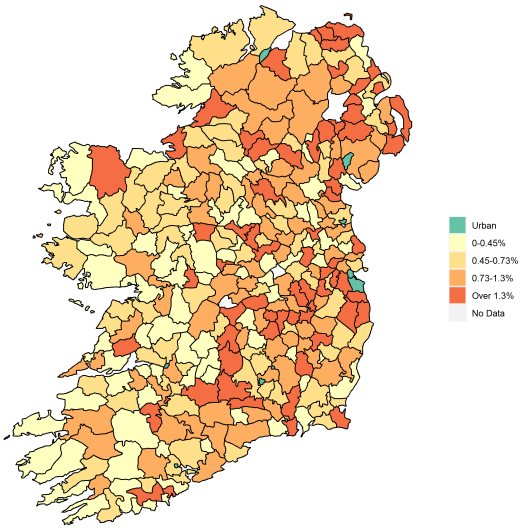
Panel A: Militia



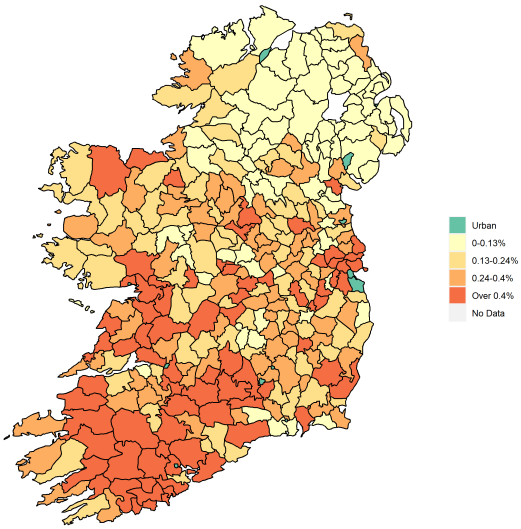
Panel B: WW1 Enlistment



Panel C: WW1 Casualties

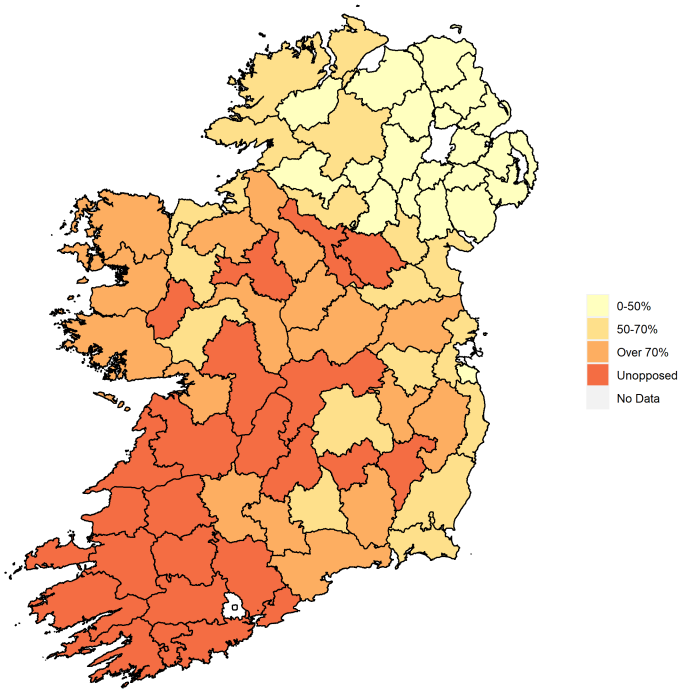


Panel D: Irish Rebels



Notes: The distribution of conflict participation as a percentage of the male population enlisted in Irish militias, WW1, and the Irish rebels.

Figure A5 – Map Sinn Féin Vote Share 1918



Notes: Geographic distribution of Sinn Féin Vote share in 1918.

F Appendix References

Coleman, Marie. 2016. "The Military Service (1916–1923) Pension Collection: The Medal Series." Óglaigh na hÉireann chapter Service Medals and Special Allowances.

Fitzpatrick, David. 1989. "Emigration, 1801–1870." In *A New History of Ireland, Volume V: Ireland under the Union 1801–1870*, ed. W. Vaughan. Clarendon Press pp. 562-–607.

Guinnane, Timothy W. 1997. *The Vanishing Irish: Households, Migration, and the Rural Economy in Ireland, 1850–1914*. Princeton University Press.

Hornbeck, Richard. 2012. "The Enduring Impact of the American Dust Bowl: Short- and Long-Run Adjustments to Environmental Catastrophe." *American Economic Review* 102(4): 1477-–1507.

Hornbeck, Richard. 2020. "Dust Bowl Migrants: Environmental Refugees and Economic Adaptation." *Working Paper*.

Ó Gráda, Cormac. 1999. *Black'47 and Beyond: The Great Irish Famine in History, Economy, and Memory*. Princeton University Press.

Saleh, Mohamed. 2020. "Export Booms and Labor Coercion: Evidence from the Lancashire Cotton Famine." *Working Paper*.

The Military Service (1916–1923) Pension Collection: The Medal Series. 2016. Óglaigh na hÉireann.