Elite Identity and Local Development in Colonial Ireland

Jeremy Bowles[*] Gabriel Koehler-Derrick[†] Michael Olson[‡]

November 2022

Abstract

We study the long-run consequences of the identity of local elites for political and economic development. Between 1652-9, approximately a third of Ireland's land was expropriated from Irish Catholic elites and redistributed to English Protestants. Leveraging the lottery-based assignment of baronies to different claimant groups, we show this exogenously predicts the share of land redistributed to Protestant elites without affecting the local *concentration* of land ownership. Drawing on a rich set of data sources, we find that (1) this variation persisted for two centuries; (2) areas more intensively redistributed to Protestant elites became more rural and more dependent on small-scale agriculture over time. We provide evidence consistent with these areas being worse affected during the Great Famine of 1845-9.

[*]Postdoctoral Fellow, King Center on Global Development, Stanford University. jbowles@stanford.edu

[†]Assistant Professor, New York University Abu Dhabi. gkd225@nyu.edu

[‡]Assistant Professor, Department of Political Science, Washington University in St. Louis. michael.p.olson@wustl.edu

With thanks to Bob Allen, Verena Fetscher, Tyler Goodspeed, Saumitra Jha, Kevin O'Rourke, Christopher Paik, Leonid Peisakhin, Giuliana Pardelli, and Nina Weber for useful discussions, and to Michael Murphy for access to the 1841 parish census shapefiles.

Note to readers: This is an initial draft of this paper. As it will probably read, we have been deep in the weeds of data collection and digitization for a while, with several tasks still remaining (as discussed at the end of the paper). We're interested in all feedback, including (1) the framing, since this project could be pitched in a number of ways; (2) how best to link the framework with the context; (3) how to prioritize between short- and long-run effects; (4) the persuasiveness of the research design or additional tests you'd like to see; (5) additional thoughts on the necessity of more political outcomes.

1 Introduction

The relationship between the distribution of resources and economic and political development has inspired scholars across the social sciences for more than fifty years (Kuznets 1955; Moore Jr. 1966), and continues to play an influential role today (Piketty 2014). While this vast literature is characterized by significant debate about the precise relationship between inequality and economic growth, over the last thirty years there has been renewed attention to how institutional and cultural legacies shape contemporary outcomes (Engerman and Sokoloff 1994). Stated simply, it is difficult to understand the relationship between contemporary levels of inequality and wealth in any polity without an understanding of the distribution of resources within it over time.

The importance of the past for understanding contemporary inequality has led to significant scholarly emphasis on the distribution of land in pre-industrial societies. This is for at least three reasons. First, in agricultural economies access to land was an important driver of production. Second, because land was immobile and highly visible, land was closely tied to local prestige and influence. Landowners often enjoyed a privileged political position and directly benefited from institutions designed to perpetuate their influence over time. Examples range from the creation of hereditary estates under feudalism, the extension of tax farming privileges, or the restriction of political privileges like the franchise to land owners. Third, granular income data is scarce outside

of Western Europe and the Americas or prior to the 19th century. Data about the distribution of land is much more widespread, and often stretches back further in time, allowing scholars to examine and test theories in a wider range of historical contexts (Deininger and Squire 1998).

This interconnectedness of the distribution of land and political influence presents two major challenges to the historical study of inequality and development. First, while scholars are naturally drawn to events that significantly impacted the distribution of land—conquest, colonization, revolution, or in the modern period land reform—these dramatic events not only shift the distribution of property but the composition and identity of the local elite as well (Banerjee and Iyer 2005; Frankema 2010). This means that, in practice, it is often difficult to disentangle whether the relationship between inequality and development is driven by the concentration of land as an economic resource or by the composition of the elite. Second, because of the importance of land, especially in agrarian economies, it is often difficult to adjudicate between many plausible mechanisms linking shifts in land inequality with local development.

This paper proceeds in three steps. First, we consider why the composition and identity of local elites might exert an independent effect on local development, and suggest such effects might be particularly stark under conditions of minority rule. Our goal in this section is to describe the pathways through which shifts in who controls land impacts local development outcomes, while holding the *concentration* of land constant. Second, we examine the short-run consequences of the Cromwellian Settlement in Ireland for the identity of local elites. This series of legal and administrative rulings, following a brutal war of conquest and occupation, decreased Catholic landownership by about 60% between 1641 and 1670 as punishment for their involvement in a series of rebellions. However, it had far more limited effects on the individuals living and working in these areas, who remained overwhelmingly Catholic both before and after the Settlement. In doing so, it cemented the political supremacy of the Protestant minority for more than two hundred years (Bottigheimer 1971; Prendergast 1870) and has since been called both "The most epic and monumental transformation of Irish life, property and landscape that the island has ever known."

(Smyth 2006, 196). Third, using a wide range of unusually disaggregated data sources from the mid 17th through the mid 19th centuries, we examine the long-run consequences of this shift in the local elite for social and economic outcomes.

We exploit a natural experiment to address the empirical challenges that have often confounded previous studies of inequality and development. The English state had achieved its conquest of Ireland through the future promise of Irish land: both to "Adventurers" (wealthy merchants and politicians) who funded the war and to the soldiers who had fought under Oliver Cromwell during the conflict (1649-1653). We take advantage of lotteries held in 1654 that were used to divide Irish baronies (the third administrative division at the time) in ten counties (the second administrative division) between the Adventurers and the Army to repay these debts. We draw on a recent digitization of the *Down Survey*, a huge effort implemented between 1655-8 which mapped every townland in these counties to facilitate its expropriation and redistribution (Larcom 1851), combined with the *Books of Survey and Distribution* which then recorded the name and religion of every landowner both before (in 1641) and after (in 1670) the Settlement (Ó Siochrú, Brown and Bailey 2013; Ó Siochrú, Brown and Bartlett 2018).

The lottery-based assignment of baronies to different groups claiming Irish land produced two outcomes. First, Adventurers were less likely to ultimately occupy their land than members of the Army, and hence the lottery generates exogenous short-run variation in the share of land redistributed from Irish Catholic to English Protestant elites. Second, we find the Cromwellian Settlement had only limited effects on aggregate levels of land concentration. We provide evidence that this is because Army claimants—long overdue compensation for their role in the conflict—sold their allocated land to their officers or existing Protestant planters (who then became large landowners) while Adventurers were more likely to sell parts of their allocated land back to pre-existing Catholic elites (Brown 2020; Ohlmeyer 2012).

Because historians have long argued that the Cromwellian Settlement structured local development in Ireland for over two hundred years (Bottigheimer 1971; Prendergast 1870), we then use the

exogenous variation in the composition of the elite generated by the lottery to examine the effect of the identity of landowners on local development over the long durée. First, we establish that this short-run variation had persistent societal effects. Two centuries later, areas assigned to the Army feature landlords and tenants with more Protestant-associated names than areas assigned to the Adventurers, while those citizens are more likely to be literate in English and less likely to speak Irish. Defying either a Coasean bargaining logic, or the forces of assimilation—either of which would anticipate the erosion of short-run differences over time—their persistence likely owes to the imposition of additional barriers preventing Catholics from acquiring land after the Settlement (Pomfret 1930).

We then examine long-run effects both before and after the Great Famine of 1845-49 by drawing on digitized parish-level data from the 1841 and 1851 censuses. Prior work draws a direct, but empirically untested, line between the Cromwellian Settlement and this tragedy, wherein 25% of the population either died or emigrated (Connell 1950; Mokyr 1983; Solar 2015). *Ex ante*, persistent local-level variation in religious and linguistic proximity to the English state could have ambiguous effects. On the one hand, areas more affiliated with the ruling Protestant minority might have received preferential access to resources or improved political representation. On the other, highly exploitative (and often absent) English Protestant landlords might have persistently under-invested in their land and extracted from their tenants.

We find evidence consistent with the latter. Areas assigned to the Army, and hence more Protestant over time, appear more rural on the eve of the Great Famine, with more households engaged in small-scale agriculture. Such small-scale agriculture, by reducing crop diversity and entrenching reliance on the potato, is held to be a central determinant of the Famine's devastating impact (Guinnane 1994; O'Rourke 1994). We observe a subsequent collapse in the share of households engaged in agriculture in those areas that had been assigned to the Army two centuries prior. Consistent with the unwillingness of elites to provide support for their overwhelmingly Catholic constituents, we find that local institutions intended to alleviate the worst impacts of the Famine were

also rarer in these areas, suggestive of the likely impact of the Famine being even more severe. While the extent of this local-level variation is modest compared to the almost ubiquitously devastating impact of the Famine across the country, these results point to the remarkably durable consequences of the identity of local elites for development outcomes over time.

2 Inequality, Ethnicity, and Development

Almost thirty years ago, Engerman and Sokoloff (1994) shifted how social scientists study the relationship between inequality and development. Not only did this article persuasively argue that levels of contemporary economic inequality were driven in part by variation arising hundreds of years ago, but an emphasis on factor endowments both refocused attention on the importance of economic inequality and showed how these claims could be tested using local data. This emphasis on sub-national variation helped address one of the major challenges in the contemporary debate about inequality and growth which had previously focused on cross-national comparisons (e.g. Alesina and Rodrik 1994; Persson and Tabellini 1994; Forbes 2000), making it difficult to account for fundamental differences in economic and political inequality between countries.

As consensus grew about the detrimental effects of long-term inequality for growth, a distinct research agenda examined the relationship between ethnicity and development. Similarly ambitious in scale, these scholars employed a wide range of methods to explain why ethnically diverse societies are less likely to be developed than more ethnically homogeneous countries, and why levels of ethnic diversity are associated with lower rates of local development (Alesina, Baqir and Easterly 1999; Alesina and Ferrara 2005). This literature argues that the relationship between ethnic diversity and development is explained by the politicization of identity and public goods provision (Alesina, Michalopoulos and Papaioannou 2016; Alesina, Gennaioli and Lovo 2019; Habyarimana et al. 2007; Habyarimana, Humphreys and Posner 1999). Specifically, the unwillingness of members of an in-group to support redistributive policies perceived to benefit an out-group, "the diversity debit,"

or the greater willingness of politicians to provide public goods and services to their in-group, the "co-ethnicity advantage" (Pardelli and Kustov 2022, 249).

While extremely influential, the claim linking greater ethnic diversity to worse development outcomes had been challenged on two fronts. Conceptually, ethnic divisions are often difficult to measure (Chandra and Wilkinson 2008), especially over time (Kustov and Pardelli 2018). Theoretically, variation in identity is itself a reflection of the state-building processes that shaped the provision of public goods locally and nationally (Kustov and Pardelli 2018; Pardelli and Kustov 2022; Singh and vom Hau 2016; Wimmer 2016). A direct implication of this critique is that inattentiveness to historical processes may lead to spurious associations between contemporary measures of diversity and development, driven by the fact that development outcomes may often be worse in homogeneous communities of historically disfavored out-groups (Pardelli and Kustov 2022).

These three insights from the literature—the detrimental effects of long-term inequality for development, the role of ethnicity in shaping contemporary redistributive preferences, and the confounded relationship between historical processes of state-building and the contemporary salience of ethnic identity—suggest that attempts to understand how disparities in economic and political inequality impact development over the long-run in agricultural economies face a common challenge: the confounded relationship between the identity of land owners and the negative impact of long term inequality on development. This is for the simple reason that shifts in the distribution of land often coincide with shifts in the composition of the political elite. Conquest, colonization, and expropriation not only impact the distribution of land, but *who* controls this key factor endowment as well. While it might be the case that new elites have the same preferences as the *ancien régime*, this is not necessarily the case, and in some instances simply changing the identity of the political elite can have significant implications for development.

3 Ethnicity and Elite Responsiveness

Our concern in this section is not to resolve these difficulties, but rather to highlight that any attempt to measure the effects of land inequality on local development in ethnically diverse contexts, must seriously consider whether this association is driven by the redistributive preferences of landowners, or the structural impacts of inequality itself. We briefly outline scope conditions and key assumptions. Given the prominent role played by land in the development literature, especially in pre-industrial societies, our framework is not intended to extend to modern, industrial economies, or pre-modern societies that did not rely on agriculture. Because of our emphasis on the role of identity in shaping preferences with respect to public goods, our theory is most applicable to divided societies, and especially to cases of minority rule.[1] Finally, building on evidence of the effects of local land inequality on development, we make two key assumptions. First, that most local elites are likely to oppose reforms that disrupt their privileges or the institutions that facilitate the transmission of these hereditary benefits to their descendants. This could include higher levels of taxation to pay for more public goods, but also more radical changes like land reform, emancipation, or the extension of the franchise to non-land owners. Second, building on the literature that suggests that high levels of persistent inequality are detrimental to local growth over the long run, we assume that where elites are able to successfully oppose redistributive reforms, levels of development will be lower.

We start from the premise that the identity of elites directly impacts their distributional preferences as well as their ability to coordinate to act on these preferences. A broad literature shows that shared ethnicity facilitates collective action (e.g. Alesina, Gennaioli and Lovo 2019). Various theoretical pathways have been posited for this relationship: Alesina and Ferrara (2005), summarizing literature in economics, argue that ethnic diversity can shape individuals' preferences, their strategies in economic interactions, or that it can shape an economy's production function (764-766); Larson

[1] However, as the regional inequality literature highlights, even in ethnically homogeneous societies, it is often the case that regional, clan or family-based identities, can play a similar role in facilitating or inhibiting coordination (Hodler and Raschky 2014).

and Lewis (2017), on other other hand, emphasize the importance of coethnicity for facilitating the flow of information and shaping social networks. Regardless of the particular mechanism, "Ethnic identity plays a fundamental role in collective action, especially in developing countries" (Larson and Lewis 2017, 350). As a result, we expect that homogeneous elites, particularly in cases of minority rule, will be more successful at resisting redistributive pressures than ethnically heterogeneous elites, because of higher levels of intergroup trust, higher defection costs, and in many cases, systematic dehumanization and denigration of non co-ethnics. To the degree that elites are willing to redistribute in this version of events, they are likely to prioritize policies that benefit their non-elite co-ethnics.

Building on insights from a growing literature on how the composition of bureaucrats impacts performance of their duties (Xu 2021; Xu, Bertrand and Burgess 2021), and the prominent role played by landowning elites for public goods provision in agricultural economies, we conceptualize this amalgamation of preferences and action as elite "responsiveness." Where elite responsiveness is ethnicized, we expect the ethnic composition of the land owning elite to reinforce distributional preferences. Specifically, greater coordination among co-ethnic elites making reforms less likely, and greater homogenization of preferences, meaning more support for public goods provision to non-elite coethnics and greater opposition to redistributive efforts that are perceived to benefit non co-ethnics.

An emphasis on the role of ethnicity and elite responsiveness implies that a shock which results in more land being concentrated in the hands of a dominant political minority would have detrimental effects on development because higher levels of trust among elites from the minority group facilitates coordination against reforms and increases the cost of defection. In this narrative, to the degree that elites redistribute, they are likely to prioritize their co-ethnics.

In practice, adjudicating between the role of elite identity and structural inequality is extremely difficult. Because shifts to the distribution of land are often associated with radical changes in the composition of the political elite, or vice versa, it is often difficult to discern whether shifts in land inequality impact development "mechanically" by facilitating or inhibiting coordination among

elites against redistribution and public goods spending, or through the "responsiveness" channel by shifting the composition of local elites. Of course this need not be a mutually exclusive proposition, and in most historical contexts it is likely that both channels are at work to some degree. In the next section we introduce the historical setting in which we test our claim that a shift in the composition of the political elite alone can impact local development: 17th century Ireland.

4 The Cromwellian Settlement

In 1641, the growing political and economic influence of Protestant planters in Ireland triggered a series of rebellions which aimed to reduce their power and end anti-Catholic discrimination (Perceval-Maxwell 1994). In response, Charles I and the Parliaments of England and Scotland agreed to raise an army to quell the rebellion. Absent sufficient ability to raise funds, under the *Adventurers' Act* (1642) a set of around 1,500 "Adventurers," so called because this group of wealthy merchants and politicians "ventured" their capital, subscribed to fund the military intervention (Brown 2020). In exchange for their funds, the Adventurers were promised land to be expropriated from Catholic landowners in Ireland after a successful military campaign (Bottigheimer 1971). Soldiers themselves were promised arrears in the form of smaller landholdings in Ireland, also to be apportioned after the conflict. This intervention was delayed by the outbreak of the English civil war and in 1649 an invading army led by Oliver Cromwell began the conquest of Ireland. After a protracted and devastating conflict, the last formal surrenders of Catholic rebels were issued in 1653 (Darcy 2013).

4.1 Expropriation and redistribution of land

As a result of the conflict and Parliament's debts to its creditors, the *Act of Settlement* (1652) and the *Act of Satisfaction* (1653) together declared that, (1) nearly all Catholic landowners were deemed liable to have their lands confiscated and to be forcibly transported across the Shannon river to the

impoverished western Connacht province; (2) their confiscated land was to be redistributed to the 1,500 Adventurers and the 35,000 Army soldiers owed arrears relating to the conflict (Prendergast 1870).[2] These twin acts thereby reallocated the nominal ownership of nearly all the land in Ireland across four groups of claimants: to the Army, the Adventurers, the English state, or to dispossessed Catholic elites given land in Connacht. We discuss the allocation of land to different groups in more detail below, including the lottery-based assignment in certain counties to the Army and Adventurers. One important detail for our data and empirics, however, is that pre-existing Protestant plantations, mostly in Ulster, as well as land owned by the Church, were largely exempt from expropriation (see Figure A2).

The magnitude of the debts that parliament owed to the Army and Adventurers, combined with uncertainty about the actual land available for redistribution in Ireland, dramatically slowed the allocation of land expropriated from Catholic landowners.[3] Three subsequent surveys sought to fill this informational void. First, the barony-level "Gross Survey" was conducted in 1653 to ascertain the overall amount of land available for repaying debts (Ó Siochrú 2013). Second, a cadastral Civil Survey was administered (1654-56) which recorded information on pre-war land ownership. This was intended to be a comprehensive survey, but was quickly discovered to be quite inaccurate (Ó Siochrú 2013). Finally, in an attempt to resolve these inaccuracies, William Petty's cartographic *Down Survey* (1655-58) was produced. The Down Survey, conducted quickly under the shadow of unresolved claims over Irish land, is often described as the first 'modern' large-scale territorial map in European history (Andrews 1985; Hardinge 1873). For the first time, it precisely mapped townlands (the smallest administrative unit) along with measures of profitable and unprofitable land to facilitate redistribution to the claimants. By 1659, essentially all the land within the areas

[2]Overall evidence on how many Catholics were transplanted to Connacht is limited, but historians suggest that agricultural workers tended to stay where they had previously resided, while only Catholic landowning elites were those forcibly transplanted (O'Hart 1887; Ó Siochrú, Brown and Bartlett 2018).

[3]Previous surveys were limited in scope and quality: The *Bodley Survey* of 1609, for example, mapped the counties of Ulster to a low degree of accuracy to facilitate the founding of the Ulster Plantation, and the *Strafford Survey* had surveyed all the counties of Connacht aside from Leitrim between 1636-40, but this area was set aside for transplantation of Catholics.

allocated to the Army and the Adventurers had been assigned to a specific claimant.

The actual settlement process, i.e. the take-up of expropriated land, was implemented in concert with the restoration of Charles II in 1660. Despite the hopes of Irish Catholics that Charles would nullify the expropriation of their land, his *Act of Settlement* (1662) effectively defined land ownership as existing in 1659 to be the basis of future claims on land. However, recognizing not all Catholic elites to have been complicit in the prior conflict, the 1662 act permitted a subset of Catholic landowners found to be "innocent" by a court of claims to buy their old land from its new owner. Later, as a further concession, a broader set of Catholic landowners were permitted to regain part of their initial land holdings following the *Act of Explanation* (1665). The lengthy resolution of the land redistribution process meant many Protestant claimants had resold the rights to their new land on the private market. As a result, some land remained owned by Catholics even in territories where all land had been *nominally* confiscated in 1652. These concessions permitted many wealthier Catholic landowners, especially Old English Royalists, to recover significant portions of their pre-conflict landholdings (Ohlmeyer 2012).

4.2 Descriptive evidence on land redistribution

By the end of the protracted redistribution process in 1670, the overall effect of the Cromwellian Settlement had been a dramatic reconfiguration of Irish land: Catholics' ownership of territory across the country fell from 50% to 20%, which has been called "the single largest shift in land ownership anywhere in Europe (and possibly beyond) during the early modern period" (Ó Siochrú, Brown and Bartlett 2018, 606).[4] We draw on recently-digitized sources to characterize the extent of this redistribution. Our landownership data ultimately comes from the *Books of Survey and Distribution* created to facilitate the expropriation of Catholic land, which was then georeferenced and spatially linked to the Down Survey by Ó Siochrú, Brown and Bailey (2013). Our data includes

[4]Excluding those areas which had been part of the Ulster Protestant plantation prior to 1641, these numbers are 57% and 24% respectively.

not only the names and holdings of landowners both before (1641) and after (1670) the Settlement, but also their religion—its inclusion itself is a testament to the importance of sectarian identity at this juncture.

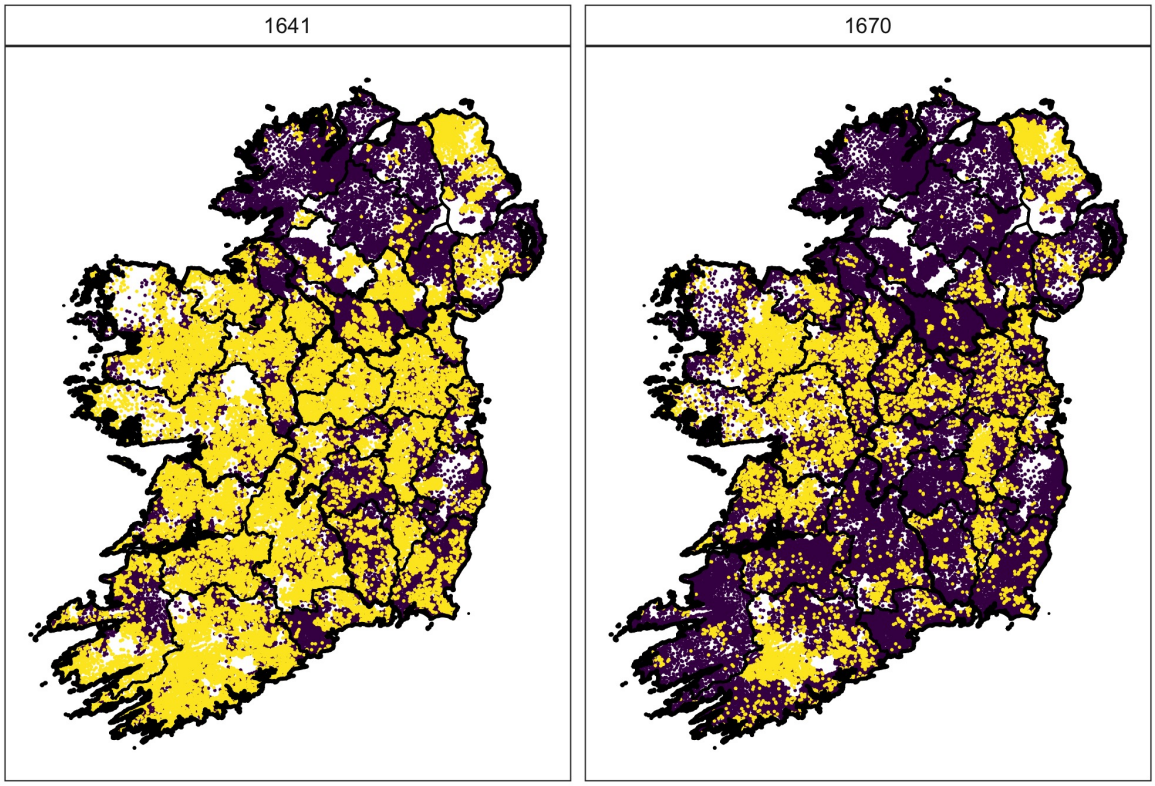

Figure 1: Landowner Religion, 1641-70

In Figure 1 we plot the distribution of Catholic and Protestant landowners before and after the Cromwellian Settlement at the townland-level ($n = 57,000$). The figure demonstrates the dramatic changes in landowning patterns across these decades. While English patterns of landholding had already shaped Ireland's landscape by 1641, with landholding elites owning large estates, England's *relative* tolerance of Catholicism up to that point ensured that most of these elites remained Catholic. Before the Cromwellian Settlement, in the left panel, we see that the vast majority of land was owned by Catholics (shown in yellow), particularly outside of Ulster and "The Pale," a coastal enclave of formal British administration established in the late 15$^{\text{th}}$ century around Dublin. After the

Cromwellian Settlement, however, in the right panel, significant areas of the island were owned by Protestants. The vast majority of the changes in land were in the provinces of Munster (the southern portion of the island) and Leinster (the eastern portion of the island). Relatively less change occurred in Connacht in the west (since dispossessed Catholic landholders were provided landholdings there) and Ulster in the north (since high pre-Settlement rates of Protestants in the Ulster plantation mean that much less land was eligible to be redistributed).

4.3 Consequences of the Cromwellian Settlement

Historians argue that the Cromwellian Settlement cemented the Protestant Ascendancy: the economic and political control of majority-Catholic Ireland under a small minority of Protestant landowners over more than two centuries (Pomfret 1930). While some Catholics demonstrably retained land following the Settlement, their economic power was hugely diminished by the end of the 17th century and into the 18th. This culminated in the Williamite War of 1688-91, in which Irish Catholics supporting James II, in the hopes that his victory would see more of their land returned to them, fought against Protestants supporting William III. William's victory led to even more dramatic restrictions on Catholic landownership through the Penal Laws, which variously banned Catholics from buying Protestant land and made it harder for them to pass on their land between generations, though the strength of enforcement of these requirements varied (Childs 2007). While Protestants enjoyed disproportionate political and economic influence prior to 1649, the Cromwellian Settlement ushered in a new era of Protestant dominance that ultimately lasted until major land reforms two centuries later in the late 19th century (Bottigheimer 1971; Pomfret 1930).

The control of land by Protestants went hand-in-hand with the political marginalization of Catholics, with the recipients of Irish land in the Settlement, and their descendants, going on to dominate national policies. The preeminent position of the Protestant minority, and more specifically the Anglican elite, was secured by a series of punitive laws that were specifically designed to eradicate any resistance to English rule. Because the franchise was tied to property ownership, and

the secret ballot was not introduced until 1872, rural landowners played a particularly influential role in Irish politics. Most had little incentive to reform a political status quo that systematically favored their interests and privileges over those of the majority Catholic population. Decades of scholarship have documented how legislation passed by this narrow elite, particularly restrictions on property rights, education, employment, and political participation, further exacerbated disparities between the marginalized Irish majority and the English minority (O'Leary 2019, Chapter 3). Despite some attempts to reform some of the most egregious anti-Catholic laws, a process known as "Catholic Emancipation," this profoundly unequal status quo would endure until Ireland gained its independence in July, 1921 (O'Leary 2019, Chapter 5).

Perhaps the most salient consequence of the mass expropriation and redistribution of Catholic land is to be found two centuries later, during the Great Famine of 1845-9 in which an estimated 20-25% of the Irish population either died or emigrated (Cousens 1960). Historians have long emphasized the importance of the Great Famine, not just as one of the seminal events in Irish history, but which through migration had significant economic and political ramifications throughout Europe, Oceania, and North America (Hatton and Williamson 1993; Ó Gráda 2018; Ó Gráda and O'Rourke 1997).

Conventional accounts of the Great Famine employed Malthusian assumptions to trace the origins of the devastation to the massive expansion of the Irish population prior to the mid 1800s (Grigg 1980). More contemporary explanations reject this deterministic account, and instead highlight the overwhelming reliance on small-scale agriculture and dependence on the potato for both sustenance and fodder for livestock in the countryside (Guinnane 1994; O'Rourke 1994). Since the early 1950s, beginning with Connell (1950), historians have argued that it is impossible to account for the devastation of the Famine without considering the long-run consequences of mass redistribution of land from Catholic to Protestant elites in the 17th century (Braa 1997). Mokyr (1983), for example, concludes his seminal work on the causes of the Famine by arguing that:

When we ask the question what, in the final analysis, was the real cause, the true

"external factor" in the dismal history of prefamine agriculture, [...] Ultimately, there is history to blame: the creation of the landlord class from British and Scottish adventurers and mercenaries, a class of parvenus and foreigners.

This connection, however, is not empirically tested by Mokyr—and, as suggested by more recent work, appears not to have been since then. Solar (2015), for example, notes that "It is very much a residual explanation, the strength of which resides in the previous dismissal of other explanations" (p.74).

5 Short-run effects on landownership

As the previous discussion makes clear, huge amounts of land were transferred from Catholic to Protestant landowners between 1641 and 1670 across the country. But, importantly for our purposes, there was also substantial local-level variation in the extent of this redistribution. In this section we describe how the lottery-based assignment of land to Army, versus Adventurer, claimants potentially provides us with an exogenous source of variation in this *intensity* of redistribution, before describing our data sources and estimating strategy.

5.1 The assignment of land to the Army and Adventurers

As a major military incursion, the Cromwellian Settlement required considerable financial support and personnel. As we note above, the "debt" incurred by Cromwell's government to finance the conflict was in the form of promises of profitable land to those who served in the Army as well as to the Adventurers who had acted as its financial backers.[5] Following its victory, the English state then faced the challenge of both expropriating and allocating this land between different claimant groups to satisfy its debts.

[5] All debts were held in the form of *profitable*, i.e. agriculturally viable, land. The relative share and spatial distribution of profitable, versus unprofitable, land was also unknown at this point at anything other than very coarse geographical levels (Andrews 1985).

5.1.1 Barony-level land lottery

Two details of the land *allocation* process, which was undertaken prior to the expropriation process, are important for our purposes. First, ten of Ireland's thirty-two counties were to be split between the Army and Adventurers. The decision to split counties between these claimant groups reflected two considerations: first, socially, "the planting of the soldiers in the same counties with the Adventurers was thought to offer some encouragement to the latter [to settle], who would know that able-bodied soldiers lay close at hand" in the likely event of future rebellions (Bottigheimer 1971, 130-31); second, politically, "In the interests of remodelling, the planners refused to allow Adventurers from individual English regions to cluster together in Ireland" (Hirst 2012, 225). Ultimately, the English state considered that dividing these counties would help form a more stable Protestant plantation than had been previously achieved outside of Ulster (Lenihan 2014; McCabe 2005).

Within these ten counties, a lottery was used to evenly allocate baronies (the third-lowest administrative unit) to either the Army or Adventurers: "In the interest of impartiality, [...] a lottery was held on 24 January 1654 to determine which baronies of each county would constitute the soldiers' half and which baronies the Adventurers' half" (Bottigheimer 1971, 143). The division of land at this level was necessitated by the state's lack of more granular information: at this point, only the crude barony-level Gross Survey of 1653 was available to provide estimates of the distribution of profitable land (Larcom 1851). Having assigned baronies to either claimant group, the Adventurers and Army were to then—amongst themselves—decide how to apportion particular land parcels to specific individuals. Figure 2 shows the allocation of land during the Settlement to different claimant groups following the 1654 barony-level lottery. These split counties, where we observe sub-county variation in the allocation of land to the Army or Adventurers, are found across three of Ireland's four provinces.[6]

[6]Due to uncertainty over whether sufficient amounts of profitable land would be uncovered in these ten counties to satisfy the huge number of Army claimants, several other counties were set aside as security just for the Army (McKenny 1989).

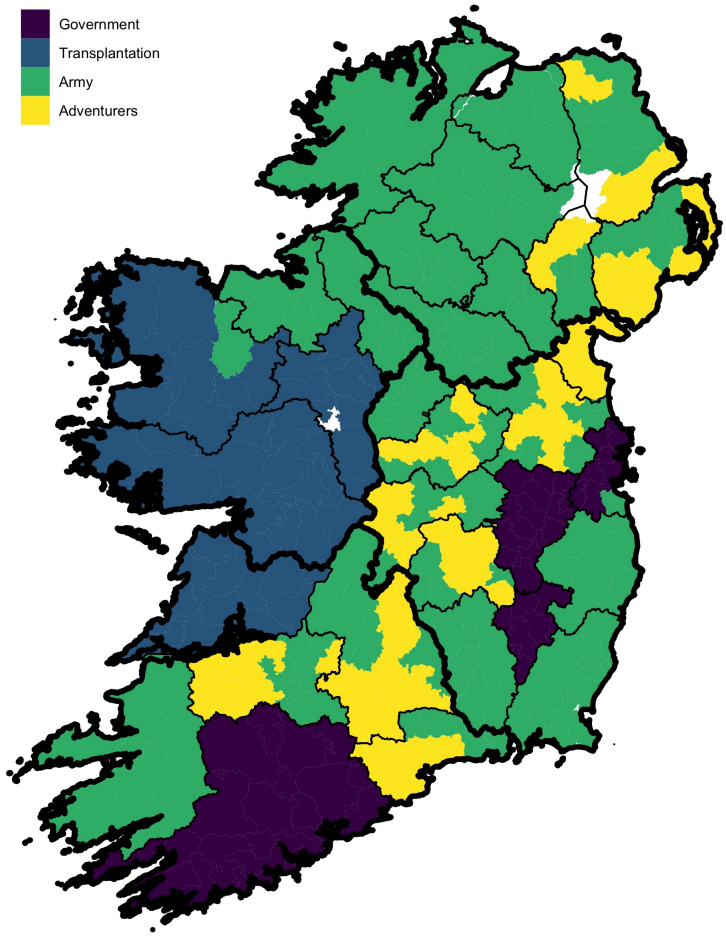

Figure 2: Assignment of land to different claimant groups following the 1654 lottery
Data from Prendergast (1870), McKenny (1989), Hardinge (1873). Thick borders indicate province; thin borders indicate county.

5.1.2 Claimants' propensity to settle land

Second, it is *ex ante* unlikely that these two claimant groups ultimately settled their allotted land at the same rates. As described above, the allocation of land to specific members of each group was very protracted, with the lack of more granular information on ownership and land quality necessitating the implementation of the Down Survey only completed in 1658—already sixteen

years after land had been promised to the Adventurers, fifteen years after the promise to compensate soldiers with land, and five years after the end of the conflict.

In addition, the process of land *expropriation* from Catholic landowners presented enduring uncertainties. Pre-existing landowners were sometimes able to recover their holdings through legal means, such as through the *Act of Settlement* (1662) or *Act of Explanation* (1665), or through informal payments. Ohlmeyer (2012) offers insight into the transactions and interactions that occurred regarding the Marquis of Antrim's estates.[7] As she notes, for both the Army-assigned and the Adventurer-assigned baronies, "there was an immediate redistribution" after the initial allotment: "in the months following the lottery the speculators either sold or exchanged their adventures" and "the majority of Cromwell's troops were eager for cash and merely sold their debentures and went home" (Ohlmeyer 2012, 291). She notes that, in the midst of this confusion, "Antrim was able to maintain very close links with his estates throughout the Interregnum" and, more broadly, that "Impressionistic evidence suggests that many of the Catholic peers [...] appear to have returned to their pre-war estates and developed survival strategies akin to those used by the Marquis of Antrim" (293). Lenihan (2014), in a study of County Wexford, finds that only a small share of Catholic landowners ultimately appear to have forfeited their entire estates and to have moved to take up new land in Connacht. As a result, by 1670 many of those initially allocated land had not settled it: ultimately "The new plantation failed on the gigantic scale originally envisaged. In 1670, when the estates of the Cromwellian settlers were confirmed they numbered 8,000 as against 36,000 in the original scheme" (Lenihan 2014, 146-147).[8]

Historical evidence is mixed and inconclusive as to whether the Adventurers or Army were ultimately *more* likely to settle their allocated land (Brown 2020). Soldiers were plausibly more desperate to receive payment, given that this was for them long overdue back wages rather than an

[7] Ohlmeyer (2012) is quick to note that while this case study "illustrates what appears to have happened on confiscated estates across the country...further cadastral studies need to be undertake in order to confirm this" (291).

[8] As we demonstrate below, though the total *number* of settlers was much smaller than initially intended, this still represented a huge shift in the aggregate ownership of land by Protestants relative to Catholics since many of the new Protestant landowners came to acquire large estates.

investment opportunity. Available evidence indicates that "most [soldiers] sold out at a discount to their officers or to existing New English settlers" (Hirst 2012, 225), who then "eagerly bought up [land] from hardpressed soldiers, and at knock-down discounts" (Hirst 2012, 224). The relationship between soldiers and their officers may have meant that they had a readily available set of Protestant buyers in the event that they chose not to settle (Ohlmeyer 2012). For Adventurers, on the other hand, "No evidence shows us how many ... actually went to Ireland and settled" (Bottigheimer 1971, 162). As we note above, the protracted expropriation process led to the eventual forgiveness of many Irish Catholic (former) landholders, allowing them to purchase back at least a portion of their land. This was perhaps more feasible in the case of their lands being given to Adventurers, since Army debentures were considerably smaller on average and hence would have required bargaining with many more individuals. The Adventurers may have also been more willing to negotiate with Catholic elites given their primarily financial motivations and general lack of direct engagement in the prior conflict (Brown 2020). Despite this historical ambiguity, we expect that the dramatically different constituencies to whom land was given—the Army and the Adventurers—produced different eventual patterns of settlement across baronies within the lottery-assigned counties.[9]

5.2 Research design

Leveraging the lottery-based assignment of baronies to the Army or Adventurers within the sample of ten 'split' counties, we more formally test for variation in the subsequent identity and religion of landowners in the short-run following the Settlement.[10]

[9]Matching Adventurer-level data reported in Bottigheimer (1971) with our landownership data recorded in 1670, we estimate that no more than 25% of Adventurers actually took up their land. Equivalent numbers for the Army are unavailable due to the absence of sources recording the names of all Army claimants.

[10]We use variables at a variety of geographic units throughout the project. From largest to smallest, Irish geographic units are provinces ($n = 4$), counties ($n = 33$), baronies ($n = 294$), parishes ($n = 2,733$), and townlands ($n = 57,343$). Lower units are usually, but not exclusively, nested within higher units; parishes, in particular, may cross barony lines.

5.2.1 Data

For outcomes, we draw on highly disaggregated data derived from the Down Survey as digitized by Ó Siochrú, Brown and Bailey (2013). Aggregating from the townland to the parish-level to match the resolution of our subsequent outcome measures, we consider measures for (1) the proportion of land owned by Catholic and Protestant landowners in 1641 and 1670; (2) the change in these proportions between 1641 and 1670; (3) the proportion of land recorded as being owned by the same family in both years. Underscoring the extraordinary extent of aggregate land redistribution between these years, Figure A1 plots the distribution of each of these measures across the full country. We also consider analogous measures of land *concentration*, which we introduce in more detail below.

5.2.2 Estimation

To define our "analysis sample" within the split counties, we record information on the assignment of baronies to the Army or Adventurers using Prendergast (1870), McKenny (1989), and Hardinge (1873). Importantly, given our main interest in isolating variation in the extent of land redistributed to Protestants, we exclude the three counties in Ulster in this sample. Landowners in Ulster were predominantly Protestant (over 80%) even before the Settlement, largely due to the geographical concentration of pre-existing plantations in this area (see Figure A2), and hence the extent of redistribution in these counties was far more limited than in the provinces of Leinster or Munster.[11] This exclusion leaves us with an analysis sample consisting of 734 parishes nested within 68 baronies in 7 counties.

Our estimating strategy requires that the assignment of baronies to claimant groups was indeed as-if random in 1654, as the historical record suggests (Larcom 1851; Prendergast 1870). To assess the "success" of this randomization, we conduct balance tests on predetermined outcomes defined at the parish-level. These are drawn primarily from Ó Siochrú, Brown and Bailey (2013) and relate

[11] Pre-existing Protestant landowners were liable to lose a fifth of their estates if they had allied with the Royalists during the English Civil War, but the restoration of Charles II in 1660 effectively negated this confiscation (Hirst 2012).

to landowning patterns in 1641. We additionally include measures of the incidence of particular words in townland names (which had largely been set centuries prior to the Settlement), since the presence of such words signified particular natural resources or geographical features (Nash 1999; Reeves 1857).[12]

We present results of these balance tests in Table 1. Columns (2) and (3) present the mean of each variable in parishes in the baronies assigned to Adventurers and the Army, respectively. There are few qualitative differences; perhaps most striking is the *higher* share of pre-Settlement Protestant religious-held land in Adventurer baronies. Column (4) presents an estimate of the difference in means between the Adventurer- and Army-assigned baronies based on a simple regression model with county fixed effects; this choice reflects the data-generating process, in which the baronies within each of these seven counties were subject to complete randomization, with half going to each of the Army and Adventurers at random.

Finally, Column (5) presents the p-value from that regression, using barony-clustered standard errors. The results are consistent with an essentially random allocation of baronies between the claimant groups. Out of twenty-five variables considered, we find imbalance that is statistically significant at the 5% (10%) level for one (three) variables. Parishes in baronies assigned to the Army and those assigned to Adventurers appear similar in terms of the types of landowners in 1641, the types of land, the amount of land, the location within counties, and the historical presence of resources or geographical features implied by patterns in townland names. Imbalances exist for the average area of townlands and the share of Protestant religious land, but the magnitude of the differences is small.[13]

[12]For example, the word "derry" in a townland name, such as in "Edenderry", signifies oak trees; "ard" signifies a high point; "carrick" signifies rocks; "down" signifies a fortified structure; "knock" signifies a hill; and "kil" signifies a church.

[13]We note that the share of land owned by Protestants was slightly greater in Adventurer baronies (43%) than Army baronies (38%). We believe that part of this owes to the fact that Catholic elites might have been more able to convert to Protestantism as a means to retain their landholdings in these baronies at higher rates than in Army baronies (Ohlmeyer 2012). Combined with the fact that the religion of the landowner we observe is fixed between 1641 and 1670, this would induce the appearance of higher rates of Protestant landowning in 1641. Consistent with this idea, if we instead measure the "Protestant-ness" of landowner surnames (by computing the frequency with which a given surname was associated with being Protestant across the full country) using the "Share Protestant landowner (surname-adjusted)" outcome, we

Table 1: Balance on predetermined covariates

	μ_{Adv}	μ_{Army}	β	p-value
(1)	(2)	(3)	(4)	(5)
Landownership in 1641				
Share Catholic landowner	0.60	0.64	0.04	[0.18]
Share Protestant landowner	0.43	0.38	-0.05	[0.12]
Share Protestant landowner (surname-adjusted)	0.42	0.39	-0.03	[0.33]
Share missing landowner information	0.02	0.02	0.01	[0.33]
Share shared townland ownership	0.08	0.07	0.00	[0.71]
Share top 10% landowners in parish	0.38	0.38	0.01	[0.78]
Share top 5% landowners in parish	0.24	0.24	0.00	[0.91]
Share top 1% landowners in parish	0.08	0.05	-0.02	[0.19]
HHI (individual landowner-based)	0.42	0.40	-0.03	[0.19]
HHI (religion-based)	0.70	0.69	0.00	[0.96]
Number of landowners	5.93	6.44	0.59	[0.13]
Townland names				
Name: Down	0.01	0.01	0.00	[0.96]
Name: Derry	0.00	0.01	0.00	[0.54]
Name: Ard	0.03	0.02	-0.01	[0.10]*
Name: Carrick	0.01	0.01	0.00	[0.53]
Name: Knock	0.03	0.03	0.00	[0.61]
Name: Kil	0.09	0.10	0.01	[0.21]
Geographical features				
Average townland area (km^2)	1.63	1.48	-0.14	[0.06]*
Share of profitable land	0.92	0.92	0.00	[0.78]
Share of protestant religious land	0.05	0.02	-0.05	[0.02]**
Share of wild land	0.01	0.01	-0.01	[0.45]
Share of common land	0.03	0.03	0.00	[0.74]
Share of religious land	0.01	0.01	0.00	[0.93]
Total area (km^2)	23.29	20.07	-4.66	[0.13]
Longitude	-7.65	-7.64	0.04	[0.43]
Latitude	52.92	52.95	0.05	[0.15]
Total profitable land (plantation acres)	1953.78	1980.26	-2.06	[0.99]

All predetermined covariates observed at the parish-level. Column (2) presents mean of parishes in Adventurer-assigned baronies; (3) presents mean of parishes in Army-assigned baronies; (4) presents coefficient from regressing outcome onto an indicator for a barony being assigned to the Army and county fixed effects; (5) presents p-values from that regression with standard errors clustered at the barony-level. * p < 0.1, ** p < 0.05, *** p < 0.01.

Given this, we estimate our main results using the following specification:

$$y_{pbt} = \beta \text{Army}_b + \eta_c + \epsilon_{pbt}, \tag{1}$$

where outcome y in parish p in barony b in year t is regressed onto an indicator Army_b for whether that parish was in a barony assigned to Army claimants in 1654. We add county fixed effects (η_c) since the assignment of baronies was effectively stratified at this level. In auxiliary specifications we control for a vector of predetermined covariates ($\mathbf{X}_{pb}$) selected by cross-validated LASSO following Belloni, Chernozhukov and Hansen (2014).[14] Standard errors are clustered at the barony-level. Given the plausibility of its exogenous assignment, β identifies the causal effect of assigning baronies to Army, versus Adventurer, claimants.

5.3 Effects of barony-level assignment on landownership

In Panel A of Table 2 we estimate effects on the proportion of land in a given parish owned by Protestants in 1670. The coefficients indicate that the exogenous assignment of a barony to Army claimants in the 1650s increases the proportion of land in that barony owned by Protestants in 1670 by between 5 and 6 percentage points (pp) ($p < 0.01$). This estimate is stably estimated regardless of the inclusion of LASSO-selected predetermined covariates (column 2). In columns 3 and 4 we find that assignment to the Army induces a *change* in Protestant landowning between 1641 and 1670 equivalent to between 7 and 11 pp ($p < 0.01$). Last, in columns 5 and 6 we find that parishes in baronies assigned to Army claimants are 5 pp more likely to have a different landowner family recorded in 1670 compared to 1641 ($p < 0.05$), indicating a greater overall rate of land turnover. The standardized effect sizes for each of these outcomes range between 0.17 and 0.31 standard

find that these imbalances are more modest.

[14]The superset of all potential covariates, $\mathbf{X}^+_{pb}$, consists all predetermined variables in Table 1 and their interactions with province fixed effects. From this superset, $\mathbf{X}_{pb}$ is defined as the union of all covariates selected by LASSO when (1) Army_b is predicted by $\mathbf{X}^+_{pb}$; (2) y_{pb} is predicted by Army_b and $\mathbf{X}^+_{pb}$. This follows the "double selection" approach of Belloni, Chernozhukov and Hansen (2014).

deviations relative to levels observed in baronies assigned to the Adventurers.

Table 2: Effects on landownership in 1670

	Share Protestant		Change Protestant		Different family	
A. Identity of landowner	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.054***	0.061***	0.108***	0.067***	0.055*	0.051**
	(0.020)	(0.017)	(0.040)	(0.016)	(0.030)	(0.020)
Controls	×	✓	×	✓	×	✓
DV Mean	0.84	0.84	0.41	0.41	0.73	0.73
DV SD	0.26	0.26	0.33	0.33	0.30	0.30
Observations	734	734	734	734	734	734
	Major landowner		Landholding HHI		Number of landowners	
B. Land concentration	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.008	0.007	-0.018	0.007	0.060	-0.007
	(0.029)	(0.021)	(0.017)	(0.011)	(0.057)	(0.025)
Controls	×	✓	×	✓	×	✓
DV Mean	0.27	0.27	0.38	0.38	1.92	1.92
DV SD	0.29	0.29	0.22	0.22	0.53	0.53
Observations	734	734	734	734	734	734

Dependent variables: Panel A: Share of parish owned by Protestants; Change in share of parish owned by Protestants 1641-70; Share of parish owned by a different family (based on surname) relative to 1641. Panel B: Share of parish owned by a landowner in the top 5% of landowners nationwide; Hirschman-Herfindahl index of individual landownership in parish; Log+1 Number of landowners in parish.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Importantly, as shown in Panel B, it does not seem to be the case that the barony assignment meaningfully affected land *concentration* following the Settlement. In columns 1 and 2, we find no treatment effects on the share of land owned by 'major landowners' in parishes within Army-assigned baronies, which we define as those landowners with landholdings in the top 5% of the distribution across the whole country in 1670, and who own around 30% of land in the analysis sample regardless of assignment. In columns 3 and 4, we find little evidence of effects on a Herfindahl index of land concentration defined at the parish-level. In columns 5 and 6, we similarly find minimal effects

on the number of distinct landowners in each parish.[15] These null effects are reinforced by the high correlations between land concentration we observe within a given county before and after the Settlement (see Figure A3).

We interpret these null effects in light of our above discussion, such that (1) more land in Adventurer-assigned baronies was sold back to pre-existing Catholic elite landowners, while (2) the protracted resolution of claims over land led much land in Army-assigned baronies to be sold to officers or new Protestant settlers, who then became substantial landowners themselves. Consistent with (1), in Panel A of Table A2 we find that 'major landowners' *as recorded and defined in 1641* owned a substantially lower share of land in Army-assigned baronies in 1670 relative to Adventurer-assigned baronies. Consistent with (2), in Panel B of Table A2 we find that the share of land owned in 1670 by major *Protestant* landowners *who had not owned land in 1641* is significantly higher in Army-assigned baronies.

Overall, the lottery-based assignment of baronies to Army versus Adventurer claimants then generated significant intensive margin variation in the extent of land expropriation and redistribution and hence the subsequent *identity* of landowners, whether Catholic or Protestant. However, it had little effect on the *concentration* of land within parishes and baronies, consistent with pre-existing Catholic economic elites being more likely to persist in Adventurer-assigned baronies while new Protestant economic elites emerged in Army-assigned baronies. We interpret the "treatment" of Army barony assignment, therefore, as representing a shift in the connectedness of local economic elites *towards* the national state (which had become overwhelmingly dominated by English Protestants) and *away from* the vast majority of the population which remained Catholic.

[15] Though the results in columns 3-6 do hint at land being slightly more fractionalized in Army-assigned baronies, these effects are both noisy and substantively small. Similar null effects on landowning by major landowners hold if we instead consider the 10% or top 1% or landowners (see Table A1).

6 Long-run effects of the Cromwellian Settlement

Leveraging this exogenous source of variation in the intensity of land expropriation and redistribution, we examine longer-run effects on social and economic outcomes. We do this drawing on an array of (generally parish-level) data sources drawn from the 19th century, which we introduce below, and estimate reduced form effects using Equation (1).[16] While the lottery-based assignment of baronies generates a useful source of variation for the research design, it is worth underscoring both the overall intensity of expropriation irrespective of barony assignment as well as the strikingly high levels of land inequality across both time periods.[17]

6.1 Persistence of variation in religious identity and national affiliation

First, we consider evidence for whether this short-run local-level variation in the religious and national identity of landowners persisted. Such persistence is not obvious for several reasons. For one, a Coasean logic would suggest that initial variation in patterns of landholding might dissipate over time as land is exchanged and consolidated between owners (Bleakley and Ferrie 2014). Alternatively, the fact that punitive Penal Laws were enacted to consolidate the Protestant Ascendancy—including rendering the acquisition of new land by Catholics extremely difficult—might have effectively frozen landholdings by religious group following the Settlement (McGrath 1996). Last, often high rates of intermarriage and religious conversion could have eroded these short-run differences over time through assimilation (Fernihough, Ó Gráda and Walsh 2015).

[16] While in principle an instrumental variables design could be justifiable using the outcomes from Table 2 as the endogenous treatment variables to be instrumented by the lottery assignment, we consider the assignment of baronies to the Army to constitute a bundled treatment which likely had other second-order effects beyond shifting the share of land owned by Protestants. For example, indicative of an exclusion restriction violation, those settling land across the experimentally-assigned baronies could have appeared different along other dimensions correlating with their religion, which might have also exerted independent longer-term effects. The absence of granular information, particularly with regard to Army claimants, renders such possibilities difficult to test.

[17] For example, 84% of land even in Adventurer- assigned baronies had become owned by Protestants by 1670, compared to 43% prior to the Settlement, while the top 5% of private landowners holding around a quarter of all Irish land both before and after the Settlement.

6.1.1 Religious identity

We draw our data on the local incidence of Protestants across the country from Griffith's Valuation, which comprised an effort to record the names of all tenants and landlords in the country for purposes of taxation (Roulston 2020). This effort, beginning in 1847 and eventually completed in 1864, represents one of the only large-scale individual-level data sources surviving from the time of the Great Famine (due to the destruction of the original 1841 and 1851 census records).[18] Using a public database, we record the full names and geographical location (to the street level) of every household head ($n = 895,000$) and their landlord ($n = 149,000$).[19]

Griffith's Valuation did not, however, record information on religion. We therefore draw on the full-count census of 1901, which did record such information. We restrict the 1901 census sample to be those individuals born in Leinster and Munster provinces (i.e. relevant for the experimental sample) and who were above 60 years old at the time of that census (and hence were alive during the administration of Griffith's Valuation). We then compute the conditional probability of a given surname being Protestant within this sample—with the intuition that particular names were often more associated with more Irish (and hence Catholic) versus more English (and hence Protestant) origins (Byrne and O'Malley 2013)—and apply these probabilities to the individual-level Griffith's Valuation data, before then aggregating to the parish-level. This exercise, which generates weighted average imputed shares of Protestant landlords and tenants, suggests that, two centuries after the Settlement, a weighted average of 16% of tenants were imputed to be Protestant but 23% of unique landlords were.[20]

Table 3 provides results, where we regress the parish-level imputed weighted measures of the religious identity of landlords and tenants as observed in Griffith's Valuation onto Equation (1). We find evidence across *both* outcomes that individuals have more Protestant-associated names

[18] The surviving parish-level records from theses censuses, as we use below, do not record information on religion.

[19] Unfortunately, data on the local rates and incidence of taxation has not been digitized yet. See `https://www.askaboutireland.ie/griffith-valuation/` for more information.

[20] These estimates do not account for the *amount* of land owned by Protestants, since this is not recorded in our data, and hence we effectively consider all unique landlords in a given parish to be equal.

Table 3: Effects on imputed religion of landlords and tenants

	Landlords		Tenants	
	(1)	(2)	(3)	(4)
Army	0.012	0.012**	0.010**	0.010***
	(0.007)	(0.005)	(0.004)	(0.003)
Controls	×	✓	×	✓
DV Mean	0.18	0.18	0.12	0.12
DV SD	0.08	0.08	0.03	0.03
Observations	734	732	734	732

Dependent variables: Columns 1-2: Weighted share of landlords in parish with an imputed Protestant name in Griffith's Valuation; Columns 3-4: Weighted share of tenants in parish with an imputed Protestant name in Griffith's Valuation.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

in baronies that had been assigned to the Army. Landlords have names which are 1.2 percentage points more Protestant-associated, while tenants have names which are 1 percentage point more Protestant-associated. That these coefficients are smaller than those observed in Table 2 perhaps owes to our use of an imputed, more indirect outcome measure not accounting for the *amount* of land owned by particular individuals—regardless, the effects point to the remarkable persistence of local-level variation in the religious identity of economic elites lasting over two centuries.

6.1.2 National affiliation

Next, we consider evidence for longer-term local-level variation in national allegiances. We do this leveraging data on the incidence of languages, whether English or Irish. For English, we draw on the 1841 census, wherein we observe—at the parish-level—information on the share of the population which was literate overall, divided by gender, and whether this literacy was based on reading only or both reading and writing. While the surviving census documentation is somewhat ambiguous,

historians view these data as reflecting literacy specifically in English (Fitzgerald 1984).

Table 4 provides results. Individuals living in parishes in baronies which, in 1654, had been assigned to the Army (and hence been more likely to have Protestant English landowners by 1670) are between 1.2 and 1.9 percentage points more likely to be literate in English in 1841 (columns 1-2). This reflects an effect size of 0.12-0.19 standard deviations relative to equivalent levels in those baronies assigned to Adventurers. Disaggregating the degree of literacy, most of the effect is driven by an increased share of the population being only able to read (columns 3-4) rather than being able to both read and write (columns 5-6). These increases in literacy are concentrated among men rather than women (see Table A3).[21]

Table 4: Effects on English literacy outcomes in 1841

	Share literate		Share read only		Share read and write	
	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.018*	0.012**	0.011*	0.006*	0.007	0.006
	(0.009)	(0.006)	(0.006)	(0.004)	(0.007)	(0.006)
Controls	×	✓	×	✓	×	✓
DV Mean	0.47	0.47	0.19	0.19	0.28	0.28
DV SD	0.10	0.10	0.06	0.06	0.08	0.08
Observations	734	732	734	732	734	732

Dependent variables: Columns 1-2: Share of population who can either read or write; Columns 3-4: Share of population who can only read; Columns 5-6: Share of population who can both read and write.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

For the incidence of the Irish language, we rely on barony-level estimates of the incidence of Irish speaking by cohort reported by Fitzgerald (1984), who retrospectively computes these measures drawing on the 1881 census for all decennial cohorts born after 1801. Rates of Irish speaking fall

[21] Importantly, these effects do not appear to be driven by the differential supply of educational facilities—as Table 6 shows, the number of schools observed in a given parish during this period is uncorrelated with treatment assignment.

Figure 3: Effects on proportion of decennial birth cohorts speaking Irish

Notes: Estimates come from regressing barony-level decennial birth cohort estimates of the share of the population speaking Irish onto a barony-level equivalent of Equation (1). 90% and 95% confidence intervals plotted.

dramatically across these cohorts within the baronies in our analysis sample, from 41% among those born between 1801-11 to 5% among those born between 1861-71 (see Figure A4). We estimate the barony-level equivalent of Equation (1), regressing each cohort-level estimate as our outcome measure. Figure 3 plots these estimates, which are consistently negative across birth cohorts. While estimates for the oldest cohorts are relatively noisy (perhaps due to the low number of sufficiently old individuals surviving to the 1881 census), estimates for younger cohorts are much more precise: the share of the population speaking Irish was around 5 percentage points lower (relative to baseline levels of around 25%) in baronies that had been assigned to the Army during the Settlement.

Overall, these results confirm that the quasi-random assignment of land to the Army in the Cromwellian Settlement had persistent effects on religious identity and national affiliation two centuries later. This persistence manifests with respect to the identity of landlords (who remained

more likely to be Protestants) but also had 'downward' societal effects: *tenants* were also slightly more likely to be Protestants, and individuals were more likely to be literate in English and less likely to speak Irish.

6.2 Effects on economic and development outcomes

How the historical assignment of land, as evidently persisting through such variation in religion and language, is likely to predict economic outcomes is unclear. On the one hand, local legacies of greater proximity to the national English state might have fostered improved access to resources, increased political representation, and the favorable supply of resources. On the other, an existing literature points to the delinquency of (often absent) Protestant English landlords, by under-investing in their land and over-extracting from their tenants, as playing a critical role in contributing to the tragedy of the Great Famine (Mokyr 1983; Pomfret 1930). Alternatively, some have argued that any such local-level variation was essentially inconsequential compared to the *national*-level institutional causes of the Famine, ultimately rooted in the island's colonization (Kelly and Ó Gráda 2015).

6.2.1 Economic conditions before and after the Great Famine

We draw our longer-run measures of economic outcomes primarily from the 1841 and 1851 censuses of Ireland.[22] These offer two unique advantages: first, they offer detailed parish-level information on a variety of developmental outcomes; second, they offer snapshots of Irish society both before and after the Great Famine (1845-9), which reshaped Ireland's demography, economy, and politics to an almost unfathomable degree. We focus on the set of parish-level economic outcomes we have so far digitized across both census volumes.[23] Prior work typically measures the impact of the Famine using the *change* in variables (especially population) between the 1841 and 1851 censuses

[22] Some of this data pertaining to the 1841 census, including the parish-level shapefiles, was generously shared by Michael Murphy, while we independently digitized many of the fields recorded in the census ourselves.

[23] Data from these censuses, generally at more aggregated levels, has frequently been used to measure the impact of the Famine (Henn and Huff 2021; Fernihough and Ó Gráda 2018; Mokyr 1983).

(Fernihough and Ó Gráda 2018). We therefore consider outcomes as observed in 1841, 1851, and the difference between the two.

Capturing the intensity of the Famine is rendered challenging by the fact that changes in population conflate the mortality effects of the Famine from its equally huge effects on emigration. However, the economic history literature strongly points to the role of small-scale agriculture, by preventing the diversification of crops and inducing reliance on the potato, as exacerbating the effects of the blight (Guinnane 1994; Mokyr 1983). We therefore consider measures relating both to demography and measures intended to capture local-level variation in agricultural dependency as being prognostic of the Famine's likely impact.[24]

Table 5 provides our full set of estimates. First, considering demographic measures pertaining to rurality in Panel I, we find evidence suggestive of Army-assigned baronies becoming slightly more rural over time. *Overall* population density appears similar across parishes in Army and Adventurer-assigned baronies (columns 1-2), as are overall population numbers (which is somewhat mechanically implied by the balance in land area across baronies). In columns 3-4 we find that an insignificantly smaller share of the population was living in towns in 1841, while in columns 5-6 we find that average household size was significantly smaller in Army-assigned baronies, suggestive of a relatively more dispersed population across space. Considering effects on the change in these outcomes between 1841 and 1851 in Panel C, we find uniformly null effects. It is plausible that these overall null results are accounted for by two countervailing effects: because rates of emigration were higher from more urban localities (Hatton and Williamson 1993), increased mortality in Army-assigned baronies might be offset by increased emigration in Adventurer-assigned baronies.

Second, turning to effects on the sector-level occupations of households in Panel II, we find few systematic differences in 1841 across the various categories (being engaged in agriculture, manu-

[24] We note that the geographical *presence* of the blight is uncorrelated with treatment assignment. Using data from Goodspeed (2016), we find that an equal share of baronies were 'heavily affected' by the disease across baronies that had been assigned to the Adventurers as the Army. Treatment effects, especially for the differenced outcomes, should therefore be considered as picking up the *impact* of the blight (conditional on local pre-Famine characteristics) rather than the geographical presence of the disease.

Table 5: Effects on economic outcomes in 1841 and 1851

	I. Rurality						II. Occupational sector						III. Means of income					
	Population density		Share living in towns		Average household size		Agriculture		Manufacture		Other		Vested means		Direction of labor		Own labor	
A. 1841	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Army	-0.00	-0.00	-0.01	-0.02	-0.04**	-0.05**	0.01	0.01	-0.00	-0.00	-0.01	-0.00	0.00	0.00	-0.03**	-0.03***	0.03**	0.03***
	(0.05)	(0.04)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓
DV Mean	4.45	4.45	0.07	0.07	1.96	1.96	0.78	0.78	0.13	0.13	0.09	0.09	0.02	0.02	0.34	0.34	0.64	0.64
DV SD	0.54	0.54	0.16	0.16	0.21	0.21	0.13	0.13	0.09	0.09	0.06	0.06	0.02	0.02	0.11	0.11	0.11	0.11
Observations	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732
B. 1851																		
Army	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.03***	-0.03***	0.01	0.01	0.03***	0.02***	0.01	0.01	-0.02*	-0.02**	0.01	0.01
	(0.04)	(0.04)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓
DV Mean	4.12	4.12	0.08	0.08	2.05	2.05	0.69	0.69	0.11	0.12	0.19	0.19	0.13	0.13	0.33	0.33	0.55	0.55
DV SD	0.52	0.52	0.17	0.17	0.28	0.28	0.10	0.10	0.05	0.05	0.08	0.08	0.07	0.07	0.11	0.11	0.11	0.11
Observations	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732
C. Change 1841-51																		
Army	-0.01	-0.01	0.00	0.01	0.03	0.03	-0.04***	-0.04***	0.01	0.01	0.03***	0.03***	0.00	0.00	0.01	0.02	-0.01	-0.02
	(0.02)	(0.02)	(0.01)	(0.01)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓	×	✓
DV Mean	-0.33	-0.33	0.01	0.01	0.09	0.09	-0.09	-0.09	-0.01	-0.01	0.10	0.10	0.11	0.11	-0.01	-0.01	-0.10	-0.10
DV SD	0.19	0.19	0.07	0.07	0.37	0.37	0.14	0.14	0.08	0.08	0.10	0.10	0.07	0.07	0.13	0.13	0.13	0.13
Observations	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732	734	732

Dependent variables: Panel I: Log population density; Share of parish population living in a town; Log average household size; Panel II: Share of households working in agriculture; Share of households working in manufacturing; Share of households working in other occupation; Panel III: Share of households earning income without labor; Share of households earning income through formal employment or by directing others; Share of low-skilled households earning income through self-directed labor. Panel A uses parish-level outcomes from the 1841 census; Panel B uses parish-level outcomes from the 1851 census; Panel C takes the difference between the values of a given outcome in 1851 and 1841.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

facturing, or neither), with a large majority (78%) of households engaged primarily in agriculture. By 1851, however, we observe a stark *reduction* in the employment share of agriculture in Army-assigned baronies, with 3 percentage points fewer households (or 4 percentage points relative to 1841) involved in agriculture and 3 percentage points more households engaged in neither agriculture nor manufacturing (indicative of no employment at all, based on the descriptions provided in the census volumes).

Third, we consider effects on the means through which households earned an income: whether with sufficient income and capital to avoid the exertion of labor ("vested means"), using skilled labor, directing others, or using more limited capital ("direction of labor"), or the low-skilled exertion of labor mostly consistent with small-scale agriculture ("own labor"). Prior to the Famine in 1841, we find that around 3 percentage points *less* of the workforce in Army-assigned baronies were involved in the "direction of labor" to earn their income by 1841, with an increased share of 3 percentage points instead involved in earning an income primarily through their own manual labor.[25] These differences persist through to 1851, especially for the reduced share involved in the direction of labor, and no differences between 1851 and 1841 are found. We find no effects on the share of the workforce earning their income through vested means, which comprised 2% of especially elite families who were not at all reliant on the exertion of labor for their incomes regardless of treatment assignment.

We consider these effects, overall, to be consistent with the impact of the Famine being larger in baronies that had been assigned to the Army during the Cromwellian Settlement. These baronies were somewhat more rural on the eve of the Famine, with evidence of significantly higher reliance on small-scale agriculture. After the Famine, though the null on demographic changes is ambiguous, the sharp fall in agricultural employment in these baronies is consistent with deeper economic

[25] As discussed above, those earning income through the "direction of labor" comprise individuals with a fixed income, artisans with specialized expertise, and farmers responsible for relatively large plots of land between 5 and 50 acres. Those earning income through "own labor" comprise families without capital (whether physical or human) who subsist through work that requires no instruction by others, and mostly comprises farmers working on small plots.

consequences of the Famine.

Table 6: Local presence of public institutions

	Workhouses		Schools		Prisons		Fever hospitals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Army	-0.053**	-0.054***	0.002	-0.011	-0.008	-0.011	-0.029	-0.015
	(0.023)	(0.019)	(0.030)	(0.034)	(0.013)	(0.015)	(0.022)	(0.023)
Controls	×	✓	×	✓	×	✓	×	✓
DV Mean	0.09	0.09	0.48	0.48	0.03	0.03	0.08	0.08
DV SD	0.29	0.29	0.50	0.50	0.18	0.18	0.28	0.28
Observations	734	732	734	732	734	732	734	732

Dependent variables: Columns 1-2: Any workhouse in parish; Columns 3-4: Any school in parish; Columns 5-6: Any prison or bridewell in parish; Columns 7-8: Any fever hospital in parish.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Additional support for this interpretation is provided by data on the location of particular local public institutions which were intended to mitigate the impacts of the Famine. As argued by Solar (1995), the limited willingness of landlords to provide support for their tenants undoubtedly exacerbated conditions. Most significantly, the provision of redistributive support through workhouses played a key role in providing food and shelter for the poorest. However, the construction and operation of workhouses relied heavily on the willingness of local landlords to provide funding.[26] In Table 6, drawing on data relating to the presence of schools, workhouses, prisons, and fever hospitals across parishes,[27] we find differences only in the local incidence of workhouses: 5 percentage points *fewer* parishes in Army-assigned baronies received workhouses relative to Adventurer-assigned baronies. Because support for the poor through the provision of workhouses was determined by the willingness of local economic elites to fund such institutions, while the need for them was intense across the entire country, their relative paucity likely exacerbated the impact of the Famine (Solar

[26]More specifically, those landlords with the largest estates, and hence paying the most taxes, were given more votes during deliberations held by local Boards of Guardians, which decided how to target support to the poor immediately prior to, and during, the Great Famine (Powell 1965).

[27]For the data on schools we draw on Commissioners of National Education in Ireland (1860); the rest come from volumes of the 1851 census.

2015).

7 Discussion and Next Steps

Our results paint a consistent portrait of the consequences of the Cromwellian Settlement for local variation in Irish development over the short and long-run. We demonstrate that, less than twenty years after the random assignment of baronies to the Army and Adventurers, clear differences in patterns of landholding emerged, particularly with respect to the religious identity of landowners. In baronies assigned to soldiers, landowners in the immediate aftermath of the Cromwellian Settlement were between five and ten percentage points more likely to be Protestant than landowners in Adventurer-assigned baronies. We find no evidence, however, that this random assignment generated variation in land concentration. Our results provide us with two significant contributions. First, we provide the most comprehensive evidence to date on the redistributive consequences of the Cromwellian Settlement, which has long been hypothesized by historians, but to the best of our knowledge has yet to be quantitatively tested. Second, building on insights from decades of research by Irish historians regarding the long term consequences of the Cromwellian Settlement, we demonstrate that the lottery generated plausibly exogeneous variation in the identity of the local elite which can be used to explore the broader consequences of landholder identity in the long term.

We then present preliminary evidence that the assignment of a barony to the Army in the Cromwellian Settlement—with the landholding patterns that this induced—is associated with more rural and smaller households, and a greater share of individuals seeming to be engaged in small-scale agriculture by 1841. We then examine how assignment to soldiers or Adventurers affected how baronies were impacted by the Great Famine. While we show no effects on changes to the population, we do find a potentially significant reorganization in the economy: while Army-assigned baronies were *more* agricultural before the Famine, they were *less* so afterwards. We also show suggestive evidence that public goods designed to offset the deleterious effects of the Famine were provided

less in Army-assigned baronies. Our results suggest a channel, the composition of the local elite, through which the Cromwellian Settlement both shaped long-run development and how the Great Famine affected areas' well-being.

While our results tell a relatively coherent story about the consequences of landowner identity in Ireland, there are a number of additional tests that we hope to perform to further clarify the consequences of the Cromwellian Settlement and the mechanisms linking shifts in the local elite and development centuries later. One set of tests will offer more fine-grained exploration of the Settlement itself. We plan to use *O'Hart's Irish Landed Gentry* to identify specific Catholics or Royalists who might have otherwise been subject to land expropriation but were instead "forgiven" by subsequent acts of Parliament; this would allow us to explore an explicitly political consequence of settlement and to further interrogate the mechanisms underlying our short-term findings. We also hope to utilize data about individual Adventurers to better understand how the amount owed influenced eventual settlement patterns. Finally, we hope to examine more explicitly political outcomes – in particular, information on petitioning as a measure of resistance to English rule, as well as information on members of Parliament throughout the period we study. Together, these additional outcomes should offer us a more concrete, less suggestive set of results that clearly lay out the consequences of landholder identity for long-term economic and political development prior to the Great Famine.

The Cromwellian Settlement caused a massive upheaval of Irish society, expropriating land from and subsequently transplanting Catholic landowners to Connacht while seeking to transform the rest of Ireland into a colony dominated by an English, Protestant minority. However, the nature of the expropriation and redistribution, as historians have noted and we show, varied dramatically across localities. This variation was, interestingly, not along the dimension previous work has often studied—landholding inequality—but in the religious and ethnic character of the landholders. We show that this change, even absent changes in landholding inequality, generated substantial differences in long-run development, possibly mediated by the political unwillingness of "foreign"

landlords to intercede on their tenants' behalf. Our case is therefore both important in its own right, but also offers unique insight into the nature of settler colonialism and landholding inequality more generally.

References

Alesina, Alberto, Caterina Gennaioli and Stefania Lovo. 2019. "Public Goods and Ethnic Diversity: Evidence from Deforestation in Indonesia." *Economica* 86(341):32–66.

Alesina, Alberto and Dani Rodrik. 1994. "Distributive Politics and Economic Growth." *Quarterly Journal of Economics* 109(2):465–490.

Alesina, Alberto and Eliana La Ferrara. 2005. "Ethnic Diversity and Economic Performance." *Journal of Economic Literature* 43(3):762–800.

Alesina, Alberto, Reza Baqir and William Easterly. 1999. "Public goods and ethnic divisions." *Quarterly Journal of Economics* 114:1243–1284.

Alesina, Alberto, Stelios Michalopoulos and Elias Papaioannou. 2016. "Ethnic Inequality." *Journal of Political Economy* 124:428–488.

Andrews, John Harwood. 1985. *Plantation Acres: An Historical Study of the Irish Land Surveyor and His Maps*. Vol. 8 Ulster Historical Foundation.

Banerjee, Abhijit and Lakshmi Iyer. 2005. "History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure." *the American Economic Review* 95(4).

Belloni, Alexandre, Victor Chernozhukov and Christian Hansen. 2014. "Inference on Treatment Effects After Selection Among High-dimensional Controls." *The Review of Economic Studies* 81(2):608–650.

Bleakley, Hoyt and Joseph Ferrie. 2014. "Land Openings on the Georgia Frontier and the Coase Theorem in the Short-and Long-run." *Working paper* .

Bottigheimer, Karl. 1971. *English Money and Irish Land: The 'Adventurers' in the Cromwellian Settlement of Ireland*.

Braa, Dean M. 1997. "The Great Potato Famine and the Transformation of Irish Peasant Society." *Science and Society* 61:193–215.

Brown, David. 2020. *Empire and Enterprise: Money, Power and the Adventurers for Irish land during the British Civil Wars*.

Byrne, Kevin and Eoin O'Malley. 2013. "What's in a Name? Using Surnames as Data for Party Research." *Party Politics* 19(6):985–997.

Chandra, Kanchan and Steven Wilkinson. 2008. "Measuring the Effect of "Ethnicity"." *Comparative Political Studies* 41(4/5):515–563.

Childs, John. 2007. *The Williamite Wars in Ireland*. A&C Black.

Commissioners of National Education in Ireland. 1860. *Twenty-Sixth report, 1859, with appendices*. Vol. 1 Alex, Thom & Son.

Connell, Kenneth Hugh. 1950. *The Population of Ireland, 1750-1845*. Clarendon Press.

Cousens, S.H. 1960. "Regional Death Rates in Ireland during the Great Famine, from 1846 to 1851." *Population Studies* 14:55–74.

Darcy, Eamon. 2013. *The Irish Rebellion of 1641 and the Wars of the Three Kingdoms*. Vol. 86 Royal Historical Society.

Deininger, Klaus and Lyn Squire. 1998. "New ways of looking at old issues: inequality and growth." *Journal of Development Economics* 57(2):259–287.

Engerman, Stanley L. and Kenneth L. Sokoloff. 1994. "Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: a View from Economic Historians of the United States." *NBER* (66).

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

Fernihough, Alan, Cormac Ó Gráda and Brendan M Walsh. 2015. "Intermarriage in a Divided Society: Ireland a Century Ago." *Explorations in Economic History* 56:1–14.

Fitzgerald, Gerald. 1984. "Estimates for Baronies of Minimum Level of Irish-Speaking Amongst Successive Decennial Cohorts: 1771-1781 to 1861-1871." *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature* 84C:117–155.

Forbes, Kristin J. 2000. "A Reassessment of the Relationship between Inequality and Growth." *The American Economic Review* 90(4):869–887.

Frankema, Ewout. 2010. "The colonial roots of land inequality: geography, factor endowments, or institutions?" *Economic History Review* 63(2):418–451.

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

Grigg, D.B. 1980. *Population and agrarian change: An historical perspective*. Cambridge University Press.

Guinnane, Timothy W. 1994. "The Great Irish Famine and Population: The Long View." *The American Economic Review* 84(2):303–308.

Habyarimana, James, Macartan Humphreys and Daniel Posner. 1999. *Coethnicity : Diversity and the Dilemmas of Collective Action*.

Habyarimana, James, Macartan Humphreys, Daniel Posner and Jeremy M. Weistein. 2007. "Why Does Ethnic Diversity Undermine Public Goods Provision?" *American Political Science Review* 101:709–725.

Hardinge, WH. 1873. "A Concluding Memoir on Manuscript Mapped and Other Townland Surveys in Ireland, from 1688 to 1864." *The Transactions of the Royal Irish Academy* 24:265–315.

Hatton, Timothy J and Jeffrey G Williamson. 1993. "After the Famine: Emigration from Ireland, 1850–1913." *The Journal of Economic History* 53(3):575–600.

Henn, Soeren and Connor Huff. 2021. "The Legacies of Atrocities and Who Fights.".

Hirst, Derek. 2012. *Dominion: England and its Island Neighbours, 1500-1707*. Oxford University Press.

Hodler, Roland and Paul A. Raschky. 2014. "Regional Favoratism." *Quarterly Journal of Economics* pp. 995–1033.

Kelly, Morgan and Cormac Ó Gráda. 2015. "Why Ireland Starved After Three Decades: The Great Famine in Cross-section Reconsidered." *Irish Economic and Social History* 42(1):53–61.

Kustov, Alexander and Giuliana Pardelli. 2018. "Ethnoracial Homogeneity and Public Outcomes: The (Non)effects of Diversity." *American Political Science Review* 84C:742–757.

Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *the American Economic Review* 45:1–28.

Larcom, Thomas Aiskew. 1851. "The History of the Survey of Ireland Commonly Called the Down Survey by Doctor William Petty, AD 1655–6." *Irish Archeological Society, Dublin* .

Larson, Jennifer M. and Janet I. Lewis. 2017. "Ethnic Networks." *American Journal of Political Science* 61(2):350–364.

Lenihan, Pádraig. 2014. *Consolidating Conquest: Ireland 1603-1727*. Routledge.

McCabe, Richard A. 2005. *Spenser's Monstrous Regiment: Elizabethan Ireland and the Poetics of Difference*. Oxford University Press on Demand.

McGrath, Charles Ivar. 1996. "Securing the Protestant Interest: The Origins and Purpose of the Penal Laws of 1695." *Irish Historical Studies* 30(117):25–46.

McKenny, Kevin. 1989. *A 17th Century "Real Estate Company": The 1649 Officers and the Irish Land Settlements, 1641-1681*.

Mokyr, Joel. 1983. "Why Ireland Starved: A Quantitative and Analytical History of the Irish Economy, 1800-1850.".

Moody, Theodore William, Francis X Martin and Francis John Byrne. 1991. *A New History of Ireland: Volume III: Early Modern Ireland 1534-1691: Early Modern Ireland 1534-1691*. Vol. 3 OUP Oxford.

Moore Jr., Barrington. 1966. *Social Origins of Dictatorship and Democracy*. Penguin.

Nash, Catherine. 1999. "Irish Placenames: Post-colonial Locations." *Transactions of the Institute of British Geographers* 24(4):457–480.

Ó Gráda, Cormac. 2018. "The Next World and the New World: Relief. Migration and the Irish Famine." *Journal of Economic History* 79:319–355.

Ó Gráda, Cormac and Kevin O'Rourke. 1997. "Migration as disaster relief: Lessons from the Great Irish Famine." *European Review of Economic History* 81:3–25.

O'Hart, John. 1887. *Irish Landed Gentry*.

Ohlmeyer, Jane. 2012. *Making Ireland English*. Yale University Press.

O'Leary, Brendan. 2019. *A Treatise on Northern Ireland*. Vol. 1 Oxford University Press.

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

Pardelli, Giuliana and Alexander Kustov. 2022. "When Coethnicity Fails." *World Politics* 74:249–284.

Perceval-Maxwell, M. 1994. *Outbreak of the Irish Rebellion of 1641*. McGill-Queen's Press-MQUP.

Persson, Torsten and Guido Tabellini. 1994. "Is Inequality Harmful for Growth?" *The American Economic Review* 84(3):600–621.

Piketty, Thomas. 2014. *Capital in the 21st Century*.

Pomfret, John. 1930. *The Struggle for Land in Ireland, 1800-1923*. Princeton University Press.

Powell, Malachy. 1965. "The Workhouses of Ireland." *University Review* pp. 3–16.

Prendergast, John Patrick. 1870. *The Cromwellian Settlement of Ireland*.

Reeves, W. 1857. "On the Townland Distribution of Ireland." *Proceedings of the Royal Irish Academy (1836-1869)* 7:473–490.

Roulston, William. 2020. "Book review: The Archives of the Valuation of Ireland, 1830–65.".

Singh, Prerna and Matthias vom Hau. 2016. "Ethnicity in Time: Politics, History, and the Relationship between Ethnic Diversity and Public Goods Provision." *Comparative Political Studies* 49:1303–1340.

Smyth, William. 2006. *Map-Making, Landscapes and Memory: A Geography of Colonial and Early Modern Ireland c. 1530–1750*. University of Notre Dame Press.

Solar, Peter M. 1995. "Poor Relief and English Economic Development Before the Industrial Revolution." *The Economic History Review* 48(1):1–22.

Solar, Peter M. 2015. "Why Ireland Starved and the Big Issues in Pre-Famine Irish Economic History." *Irish Economic and Social History* 42(1):62–75.

Stewart, Anthony Terence Quincey. 1989. *The Narrow Ground: The Roots of Conflict in Ulster*. Faber & Faber.

Wimmer, Andreas. 2016. "Is Diversity Detrimental? Ethnic Fractionalization, Public Goods Provision, and the Historical Legacies of Stateness." *Comparative Political Studies* 49:1407–1445.

Xu, Guo. 2021. "Bureaucratic Representation and State Responsiveness during Times of Crisis: The 1918 Pandemic in India." *the Review of Economics and Statistics* .

Xu, Guo, Marianne Bertrand and Robin Burgess. 2021. "Organization of the State: Home Assignment and Bureaucrat Performance." *the Journal of Law, Economics, and Organization* .

Ó Siochrú, Micheál, David Brown and Thomas Bartlett. 2018. "The Down Survey and the Cromwellian Land Settlement." *The Cambridge History of Ireland* 2:584–607.

Ó Siochrú, Micheál. 2013. "The Down Survey of Ireland Project." *History Ireland* 21(2).

Ó Siochrú, Micheál, David Brown and Eoin Bailey. 2013. "The Down Survey of Ireland: Mapping a Century of Change.".
URL: *http://downsurvey.tcd.ie*

A Online Appendix

Figures

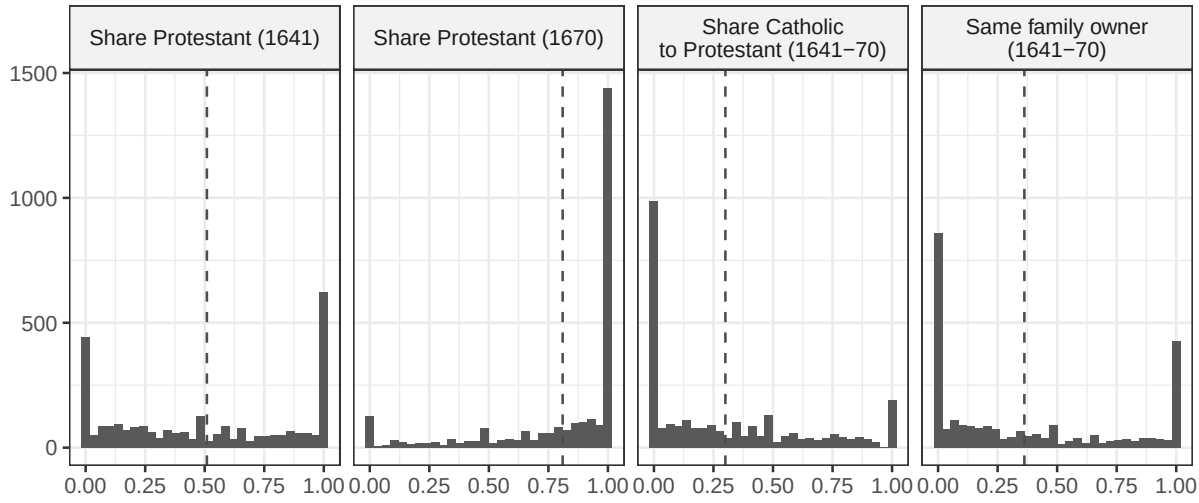

Figure A1: Distribution of short-run outcomes (average of parish-level values)

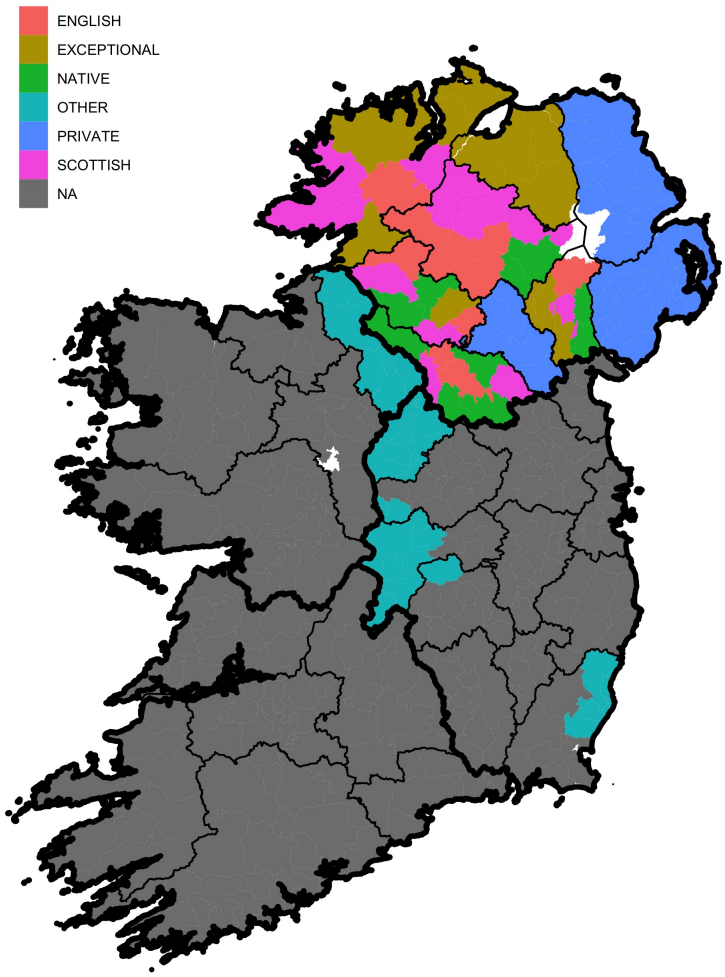

Figure A2: Presence of plantations prior to 1641.
Sources: **English**, **Exceptional**, **Native**, **Scottish**: Moody & Hunter, *The Ulster Plantation, 1609-13*, Fig. 54, Moody, Martin and Byrne (1991) Vol. IX. **Other**: Clarke, *Plantations in the Reign of James I (1603-25)*, Fig. 55, Moody, Martin and Byrne (1991) Vol. IX. **Private**: Stewart (1989).

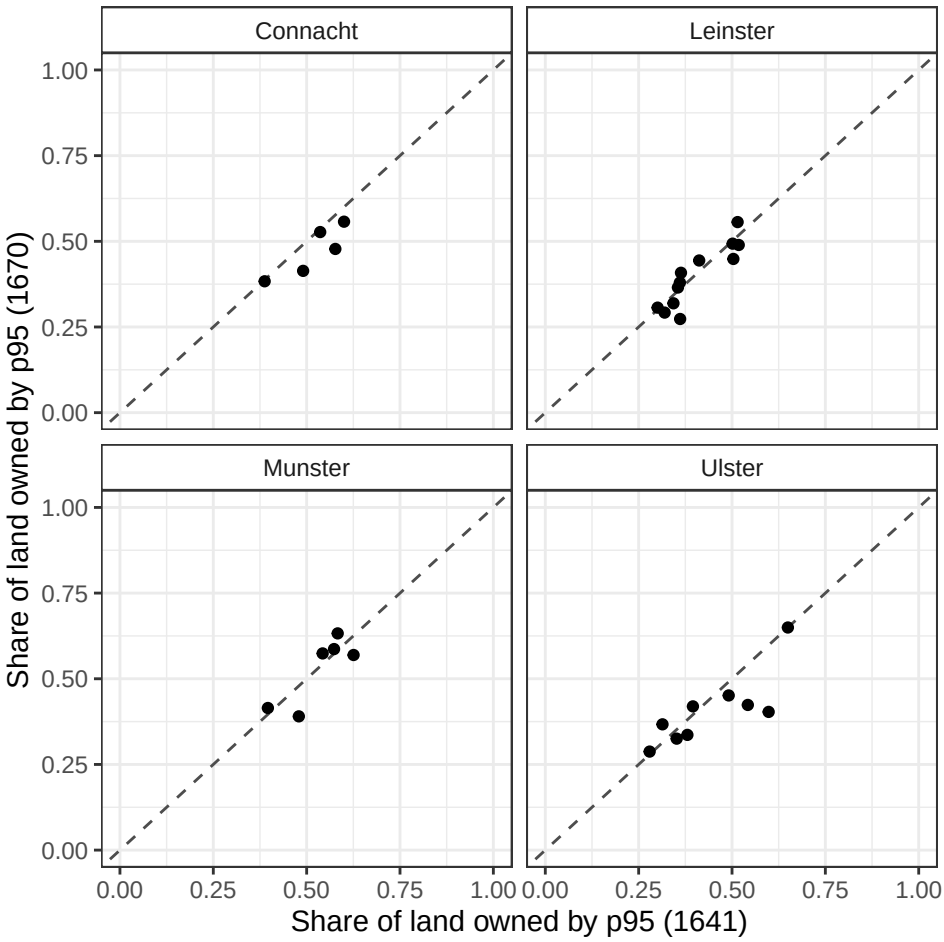

Figure A3: Share of land owned by top 5% of landowners (by total area of landholdings) in each county, 1641-70.

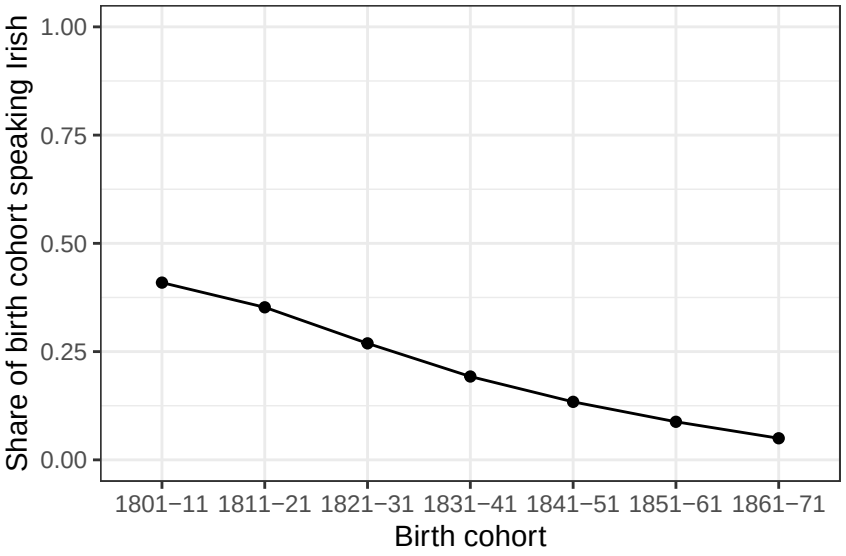

Figure A4: Share of decennial birth cohorts speaking Irish as observed in 1881 census

Tables

Table A1: Effects on share of land owned by major landowners in 1670

	Top 10%		Top 5%		Top 1%	
	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.016	0.003	0.008	0.007	-0.007	-0.006
	(0.028)	(0.023)	(0.029)	(0.021)	(0.015)	(0.014)
Controls	×	✓	×	✓	×	✓
DV Mean	0.38	0.38	0.27	0.27	0.11	0.11
DV SD	0.31	0.31	0.29	0.29	0.19	0.19
Observations	734	734	734	734	734	734

Dependent variables: Panel A: Share of parish owned by Protestants; Change in share of parish owned by Protestants 1641-70; Share of parish owned by a different family relative to 1641. Panel B: Share of parish owned by a landowner in the top 5% of landowners nationwide; Hirschman-Herfindahl index of individual landownership in parish; Log+1 Number of landowners in parish.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table A2: Effects on share of land owned by individuals as a function of 1641 ownership

	Top 10%		Top 5%		Top 1%	
A. Major landowners as defined in 1641	(1)	(2)	(3)	(4)	(5)	(6)
Army	-0.056**	-0.052***	-0.049*	-0.042***	-0.018	-0.006
	(0.025)	(0.016)	(0.026)	(0.014)	(0.013)	(0.008)
Controls	×	✓	×	✓	×	✓
DV Mean	0.21	0.21	0.17	0.17	0.07	0.07
DV SD	0.26	0.26	0.24	0.24	0.16	0.16
Observations	734	734	734	734	734	734

	Top 10%		Top 5%		Top 1%	
B. Major Protestant landowners in 1670 without land in 1641	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.041	0.020	0.047**	0.033	0.003	-0.002
	(0.025)	(0.021)	(0.022)	(0.020)	(0.013)	(0.013)
Controls	×	✓	×	✓	×	✓
DV Mean	0.25	0.25	0.17	0.17	0.07	0.07
DV SD	0.27	0.27	0.24	0.24	0.15	0.15
Observations	734	734	734	734	734	734

Dependent variables: Panel A: Share of parish owned by Protestants; Change in share of parish owned by Protestants 1641-70; Share of parish owned by a different family relative to 1641. Panel B: Share of parish owned by a landowner in the top 5% of landowners nationwide; Hirschman-Herfindahl index of individual landownership in parish; Log+1 Number of landowners in parish.

All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table A3: Effects on literacy outcomes in 1841 (by gender)

	Share literate		Female		Male	
	(1)	(2)	(3)	(4)	(5)	(6)
Army	0.018*	0.012**	0.013	0.009	0.020**	0.013**
	(0.009)	(0.006)	(0.012)	(0.007)	(0.009)	(0.006)
Controls	×	✓	×	✓	×	✓
DV Mean	0.47	0.47	0.40	0.40	0.54	0.54
DV SD	0.10	0.10	0.11	0.11	0.10	0.10
Observations	734	732	734	732	734	732

Dependent variables: Columns 1-2: Share of population who can either read or write; Columns 3-4: Share of women who can either read or write; Columns 5-6: Share of men who can either read or write.
All specifications are estimated using OLS with county-level fixed effects using Equation (1). Even-indexed columns add LASSO-selected predetermined covariates. Standard errors clustered at the barony-level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.