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The long-run impact of historical shocks on the decision to migrate: Evidence from the Irish Migration*

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Abstract

What is the long-run impact of large negative historical events on the individual decision to migrate? We investigate this research question by looking at the effect of the Great Irish Famine (1845-1850) on the long-run individual decision to migrate to the US during the Age of the Mass Migration. We construct a unique dataset based on two early 20th century Irish Censuses and the Ellis Island Administrative Records. This allows us to test whether the Great Irish Famine, one of the most lethal episodes of mass starvation in history, had a long-run impact on individuals' migration decisions. Controlling for individual and geographical characteristics, we find that the Irish Famine was a significant long-run driver of individuals' migration choices.

Key words: mass migration, negative shock, long-run impact, Great Famine.
JEL classification codes: F22, N33, N93.

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1. Introduction

The Age of Mass Migration witnessed an unprecedented movement of individuals: between 1850 and 1913 about 30 million people emigrated from Europe to the US (Hatton and Williamson, 1998, Abramitzky et al. 2012), with Ellis Island, New York, being the main port of entry from 1892 onwards. The aim of this paper is to study the long-run impact of large negative historical events on the individual decision to migrate during the Age of Mass Migration. We investigate the role of one of the major disasters in 19th century Europe, the Great Irish Famine (1845-1850), on the decision to migrate of subsequent Irish generations. As pointed out by Hatton and Williamson (1994), the scale of Irish emigration was significant, even in comparison to the scale of the Norwegian, Swedish or Italian migratory flows during the Age of Mass Migration: over 4.2 million individuals emigrated from Ireland over the period 1850 to the 1910s, with chain migration facilitating the movement of subsequent cohorts of migrants (Fitzpatrick, 1980). Following the historical literature on the Famine, this paper explores the individual characteristics of migrants and tests the hypothesis that the Famine continued to have a crucial role in shaping long-run migration decisions. In order to test for this hypothesis, we construct a unique data set combining different sources of historical administrative data and proceed in two steps. First, we make use of the two waves of early 20th century Irish Censuses, 1901 and 1911, which offer detailed information on individuals' characteristics. We link individuals across the two Census years with the Ellis Island Administrative Records, which provide extensive information on migrants arriving in the US through the main port of entry. This allows us to present a detailed picture of Irish migrants to the US at the turn of the 20th century. Our empirical evidence shows that migrants were more likely to be male, catholic, young and single adults. We also provide evidence of migrants' *positive* self-selection, as measured by literacy. As a second step, we explore the long-run effect of the Great Irish Famine on the decision to migrate of subsequent generations. We construct two different measures of the Famine at county level based on county excess mortality rates and Famine relief. Individuals born in counties that were more severely affected by the Great Irish Famine had a higher probability of migrating, even 50 to 70 years after the events. Finally, using information from the US Census Samples, we are also able to investigate the role of migration networks, generated from the Famine, in providing support to subsequent generations of migrants moving to the US.

According to the US Census, over 32 million (about 10 per cent) of the population in the US claim to have Irish origin.[1] Analysing the Irish migration to the US is therefore a very relevant exercise that can contribute to the understanding of the historical roots of contemporary US society. Previous research analyses the characteristics of Irish migrants for the period between 1876 and 1895 (Fitzpatrick, 1980). The contribution of this paper is multifaceted. First, we contribute to these findings by looking at the individual decision to migrate during the Age of Mass Migration. This paper also complements the recent work by Connor (2019), which highlights the role of migration networks in providing support to male migrants originating from poor farming communities.

A second contribution of the paper is to investigate the long-run effect of negative historical shocks on the on the probability of an individual migrating.[2] The Great Irish Famine (1845-1850), caused by the diffusion of the *Phytophthora infestans*, a potato blight, was one of the say most lethal episodes of mass starvation in modern history. Over the span of five years, about one million individuals, out of a population of 8.5 million, died due to starvation and related diseases, while around one million migrated, mainly to North America (Ó Gráda 1989 and 1994). The demographic impact of the Famine was immediate and long-lasting: indeed, according to O'Rourke (1995), Irish emigration remained sustained throughout the 50 years following the Famine.[3] Using individual migration data over the period 1901-1924, this paper provides evidence supporting the hypothesis that the Great Famine shaped the migration decisions of subsequent generations of Irish migrants. Using US Census data, we also uncover the role of historical migration networks, which originated from the Famine, in influencing the migration decision of individuals at the turn of the 20th century. Applying different econometric techniques, we find a strong positive effect of the Great Famine on migration in the long-run, even after controlling for the role of migration networks.

Third, this paper also contributes to the literature investigating European Mass Migration to America. Using the Ellis Island Administrative Records, Bandiera et al. (2012) measure migrant flows into and out of America in the age of mass migration, at the turn of the 20th century.

[1] https://www.census.gov/content/dam/Census/newsroom/facts-for-features/2018/fff-irish-american.pdf

[2] This paper complements the work of Narciso and Severgnini (2016), who analyse the impact of the Famine on the probability of joining the Irish Revolution.

[3] See also Guinnane (1984) and O'Rourke (1995). Whelan (1999), adapting Krugman's (1991) theoretical framework, shows how the Famine, together with development in transportation and demand for industrialization, have caused persistent depopulation and relative industrial decline.

Abramitzky et al. (2012a) examine selectivity in Norwegian migration, finding evidence for negative selection from urban areas. Karadja and Prawitz (2019) study the impact of large-scale emigration on the political situation of the sending countries in the long-run with the example of Sweden. Our paper is the first study to look at the impact of large historical events on the *decision to migrate* during the Age of Mass Migration.

Our study also contributes to the recent literature that analyzes migrants' selection and migration in response to natural shocks (Kirchberger, 2017). While this literature has mainly focused on the immediate response of the migration decision to natural shocks, this paper takes a long-run perspective and shows how large negative historical shocks can have a persistent long-run effect on the decision to migrate through the channel of migration networks.

The rest of the paper is structured as follows. Section 2 provides historical background on Irish migration and the Great Famine. Section 3 presents the data sources and describes the matching strategy. Section 4 provides the empirical strategy. Section 5 summarizes the results, while Section 6 presents the robustness checks. Finally, Section 7 concludes.

2. Historical Background

2.1 Irish Migration

The history of Irish emigration started long before Ireland's Independence (1921). In the 17th century around 50,000 Irish left primarily for Europe, and an approximately equal number left for the Americas (Cullen, 1994). In particular, it is towards the end of the 17th century that Irish Protestants began migrating towards North America (Kirkham 1997). Canny (1994) identifies famines, economic crises, and conflicts as the main determinants of migration in the 17th century. According to Harkness (1831), Irish migration in the 18th century took two main directions: first, military migration[4] towards France, Austria, Spain and, later in the century, to the British Army, and second, industrial migration to Europe and North America due to the decline of the woollen industry in Ireland. It is estimated that around 200,000 Ulster Presbyterians[5] moved from Northern

[4] According to Conaill (2005), significant emigration occurred with the start of Williamite wars towards the end of the seventeenth century, the defeat of James Second's Army in Ireland. In exchange for the contingent of French soldiers sent to Ireland, around 5,000 Irish soldiers sailed from Kinsale to Brest in France.

[5] According to the National Archives of the Presbyterian Church in the United States, Presbyterianism is the system of church government by representative assemblies called presbyteries, in opposition to government by bishops (episcopal system), or by congregations (congregationalism).They were among the earliest Reformed immigrants to America.

Ireland to America between 1700 and 1775 (Shannon, 2015), with the first wave of immigrants moving to Boston and New England taking place in this period. After a brief interruption due to the American Revolutionary War (1776-1783), Irish migration to the USA resumed after 1783, due to high unemployment and low income caused by the decline in the linen industry in northeast Ulster (Shannon, 2013). Again, most of Irish migration until 1815 was crisis-driven, following the economic depression in late 18th century (1783-1785), a famine in 1799-1801, and political turmoil after 1793 (Doyle 1981). During the three decades before the start of the Famine in 1845, between 800,000 and one million Irish migrated to North America (Adams 1932), while about half a million individuals, for whom the transatlantic fares were prohibitively expensive, migrated to Great Britain (Fitzpatrick 1989). At least 35,000 migrants settled in Australia (O'Farrell, 1989), while a small proportion of migrants left for Argentina.

International emigration rose significantly during the Great Famine (1845-1850).[6] High levels of poverty and starvation resulted in a staggering level of over one million people leaving Ireland (Ó Gráda, 1993). In terms of self-selection, according to Ó Gráda and O'Rourke (1997), the 1.8 million Irish arriving in the United States between 1845 and 1855 came from much poorer backgrounds than the Irish migrants who had moved to the US before the Great Irish Famine. However, the migrants were not the poorest class of Irish society: according to Ó Gráda and O'Rourke (1997), emigration reduced the level of Famine mortality and in the long-run it may have allowed the convergence of living standards between Ireland and the rest of the world. After the Irish Famine, emigration remained sustained up until the 1860s, when emigration rates started decreasing: from 15 per 1,000 people, the level reduced to 8 per 1,000 just before the beginning of World War I (Hatton and Williamson, 1993). Improved economic conditions and a decrease in agriculture's share of the total working population from the 1860s onwards may have contributed to the decrease in emigration rates.

It is estimated that between 1880 and 1921 about 87 per cent of Irish migrants moved to the US, while Great Britain became the main destination country for Irish migrants only after the 1930s (Barrett, 1999).[7] Figures A2 and A3 in the Online Appendix show Irish migration to

[6] See Figure A1 in the Online Appendix.
[7] Our analysis focuses on the Irish migration to the US between 1901 and 1924. Given the role of the US as the major destination country over that period, migration to the US can be considered as a good representative of overall Irish migration.

destination countries between 1876 and 1914. The US features as the main destination for Irish migration: emigration rates to the US fluctuated between 5 and 11 people per thousand annually for the period 1876-1914 with the highest rate reached in the years 1886-1895 (Fitzpatrick 1980). Overall, the proportion of emigrants to the USA accounted for around two thirds of the total for the period between 1880 and 1914. In 1893 almost 94 per cent of the emigrants settled in the US. Emigration to the US declined after 1914.

According to Fitzpatrick (1980), the analysis of 1876-1895 emigration shows that the American-Irish came from "backward" counties, *i.e.* counties characterized by many Irish-speakers, fewer Protestants, larger agricultural populations, and with lower farm values per capita. Since 1856 the majority of the migrants in the nineteenth century were in the age range between 15 and 24 (Harkness 1931). The recent work of Connor (2019) on Irish migration over the period 1901-1911 provides evidence of negative self-selection, with male migrants originating from poor farming communities. Our analysis complements the work by Connor (2019) by extending the time period considered and by investigating the long-run drivers of the Irish migration to the US.

2.2 The Great Famine (1845-1851)

The Great Irish Famine was caused by the *Phytophthora infestans*, a potato blight, which originated from Mexico in 1843 (Goss et al., 2014) and spread across Europe, reaching Ireland in 1845, when one third of the potato crop failed. The following year was characterized by an almost complete failure of the potato crop (Ó Gráda, 1993). The prices of all types of potatoes dramatically increased, while average agricultural wages became lower than the average costs of a poor working male's typical diet. Relief was provided in the form of workhouses and public works, which were introduced in March 1846 (Ó Gráda, 1999). In 1847 the extent of the blight was limited, however because of the limited availability of seed potatoes from the previous year, the total potato yields were low. In March 1847, soup kitchens were introduced under the Destitute Poor Act (Dudley-Edwards and Williams, 1956) and by summer 1847 local relief committees provided up to 3 millions meals daily. In 1848 the blight hit significantly again, leading to almost complete crop failure. The blight appeared again in 1849 and in some areas in 1850 as well (Goodspeed, 2016). Excess mortality rates were particularly high in 1846-1847 (Ó Gráda, 2006), and they continued up until 1851. Figure 1 presents the distribution of the Famine in Irish counties, based on excess mortality levels and the extent of relief provided, in the form of food rations.

[Figure 1 about here]

3. Data

3.1 Data sources

The analysis rests on a substantial effort of data collection, digitization and linking of historical datasets. We employ four sets of data sources.

First, we collect data on the entirety of the 1901 and 1911 Irish Censuses, which provides information at the individual level. The two Census datasets provide information about name, age, gender, religion, occupation, marital status, country or county of birth, literacy, type of disability (if any) of all individuals living in the 32 Irish counties in 1901 and 1911.[8] In addition, the Census provides information on the exact place of residence of individuals: county, district electoral division (*ded*) and street. Overall, the two rounds of the Irish Census consist of more than four million observations each. We exclude children from our analysis. In particular, we exclude any children under 6 from the 1901 Irish Census and any children under 16 from the 1911 Census. Unlike Connor (2019), we include women in the analysis.

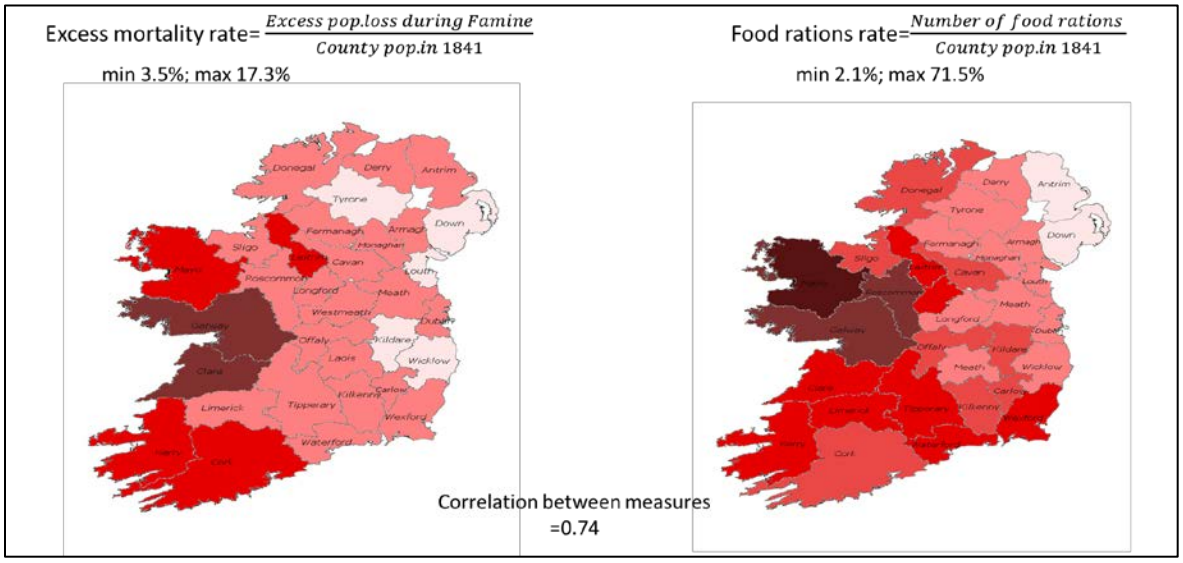
The second source of data is the Ellis Island Administrative Records.[9] In 1819 the Federal Government of the US passed an Act called the Steerage Act, also known as the Manifest of Immigrants Act. According to the Act, ship captains were required to report the list of passengers on board. Passenger lists were created using passenger documents required to enter the US (Bandiera, et al, 2013). The entire dataset consists of information on migrants from 1892 until 1924. Given the availability of the 1901 and 1911 Census, we use the records on Irish migrants from 1901 to 1924. The records contain information on immigrants' name, surname, gender, age, marital status, port of departure, name of vessel, date of arrival, ethnicity and residence. The Ellis Island dataset on Irish migrants consists of over 800,000 observations.

Third, we employ two measures of the extent of the Famine. The first measure relies on excess mortality rates as a measure of the severity of the famine at county level (Counsens, 1960). Excess mortality rate is calculated as the ratio of excess deaths in the counties during the Famine years and the county population in 1841. Excess deaths are measured as the difference between

[8] http://www.census.nationalarchives.ie/.
[9] Ellis Island records are available at https://stevemorse.org.

the postulated deaths, according to past death rates, and actual recorded deaths. As a robustness check, we introduce a second measure of the severity of the famine, based on the rate of food rations, *i.e.*, the amount of food rations provided to the Irish population during the summer of 1847, divided by county population in 1841. The data on food rations by county are available in the Enhanced British Parliamentary Papers on Ireland, seventh report of the relief commissioners.

Figure 1: The extent of Famine at county level.



Note: Darker shades represent higher extent of the Famine. Map on the left: the measure of the famine is the excess mortality rate in the counties between 1846 and 1851, according to Counsens (1960). Map on the right: authors' calculations using data from Commission on Relief: fifth, sixth and seventh reports, Enhanced British Parliamentary Papers on Ireland.

Finally, we construct a measure of the extent of Irish migration in the US, generated during the Great Irish Famine. In order to do so, we link the six rounds of the representative US Census Samples (1850, 1860, 1870, 1880, 1890, 1900 and 1910)[10] with abovementioned sources. In order to create the migration network variable, we consider Irish-born individuals who moved to the US during the Famine years (1845-1852). Using the 1901 and 1911 Irish Census data, we measure the frequency of Irish last names by county. There are 91,213 unique surnames identified across the thirty-two counties.[11] We then identify the unique surnames of Irish-born migrants in the US. We identify 32,861 surnames. We then assign Irish Famine migrants to their county of origin in Ireland, on the basis of a weight of their surname. Based on this, we construct county emigration

[10] In the analysis, we employ the 1 per cent samples of 1850, 1860, 1870 US Censuses, 10 per cent sample of 1880, 5 per cent sample of 1900 and 1.4 per cent sample of 1910 US Censuses.
[11] Surnames have been homogenized using the *soundex* command in Stata.

rates to the US during the Famine years.

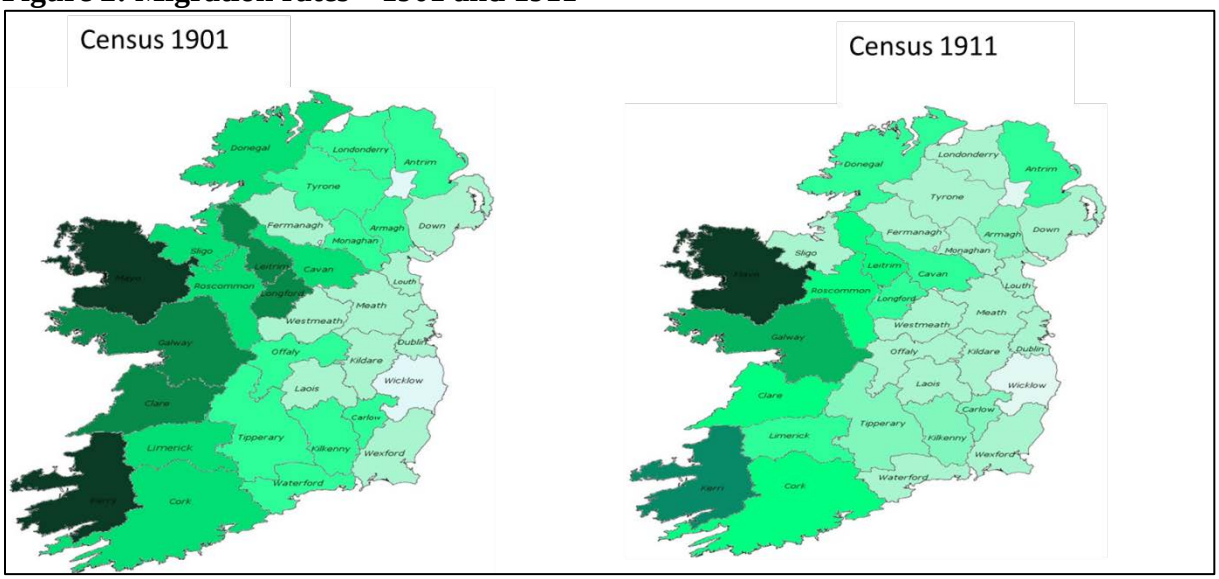
3.2 Data linking

We proceed with the matching of historical data, by employing the linking strategy proposed by Abramitzky et al. (2012). Matching between the 1901 and 1911 Irish Censuses and the Ellis Island Administrative records is conducted in two steps. First, we match individuals across the 1901 Irish Census and the 1911 Census. Second, we match the overall census sample set with the Ellis Island records on Irish migrants. The matching procedure is described in Vardanyan (2019).

Matching the 1901 and the 1911 Censuses: We match individuals assuming no change of address between 1901 and 1911. Matching is done based on key variables: name, age, gender, county of birth and place of residence. As the place of residence, we consider census county, electoral districts and street. We match 133,805 individuals, which accounts for around 4.5 per cent of the 1911 Census observations. For the rest of the individuals we assume a change in the place of residence: the key variables for matching are the same, excluding residence. We match 333,901 individuals, which is approximately 11.5 per cent of the 1911 Census dataset. Together we match 467,706 individuals across the two Census years: around 16 per cent of the 1911 Census observations are matched with the 1901 Census. As matter of comparison, Abramitzky et al. (2012) achieve a matching rate of around 16 per cent matching rate for per cent matching rate for the US-born native men across the 1900, 1910 and 1920 US Censuses, while Ferrie (1996) reaches around 10 per cent matching rate for men between the 1850 and 1860 US Censuses.

Matching the sample of the 1901 and 1911 Censuses with Ellis Island administrative records. We match the sample of the 1901 and 1911 Censuses with the Ellis Island records on Irish migrants based on name, gender, age, and county of residence. We allow for a two-year margin of error in the reported census ages. Overall, we match 44,543 migrants out of the total 227,000, thus achieving around a 19.62 per cent matching rate. The matching rate is in line with the literature, *e.g.*, Ferrie (1996) and Abramitzky (2014). Figure 2 presents the migration rates, by Census year and by county. In both Census years, western and south-western counties display higher emigration rates to the US.

Figure 2: Migration rates – 1901 and 1911



Source: Authors' calculations based on 1901 and 1911 Irish Censuses. Darker shades represent higher migration rate.

3.3 Summary Statistics

Table A1 in the Online Appendix presents the first part of our summary statistics. Our final dataset consists of the 1901 and 1911 Census data. The final census dataset has 4,892,216 observations with 44,543 migrants, which is 0.91 per cent of the sample. We describe the 1901 and 1911 Census data separately, distinguishing between migrants and non-migrants. For the 1901 Census dataset, migrants are considered those who appear in the Ellis Island Database between 1901 and 1924. For the 1911 Census dataset, individuals are labelled as migrants if they appear in the Ellis Island Database between 1911 and 1924.

The 1901 Census sample: Migrants are about 1.3 per cent of the 1901 Census. The average migrant is around 18 years old, while a non-migrant almost 32. Around 52 per cent of the non-migrants and 46 per cent of migrants are female. Migrants are on average more literate than non-migrants. The corresponding figures are around 95 per cent and 88.50 per cent. Migrants are more often Catholic and less often Protestant in comparison with non-migrants: around 82.5 per cent of migrants and 71 per cent of non-migrant population is catholic. Around 17 per cent of migrants and 28 per cent of non-migrants are protestants. Only 7.7 per cent of migrants and 32 per cent of the non-migrants population in 1901 are married. Approximately 17 per cent of the migrants are Irish speaking while less than 15 per cent of non-migrants spoke Irish. The most common

occupations among the entire population were agricultural occupations, with around 30 per cent of the non-migrants and slightly above 21 per cent of migrants being involved in agriculture. Around 33 per cent of migrants are from Ulster while the province having the lowest percentage of migrants is Leinster, 13.6 per cent. Non-migrants are also mainly from Ulster[12], around 38 per cent, while the lowest percentage of share of the non-migrant population was in Connacht being around 13.9 per cent.

The 1911 Census sample: Around 0.4 per cent of the 1911 Census sample are migrants. The average migrant is around 24 years old, while a non-migrant is 41 on average. Almost 52 per cent of the non-migrants and 44 per cent of migrants are female. Migrants are on average more literate than non-migrants, with literacy rates of 97.60 per cent and 89.60 per cent respectively. Migrants are more often catholic and less often protestant in comparison with non-migrants: around 81 per cent of migrants and 71 per cent of non-migrants are catholic. Around 28 per cent of non-migrants and 18.6 per cent of migrants are protestants. Migrants are mostly unmarried with only 14 per cent being married while slightly more than 40 per cent of the non-migrant population in 1911 is married. Around 19 per cent of the migrants are Gaelic speaking while slightly more than 14 per cent of non-migrants speak Irish. The most common occupation among the entire population is agricultural occupations, with around 42 per cent of the non-migrants and just above 37 per cent of migrants being involved in agriculture. Almost 35 per cent of migrants are from the province of Ulster. Around 27 and 25 per cent are from Munster and Connacht respectively. Almost 38 per cent of the non-migrant population is from Ulster, while the province with the second largest share of non-migrants is Leinster.

Migrants in 1901 compared to migrants in 1911 Census sample: Migrants in the 1901 Census are on average 5 years younger than migrants in the 1911. There are almost equal proportions of female migrants in both Census years. Migrants in 1911 are slightly more often literate, less often catholic, more often protestant compared to those in 1901. On average, migrants in the 1911 Census are more likely to be married than migrants in the 1901 Census. Around 19 per cent of the 1911 migrants are Gaelic-speaking, with 17 per cent being Gaelic-speaking in 1901. The most common occupation among the migrants according to both Census years is agriculture.

[12] Around 37 per cent of the population in 1901 is from Ulster. The corresponding figures for Leinster, Munster and Connacht are 27; 21 and 14 per cent respectively.

*Non-migrants in the 1901 Census sample compared to non-migrants in the 1911 Census sample***:** The non-migrant population in the Census sample 1901 is on average 9 years younger than the non-migrant population in 1911. In both years the percentage of females among the non-migrant population is around 52 per cent. The proportion of literate non-migrants was slightly higher in 1911 than in 1901. Around 31 per cent of non-migrants were married in 1901 with about 41 per cent being married in 1911.

4. Econometric Specifications

We investigate the determinants of migration and the role of the famine in the probability of becoming a migrant. In line with Narciso and Severgnini (2016), we estimate the following equation by Census year:

$$Migrant_{ijd} = \alpha + \beta Famine_j + \gamma \boldsymbol{X}_i + \delta \boldsymbol{C}_j + \varphi \boldsymbol{Z}_d + \epsilon_{ijd} \quad (1)$$

The dependent variable $Migrant_{ij}$ is an indicator variable which takes the value 1 if individual i born in county j, resident in electoral district d, migrated from Ireland to the US, according to our linking strategy, and 0 otherwise. Individuals in the 1901 (1911) census are labelled as migrants if they appear in the Ellis Island Database over the period 1901-1924 (1911-1924), as described in Section 3. The variable $Famine_j$ captures the extent of the Great Irish Famine in the county of origin. As discussed in Section 3, we employ two measures of the extent of the Famine: excess mortality rates according to Counsens (1960) and the rate of food rations in July 1847. We control for a set of individual characteristics ($\boldsymbol{X}_i$) such as age, gender, literacy, occupational dummies, being Catholic, marital status and whether the individual speaks Gaelic. The econometric specification also includes county of origin characteristics, such as the outmigration rates between 1851 and 1852, as measured by the Irish Emigration database. We also include a set of characteristics of electoral districts of residence ($\boldsymbol{Z}_d$), *i.e.* literacy rate, share of Catholics, and the share of young adults (age 18-40).

5. Estimation Results

Table 1 presents the results of the linear probability model, distinguishing between the 1901 and 1911 datasets. Column 1 in Table 1 presents the results of the estimation, which includes individual characteristics, electoral districts control variables for the 1901 Census. Irish migrants

to the US were more likely to be young, male, Catholic and single. Interestingly, the analysis provides evidence of positive self-selection of Irish migrants to the US, as literacy is positively correlated with the probability of migrating to the US. This result is in contrast with the recent findings of Connor (2019), who shows that highly-skilled individuals were under-represented among Irish migrants. We can identify three potential reasons for this difference in results. First, our dataset includes men and women, rather than just men. Second, our analysis focuses on a longer time period, *i.e.*, from 1901 until 1924. Third, we identify Irish migrants by linking Irish Census data with the Ellis Island database. This allows us to identify individuals who have just arrived to the US, rather than Irish-born individuals who stayed in the US according to the US Census, as in Connor (2019). Overall, the results related to the positive self-selection of migrants hold across the various specifications and the samples (1901 or 1911 Census) employed. Next, column 2 presents the results of the specification that includes one of the two measures of the extent of the Great Irish Famine, i.e., excess mortality rate. The coefficient is positive and statistically significant at the 1 per cent level: individuals born in counties that were more affected by the Famine are more likely to migrate to the US, two generations afterwards. This result is robust also to the inclusion of variables capturing the extent of the migration rates during the Famine period. Column 3 presents the results of the estimation where the extent of the Famine is measured using the information on food rations in 1947. The estimation results show a positive and statistically significant impact of the famine (about 6 per cent at the mean) on the probability of migrating from Ireland to the US on the basis of the 1901 Census.

Table 2: Estimation results: Baseline specification. Linear Probability Model

	(1)	(2)	(3)	(4)	(5)	(6)
	Census 1901			*Census 1911*		
VARIABLES	*Migrant*					
Excess mortality rate		0.058***			0.021***	
		[0.007]			[0.004]	
Food rations			0.014***			0.009***
			[0.002]			[0.001]
Emigration rates		-0.000	0.000***		0.000	0.000***
		[0.000]	[0.000]		[0.000]	[0.000]
Age	-0.002***	-0.003***	-0.003***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Female	-0.003***	-0.003***	-0.003***	-0.001***	-0.002***	-0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Literate	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Catholic	0.003***	0.002***	0.002***	0.001***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Married	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Irish	-0.000	-0.001**	-0.001**	0.000	0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Share catholic DED	0.005***	0.005***	0.004***	0.000	0.000	-0.000
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Share age1840 DED	-0.024***	-0.022***	-0.023***	-0.013***	-0.010***	-0.011***
	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]	[0.002]
Literacy rate DED	0.017***	0.014**	0.013**	-0.005***	-0.006***	-0.004***
	[0.006]	[0.006]	[0.006]	[0.002]	[0.002]	[0.002]
Connacht	0.003***	-0.000	-0.001	0.002***	0.001***	-0.000
	[0.001]	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]
Leinster	-0.007***	-0.008***	-0.008***	-0.002***	-0.003***	-0.003***
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Munster	0.000	-0.003***	-0.002***	0.001***	-0.000	-0.001
	[0.001]	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]
Dublin	0.000	-0.000	0.001***	0.001***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Occupations	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,403,940	1,329,919	1,329,919	1,310,942	1,249,046	1,249,046

*** p<0.01, ** p<0.05, * p<0.1. Standard errors, clustered at the electoral district level, are presented in parentheses

Next, Columns 4 to 6 of Table 1 present the estimation results of the analysis using the 1911 Census data. The estimation results present consistent outcomes also when considering the 1911 data, either in terms of migrants' characteristics or in terms of the effect of the Great Irish Famine. One point to note is the estimated coefficient on the Famine: as in the previous columns, the coefficient is positive and statistically significant. However, the point estimate is less than half

than the coefficient presented in Column 2. This is an interesting result, as it highlights how the effect of the severity of the Famine on the probability of migrating decreases over time.

6. The role of migration networks

After the Famine, Irish emigration continued to persist compared to other European countries. Hatton and Williamson (1998) estimate that for every 1000 previous migrants, an additional 41 migrants were attracted each year. Fitzpatrick (1980) and O'Rourke (1995) emphasize the role of chain migration in facilitating the movement of subsequent cohorts of migrants. Similarly, Connor (2019) highlights the role of migration networks in providing support to negatively selected migrants. The analysis presented so far has taken into account the role of migration networks, as measured by the emigration rate at the county of origin between 1851 and 1852, on the basis of the Irish emigration database[13]. This section further explores the role of migration networks, by providing an alternative measure. As discussed in section 3, we make use a of representative sample from the 1900, 1910, 1920 and 1930 US Censuses. Earlier US Census data are also available, however no information is provided on the arrival year of Irish-born individuals. In order to create the new migrant network variable, we consider Irish-born migrants who moved to the US during the Great Irish Famine between 1845 and 1852, according to the US Census samples. Next, we identify the unique surnames of Irish migrants in the US and map migrants' last names to counties in Ireland.[14] To do so, we use the 1901 and 1911 Irish census and measure the frequency of Irish last names by county. We then assign Irish migrants reported in the US Census sample to a county of origin in Ireland, on the basis on their surname. From this, we obtain the migration rates of county of origin during the Famine.

Table 3 presents the results of the estimation, which include the new migration network variable. The results are consistent with the previous findings for both Census years, showing that the intergenerational effects of the Famine are still present when taking network effects into account, which can also be considered a measure of social capital.

[13] https://www.irish-genealogy-toolkit.com/emigration-Ireland-19th-century.html

[14] According to the dataset we have generated in the US Census Sample, there are 3723 unique surnames in the US Census samples.

Table 3: Including the measure of network

VARIABLES	(1)	(2)	(3)	(4)
	Census 1901		*Migrant* *Census 1911*	
Excess mortality rate	0.062***		0.024***	
	[0.006]		[0.003]	
Migration Network	0.008***		0.001**	
	[0.001]		[0.001]	
Individual characteristics	Yes		Yes	
Occupations	Yes		Yes	
DED characteristics	Yes		Yes	
Location indicators	Yes		Yes	
Estimation method	LPM		LPM	
Observations	1,329,919		1,249,046	
R-squared	0.016		0.008	

*** p<0.01, ** p<0.05, * p<0.1. Standard errors, clustered at the electoral district level, are presented in parentheses

7. Conclusion

This paper studies the role of a large negative historical event on individuals' decision to migrate. We tackle this question by looking at the impact of the Great Famine on Irish mass migration to the USA at the start of the twentieth century. Supported by the existing literature, we assume that the impacts of the Great Famine on individuals' decision to migrate were long-lasting. We contribute to the literature investigating the role of the Great Famine in the long-run, finding strong evidence of its effect on individuals' migration choices.

We firstly exploit three different historical administrative data sets. Combining the 1901 and 1911 Census sets with the Ellis Island Administrative Records on Irish migrants we find characteristics of individuals who left Ireland. We conclude that migrants were mostly young, single adults. Male, catholic and literate individuals had higher likelihood of migrating. This is in line with the literature on the characteristics of Irish migration after the Famine. We further plan to explore family migration. Our contribution is the granular data that has not been used before, as well as the time period of investigation. We also contribute to the literature studying emigration from Europe to Ellis Island.

Secondly, we suggest different measures of famine for assessing its impact on emigration decisions. We find a strong positive relationship between the severity of the famine at the county level and the individuals' probability of deciding to migrate. We find that excess mortality increases an individual's probability to migrate by between 2 and 6 percent. As a robustness check, an alternative measure of famine using the rate of food rations sent to each county/district confirms our results.

Given the usage of two large historical census data sets and the precise records on Irish migrants, we believe that our findings are important. Our findings shed light on the characteristics of Irish migration at the turn of the 20th century, and provide evidence of the link between large historical events and migration decisions in the long-run.

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The long-run impact of historical shocks on the decision to migrate: Evidence from the Irish Migration*

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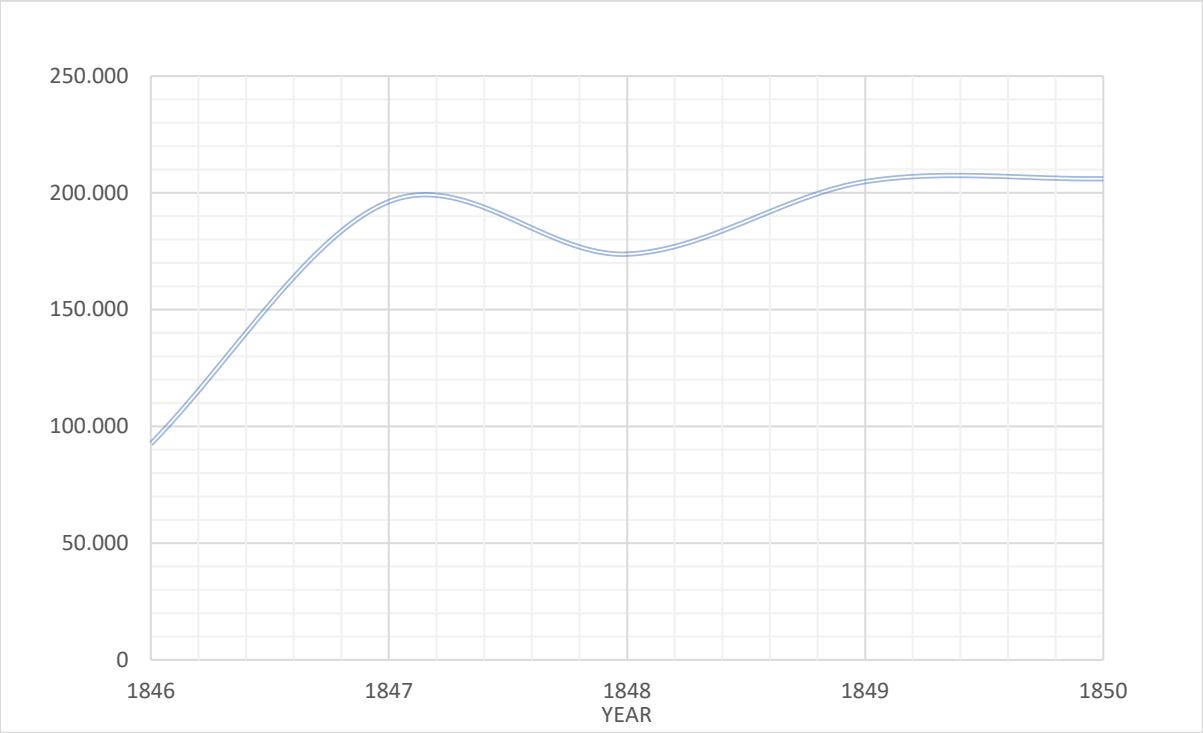
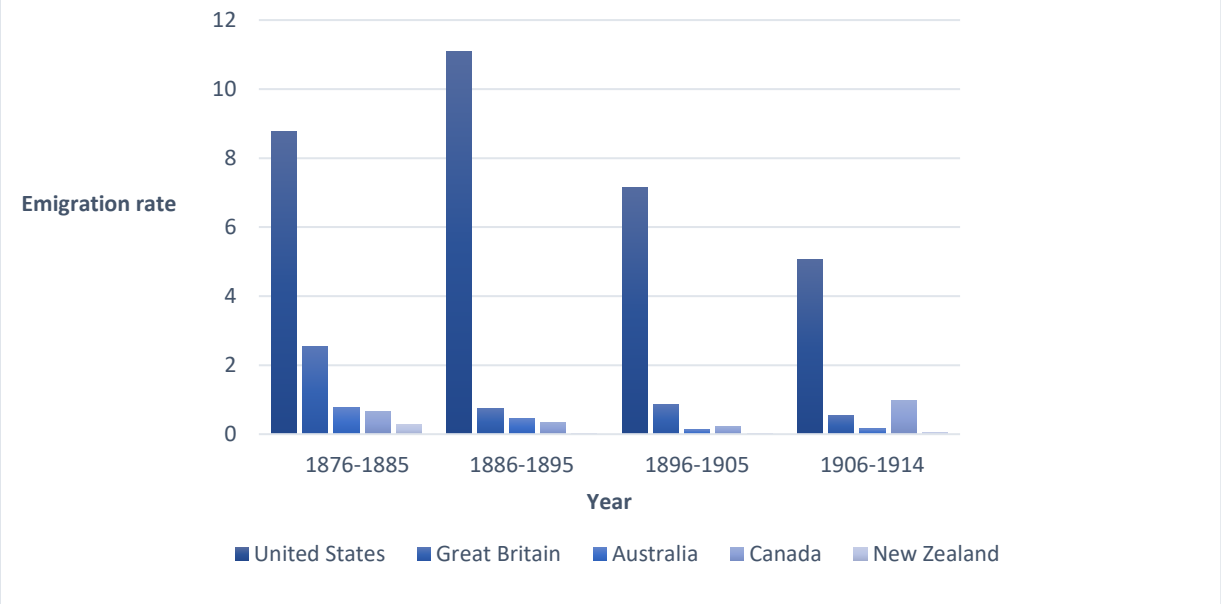
Figure A1 Irish Emigration during the Great Famine (1845-1850).



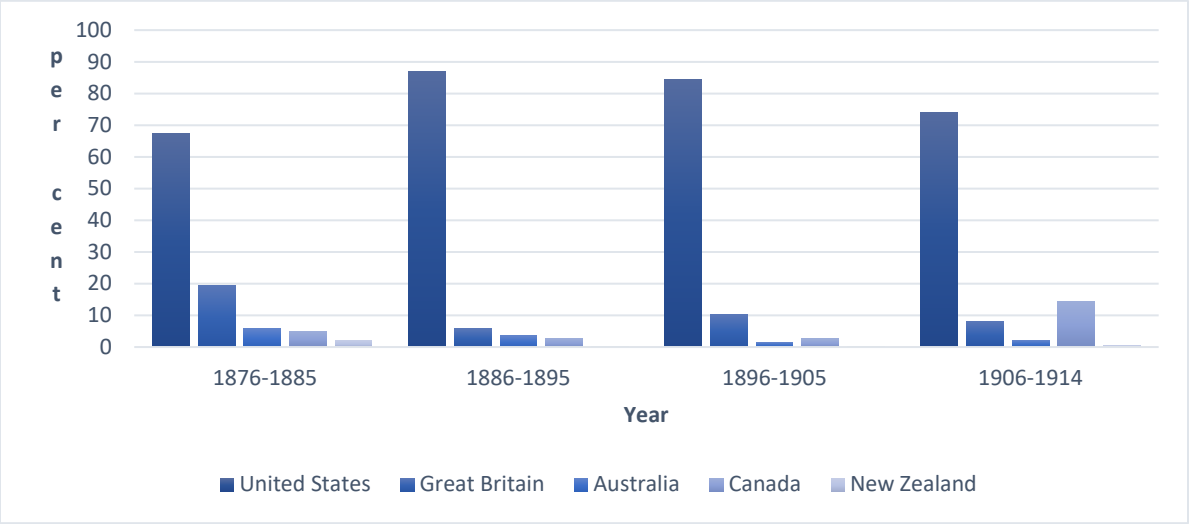
Source: Graph based on annual emigration data from "Irish emigration", in W. F. Willcox, International migrations, statistic (2 vol., New York 1929)

Figure A2 Irish emigration to destination countries, 1876-1914, emigration per thousand, per annum.



Source: Fitzpatrick (1980).

Figure A3: Percentage of total emigration, 1876-1914, by destination country.



Source: Fitzpatrick (1980).

Table A1: Descriptive Statistics of Census Samples 1901 and 1911

	Migrants						Non-migrants					
	Mean	Median	SD	Min	Max	Obs	Mean	Median	SD	Min	Max	Obs
					Demographics							
Migrant 1901	1.32	-	-	1.00	1.00	38,680	98.68	-	-	0.00	0.00	2,906,370
Migrant 1911	0.41	-	-	1.00	1.00	9,702	99.59	-	-	0.00	0.00	2,334,485
Age 1901	17.87	17.00	8,59	6.00	73.00	38,680	31.92	28.00	18.72	6.00	79.00	2,897,360
Age 1901	23.56	21.00	8.54	16.00	82.00	9,702	41.08	38.00	18.32	16.00	88.00	2,334,485
Female 1901	46.71	0.00	-	0.00	1.00	38,680	52.08	1.00	-	0.00	1.00	2,890,014
Female 1911	44.18	0.00	-	0.00	1.00	9,702	51.85	1.00	-	0.00	1.00	2,331,123
Literate 1901	94.75	1.00	-	0.00	1.00	38,679	88.50	1.00	-	0.00	1.00	2,897,297
Literate 1911	97.59	1.00	-	0.00	1.00	9,662	89.59	1.00	-	0.00	1.00	2,305,358
Catholic 1901	82.22	1.00	-	0.00	1.00	38,679	70.87	1.00	-	0.00	1.00	2,906,370
Catholic 1911	80.80	1.00	-	0.00	1.00	9,639	71.01	1.00	-	0.00	1.00	2,307,654
Protest 1901	17.42	0.00	-	0.00	1.00	38,679	28.51	0.00	-	0.00	1.00	2,897,303
Protest 1901	18.60	0.00	-	0.00	1.00	9,639	28.24	0.00	-	0.00	1.00	2,307,654
Married 1901	7.72	0.00	-	0.00	1.00	38,215	31.76	0.00	-	0.00	1.00	2,857,805
Married 1911	13.86	0.00	-	0.00	1.00	9,529	40.61	0.00	-	0.00	1.00	2,292,417
Gaelic 1901	16.82	0.00	-	0.00	1.00	38,680	14.69	0.00	-	0.00	1.00	2,897,360
Gaelic 1911	19.03	0.00	-	0.00	1.00	9,702	14.17	0.00	-	0.00	1.00	2,334,485
Disabled 1901	0.19	0.00	-	0.00	1.00	38,678	0.46	0.00	-	0.00	1.00	2,896,999
Disabled 1911	0.14	0.00	-	0.00	1.00	9,702	0.60	0.00	-	0.00	1.00	2,334,485
					Occupations							
Agri 1901	21.07	0.00	-	0.00	1.00	29,435	29.31	0.00	-	0.00	1.00	1,978,081
Agri 1911	36.88	0.00	-	0.00	1.00	6,187	41.78	0.00	-	0.00	1.00	1,327,918
Profess 1901	0.48	0.00	-	0.00	1.00	29,435	1.26	0.00	-	0.00	1.00	1,978,081
Profess 1901	1.24	0.00	-	0.00	1.00	6,187	2.12	0.00	-	0.00	1.00	1,327,918
Prod 1901	13.22	0.00	-	0.00	1.00	29,435	18.19	0.00	-	0.00	1.00	1,978,081

Prod 1911	24.09	0.00	-	0.00	1.00	6,187	25.80	0.00	-	0.00	1.00	1,327,918
Clerical 1901	0.98	0.00	-	0.00	1.00	29,435	1.15	0.00	-	0.00	1.00	1,978,081
Clerical 1911	2.19	0.00	-	0.00	1.00	6,187	1.87	0.00	-	0.00	1.00	1,327,918
Sales 1901	2.06	0.00	-	0.00	1.00	29,435	3.67	0.00	-	0.00	1.00	1,978,081
Sales 1911	4.18	0.00	-	0.00	1.00	6,187	5.13	0.00	-	0.00	1.00	1,327,918
Service 1901	7.48	0.00	-	0.00	1.00	29,435	12.20	0.00	-	0.00	1.00	1,978,081
Service 1911	10.28	0.00	-	0.00	1.00	6,187	10.85	0.00	-	0.00	1.00	1,327,918
					Location							
Leinster 1901	13.59	0.00	-	0.00	1.00	38,680	27.33	0.00	-	0.00	1.00	2,897,360
Leinster 1911	14.29	0.00	-	0.00	1.00	9,702	27.97	0.00	-	0.00	1.00	2,334,485
Munster 1901	28.51	0.00	-	0.00	1.00	38,680	21.10	0.00	-	0.00	1.00	2,897,360
Munster 1911	26.90	0.00	-	0.00	1.00	9,702	21.09	0.00	-	0.00	1.00	2,334,485
Connacht 1901	25.06	0.00	-	0.00	1.00	38,680	13.89	0.00	-	0.00	1.00	2,897,360
Connacht 1911	24.74	0.00	-	0.00	1.00	9,702	13.42	0.00	-	0.00	1.00	2,334,485
Ulster 1901	32.83	0.00	-	0.00	1.00	38,680	37.66	0.00	-	0.00	1.00	2,897,360
Ulster 1911	34.90	0.00	-	0.00	1.00	9,702	37.51	0.00	-	0.00	1.00	2,334,485

Source: Authors' calculations on the matched sample.