The Cream of What Crop? Selectivity and Local Determinants of Migration from Ireland to North America in the early 20th century

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Abstract

Research suggests that international migration is a highly selective process. However, there is debate in the literature as to whether migrants tend to be positively or negatively selected and, further, about how selection differs across sending locations. In this paper, I link over 300,000 people from Ireland in 1901 to either Ireland in 1911 or to the United States in 1910. I estimate a series of multinomial logit models to examine the determinants of internal and international migration. I model a range of local characteristics and use GIS to explore spatial variability in migration behaviors. After analyzing migrant characteristics, family characteristics and places of origin, I conclude that migrants from Ireland were positively selected on family status, occupation and human capital. Further, local opportunities influence the odds of migration but this is made complicated by the striking spatial polarization of international and internal moves.

> *"All we can say is that, the smaller the community and the more self-development is hindered … the stronger is the urge for persons above the average in character and intellect to seek their fortunes in the great world outside. Looking at the opposite side of the medal, one hesitates to think of the turmoil that would have been created in this state if this safety-valve had been absent"* (Carter et al., 1956, p. 110)

Introduction

During the Age of Mass Migration (1850-1913), the United States absorbed nearly 30 million migrants from Europe. More than 4.5 million of these people came from only one country, Ireland. The rate of emigration from Ireland, 13 per thousand, was double that of any other European country, and most of this migration occurred long after the Great Irish Famine (1848 -1852) (Hatton & Williamson, 1993). The Age of Mass Migration profoundly shaped economic development and social life in Ireland and the US. Economic development was relatively slow in Ireland during this period and there was concern that the country was losing its best and brightest to selective migration across the Atlantic (Commission on Emigration and Other Population Problems, 1948-1954). This exodus was also *the* major driver of Ireland's 19th and early 20th century population collapse, which saw the country's total inhabitants fall from 7 million in 1840 to just over 3 million in 1911.

On the flip-side, if the best and brightest were crossing the Atlantic, Ireland's loss was America's gain. Although the open border with Europe had earlier come under scrutiny in the US (Dillingham, 1911), discussions to the opposite effect continued in Europe for decades after. Commenting on the report furnished by the Commission on Emigration and Other Population Problems, Carter et al. (1956) stated "so long as emigration to the wider world … remains relatively free … [the] emigration of the more adventurous, the more gifted, and those who feel cramped and oppressed by the restriction of a small, narrow and in-growing community [could not be checked]" (p. 110). Carter's statement is inline with the logic of the Commission, which saw emigration as a long-running part of Irish life. One reason emigration was so common in Ireland was the lack of opportunities through internal migration to cities. While European cities grew rapidly in the 19th and early 20th century, Irish urban growth was much slower. This said, internal migration *did* occur in Ireland, albeit at a lower rate. Yet, relatively little is known of how internal migrants differed from their emigrating counterparts. In this paper I ask two related questions. First, were emigrants the best and brightest of Ireland's children (i.e. positively selected)? Second, how did people moving within Ireland differ from those moving overseas?

This paper is the first to link US immigrants back to their childhood homes in Ireland.

This linked sample, constructed using the Irish censuses of 1901 and 1911, and the US census of 1910, makes three contributions. First, the direction of selection is analyzed by comparing the pre-migration characteristics of migrants and non-migrants. Second, I analyze if overseas migrants differed from their counterparts who moved within Ireland over the same period. Third, after linking people to their Poor Law Union of residence in Ireland, I analyze how local social and economic conditions affected proximate determinants of migration. This study is situated 50 years after the Great Irish Famine, and at the tail-end of the great Irish flight across the Atlantic. Yet, even though emigration had slowed down by the early 20th century, in 1911, 33 percent of all people born in Ireland still lived elsewhere (Guinnane, 1997, p. 104-108). Although this chapter of Irish emigration has received less attention than Ireland's famine migration, I argue that this migration may be a more representative case of overall mass-migration to the US, and less a-typical than the famine migration.

Migrant Selection to the United States

Whether or not the United States attracts the most-skilled people from other countries is hotly contested. The literatures on historical and present-day migration, which have become increasingly integrated, typically show migrants to be better skilled and more educated than the people they leave behind (positive selection). This has been a divisive issue among scholars of Mexico-US migration. The standard economic model of migration, the "Borjas-Roy model", predicts that the US should attract migrants from the lower-end of the Mexican skill distribution (negative selection) due to higher relative wages in the US (Borjas, 1987, 1994). However, studies has consistently found positive selection from sending countries for Mexicans and other immigrant populations (Chiquiar & Hanson, 2005; Chiswick, 1999; Feliciano, 2005, 2008; Gould & Moav, 2007; Grogger & Hanson, 2011; Orrenius & Zavodny, 2005). This view of positive selection, largely the norm in the literature, is coming under increasing scrutiny.

New evidence shows migrants from Mexico to be negatively selected, and earlier findings of positive selection to be driven by spatial differences in selection and heterogeneous migration costs. Recent support for the predictions of the Borjas-Roy model have emerged

from the use of more representative data and a number of refinements, namely, the consideration of network effects and liquidity constraints on migration decisions (Moraga, 2011 & 2013; Rendall et al., 2015). Rendall & Parker (2015) argue that earlier findings, which found positive selection from Mexico overall, were driven by the under-sampling of smaller cities, towns and villages, which tend to send less educated people. Moraga's (2011) results are consistent with this but she notes substantial heterogeneity between urban and rural places. Moraga (2013) explains sizeable portions of these between-place differences through heterogeneity in skill prices, the prevalence of migrant networks and wealth constraints. This finding reinforces the overall conclusion that Mexicans tend to be negatively selected from the population. These findings have appeared alongside other studies which use representative micro-data to analyze the direction of selection from other major migrant sending countries to the US.

Research for earlier mass-migrations also suggests that migrants were not "the best and brightest" as a rule, and that local characteristics demand attention. Abramitzky et al. (2012, 2013) find evidence of negative selection overall on wealth and earnings, but inconclusive results from smaller-urban and rural places. Wegge (2002) finds no strong selectivity from 19th century Hesse-Cassel but argues that travel was prohibitively expensive, and discouraged the emigration of the poor. In their anthropometric analysis of Italian migrants to the US from 1907 to 1925, Spitzer & Zimran (2013) find negative selection at the national level but with a notable *caveat*. Although Italian migrants tended to originate in Italy's shorter, southern provinces, it tended to be the taller people in those places who emigrated. For Mexico-US migrants in the 1920s, Kosack & Ward (2014) find evidence of positive selection on height. These studies, which highlight the dynamic and local nature of migrant selection, challenge sweeping accounts of earlier migrations from Europe.

The statement in the epigraph of this article by Carter et al. implies a duality to Irish migration. While emigration was a safety-valve for overpopulation during some periods, its selective nature also hindered economic development. The salience of selective emigration varied over time and several studies have used age-heaping methods to infer this. Mokyr & Ó Gráda (1982) use ship registries from 1803-1846 and find evidence of increasing negative

selection on human capital and occupation over time. Despite this negative selection, Ó Gráda (2000) does note that that emigrants feeing the Great Famine were not Ireland's poorest – the poorest died. Stolz & Baten's (2012) recent multi-country age-heaping analysis is consistent with these findings. Stolz and Baten even find evidence of positive selection from Ireland after 1880, although their result also show a decline in selection again after 1900. Although useful, age-heaping measures are limited in assessing whether selection varies across skill distributions, and further, it is not clear how to interpret temporal age-heaping estimates in the face of changes in the availability of education for the population as a whole.

I create a linked sample of individuals between Ireland and the US to analyze selection from Ireland. This offers more detailed insight than age-heaping studies, or analyses of the official emigration statistics, which are beset by a number of key issues. The official statistics substantially undercount true emigration and are also biased by their omission of people who first moved to England (Ó Gráda, 1975). The linked sample used in this paper is less exposed to this issue. Aside from age-heaping, other techniques have been to analyze emigration without the official statistics. Guinnane (1997) uses county cohort-depletion rates to analyze emigration in post-famine Ireland. Guinnane finds that emigration was more common along Ireland's Atlantic seaboard where farming was much less developed. The official statistics from after 1900 also suggest that up to two-thirds of emigrants were unskilled and approximately 60 per cent were aged 15 to 24 and most were unmarried (Guinnane, 1997, p. 106; Miller, 1988, p. 328). Miller (1985) makes the interesting suggestion that while migrants possessed few of their own skills, they were typically drawn from middling backgrounds. It has not previously been possible to separate out these conflicting claims.

A number of other features of the Irish migration are important to the interpretation of findings. From 1870 to 1920, people left Ireland for increasingly mundane reasons. Those crossing the Atlantic increasingly fit the migrant stereotype of being young and in search of work (Perlmann, 1989). Irish emigration was distinct during this period, in that Irish men and women migrated in comparable numbers and were typically not "birds of passage". The Dillingham Commission reported that for every 100 Irish people who entered the United States from 1908 to 1910, only seven left. Hatton and Williamson's (1994) analysis of county

level migration rates also suggests that local agricultural opportunities and business cycles in the US were important drivers of migration over time. In sum, the pull of US cities attracted young Irish men and women in much the same way as they have for many other populations elsewhere, and unlike their Italian counterparts at the time, the Irish tended not to return home.

Post-Famine Ireland

Ireland's cataclysm, the Great Famine (1845-1852), drove over half a million people from Ireland to the shores of the New World, and another million to their graves. Ireland subsequently experienced a population collapse from the Great Famine to the First World War. Over 4 million people left Ireland for the United States during this period, the total population of the island fell from 8 million to 4 million, and permanent celibacy became remarkably widespread (Guinnane, 1997). Yet, with living standards steadily rising, the loss of great numbers of people across the Atlantic was a more protracted feature of 19th century Ireland than high mortality (Gráda, 1991).

Explanations of Irish migration from post-famine Ireland are highly varied. The greatest distance between the "root causes" of emigration is likely between the account given in Miller's (1988) seminal work *Emigrants and Exiles* and Timothy Guinnane's (1997) *The Vanishing Irish*. Miller (1988) follows a *world-systems* logic, as he argue that continued migration from Ireland was the result of colonial underdevelopment. Miller argues that Marx's (1861) prophecy for the Emerald Isle was realized, as in the late-19th century it met its "true destiny, that of an English sheep-walk and cattle-pasture" (ch. 24). In this account, transformations in post-famine Ireland promoted migration through several key pathways: Ireland had been incorporated into a free-trade system with Britain and the United States on unfavorable terms and Ireland suffered the ill-effects of import competition; as a result, living costs continued to rise in rural Ireland; the capitalist elite had continued to dispossess and consolidate small farms in order to raise productivity and complete the shift from tillage- to pasture-farming; as a result, opportunities for farm ownership or employment on farms declined; these changes transformed social relations in ways that discouraged marriage and

encouraged impartible inheritance within families. Although Guinnane does not challenge this larger interpretation, his explanation is oriented toward a more "economically logical" set of decisions and broader demographic changes which were not specific to Ireland. Although Guinnane agrees that farm consolidation did promote migration, he argues that many laboring families joined the farming classes and living standards rose overall.

Regional specialization, particularly in agriculture, meant that there were at least some opportunities for internal migrants. Economic development, agriculture and migration in post-famine were geographically uneven and regionally diverse (Guinnane, 1997, p. 101). By standard economic measurement, living standards and agricultural productivity rose in Ireland from 1890 to 1910 as Ireland's rural economy boomed (Bourke, 1993, p. 21). Manufacturing centers, and larger farms linked to Ireland's growing dairy industry were increasingly located in the south, east and northeast of Ireland (Bourke, 1993; Miller, 1988). Despite overall gains in living standards, Guinnane (1997) notes that "[some] regions of Ireland remained desperately poor into the twentieth century. Along the Atlantic coast, from south to north, a considerable population tried to scrape out a living from a combination of fishing, some cottage work and cultivating small amounts of poor-quality land" (p. 46). Diets in these places often consisted of only potatoes and porridge (Breathnach, 2005). Ireland's west was so underdeveloped that major public works schemes attempted to make the region economically viable through large scale investment and operations such as the Congested Districts Board and assisted migration schemes (Breathnach, 2005; Moran, 2004).

Regional divisions in production and agriculture were not the only local structures affecting opportunities, regionally specific systems of poor relief had also emerged over the 19th century. Crossman (2013 notes that "welfare cultures" and quite specific local economies for the poor had evolved heterogeneously across 19th century Ireland (p. 61). Crossman's evidence suggest that in the central southeastern regions of Ireland, relief provision was generously high and easy to access; in the North political and religious cultures of self-reliance emerged in-sync with a system of limited and low access relief system; along the western shoreline, outdoor relief was easier to access but was minimal outside of periods of crisis and distress. An important implication of these distinct "welfare cultures" is that poor relief in

Ireland did not represent levels of poverty but rather the local culture of relief administration and the capacity to provide relief (Laragy, 2011; Crossman,2013). Poor relief levels likely had little impact on internal migration, as internal migrants were typically turned away by relieving officers. However, it is not well understood what impact the availability of poor relief had on emigration.

Data and Matching

This study differs from earlier studies of Irish migration by using linked individual level data rather than the more typical aggregate emigration data (e.g. Hatton and Williamson, 1993). Individual level data is required to effectively compare migrants to non-migrants. To construct such a dataset, I use an iterative matching procedure to link people enumerated in the 1901 Irish census to either the 1911 Irish censuses or the 1910 US census. The studies by Abramitzky et al. (2012, 2013 & 2014), drawing on the techniques of Ferrie (1996), are the first works to use such automated matching procedures to construct samples to analyze migrant selection during the Age of Mass Migration. Constructing datasets through these means has become possible due to the rapid growth of indexed historical data and improvements in matching technology. The data I use here have been made available from two sources. The 1901 and 1911 censuses of Ireland have been made publically available by the National Archives of Ireland. The Irish censuses were digitized as part of a collaborative Irish-Canadian project directed at genealogical researchers. The full-count 1910 US census has been made available by the Minnesota Population Center and its collaborator, Ancestry.com.

These matching techniques rely on the isolation of unique characteristics which should not change unpredictably over time. Five independent pieces of information were required to search for possible matches: a first name; a last name; a place of birth; an age; and if they moved to the US, an arrival year within the study period. For each man in the 1910 or 1911 censuses, I searched the Irish census of 1901 for a man of the same name with age – (t1 – t0). In cases where no match can be found, I then search with age bands of +1/-1 and +2/-2 to allow for measurement error. A potential match is only considered to be possible if only one individual with these characteristics can be found. In order to avoid the double matching of

people in Ireland and the US, I merged the Irish 1911 census with the US 1910 census into a pooled 1910-1911 census. I attempted only to link men older than 5 years of age and younger than 41 in 1901. Infant and child mortality was unevenly distributed between families in Ireland and attempting to match infants and young children under-5 would introduce unnecessary bias.

This technique does have some possible drawbacks. Notably, the technique is less likely to match people with very common names (e.g. John O'Brien). If two or more people are indistinguishable using their matching characteristics, in one time-period, they are deemed ineligible to match. I also modified this algorithm to deal with potential name changes or typographic errors. I did this by transforming all names into their phonetic spelling and corrected for nicknames (e.g. "Ed" vs. "Edward"). For robustness, which I will discuss later, I also reanalyzed with sensitivity to the Anglicization or Americanization of Irish names (e.g. O'Connor vs. Connor). In total, 9,237 people with complete information were successfully matched from Ireland to the US, along with 56,420 inter-county movers and 344,147 non-movers within Ireland. Overall, this corresponds to a forward match rate of 39 percent within Ireland, a 13 percent backward match-rate from the United States to Ireland, and a weighted overall match-rate of 38 percent. These figures are consistent or higher than those typically found in the literature.

Figure 1. County Emigration from Ireland (1900-1910).

Earlier studies of Irish migration have largely focused on county-level migration rates and determinants (e.g. Hatton and Williamson, 1994). This is partly because county boundaries are generally consistent over time and data on emigration rates have historically been collected at the county level. Using data from official the Irish emigration statistics from 1900-1910, I map county level emigration rates for the 32 counties of Ireland (figure 2). This figure appears as one might expect. Emigration rates were higher along Ireland's west and southwest coasts and also from the cities of Belfast and Dublin on the east coast. Although county level maps offer important insight into general trends, they are quite large in extent and are not the

most suitable for assessing local characteristics.

In order to analyze local migration patterns and determinants, I use a modified version of the Poor Law Union (PLU) boundaries (Gregory, 2008). The indexed Irish censuses do not indicate which PLU people were actually located in. Thus, I manually linked several thousand wards to 158 PLUs using the Irish Topographical Index (1901). The PLUs are used as the primary aggregate unit for this analysis. PLUs were administrative units established under the British poor-law system in the 1830s and lasted until the signing of the Anglo-Irish Treaty in 1921. PLUs and their Boards of Guardians were responsible for the provision of poor relief and local taxation. As a result of their administrative importance, detailed agricultural, social and economic characteristics were collected for these places. The fine spatial scale of PLUs make them well-suited to this analysis. Crossman (2013) has compiled and shared important data on the provision of relief by PLU. Further, the published population and agricultural censuses also collected data for PLUs and these have been compiled and shared through the British Data Archive. I include measures of agricultural focus, land structure, land valuation, the provision of poor relief and the local presence of Americans, all at the level of the PLU.

Modeling Strategy

To examine the determinants of international and inter-county migration, I estimated a series of multinomial logits with k-1 equations with three potential outcomes for the period of 1901 to 1910-1911: did not move; moved county; moved to the United States. I chose county-moves as the appropriate outcome for internal migration as the boundaries of PLUs are not as consistent over time. I estimate these models using four separate samples: rural boys; rural men, urban boys; and urban men. I define "boys" as males aged under-21 and still living with their fathers. I define men as males aged over 16 and reporting an occupation of their own. There has been much important discussion around the relatively old age at which "boys" in rural Ireland lived in the family home (see Guinnane, 1997; Arensberg & Kimball, 1940). However, these older males likely differed from their counterparts who had left home (e.g. potential inheritors of farms, disability, pursuing education). As a result, I include these males in the sample of "men" and included a dummy variable for men who report an occupation but

still live in the family home. Occupations were coded using the Irish adaption to the HISCO scheme by Fernihough et al.(2015). These HISCO codes were then linked to HiSCLASS categories, and I used a slightly modified version of this HISCLASS scheme (Lambert, et al., 2013; Van Leeuwen et al., 2002)

The literature suggests that local factors drove emigration from Ireland and Europe. I have included local indicators for the prevalence of important crops and livestock and estimated a further set of random-intercept models to model local conditions. Following Hatton and Williamson (1994), I include a variable on the proportion of farms of less than 5 acres in each locality. I use this to assess whether the possibility of acquiring a small farm influenced migration. I use Crossman's (2013) data on the average number of days each pauper received poor relief and the total cost allocated to poor relief in each PLU during the study period. Finally, to attempt to gain some grasp on the importance of migrant networks, I looked at the proportion of people aged under-21 who were born in the United States. Several thousand people living in Ireland during this period were born in the US and these people were disproportionately younger than the rest of the population. These young Americans were typically the children of US immigrants who had returned home to Ireland after giving birth in the US. Thus, I use the prevalence of these people in particular locales, as an indicator of earlier migration from these places, to the United States.

Results

Migrants tended to be positively selected into internal and international migration. However, the direction of selection is mixed from the samples of men who reported occupations in 1901. Selection for rural men is positive, but with a notable *caveat*. Men who had already become farmers by 1901 had the lowest odds of emigration. The coefficients for literacy are generally consistent with this finding of positive selection. The remainder of this results section is structured as follows: an overview of internal and international migration is provided for the linked sample; selection in the samples of sons is reviewed; this is followed by a discussion of the sample of men; I conclude the results section with a discussion of local characteristics and the results from the random intercept models.

Descriptive statistics suggest also highlight this positive selection. An analysis of age-heaping in the 1901 Irish census using the Whipple index (not shown), shows emigrants to be less likely to age-heap than non-migrants. Based on mean differences between movers and non-mover, 92 per cent of emigrants to the US could read and write, yet only 84 per cent of non-migrants could do the same. Migration also had a distinct geography. Consistent with earlier accounts from Ireland, emigration was most prevalent along Ireland's west coast (figure 2a). The strength of this pattern, and its consistency with earlier accounts, suggests that the backward match from Ireland was successful. It is also worth noting that emigration from western Ireland, as pronounced as it is in figure 2a, is actually being underestimated in these models. As table 5 shows, many people emigrating from eastern cities, had moved previously their from the west coast and elsewhere, prior to the enumeration of the 1901 census.

Figure 2a & Figure 2b. Map of International and Internal Migration in Ireland

Emigrants to the US in the sample of sons tend to be positively selected from the country as a whole, and from rural areas in particular. However, sons exhibit no distinct pattern of selection from urban areas (table 1.1). The sons of men in high status occupations such as farmers, or managers, professionals and clerical workers (MPCs), have higher odds of emigrating than the sons of unskilled workers or farm labourers. Further, the ability to speak Irish increases the odds of emigration by almost a 50 per cent out of rural areas. This largely reflects the geographical prevalence of emigration in the more heavily Irish-speaking west coast.

Table 1.1 & 1.2. Urban and rural sons' migration

The sons of workers engaged in agriculture are generally less mobile within Ireland than their non-agricultural counterparts (table 1.2). Separating the agricultural sector (farmers and fisherman, and farm labourers) from the urban sector (skilled workers, unskilled workers, and MPC workers) in table 1.2, reveals that positive selection is stronger from rural areas than in urban areas. Worded differently, the sons of farmers are mobile than the sons of farm labourers, and the sons of skilled workers are more mobile than the sons of unskilled workers.

Although the sons of MPC workers are significantly more likely to migrate from urban areas and less likely to migrate from rural areas, the coefficients for the sons of all other workers are clustered quite closely together. This suggests that the selection results are partly driven by the gap between MPC workers and all others. This said, the literacy coefficients persistently indicate positive selection. In summary, among sons there is a tendency toward positive selection into both internal and international migration. This holds for all migration out of all areas with the exception of urban international movers.

For the sample of men, selection into international migration is mixed (table 2.1). In urban and rural areas, men already employed as farmers are less likely to emigrate than men employed as farm laborers. Similarly, in both urban and rural areas, men engaged in unskilled work have lower odds of emigration than their manual-skilled and MPC counterparts. Men still living at home with their parents, or men who are married, have lower odds of emigrating than their living-out and unmarried counterparts. These results suggest a tendency toward positive selection out of urban areas and negative selection out of rural areas. Lower odds of migration among farmers is intuitive given the shift toward impartible inheritance in farm ownership and the coinciding decline of opportunities for farm labour in some regions of Ireland.

Table 2.1 & 2.2. Urban and rural migration of men.

The patterns of selection for men are similar for both internal and international migration (table 2.2). Selection across occupations appears to be polarized between MPC workers (highest odds of emigration), and farmers and fisherman (lowest odds of emigration). The coefficients for the remaining occupations are clusters relatively tightly in between these outlying occupational classes. Farmers and fishermen have the lowest odds of emigrating within Ireland and to the United States. However, the relative gap between farmers and fishermen, and other occupations, is most pronounced for inter-county migration. This suggests that although farmers and fishermen were the least mobile occupational group, when they did move, they tended to move to the US. This account is consistent with figure 2, which suggests highly concentrated emigration and very low internal migration along Ireland's

agricultural west coast, where small-holding farmers were still quite prevalent.

Table 3.1 & 3.2. Multilevel Estimates with PLU random intercepts for sons and men.

The models with random PLU intercepts were estimated to control for these types of local differences, which may impact selection. However, in these models, the selection results for international migration do not radically change (table 3.1). There is no clear direction of selection for sons from urban families but sons from rural families tend to be positively selected. From urban areas, men tend to be positively selected within the non-agricultural sector. The only clear result for rural men in these models is that men owning a farm have lower odds of emigration relative to everybody else. These results are all consistent with the standard multinomial logit models. For internal movers, the random intercept models (table 3.2) present a consistent bi-modal result across occupations, locations and sectors. MPC workers and the sons of MPC workers have the highest odds of migrating between counties, and farmers and their sons have lowest odds of moving within Ireland. Among sons and men associated with the remaining skilled and unskilled occupations, the coefficient values are clustered relatively close together. The literacy coefficient also suggests a tendency toward positive selection.

Table 4.1 & 4.2. Migration with PLU level variables

I will conclude the results section with a brief discussion of the local determinants of emigration. I discuss these as potential factors which may impact selection. However, I have not explicitly analyzed these interactions here. Consistent with Hatton and Williamson's (1994) findings, table 4.1 shows that the prevalence of small holdings was associated with lower levels of emigration. One explanation may be that the opportunity to obtain land for young men to farm may have discouraged emigration. The coefficients for poor relief support the claim that local opportunities affected migration decisions. People were more likely to leave places with higher proportions of the population receiving poor (outdoor) relief, but people were less likely to leave places where relief transfers were more generous per person.

Crossman (2013) suggests that in some parts of Ireland, poor relief was a means of maintaining a pool of local labour when work was slack. The coefficients for the proportion of young people born in the US also suggests the emigration was persistent in some places, possibly through the effects of migrant networks.

In sum, factors such as transfers, network effects and local opportunities are all commensurate with selection within a Roy-model framework, and there is considerable scope to model these interaction in further research. An obvious analysis of interaction effects could follow up on the claim that the social and economic distance between farm laborers and farmers varied across Ireland, and this was linked to the size of agricultural holdings in different places (Fitzpatrick, 1984; Guinnane, 1997). The next step in the analysis would be to examine how such contextual factors interacted with family- or self-selection. This is particularly interesting in this case, given the finding that many contextual variables seem to operate in opposite directions for international migration, relative to inter-county migration, and that these behaviours are also so spatially polarized.

Robustness

It is difficult to ascertain the exact source and direction of biases introduced through the record matching techniques which were used to generate the sample. One concern is that the commonness of names and ages might bias the sample toward people of higher social status who tend have more distinct first names, surnames and are less likely to misreport or "heap" their ages on a multiple of five or ten (see Budd & Guinnane, 1991; Mokyr and O Gráda, 1980 for discussions of age-heaping). However, it should be kept in mind that it is not the probability of being matched that would bias the selection coefficients, but rather, differential matching by social or economic status between the two places of interest (the United States and Ireland).

One pathway through which this might occur, is through the dropping of the prefixes in particular Irish surnames. For example, O'Connor might have become Connor. Another might be changes in the reporting of names in English or *as Gaeilge* (in Irish/Gaelic). For example, Ó Gráda may have become O'Grady or even Grady. The reporting of names *as Gaeilge* is unlikely

to be a major issue here, as the reporting of Irish names was strongly discouraged by Irish census takers. Similarly, the US census does not display a dramatically different trend to the Irish censuses. In the 1911 Irish census, only 6 and 61 people reported the relatively common names of *Conchobhar* (translated to "Connor" or "Conor") or *Briain* (translated to "Brien") as a first or last name. In the 1910 US census, nobody or very few people, appear to have reported these names. Although in earlier and later censuses of the US (not used here), these names appear to become more common.

This said, the dropping of surname prefixes is of much greater concern. In Ireland in 1901 there were 4,656 with the surname "O'Connor" and 5,826 with the surname "O'Brien". Ten years later, there were 3,974 people with the surname "O'Connor" and 4,366 with the surname "O'Brien". These changes are inversely related to the change in the number of people with the more Anglican surnames of "Connor" and "Brien". In order to investigate this issue, I re-matched all samples, omitting typical Irish surname prefixes ("O", "Ó", "Mac", "Mc" etc.) so that "Brien" and "O'Brien" would be considered equivalents. I then re-estimated the final equations. The results of this analysis were generally consistent with the findings of the main analysis and this allays some concerns surrounding surname pre-fixes as a potential source of bias.

One further test was undertaken for robustness. Some surnames have historically been more prevalent in some parts of Ireland than in others (see Matheson, 1908/1909). Thus, it is possible that the prevalence of common surnames, and thus higher likelihood of exclusion from the sample, could be driving the spatial patterns found in these maps. In order to examine the degree to which local variability in migration corresponded to the actual likelihood of emigration from particular poor law unions, I analyzed cohort depletion rates. More specifically, I calculated the ratio between the 15-24 age cohorts in each poor law union in 1901 to those in the 25-34 age cohort in 1911. Although this could not possibly be a perfect match and suffers from its own biases, the similar pattern evident in figure 5, suggests that this is also unlikely to be a major source of bias.

Figure 3. Cohort Depletion from Irish PLUs from 1901-1911

Discussion & Conclusion

The problem highlighted by Carter and colleagues in the epigraph and the introduction of this article – that open borders and a lack of economic opportunities would lead Ireland to continue losing its best and brightest – gains some support from these results. Emigrants to the United States tended to come from families of higher status and were more likely to be literate than their counterparts. Aside from the effect of this drain on Irish economic development, this has two further implications. First, although the actual rates of American-Irish social mobility in the US have been contested (Guinnane, 1997), higher than average rates of social mobility for Irish immigrants or their children may be linked to pre-migration status. This hypothesis gains support in the recent study by Abramitzky et al. (2014). Second, in support of Miller's (1988) speculation, Irish immigrants arrived with few skills of their own, but they likely had a better upbringing and better basic educations than the people remaining in Ireland. This highlights the importance of analyzing families and the parent-generation, and not just the reported occupations of children, when inferring selection. This said, the famous work of Arensberg and Kimball (1940) on Irish family and community, depicted a distinct ordering within the rural family, one where the financing of education, migration or the inheritance of land was selectively assigned to children in the household. A further analysis of within-family selection is required to establish how selection operated in rural Ireland.

Two further features of migration are notable with respect to Ireland. First, the finding of positive selection appears to run counter to the Borjas-Roy model, which would likely predict negative selection. However, the lack of detailed wage data for Ireland make this difficult to formally test. It is also not clear how helpful wage data would be in rural Ireland, where so many transactions took the form of reciprocal or in-kind transactions. Predictions from the Borjas-Roy model are also complicated by internal migration. On the one hand, Arensberg and Kimball (1940/1968) noted "there are many instances of countrymen, returned Americans … who have roamed over the world but have never seen more of Ireland than their route to and from their port of embarkation" (p. 145). The maps of migration to the US and inter-county migration (figure 2a & 2b) are consistent with this account. Yet, there is evidence of emigrants making their journey in stepwise fashion; first leaving rural places for domestic

cities, and then moving abroad. This raises question as to why migration behaviours and location choices differed so dramatically between different regions of the island, and how such regional differences shaped selection out of specific locales.

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Appendix

	Moved to the USA (table 1.1)					**Moved County (table 1.2)**				
	Whole Country	**Urban**		**Rural**		**Whole Country**	**Urban**		**Rural**	
(Intercept)	0***	0***	0***	0***	0***	0.12***	0.15***	0.12***	0.030***	0.03***
Age	2.34***	1.92***	1.92***	2.53***	2.53***	1.08***	1.04	1.06*	1.110***	1.12***
Age Squared	0.98***	0.98***	0.98***	0.97***	0.97***	1	1	1	1	1
Father's Occupation (ref = Manager, Professional & Clerical Workers (high status))										
Farm Labourers (low status)	0.83*	0.91	0.9	0.75***	0.76***	0.45***	0.57***	0.58***	1.490***	1.51***
Farmers and Fishermen (high status)	1.12	0.96	0.87	0.99	1	0.30***	0.43***	0.38***	1.7***	1.72***
Foremen and Skilled Workers	0.88	0.9	0.92	0.73*	0.75	0.56***	0.63***	0.64***	2.16***	1.97***
Lower Skilled Workers	0.7***	0.79	0.82	1.16	1.17	0.57***	0.58***	0.58***	3.82***	3.71***
Unskilled Workers (low status)	0.75***	0.84	0.86	0.71**	0.73**	0.46***	0.51***	0.54***	1.490***	1.51***
Can Read and Write	1.02	0.94	0.93	1.06	1.07	1.26***	1.12*	1.03	1.350***	1.3***
Jewish *(ref = Catholic)*			2.48		1			0.73		1
Protestant *(ref = Catholic)*			1.14		0.91			1.7***		1.67***
Speaks Irish *(ref = No Irish)*			1.21		1.4***			0.97		0.7***
Distance From Port			1.15***		1.05*			1.16***		1.06***
Deviance	123542	41397	41015	82009	81544	123542	41397	41015	82009	81544
Num. obs.	147750	44532	44532	103218	103218	222400	44532	44532	103218	103218

s) standard units

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 1.1 & 1.2. Urban and rural migration of sons. Regression table for multinomial logit estimation for the odds of migrating to the United States or within Ireland from 1901-1910/1911.

	Moved to the USA (table 2.1)					Moved County (table 2.2)				
	Whole Country	Urban		Rural		Whole Country	Urban		Rural	
(Intercept)	0***	0.26***	0.2***	0.51***	0.51***	0.52***	0.41***	0.3***	0.55***	0.51***
Age	1.88***	1.03***	1.04***	0.96***	0.96***	0.91***	1.05***	1.07***	1	1
Age Squared	0.98***	1	1	1	1	1	1	1	1	1
Own-occupation (ref = Manager, Professional & Clerical Workers (high status))										
Farm Labourers (low status)	0.94	1.01	1.01	0.88***	0.85***	0.38***	0.6***	0.63***	0.47***	0.49***
Farmers and Fishermen *(high status))*	0.86*	0.68***	0.66***	0.84***	0.81***	0.18***	0.3***	0.3***	0.24***	0.25***
Foremen and Skilled Workers	0.77**	0.9*	0.92	0.94	0.93	0.51***	0.670***	0.7***	0.56***	0.57***
Lower Skilled Workers	0.83*	0.97	1.01	0.94	0.94	0.49***	0.66***	0.7***	0.71***	0.71***
Unskilled Workers (low status)	0.73***	0.87*	0.90*	0.89*	0.86**	0.39***	0.59***	0.64***	0.44***	0.46***
Can Read and Write	1.16*	1.17***	1.15***	0.96	0.98	1.21***	1.21***	1.16***	1.12***	1.07*
Lives at Home		0.26***	0.2***	0.51***	0.51***		0.41***	0.3***	0.55***	0.51***
Jewish *(ref = Catholic)*			0.59***		0.06***			0.53***		00***
Protestant *(ref = Catholic)*			1.06		0.84***			1.350***		1.36***
Irish *(ref = No Irish)*			1.48***		1.32***			1.110*		0.50***
Distance From Port (s)			1.03		1.04**			1.03***		1.04***
Unmarried			1.3***		1.06***			1.32***		1.110**
Deviance	225279	115376	114856	141028	140355	225279	115376	114856	141028.2	140355
Num. obs.	219233	75119	75119	144114	144114	219233	75119	75119	144114	144114

(s) standard units

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 2.1 & 2.2. Urban and rural migration of men. Regression table for multinomial logit estimation for the odds of migrating to the United States or within Ireland from 1901-1910/1911.

	Moved to the USA (table 3.1)				Moved County (table 3.2)			
	Urban Sons	**Rural Sons**	**Urban Men**	**Rural Men**	**Urban Sons**	**Rural Sons**	**Urban Men**	**Rural Men**
(Intercept)	0***	0***	0.06***	0.23***	0.16***	0.11***	0.16***	0.29***
Age	1.93***	2.51***	1.04	0.96	1.05*	1.110***	1.05***	1
Age Squared	0.98***	0.97***	1	1	1	1	1	1
Occupation of father/son (ref = Manager, Professional & Clerical Workers (high status))								
Farm Labourers (low status)	0.9	0.73**	0.95	0.9	0.51***	0.37***	0.59***	0.44***
Farmers and Fishermen (high status)	0.84	0.84	0.59***	0.77**	0.36***	0.26***	0.29***	0.24***
Foremen and Skilled Workers	0.91	0.9	0.86*	0.95	0.59***	0.44***	0.65***	0.550***
Lower Skilled Workers	0.84	0.68*	0.95	0.96	0.54***	0.52***	0.64***	0.68***
Unskilled Workers (low status)	0.84	0.69**	0.84*	0.86	0.47***	0.38***	0.57***	0.43***
Can Read and Write	0.94	1.17	1.2	1.03	1.08	1.350***	1.220***	1.07*
DIC	7369.09	23172.2	14353.3	32194.2	32948.1	57397.5	73944.4	90372.8
Num. obs.	38749	94458	59571	129351	43728	100385	73479	140280
Num. groups: PLU_NAME	121	158	123	158	121	158	123	158
Variance: PLUs	0.1	0.18	0.11	0.16	0.16	0.15	0.14	0.15
Variance: Residual	1	1	1	1	1	1	1	1

(s) standard units

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 3.1 & 3.2. Multilevel Estimates with PLU random intercepts for sons and men.

	Moved to the USA (table 4.1)				Moved County (table 4.2)			
	Urban Sons	Rural Sons	Urban Men	Rural Men	Urban Sons	Rural Sons	Urban Men	Rural Men
(Intercept)	0***	0***	0.07***	0.26***	0.15***	0.11***	0.170***	0.30***
Age	1.93***	2.51***	1.02***	0.96***	1.05*	1.110***	1.05***	1
Age Squared	0.98***	0.97***	1	1	1	1	1	1
Occupation of father/son (ref = Manager, Professional & Clerical Workers (high status))								
Farm Labourers	0.91	0.69**	1.03	0.9**	0.57***	0.38***	0.610***	0.46***
Farmers and Fishermen	0.83	0.82	0.64***	0.79***	0.37***	0.26***	0.3***	0.25***
Foremen and Skilled Workers	0.92	0.88	0.9	0.94	0.610***	0.44***	0.66***	0.55***
Lower Skilled Workers	0.84	0.7*	1	0.99	0.55***	0.52***	0.66***	0.7***
Unskilled Workers	0.86	0.66**	0.9	0.9	0.50***	0.38***	0.59***	0.44***
Can Read and Write	0.95	1.09	1.2***	0.99	1.08	1.34***	1.19***	1.110***
Total Potatoes (per acre) (s)	0.95	1	0.90**	0.96	1.08***	1.04*	0.99	1
Total Milk Cows (per acre) (s)	0.99	0.97	1.04	1.03	1.38***	1.04**	1.13***	1.04**
Proportion of Small Holdings (s)	0.87*	0.81***	0.84***	0.82***	0.84***	1.09***	1	1.13***
Distance from Port (s)	1.15**	1.03	1.05	1.02	1.08***	1.02	1.05***	0.98
Total Land Valuation (s)	1.16	0.97	1.14*	0.96	0.90**	1	0.91***	0.94***
Average Paid in Poor Relief (s)	0.89**	0.89***	0.91**	0.90***	1.13***	1.14***	1.110***	1.13***
Total People on Outdoor Relief (s)	1.04	1.15***	1.01	1.12***	0.90***	0.90***	0.86***	0.9***
Proportion Under 21 Born in USA (s)	1.09**	1.03	1.08***	1.02	1.03*	1.02	1.04***	1.03**

(s) standard units

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 4.1 & 4.2. Regression table for multinomial logit estimation for the odds of migrating to the United States or within Ireland from 1901-1910/1911 with PLU level variables

	n	Average Age	SD of Age	Percentage of county population born in a different county	Percentage of flow born in different county
Antrim-Manhattan	44	28.73	6.45	0.83	0.77
Antrim-Philadelphia	47	30.89	7.23	0.83	0.75
Cork-Manhattan	46	28.82	4.53	0.96	0.92
Dublin-Manhattan	73	31.73	7.5	0.79	0.64
Donegal-Philadelphia	42	27.55	5.04	0.98	0.96
Galway-Boston	60	27.32	4.83	0.98	0.99
Galway-Manhattan	44	28.14	6.29	0.98	0.94
Mayo-Chicago	52	28.46	5.51	0.98	0.95
Mayo-Manhattan	48	28.38	6.39	0.98	0.98
Mayo-Philadelphia	45	28.2	6.21	0.98	0.92

Table 5. Top 10 Migration Flows from Irish Counties to US Cities. Stepwise migration evident from counties containing Belfast (Antrim) and Dublin (Dublin).

	Did Not Move			Moved County			Moved to the USA		
	Count	**Mean**	**SD**	**Count**	**Mean**	**SD**	**Count**	**Mean**	**SD**
Occupation of Father									
Farm Labourers	18525			2150			414		
Farmers and Fishermen	93871			7179			2759		
Foremen and Skilled Workers	18530			2594			459		
Lower Skilled Workers	11216			1617			233		
Managers, Professionals and Clerical Workers (MPCs)	12259			2960			309		
Unskilled workers	15285			1846			326		
Occupation									
Farm Labourers	33913			5258			1230		
Farmers and Fishermen	83748			6622			2432		
Foremen and Skilled Workers	22975			5317			664		
Lower Skilled Workers	18129			4360			606		
Managers, Professionals and Clerical Workers (MPCs)	18300			6619			553		
Unskilled workers	21950			4086			659		
Can Read and Write (Yes/No)	(297438/46709)			(51156/5264)			(8548/689)		
Religion Catholic Jewish Protestant	 253278 273 90596			 35386 40 20994			 6977 6 2254		
Irish Speaking (Yes/No)	(15778/328369)			(1961/54459)			(573/8664)		
Married (Yes/No)	(31780/312367)			(6315/50105)			(415/8822)		
Age		20	10		21	10		19	6
Total Potatoes (per acre) (s)		0.04	0.02		0.04	0.02		0.03	0.02
Total Milk Cows (per acre) (s)		0.09	0.06		0.11	0.07		0.09	0.06
Proportion of Small Holdings (s)		0.03	0.17		0.34	0.18		0.28	0.16
Distance from Port (s) (km)		32	24		28	24		34	25
Total Land Valuation (s)		0.83	0.68		0.96	0.76		0.79	0.68
Average Paid in Poor Relief (s)		44.18	6.81		44.84	7.07		43.5	6.43
Total People on Outdoor Relief (s)		0.03	0.02		0.03	0.02		0.03	0.02

(s) = standard units

Table 6. Descriptive Statistics for Variables

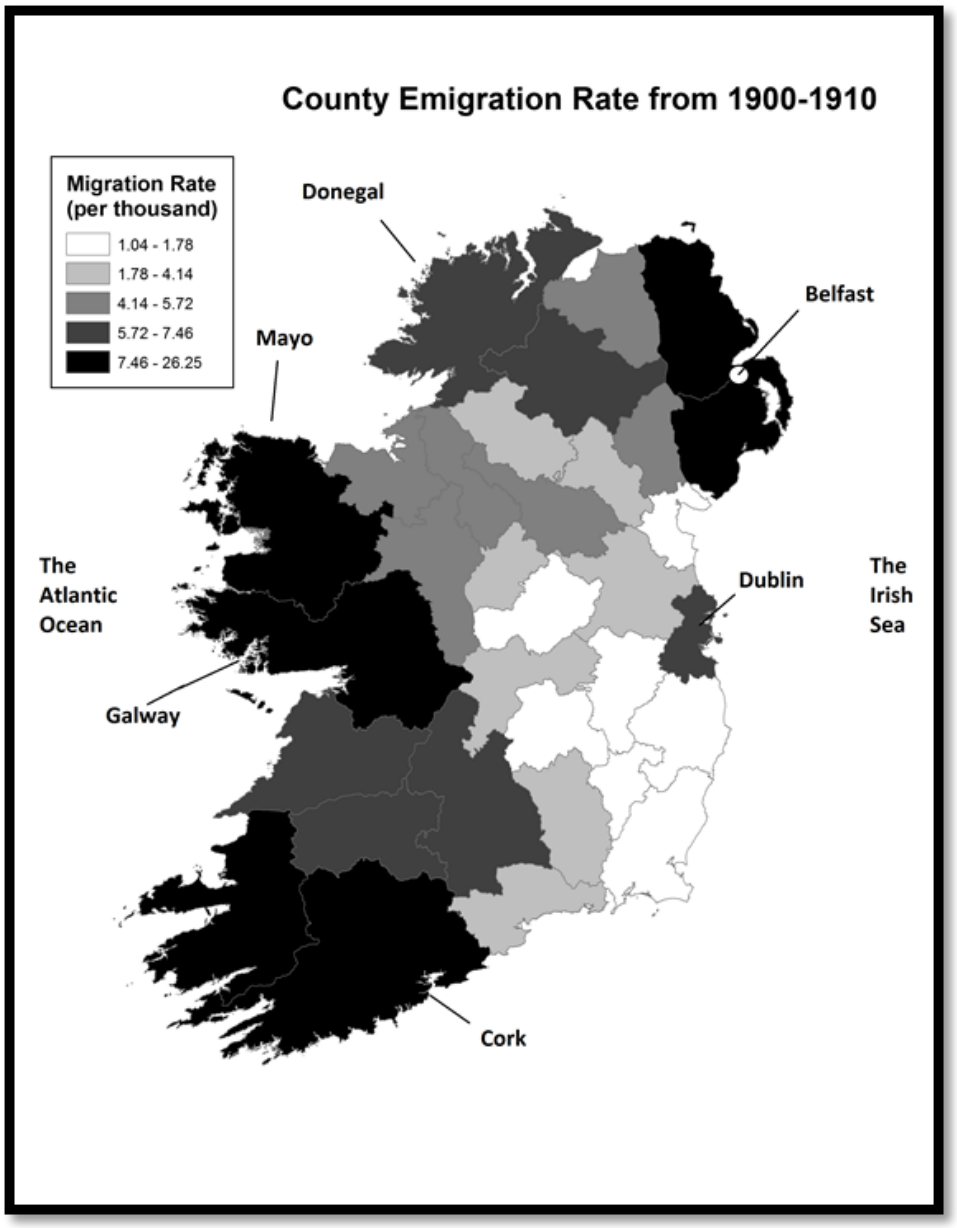

Figure 1. County Emigration from Ireland (1900-1910).
Calculated using official emigration statistics.

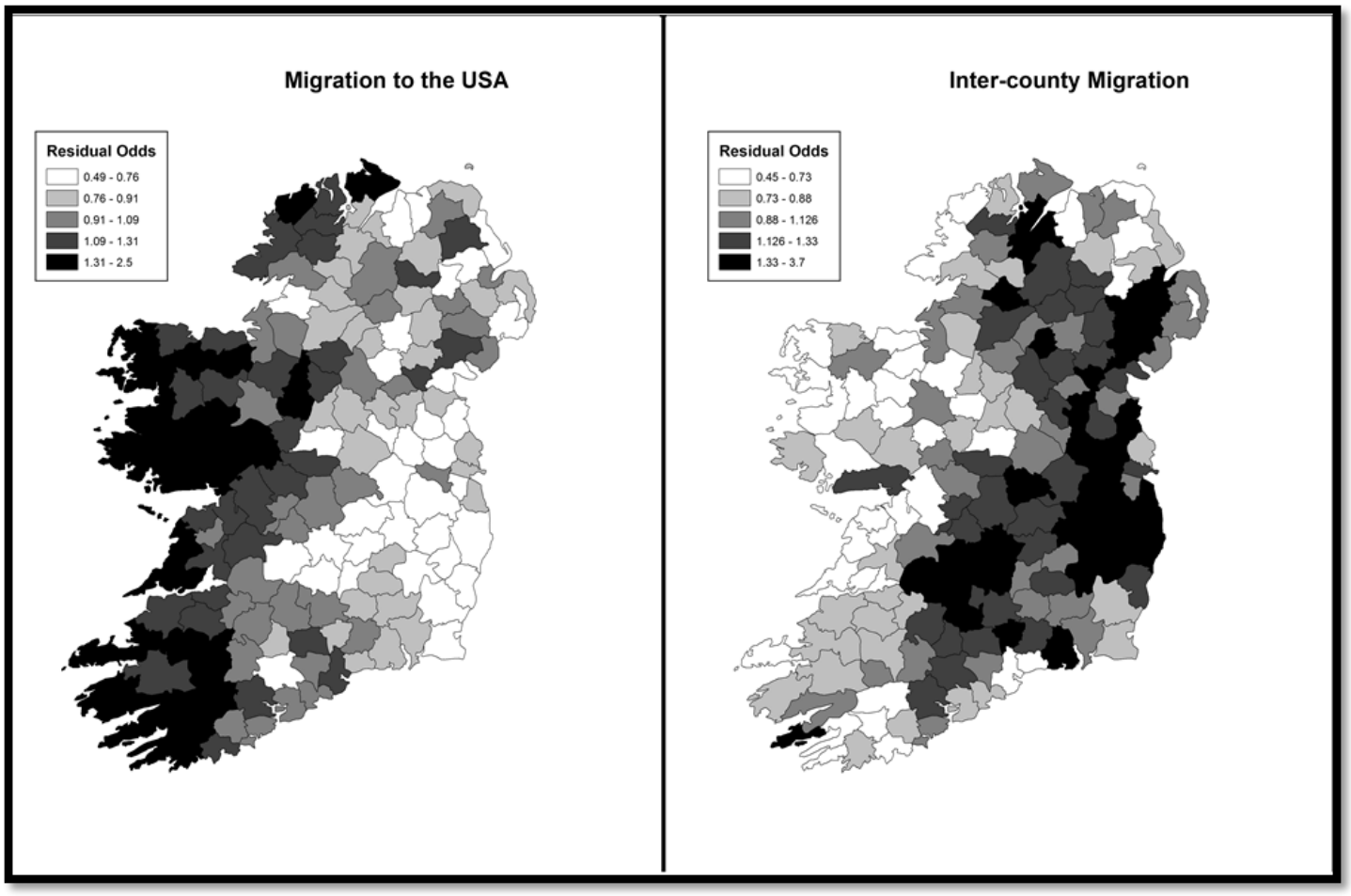

Figure 2a and 2b. Estimated random effects for migration to the USA (left) and between counties (right) from PLUs. Black corresponds to higher odds of migration and white corresponds to lower. I controlled for county size in the inter-county migration regression.

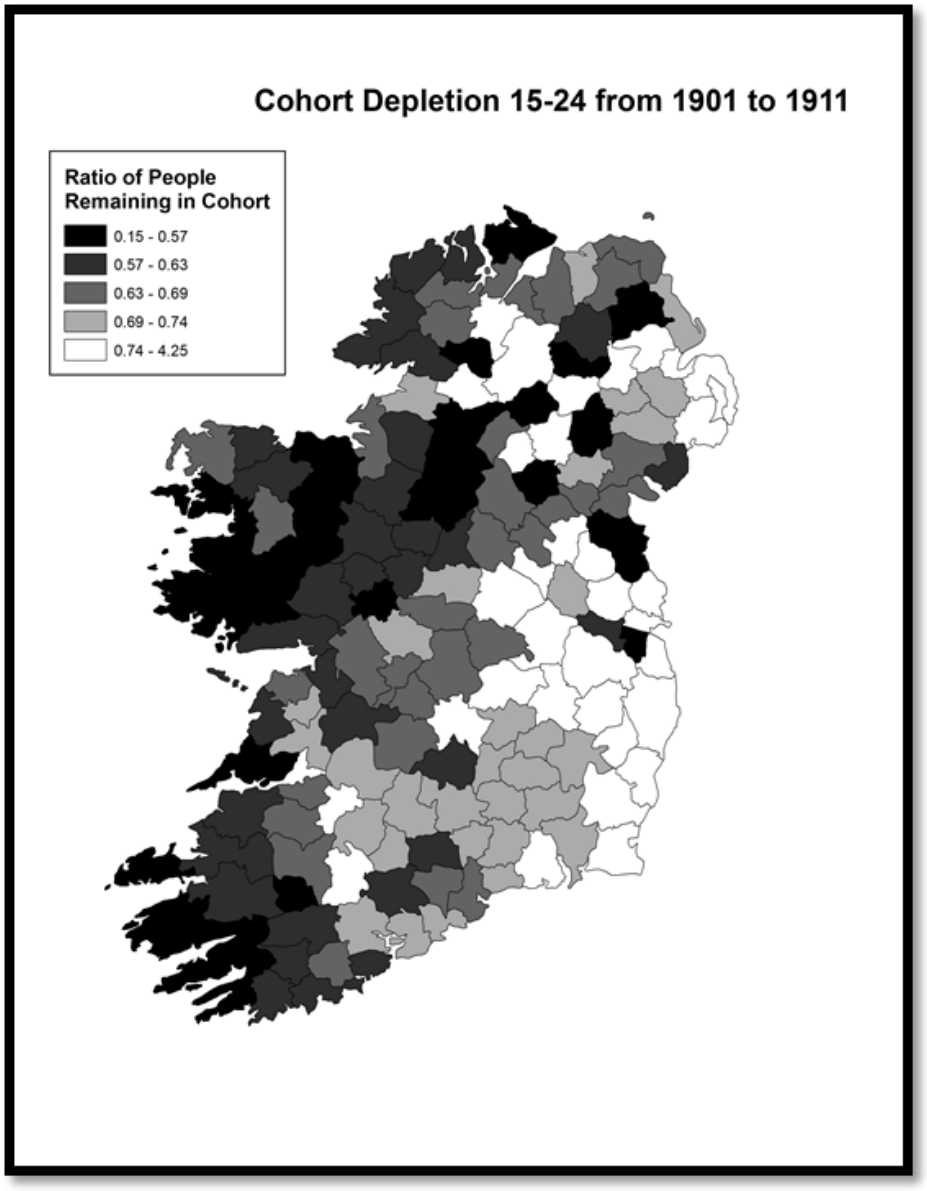

Figure 3. Cohort Depletion from Irish PLUs from 1901-1911