

# **MIGRATION AS DISASTER RELIEF: LESSONS FROM THE GREAT IRISH FAMINE**

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## ABSTRACT

### Migration as Disaster Relief: Lessons from the Great Irish Famine\*

Mass emigration was one key feature of the Great Irish Famine which distinguishes it from today's famines. By bringing famine victims to overseas food supplies, it undoubtedly saved many lives. Poverty traps prevented those most in need from availing of this form of relief, however. Cross-county data show that the ratio of emigration to deaths was higher in richer than in poorer counties. Another key feature of the Famine emigration was that it was irreversible. The Famine thus had a permanent impact on Ireland's population and economy, whereas typically famines only reduce population in a transitory fashion. Famine emigration spurred post-Famine emigration by eliminating poverty traps; the result was a sustained decline in the Irish population, and a convergence of living standards both within Ireland and between Ireland and the rest of the world.

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## NON-TECHNICAL SUMMARY

Mass migration was a key distinguishing feature of the Great Irish Famine of the late 1840s. All famines induce migration in search of food, but such movements are typically short-distance and temporary. By contrast, the emigration of one million people from Ireland during the Famine years was long-distance and largely irreversible. There are good reasons why the Irish experience was unique. Liberal immigration policies offered Irish famine victims options unavailable to today's Ethiopians or Somalis; and long distance travel by sea was relatively cheap.

The Irish Famine thus provides a unique opportunity to study the effects of mass migration under famine conditions. Emigration brought famine victims to available food supplies, in contrast to today's food relief programmes, which bring food to people in need. This paper highlights two other contrasts between mass migration and food relief. First, migration was an inefficient form of relief, in that those most in need were unable to afford the travel costs involved. Second, food relief programmes tend to be temporary, ending when the crisis is over. The Irish Famine emigration was, however, permanent, and thus had a permanent impact on the Irish economy.

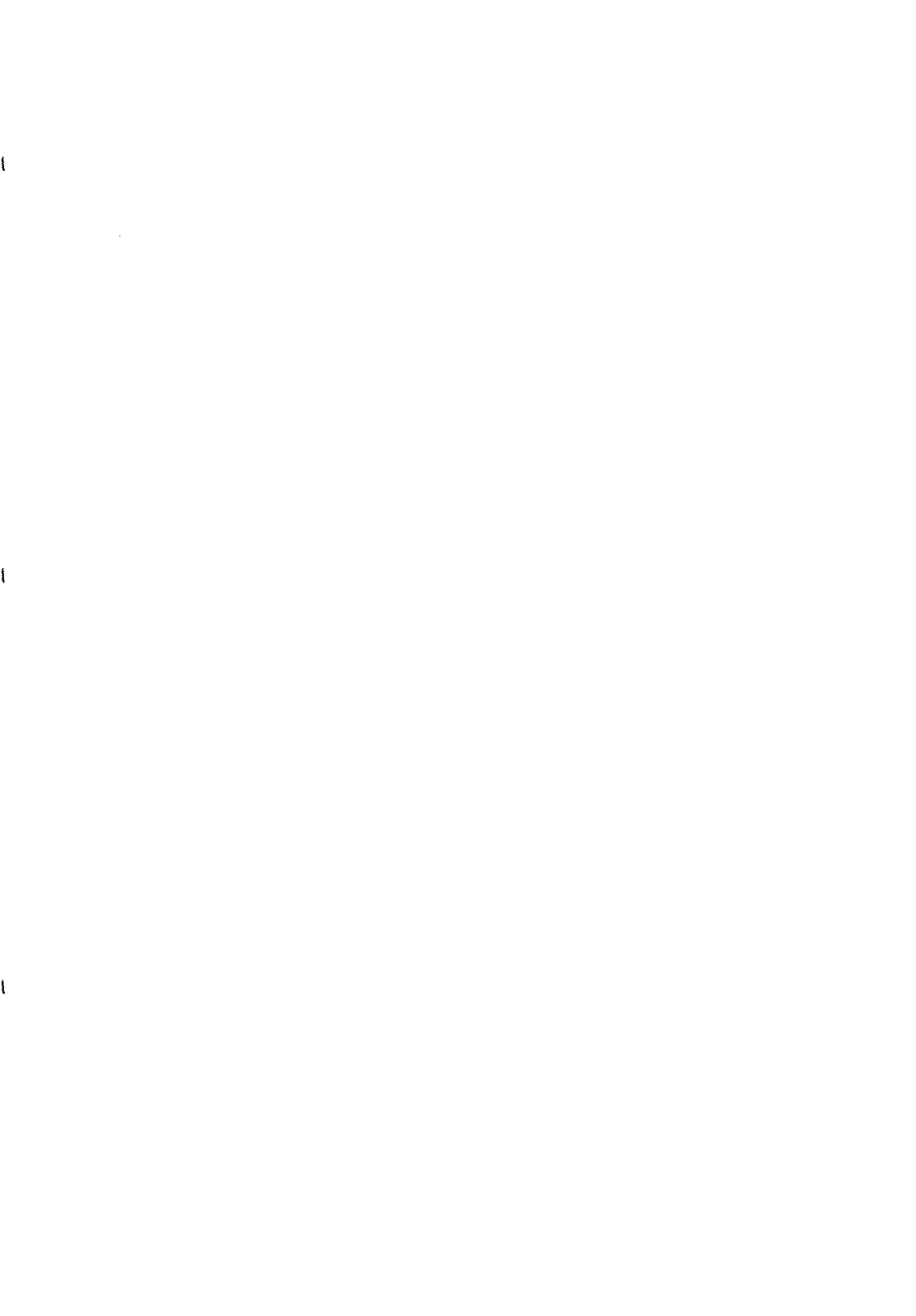
The Irish Famine has to be set in the context of debates about whether pre-Famine Ireland was over-populated or not. We doubt that a Malthusian explanation of famine is appropriate in the context of an ecological shock as huge and unforeseeable as the potato blight; but we do find cross-section evidence of a negative link between population and living standards. Using baronial data not exploited until now, we find: that baronies with higher population growth between 1821 and 1841 were poorer on the eve of the Famine; that baronies experiencing higher population loss between 1841 and 1851 experienced a higher growth in living standards during that decade; and that population loss during the Famine was lower in baronies where living standards were higher in 1841.

The costs of passage put the voyage to America beyond the reach of many of the poor. We exploit county-level data to make the point. Official statistics on emigration during the Famine are not available, at either the national or the county level. Emigration by county can be calculated from estimates of excess mortality, however, and by assuming counterfactual, no-Famine population growth rates. Not surprisingly, the poorest provinces (Connacht and Munster) had the highest emigration rates *and* the highest death rates during the crisis; but the correlation between emigration and death rates is far weaker at the

county level. Similarly, the correlation between pre-Famine living standards and death rates is far stronger than that between pre-Famine living standards and emigration rates, implying that the ratio of emigration to deaths was higher in richer counties. There is thus *prima facie* evidence that a poverty trap operated during the crisis, with the poorest being unable to avail of the emigration option. Nonetheless, excess mortality would undoubtedly have been much higher had emigration been impossible.

A second feature of the Famine migration was its permanent impact on Ireland's economy and population. Populations typically recover after famine, whereas in the Irish case the population declined continuously, from 8.5 million in 1845 to 4.2 million in 1926. This unique demographic experience can be explained by emigration, and the emigration of the Famine years is crucial in understanding the emigration which followed. Famine deaths and emigration raised land-labour ratios and wages, while Famine emigrants remitted money to relatives at home. Both forces helped eliminate the poverty traps which had prevented the poorest from emigrating before and during the Famine. While wages were only weakly (but negatively) correlated with emigration before the crisis, they were strongly and negatively correlated with emigration from 1850 on. One result of this was a convergence of living standards within post-Famine Ireland.

At an aggregate level, emigration models which have been estimated on late nineteenth century data suggest that the Famine emigration could have directly led to an extra 41,000 emigrants per year, enough to prevent Ireland's population from ever recovering. Post-Famine emigration and depopulation can explain a large proportion of the late nineteenth century convergence of Irish living standards on those in Britain and America. If the Irish Famine ended Irish poverty and overpopulation, this was due to the mass migration which distinguished it from today's famines.



MIGRATION AS DISASTER RELIEF:  
LESSONS FROM THE GREAT IRISH FAMINE

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1. INTRODUCTION
2. POVERTY AND POPULATION ON THE EVE OF THE FAMINE
3. POVERTY, EMIGRATION, AND DEATH
4. THE PERMANENT IMPACT OF THE FAMINE EMIGRATION
5. CONCLUSION

1. INTRODUCTION

Mass long-distance emigration from Ireland is an important legacy of the Great Irish Famine, and also one that distinguishes it from most historical and modern Third World famines. All famines induce people to move temporarily in search of food and in order to escape disease. Much of the movement is from rural areas into the towns, and when the worst is over most of the migrants usually return home (Sen, 1981: 98, 205; Watkins and Menken, 1985: 652; Findley, 1994). Some of the migration during the Great Irish Famine followed this pattern, as cities and bigger towns were swollen by the arrival of thousands of largely unwelcome famine migrants seeking relief or work. The huge increase between 1841 and 1851 in the percentage of Dubliners born outside of Dublin (from 27 to 39 per cent) was largely the result of the Great Famine. The inflow into the cities provoked its own problems and responses.

However, a distinction must be made between such 'local', largely temporary, movements and permanent long-distance migration. A crucial difference between the Great Irish Famine and most other famines is that for many of the Irish poor in the 1840s, mass emigration provided a welcome safety-valve. As explained in more detail later, estimates of Irish famine-induced emigration can be only approximate, but Famine emigrants certainly numbered more than half of the 1.5 million or so who

left Ireland for good between the mid-1840s and the early 1850s. The number of Irish-born persons living abroad more than doubled in that period, and the number in the United States and Canada probably increased by more than that. Though long-distance emigration was nothing new in Ireland, the vast Famine exodus was probably without precedent in European history.

The Famine migration occurred just before steamships won out over sail on the north Atlantic route. A great deal has been written about the terrible conditions and high mortality endured by Ireland's 'economic refugees' on the long crossing. Scally (1995: 218) offers an eloquent example:

The miserable epic of the Atlantic crossing in these years has been told so often and well that it hardly seems necessary to recount its dreadful details. Flanked by Skibbereen and Grosse Isle at either end of the voyage, the 'coffin ship' stands as the central panel of the famine triptych, depicting bondage and fever in the steerage, wailing children and mothers' pleas from the darkness below decks, heartless captains and brutal crews, shipwreck, pestilence, and burial at sea. In its own smaller scale, the memory of the emigrant steerage has long been held, like the slaves' 'middle passage' and the trains of the Holocaust, as an icon in Ireland's oppression.

Such accounts are reminders of the harsh conditions faced by most passengers, and of the exploitation endured by some of them at the hands of unscrupulous shipowners and agents en route. But they hide the reality that most Irish emigrants made it safely to the other side during the Famine years. Raymond Cohn (1984, 1987) has inferred migrant mortality on the passage between Europe and New York between 1836 and 1853 from a sample of contemporary passenger lists. What is most remarkable about his findings is that neither the Irish as a group nor the famine years stand out: the record of German ships in 1847 and 1848 was much worse, and curiously 1849, not 1847, produced the highest mortality overall. Cholera was presumably responsible for the high mortality in 1849. In Table 1 Irish ports and Liverpool represent Irish emigrants. While the death rate out of Liverpool was higher in 1847-8 than in 1845-6, the mean mortality rate was still less than two per cent. Whether the high mortality out of Irish ports in 1852 reflects a 'rogue' small sample (two ships) deserves



further checking.

Other data, it is true, highlight Black 1847, and mortality among poorer passengers who chose ships bound for Maritime and Canadian destinations (who accounted for nearly half of the Irish who crossed the Atlantic in Black '47, but only 10-15 per cent thereafter) was higher than those bound for New York. Cohn's numbers exclude ships that sank or turned back and unrecorded deaths on board. Still, his results suggest that Mokyr's assessment of the overall death rate on the north Atlantic passage - 'five per cent of the total overseas migration at the most' - is not far from the truth (Mokyr, 1985: 267-8). In the sometimes chaotic circumstances, the outcome is an impressive achievement.

On arrival, the prospects facing the typical Irish immigrant were unskilled labour and sium accommodation in the big cities. Yet surely the fundamental comparative point to make here is that most migrants survived the passage and that many of today's famine victims would welcome such prospects in North America, Japan, or western Europe.

The Famine migration raises many questions, the most obvious being to what extent it reduced Famine mortality. A key issue here is the extent to which a poverty trap operated: the really poor, who were most vulnerable during the Famine, and who most needed to emigrate, were less likely to be able to afford the voyage than their better-off neighbours. In fact, several considerations suggest that emigration may have provided a more effective safety valve than would be possible today. First, it occurred during that 'liberal interlude' when the international movement of labour was freer than ever before or since. Second, it occurred at a time when long-distance travel by sea was relatively cheap. A steerage passage from Ireland to Britain could be had for a few shillings and to one of the Canadian maritime ports - the least expensive transatlantic route - for a few pounds. True, £3 or £4 still amounted to one-third or one-half of an unskilled worker's yearly wages or a similar fraction of pre-famine income per capita (compare Mokyr, 1985: 10), and this must have ruled out long-distance migration for the most destitute; but long-distance travel for the poorest of the poor is relatively more expensive today. Table 2 makes the point clearly: one-way airfares from Addis Abbaba, Mogadishu or Khartoum to

London or New York are multiples of income per capita in Ethiopia, Somalia or Sudan, rather than fractions, as was true in the Irish case. Nonetheless, and in particular despite the possibility of very cheap fares to Britain, a poverty trap did probably prevent emigration from being an efficient form of famine relief. Section 3 tries to verify this intuition using the available cross-county data, and speculates on the contribution which emigration *did* make to reducing excess mortality during the Famine.

Long-distance emigration differs from food relief in another crucial respect: it is irreversible. In modern famines, food is shipped to the hungry, and when famine retreats, outside food shipments cease. In the Irish case, the hungry went to where the food was, and they never returned. The famine thus had a permanent impact on the Irish economy, whereas other famines leave a more transitory imprint on the societies which they afflict. Section 4 deals at length with the long run demographic and economic consequences of the Irish Famine emigration.

## 2. POVERTY AND POPULATION ON THE EVE OF THE FAMINE

A few words first on the Great Famine's context. How did Irish incomes in the early 1840s compare with those in the Third World today? Only the crudest answer is possible. However, Irish economic historians believe that average income in Ireland just before the Famine was somewhat less than half of that in Great Britain, and British economic historians estimate that incomes in Britain have increased eight- or tenfold between then and now. In the late 1980s, moreover, the average purchasing power of incomes in Ethiopia was about 2.8 percent of Great Britain's, and in Somalia about 6.6 percent (Summers and Heston, 1991: Table 2). Taken together, these numbers indicate that Irish living standards on the eve of the Great Famine lay somewhere between those of Ethiopia and of Somalia a few years ago, though closer to Somalia's (Ó Gráda, 1995).

Much of the recent discussion about the Irish economy before the Famine seeks to answer the question, 'Was Malthus Right?'. In 1817, Malthus wrote, in a letter to Ricardo, that "the land in Ireland is infinitely more peopled than in England; and to give full effect to the natural resources of the country a great part of the population should be

swept away from the soil".<sup>1</sup> Although Malthus subsequently qualified this position, the notion that Ireland's poverty was a result of overpopulation took a firm hold in British policy-making circles: after all, Ireland's population had grown from 5 million c. 1800 to 8.2 million in 1841 (Mokyr and Ó Gráda, 1984). Politically, the Irish Famine and Irish emigration have to be viewed in the context of this debate. British political economists favoured emigration as a solution to Ireland's problems; and when the Famine came, they regarded it as an inevitable consequence of Ireland's failure to adopt preventive checks (such as emigration, or a lowering of the fertility rate). This belief clearly influenced the British government's attitude towards famine relief during the crisis.

Mokyr's (1985) answer to the question exploited the county-level data offered by a range of pre-famine social and statistical surveys. The thirty-two counties provided a convenient cross-section for econometric analysis, just large enough for conventional statistical inference. To his surprise Mokyr failed to find any strong connection between land hunger and living standards on the eve of the Famine. That result, and the rather weak association between excess mortality during the Famine and variables such as the land-labour ratio and potato consumption, suggested, controversially, a rejection of traditional Malthusian interpretations of Irish poverty and the Famine.

A finer grid, previously unexploited, is provided by baronial data.<sup>2</sup> The barony is an obsolete administrative unit introduced in Elizabethan times; at the time of the Famine Ireland was divided into 327 of them. The following correlation matrices and regression estimates are based on a subset of 305 baronies, for whom good data are available. The descriptive statistics in Table 3, grouped below by province, show Leinster to have been the richest province in 1841, followed by Ulster, Munster, and Connacht. Living standards are captured by indices of housing quality (the proportion of households not living in fourth-class accommodation) and literacy (the proportion of people who could at least read) in the 1841

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<sup>1</sup> Cited in Mokyr (1985, p. 38).

<sup>2</sup> The following few paragraphs are based on Ó Gráda (1995a).

census, and by the poor law valuation, as reported in the 1851 census, divided by the 1841 population. Since land dominated the poor law valuation, the last of these proxies amounts to a measure of quality-adjusted land per head.

The human cost of the Famine, measured by population loss between 1841 and 1851, was greatest in Connacht and least in Ulster.<sup>3</sup> Table 4 correlates this measure with living standards indicators: the variables used are

- population in 1821, 1841, and 1851 (POP)
- GOODH, the proportion of families not relying on fourth-class housing.
- LIT, the proportion of the population which could at least read
- AVPLV, poor law valuation per capita divided by population in 1841
- DLIT = LIT51-LIT41
- DGOODH = GOODH51-GOOD41
- DPOP4151 = POP51-POP41
- DPOP2141 = POP41-POP21
- SEA, a dummy variable set equal to one for coastal baronies

The results suggest

- (a) a positive association between our different measures of living standards in 1841 and population change in 1841-51.
- (b) a negative association between improvements in living standards in 1841-51 and population change in the same decade.
- (c) a negative association between population growth before the Famine (1821-41) and living standards on the eve of the Famine.
- (d) some sign of a convergence in living standards, in the negative correlations between our proxies for living standards in 1841 and changes in living standards during the Famine decade.

Only one of the measures of living standards on the eve of the Famine

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<sup>3</sup> Mokyř used excess mortality rates, but these cannot be calculated at the baronial level.

(the poor law valuation per head) comes close to capturing Mokyr's land-based proxies for population pressure. Still, the findings reported in Table 4 are consistent with a loosely Malthusian perspective on the crisis. They imply that the Famine struck hardest in the poorest baronies, and the increase in living standards that followed was greatest where population loss was greatest. Moreover, population growth before the Famine was associated with poverty in 1841, if not impoverishment (on which we lack data at the baronial level).

Regression analysis of population change during the Famine refines these findings somewhat. Our focus is on the effect of living standards on the eve of the famine on the gravity of the famine at baronial level. Table 5 reports the results; the dependent variable throughout is DPOP4151. Regressions {1}-{3} describe the explanatory power of GOODH, AVPLV, and LIT on DPOP4151, controlling for coastal location. These proxies are not perfect correlates, and including two of them in {4} increases explanatory power. It is interesting to note that adding DPOP2141 fails to support the belief that counties with higher population growth before the Famine had higher population declines during the 1840s. By and large, high population growth before the Famine meant high population growth in its wake. In general baronies with a sea boundary fared better, after controlling for poverty on the eve of the Famine, suggesting that access to fish, sea-shells and seaweed mattered during the crisis.

The key point to take from the table is however that the poorest baronies were the worst hit during the Famine, in line with Malthusian thinking. Indeed, one does not need to delve into the baronial records to reach this conclusion, at least if by 'Malthusian' one means the notion that poverty (as opposed to the land-labor ratio) was associated with Famine mortality. Regressing Famine excess mortality rates (by county) against wages in 1836 yields the following result (both variables are in log form):<sup>4</sup>

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<sup>4</sup> The wage data were generously provided by Liam Kennedy. The excess mortality data are as described in Section 3. County Dublin was omitted from the regression, for reasons given in Section 3.

$$\begin{array}{l} \text{LDEATH} = 2.84 - 2.24 * \text{LWAGE} \quad R^2 = 0.69 \quad (1) \\ (4.45) \quad (-7.98) \quad F(1,29) = 63.62 \end{array}$$

Pre-Famine poverty was clearly associated with suffering during the Famine. Do other Malthusian intuitions also hold up? Did emigration provide a safety valve, in the sense that death rates were lower where emigration rates were higher? And to what extent did poverty traps prevent emigration from reducing death rates in the poorest counties? Was emigration higher from poor counties, as standard migration models suggest, or was it the rich who managed to escape to the New World? We turn to these questions in the next section.

### 3. POVERTY, EMIGRATION, AND DEATH

Welfare assessments of Irish emigration have often dwelt on the human capital characteristics of those who left relative to those who stayed behind. It is certainly true that emigration in normal times was age-selective: young single adults had the most to gain from emigrating, and they were disproportionately represented in the flow. This implied a 'life cycle' loss for Ireland (and the rest of Europe), and a 'life cycle' gain for the New World, as Ireland lost the productive capacity of children she had reared, and the New World gained 'instant adults'.

Was emigration selective in other ways as well? Both theory and the available evidence are elusive. If poor countries have a higher ratio of unskilled labour to skilled labour than rich countries, then standard Heckscher-Ohlin logic suggests that the unskilled should have the greater incentive to migrate. Taking into account the fixed cost of migration makes the outcome uncertain, however, as skilled emigrants may gain more in *absolute* terms. If emigrants' skills are initially unobservable to foreign employers, or there are segmented labour markets in the host country, with immigrants consigned to low-level jobs, then unskilled workers may again have a greater incentive to migrate.<sup>5</sup> The evidence on the skill composition of Irish emigrants is ambiguous. Mokyr and Ó Gráda

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<sup>5</sup> On the first point, see Katz and Stark (1989).

(1982) examine the numeracy, or what Mokyr (1985: 244) has called the 'quantitative sophistication', of the migrants by calculating the degree of age-heaping in the passenger lists. Age-heaping refers to the tendency for responses to questions about age to concentrate on rounded estimates, and in particular on the nearest zero (20, 30, and so on). Their results suggest that, if anything, pre-Famine emigrants were *less* numerate, and thus less educated, than the population as a whole. On the other hand, Nicholas and Shergold (1987) come to the opposite conclusion, based on literacy and occupational data for Irish convicts in Australia, shipped from Ireland and from Britain.

What about the quality of emigrants within given skill categories? A *priori* reasoning suggests that in normal times, workers with 'drive' are more likely to emigrate than the more risk-averse, or workers with a higher preference for leisure.<sup>6</sup> Of course, this intuition is impossible to test, although there is no shortage of anecdotal evidence. In short, there is some reason to believe that in good times, when emigration was determined by the 'pull' of the New World, the quality of emigrants was likely to be high. During the Famine, on the other hand, the opposite might be expected to be the case, as the most vulnerable fled the crisis. There is some direct evidence that this was in fact the case. In March 1847, in a frequently cited passage (e.g. Handlin, 1941: 55), the *Cork Examiner* noted that 'the emigrants of this year are not like those of former ones; they are now actually *running* away from fever and disease and hunger, with money scarcely sufficient to pay passage for and find food for the voyage'. The analysis of lists of New York-bound Irish emigrants offers some clues here (Glazier et al., 1989; Ó Gráda, 1983). First, it suggests a sharp drop in the share of unaccompanied passengers during the Famine. This, and the accompanying shift in the age composition of the migration, reflects the more family-oriented character of Famine migration. The share of females in the migrant outflow was largely unaffected by the Famine, however.<sup>7</sup>

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<sup>6</sup> On the latter point, see O'Rourke (1992).

<sup>7</sup> A remarkable feature of the Famine emigration is that women were about as likely as men to 'better themselves' through leaving, a pattern that has endured in Ireland till today. In the Third World today crisis migrations

Occupational data suggest little change either: both before and during the Famine unskilled categories such as labourers and servants accounted for over three-fifths of the total. But another important difference is that the shares of the worst-hit provinces of Connacht and Munster rose significantly (compare Handlin, 1941: 56).

The increase in the proportion of children and older people means a lower 'life-cycle' gain from immigration to host countries. The occupational spread suggests no deterioration, however. Other clues about the relative 'quality' of the Famine migrants are scarce. Table 6 reports the outcome of an analysis of age-heaping in Boston passenger lists in 1822-39, and in New York passenger lists just before and during the Famine. There are many indices of age-heaping. Table 6(b) below relies on the simplest of all: the ratio of migrants reporting their ages at 20, 30, and 40 to those reporting ages of 20-4, 30-4, and 40-4 years, respectively. The value of this index can range from 0.20 (no age-heaping) to 1.00 (complete age-heaping). The trends in each category in Table 6(b) show little difference between 1820-39 and 1846-1850 except in the 20-24 year category, where a deterioration is indicated. On the other hand, there is little sign in the passenger lists of a drop in emigrant quality during the Famine period.

Another hint of emigrant 'quality' during the Famine is provided by Ferrie (1994, 1995), who interprets the results of his analysis of the wealth accumulation, between 1850 and 1860, of European immigrants landing in New York in the 1840s as evidence of the 'flexibility' and 'adaptability' of both the immigrants and U.S. economy. The Irish fit the claim in the sense that though they remained the poorest group in 1860, as they had been in 1850, they had converged on the British and Germans in a relative sense (Table 7). Nevertheless, the absolute gap in terms of real estate wealth between them and German and British emigrants was wider in 1860 than in 1850, and the gap between the Irish and British in both years was wider than the gap between British and Irish income per capita. The

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typically involve adult males; some abandon their families, but most offer a crucial lifeline in terms of remittances (Drèze and Sen, 1989: 77-9).



Irish were also slowest to make the occupational transition between labourer and non-labourer.

In Table 8 below, reproduced from Ferrie (1994), the dependent variable is the natural logarithm of real estate wealth plus \$1 (to account for individuals with zero wealth). The outcome highlights the disadvantage of the Irish on arrival. It also indicates that passengers arriving in 1846-8 (among whom the Irish were presumably especially numerous) were less wealthy than other immigrants, after controlling for age and duration in the U.S. The effect is statistically weak, however, and the impact of duration in the U.S. is still positive after accounting for this cohort effect. Ferrie's analysis is not however directed at the effect of the Famine on migrant quality, and lacks the interaction terms needed to pinpoint such an effect.

The evidence above suggests that the Famine emigration was qualitatively different than emigration in normal times: it was less age-selective, the migrants were lower skilled, and they did less well than might otherwise have been expected when they reached the United States. However, the migrants were not the very poorest or the worst affected by the potato failure. Most of them relied on their own resources in funding their emigration; perhaps fifty thousand of nearly a million were assisted by landlords or the state (McDonagh, 1956: 335; Fitzpatrick, 1984: 20). This implies that the very poorest, those with no savings or goodwill to capitalize on, could not travel. The implication is that the receiving countries were not getting the paupers.

Though data on the socio-economic backgrounds of those who died and those who emigrated are lacking, it seems fair to assume that the latter were mostly people of some modest means. For most of the landless poor, with no savings or compensation for eviction to fall back on, the cost of a passage would have been too high. An account in the *Freeman's Journal* (8 May 1847) of a Roscommon woman who had sought refuge for herself and six children in a night asylum in Dublin, is interesting in this respect. She had been put into custody by the keeper for failing to account for a large sum of money in her possession. The magistrate evinced surprise at the family's condition, 'while she had so much money about her'. The following

is the woman's account:

She lived in the county Roscommon, and her husband held about ten acres of land, but he died last Shrovetide; she had no means of sowing a crop, and she gave up the place to a collector of poor rate, who gave her £15 for it; she got £5 for a mare, and £4 for a cow, 10s. for a cart and harrow, and more money for other things, and this made up all she had; she was about going to America, but she would not be taken with her children for less than £27.

When her eldest boy, a thirteen-year old, corroborated her story, the magistrate deemed it 'evidently true', and discharged her.

To what extent can we generalise from stories such as this one? One approach is to turn yet again to the cross-section evidence, and this first requires us to compute emigration rates across counties. Easier said than done! True, we have censal estimates of population in 1831, 1841, and 1851, and we have Cousens' (1960) estimates of excess mortality by county. The latter are problematic, alas. Cousens' gave a national total for excess mortality of only 800,000, whereas more recent estimates have opted for a higher figure of one million. But not only is Cousens' aggregate too low; his strategy of combining recorded deaths in institutions and deaths in households as retrospectively recorded in 1851 lends an unknown bias to the cross-county variation in his data. On the one hand, emigrant families were not around in 1851 to report earlier deaths in their households. On the other, under-reporting is likely to have been greater in poorer counties. Nevertheless, the exercise which follows relies on Cousens' county estimates of excess mortality, scaled up uniformly by 25%.

To derive an estimate of emigration between 1841 and 1851, it is necessary to guess what the 1851 population would have been in the absence of the Famine. A reasonable guess might be that the national population would have grown at 0.5% p.a. between 1841 and 1851, had the potato blight not intervened.<sup>8</sup> However, population growth would not have been uniform across counties. Between 1831 and 1841, population growth per annum ranged from a high of 1.1% in Kerry to a low of 0% in Derry. Remarkably, the

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<sup>8</sup> The population had grown at just over this rate during the previous decade.

official figures show Dublin's population *shrinking* at 0.1% p.a.! Because Dublin's unusual demographic experience (it experienced substantial immigration during the Famine years) make it a substantial outlier, it is not included in the correlation exercises which follow.

We therefore adopt the expedient approach of first assuming that county populations would have continued to grow between 1841 and 1851 at the same rate as they had between 1831 and 1841. This implied a counterfactual national population in 1851 of just over 8.6 million. We then scaled down each county population estimate for 1851, so that the national total was just *under* 8.6 million, as would have been the case if the national population growth rate was 0.5% p.a.

This procedure gave county estimates of counterfactual, 'no-Famine' populations in 1851. From these totals we subtracted the actual 1851 population figures. The difference was taken to be due to either emigration or excess mortality. Subtracting the adjusted excess mortality figures thus gave an estimate of emigration by county during the decade.<sup>9</sup> The implied provincial emigration and death rates are given in Table 9. The numbers are consistent with qualitative accounts: Connacht was most severely affected by the potato blight, followed closely by Munster, with Leinster and Ulster being the least affected. Interestingly, the data show Leinster's death rate being higher than Ulster's (as expected), but Ulster's emigration rates being higher than Leinster's. Otherwise, the ranking of provinces by death rates is the same as that by emigration rates.

However, as Table 10 shows, the correlation between emigration and death rates is not strong across counties. Consequently, counties such as Clare and Galway, with high death rates, also tended to have a low ratio of emigration to deaths (Figure 1). There is a strong negative correlation between these variables (Table 10), consistent with the notion that it was not the poorest who emigrated. To explore this possibility further, county-level emigration and death rates are correlated with a number of variables indicating living standards and vulnerability on the eve of the

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<sup>9</sup> More precisely, the estimates are of *excess* emigration by county; i.e., of emigration above pre-Famine rates.

Famine.

Table 11 gives the results. Not surprisingly, counties with low wages, a high dependency on the potato (as measured by 1841 acres per capita) and a large drop in the potato acreage, had higher death and emigration rates (Figure 2). However, the relationship between potato dependency and emigration was almost non-existent. Interestingly, the relationship between wages and death rates was far stronger than the link between death rates and any of the potato variables.<sup>10</sup> Once again, in richer counties, the ratio of emigration to deaths was higher than in poor counties, again supporting the intuition that the poorest died rather than emigrated (Figure 3).<sup>11</sup>

Emigration was thus an inefficient form of Famine relief: it did not help those most at risk. Nonetheless, without the emigration option, Famine mortality would surely have been higher.<sup>12</sup> It is unlikely, though not inconceivable, that the absence of distant outlets for emigration would have increased mortality by more than the number of frustrated would-be emigrants. A more plausible outcome would be the death of a fraction of those forced to remain. In addition, some migration would be diverted to the already crowded cities of Ireland and Great Britain. The negative externalities through the spread of disease and misery resulting from such

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<sup>10</sup> Adding potato variables to equation (1) above adds nothing to the regression: these variables are completely swamped by the wage variable, are completely insignificant, and in some cases have the wrong sign.

<sup>11</sup> As a partial check on the sensitivity of our results to the emigration estimates, we also calculated emigration rates on the assumption that 200,000 births were averted during the crisis. These averted births have to be subtracted from our emigration estimates; the averted births were allocated between counties in proportion to deaths, and emigration figures were again calculated as residuals. On these assumptions, the correlation between emigration and deaths was  $-0.015$ , and the correlation between emigration and the emigration/death ratio was  $0.726$ . Emigration was more weakly correlated with the explanatory variables in Table 11 than before; otherwise the results were unaffected.

<sup>12</sup> We ran the regression in equation (1), adding the log of the emigration rate to the right hand side. Controlling for wages, the partial impact of emigration on death rates was indeed negative, although the elasticity was low (0.1) and the coefficient only weakly significant (a  $t$ -ratio of  $-1.13$ ). In addition, there is clearly a great deal of simultaneity in the data, which is why we do not want to lean on this analysis in the text.

migration are impossible to calculate, but should be borne in mind.<sup>13</sup>

#### 4. THE PERMANENT IMPACT OF THE FAMINE EMIGRATION

Malthusian theory traditionally assigned an important role to famines in helping to regulate population. In the absence of the preventive check, population would grow to the point where positive checks such as higher infant mortality or disease became inevitable. If these failed, famine provided the ultimate sanction. As mentioned earlier, this attitude informed much contemporary British opinion regarding 19th century Ireland. Ireland's poverty was due to overpopulation; famine, while regrettable, was inevitable.

In an important paper, Susan Watkins and Jane Menken (1985) argue that, contrary to Malthusian doctrine, famines do not have important long run demographic effects. Surveying historical and contemporary famines, they conclude that mortality does not rise by as much, and fertility does not fall by as much, during famines as is commonly thought; moreover, severe famines have been relatively infrequent. The heart of their paper is a simulation of the long run demographic consequences of famine using demographic parameters typical of Asian society ('high mortality, early and virtually universal marriage, and relatively moderate fertility', p. 658). The authors allow for excess mortality rates during famines which vary by age cohort, and trace out the implications for the long run evolution of a population. The striking finding is that even severe famines have only a small impact on population in the long run. For example, in a population with an initial growth rate of 0.5% p.a., which experiences a famine involving mortality rates 110% higher than normal, and birth rates one-third lower than normal, for a period of two years, population returns to its original level less than twelve years after the crisis (p.660). However, if mortality rates are 150% above average for 5 years, it takes 50 years for the population to regain its original level.

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<sup>13</sup> Ó Gráda (1995b) shows that mortality rates increased in Dublin during the Famine, following the influx of immigrants from the countryside. For an analysis of how the Famine emigration affected Lancashire, see Neal (1995).

The point can be illustrated by the 'no emigration' line in Figure 4, which takes the Irish population on the eve of the Famine as 8.5 million. Excess mortality was one million, and was largely over by 1851. Imagine that birth rates declined enough during the crisis to reduce population growth, net of excess mortality, to zero during the six years; and imagine a world without emigration. Assume further (and implausibly) that excess mortality would have remained the same in the absence of emigration. Population would then have been 7.5 million in 1851. If excess mortality had affected all age cohorts equally, population growth would simply have resumed at its pre-1845 rate in 1851. At this rate, population would have recovered by 1877, 32 years after the onset of the crisis.

Moreover, if one allows for excess mortality to vary by age cohort, as Watkins and Menken do, and as was surely the case, then it would have taken even less time for the Irish population to recover. The reason is simple, and is highlighted by Watkins' and Menken's simulations. During famines, the old and the young are more likely to die than adults of child-bearing age: the share of the latter group in the total population thus increases. In reality, therefore, after famines have passed, given age-specific fertility rates translate into higher birth rates for the population as a whole; and this implies a higher population growth rate post-famine than pre-famine. This age cohort effect alone can make a big difference to the time to recovery. In the four experiments presented in their Table 3, not allowing for excess mortality to vary by age group increases the time to recovery by 5%, 50%, 66% and 69%.

Furthermore, these simulations assume that age-specific fertility and mortality rates return to normal after the famine; whereas unless famine forces a shift in preferences, mortality rates should decline and fertility rates increase as Malthusian pressures ease. Again, allowing for these typical responses to famines would speed up post-famine population growth rates, and lower the time to recovery; as would relaxing the assumption that the population growth rate, net of excess mortality, fell to zero during the crisis. Taking all these factors into account, Ireland's population might have recovered in 15 or twenty years, rather than the 32 years suggested by Figure 4, had it behaved in a 'normal' fashion. The

one, important, consideration which works in the opposite direction is the assumption in this no-emigration counterfactual that excess mortality would have been the same in the absence of Famine emigration. Presumably excess mortality would in fact have exceeded one million in this case, as the previous section suggested.

In any event, the general point is clear enough. In economies without labour market links to the rest of the world, famines do not generally have long-lasting effects on population. Figure 4 tells us immediately that Ireland was a very different case indeed. Far from returning gradually to pre-Famine levels, Ireland's population actually entered into a steady decline, which in the 26 counties of the present-day Republic of Ireland persisted until 1961. The Great Famine's effects on Ireland's population were clearly permanent, rather than transitory, and emigration holds the key to understanding this.

Clearly the emigration which took place during the famine -- about one million people left -- contributed directly to long run population loss; but it is the sustained emigration which followed that explains the perverse Irish population decline. However, this post-Famine emigration was intimately linked to the Famine, for at least two reasons.

First, by increasing land-labour ratios the Famine eliminated the poverty trap which had prevented people from the poorer parts of Ireland from emigrating before 1845. This argument is consistent with the general view of European emigration presented by Hatton and Williamson (1994). They note that emigration rates rise during the course of development, before falling again, despite the fact that the initial development should have made emigration less attractive. The explanation is straightforward: initially potential migrants were too poor to afford the costs of migration. With growth, this poverty trap was overcome; path dependence ensured that an initial burst of emigration would lead to ever-increasing levels of emigration; only eventually would rising wages choke off the demand for emigration.

In Ireland, many victims of this poverty trap died during the Famine, while many of those who were slightly better off were forced to emigrate. These developments of course implied higher wages post-Famine; furthermore,

relatives and friends in the US or elsewhere could now make information and money available to potential emigrants. Emigration became available to all, and Irish living standards began to increase rapidly. Boyer et al. (1994) estimate that real agricultural wages doubled between 1860 and 1913; moreover Irish wages converged on their British counterparts. Williamson (1995) estimates that unskilled building wages were 51% as high in Ireland as in Britain in 1852, but 93% as high in 1904, a finding echoed by Boyer et al.

To check the notion that the Famine helped overcome the poverty traps which had constrained pre-Famine emigration, we examined the inter-county variation in net migration rates before and after the Famine. Since reliable net migration statistics are lacking, we proxied migration by age-cohort depletion: we chose the reduction in the 5-15 year-old age-cohort between 1821 and 1841, 1851 and 1871, and 1871 and 1891. We then correlated the loss across counties with estimates of the unskilled wage, and also calculated the elasticity of the migration rate with respect to the wage. The outcome, seen in Table 12 below, suggests a significant difference between pre- and post-Famine patterns. Before the Famine, emigration was only weakly correlated with wages, and the wage-emigration elasticity was low, suggesting that it was not necessarily the poorest who were emigrating. After the Famine, wages and emigration were strongly and negatively correlated, and wage-emigration elasticities were high.<sup>14</sup> Convergence on living standards overseas was accompanied by internal convergence: the coefficient of variation across counties of wages was 0.175 in 1835, 0.154 in 1836, 0.156 in 1850, 0.121 in 1860, 0.109 in 1870, 0.166 in 1880, 0.116 in 1893, and 0.075 in 1911. The 1880 figure may be an aberration; that observation apart, the picture is one of steady convergence after the Famine.<sup>15</sup>

The second way in which the Famine contributed to subsequent

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<sup>14</sup> Hatton and Williamson (1993) also find that it was the poorest who left after the famine, in a multiple regression framework.

<sup>15</sup> The wage data are taken from Bowley (1899) and Fitzpatrick (1980), except for 1836, for which we thank Liam Kennedy. Bowley's 1870 estimates for Clare and Roscommon were replaced by more plausible numbers.



emigration is that emigration directly begets further emigration: there is a powerful path dependency at work here. This point is illustrated by the econometric work of Hatton and Williamson (1993), who estimate a time series model of Irish emigration over the period 1877-1913. The model is based on utility-maximising microfoundations, and assumes risk-aversion on the part of migrants. Thus, while relative wages are key for long run migration, the timing of migration will be largely influenced by unemployment rates. Moreover, risk aversion implies that unemployment rates and relative wages should be entered separately into the equation, in contrast to the expected wage approach of Todaro (1969) and others. Finally, the model includes a migrant stock term, to capture the 'friends and relatives' effect: prior migration makes current migration less costly (in terms of places to stay, flows of information, and remittances) and thus more common. This of course implies path dependence. The model estimated is:

$$\begin{aligned}
 M/P_t = & \alpha_0 + \alpha_1 \Delta \log(EF)_t + \alpha_2 \Delta \log(EH)_t + \alpha_3 \Delta \log(W)_t \\
 & + \alpha_4 \log(EF)_{t-1} + \alpha_5 \log(EH)_{t-1} + \alpha_6 \log(W)_{t-1} \\
 & + \alpha_7 (MS/P)_t + \alpha_8 (M/P)_{t-1} \qquad (2)
 \end{aligned}$$

where M/P is the emigration rate (emigrants divided by population), EF and EH are the foreign and home employment rates, W is the ratio of foreign to domestic wages, and MS is the stock of previous migrants.

Hatton and Williamson find that emigration responded strongly to relative wages, and to the foreign unemployment rate. More importantly for our present purposes, they also find strong evidence of path-dependence: after controlling for the influence of wages and employment, for every 1000 previous migrants, an extra 41 were attracted overseas each year.

The Famine directly led to at least one million people emigrating. The Hatton-Williamson results imply that this shock alone might have implied as many as 41,000 extra migrants per annum. The Irish population was roughly 6.5 million in 1851; the path dependence effect alone might have boosted the emigration rate by 6 (i.e. 41,000 divided by 6,500) per thousand per annum, which is in fact the amount by which average post-

Famine emigration rates (13) exceeded pre-Famine rates (7).<sup>16</sup> The Famine was crucial to subsequent high emigration rates.

This extra post-Famine emigration is by itself sufficient to explain the failure of Ireland's population to revert to its original level. The 'post-famine emigration' line in Figure 4 assumes, as does the 'no emigration' line, that birth and death rates on their own would have led to the population growing at 0.5% p.a. However, it now lets emigration take place at the rate of 41,000 per year, the figure suggested by the Hatton-Williamson exercise. This emigration places a sufficient drag on the overall population to ensure that population continues to decline after 1851, rather than increase to its original level. Allowing both for this level of post-Famine emigration, and the Famine emigration itself (the 'Famine emigration' line in Figure 4) brings us a lot closer to what actually happened to the Irish population. Add in the levels of emigration that would have taken place even had the famine not occurred, and the long run evolution of Ireland's population, so different from the Watkins-Menken norm, no longer seems perverse.

Furthermore, the assumption of Watkins and Menken that birth rates would revert to their pre-famine norm, or even increase, after the crisis, did not apply in Ireland. The lack of civil registration and the likely underenumeration of very young children in the census rule out firm estimates of post-famine birth rates. However, the drop in the proportion of children aged 0-4 years in the total population from 12.6% in 1841, to 12.0% in 1861, and 11.1% in 1881 is indicative of a *decline* in birth rates. The rise in the percentage of never-married Irishwomen aged 45-54 years from 12.5% in 1841 to 14.3% in 1861 and 17.1% in 1881 is corroborative. And this helps further explain the drop in Ireland's population. One might imagine a fifth line on Figure 4, somewhere in between the lower 2, which incorporates the fact that the 'no-emigration' natural population growth rate was lower than it would otherwise be.

In conclusion, the Famine does appear to have put an end to Irish 'overpopulation', in the sense that most survivors experienced higher and

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<sup>16</sup> For the pre-Famine figure, see Mokyr (1985, p. 35); for the post-Famine period, see Hatton and Williamson (1993, p. 575).

increasing living standards. However, this is in large part due to the mass emigration associated with the famine and its aftermath: Boyer *et al.* (1994) conclude that perhaps half of the Irish convergence on Britain can be explained by Irish emigration, while O'Rourke and Williamson (1996) argue that the *entire* Irish convergence on Britain and America can be explained by mass migration, a dubious distinction Ireland shares with Italy. Watkins' and Menken's work is a reminder that in the absence of emigration, Ireland's population might well have recovered from the crisis, however slowly, as has been the experience elsewhere.

## 5. CONCLUSIONS

Emigration was by no means an ideal substitute for other forms of famine relief on the 1840s. Because only a tiny fraction of the emigration was state-assisted or landlord-assisted, those who could afford to emigrate were not those at greatest immediate risk from starvation. The timing of the migration -- heavier after than during Black '47 -- also suggests that it was not ideally tailored to relieve the worst-hit. In the words of Robert Murray, general manager of the Provincial Bank of Ireland, in 1847, 'the best go, the worst remain',<sup>17</sup>

Still, emigration reduced famine mortality. Moreover, few of the emigrants returned when the crisis had passed, suggesting an asymmetry with other forms of disaster relief. While emigration did not target the poor as effectively as soup-kitchens or the public works, unlike them, its effect went well beyond mere crisis-management. The Famine emigration has often been seen as one of the great tragedies in Irish history, and in human terms this is of course correct. Nonetheless, in the long run this emigration played an important role in increasing the living standards of those who stayed behind.

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<sup>17</sup> Cited in Black (1960), p. 229.

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Table 1. Mortality on New-York bound ships, 1847-1853

Year	(a) Irish ports		(b) Liverpool		(c) France		(d) Germany		(e) London	
	MR	Obs.	MR	Obs.	MR	Obs.	MR	Obs.	MR	Obs.
1845	-	-	0.76	13	0.61	8	0.96	5	3.57	1
1846	-	-	0.91	18	1.18	11	1.07	13	1.28	5
1847	1.33	5	1.73	17	0.83	6	3.77	5	1.09	3
1848	2.74	5	1.36	34	1.35	11	3.36	2	1.04	2
1849	3.36	14	3.33	47	1.74	7	1.51	8	0.56	1
1850	1.16	7	1.54	50	0.55	3	4.41	3	1.89	2
1851	0.67	16	1.28	78	0.79	12	1.05	8	0.52	8
1852	3.59	2	0.88	67	0.74	16	0.55	5	0.96	12
1853	0.62	5	1.73	54	1.30	18	1.01	27	1.23	10

Source: Ó Gráda (1995a).

Table 2. Modern transport costs

	Ethiopia	Somalia	Sudan
GDP per capita, 1989-1991 (\$)	133	116	567
One-way fare to London (\$)	997	1130	690
One-way fare to New York (\$)	1089	1529	1529

Source: UN Statistical Yearbook 1992 (New York, 1994); UCD Travel Office.

Note: airfares are from Addis Abbaba, Mogadishu and Khartoum.

Table 3. Descriptive statistics by province

(means and standard errors; standard error in parentheses)

Variable	Ireland	Leinster	Munster	Ulster	Connacht
DPOP4151	-0.219 (0.115)	-0.199 (0.118)	-0.253 (0.107)	-0.173 (0.102)	-0.285 (0.089)
DPOP2141	0.202 (0.166)	0.144 (0.155)	0.259 (0.199)	0.183 (0.103)	0.292 (0.154)
GOODH41	0.642 (0.150)	0.724 (0.091)	0.543 (0.149)	0.697 (0.095)	0.504 (0.155)
DGOODH	0.206 (0.116)	0.127 (0.092)	0.251 (0.100)	0.230 (0.077)	0.307 (0.114)
LIT41	0.541 (0.139)	0.585 (0.074)	0.456 (0.088)	0.663 (0.142)	0.376 (0.082)
DLIT	0.028 (0.037)	0.033 (0.041)	0.024 (0.036)	0.029 (0.037)	0.022 (0.027)
AVPLV	1.576 (0.878)	2.131 (0.990)	1.288 (0.641)	1.425 (0.487)	0.822 (0.285)
SEA	0.236 (0.425)	0.127 (0.335)	0.356 (0.482)	0.290 (0.457)	0.244 (0.435)

Source: Ó Gráda (1995a).

Note:

- DPOP4151 = POP51-POP41
- DPOP2141 = POP41-POP21
- POP21, POP41, POP51: population in 1821, 1841, and 1851
- GOODH41 and GOODH51: the proportion of families not relying on fourth-class housing in 1841 and 1851
- DGOODH = GOODH51-GOOD41
- LIT41 and LIT51: the proportion of the population which could at least read in 1841
- DLIT = LIT51-LIT41
- AVPLV, poor law valuation per capita divided by population in 1841
- SEA, a dummy variable set equal to one for coastal baronies



Table 4. Population and living standards

(correlation coefficients)

	DPOP4151	DPOP2141	AVPLV	GOODH	LIT41	DGOODH	DLIT
DPOP4151	1.000						
DPOP2141	0.072	1.000					
AVPLV	0.365	-0.201	1.000				
GOODH41	0.414	-0.281	0.430	1.000			
LIT41	0.405	-0.262	0.429	0.638	1.000		
DGOODH	-0.285	0.242	-0.518	-0.786	-0.391	1.000	
DLIT	-0.240	-0.082	0.077	-0.028	-0.127	-0.036	1.000

Source: see text.

Table 5. Accounting for population change during the Famine

(t-statistics in parentheses)

	{1}	{2}	{3}	{4}	{5}	{6}
CONSTANT	-0.430 (-17.66)	-0.450 (-17.06)	-0.313 (-23.84)	-0.235 (-22.49)	-0.451 (-17.63)	-0.484 (-16.77)
LIT41	0.363 (8.57)					
GOODH41		0.338 (8.63)			0.258 (6.17)	0.291 (6.95)
AVPLV			0.051 (7.42)		0.032 (4.53)	0.035 (4.92)
DPOP2141				0.029 (0.72)		0.132 (3.77)
SEA	0.065 (4.65)	0.061 (4.43)	0.059 (4.15)	0.045 (2.87)	0.065 (4.87)	0.057 (4.33)
F	42.5	43.1	33.1	4.9	37.4	32.8
Rsq	.220	.222	.180	.032	.272	.304

Source: see text.

Note: the dependent variable throughout is DPOP4151

Table 6. Age-heaping 1846-1849

(a) Raw data, 1846-1849

Age	1846 (*)	1847 (**)	1848 (^)	1849 (***)
20	585	550	387	381
21	187	292	153	124
22	145	327	137	130
23	107	190	95	51
24	136	327	207	133
30	142	386	182	298
31	15	44	17	17
32	24	88	46	28
33	9	41	22	20
34	16	62	22	17
40	54	245	173	129
41	2	13	8	4
42	6	29	13	5
43	4	9	9	2
44	3	13	8	8

Source: derived from Glazier (1984).

(b) Age-heaping indices

	1820-39	1846	1847	1848	1849
Index					
20-24	.27	.50	.33	.40	.47
30-34	.67	.69	.62	.63	.78
40-44	.83	.78	.79	.82	.87

Source: the 1822-39 estimates are from Ó Gráda (1983: 128); those for 1846-48 are derived from data in Glazier (1984).

(\*) Jan-March, (\*\*) July, (^) Jan. (\*\*\*) Jan 1-Jan 20

Table 7. Mean wealth by ethnicity, USA, 1850-1860

	British	Irish	German	All
Mean real estate wealth, 1850 (\$)	388.5	109.6	289.4	270.1
Mean real estate wealth, 1860 (\$)	1398.8	461.4	1149.1	1048.4
Mean personal wealth, 1860 (\$)	507.3	229.5	595.3	441.8

Source: Ferrie (1994), p. 6.

Table 8. Immigrant wealth, USA, 1850-1860

Variable	$\beta$	Probability
Intercept	-2.4673	.0263
Age	0.1499	.0065
Age squared	-0.0011	.0781
Origin		
Irish	-0.9722	.0002
German	0.0505	.8554
Other	0.4669	.2634
Years since arrival	0.1058	.0001
Arrival cohort		
1840	0.0451	.9237
1841	0.2400	.6073
1842	-0.0628	.8891
1843	0.1064	.8394
1844	0.6411	.1809
1845	0.6495	.1406
1846	-0.0825	.8448
1847	-0.0669	.8813
1848	-0.3410	.3916
1849	0.1290	.7639
Adjusted R-squared	0.1488	
F	12.115	.0001
N	1018	

Source: Ferrie (1994), p. 10; 1850-1860 panel estimates.

Note: dependent variable is  $\ln(\text{real estate wealth} + \$1)$ .

Table 9. Provincial excess mortality and emigration rates, 1841-1851

	Population	Emigration	Deaths	Emigration rate (%)	Death rate (%)
Ulster	2386373	290970	184123	12.2	7.7
Munster	2396161	332936	382951	13.9	16.0
Leinster	1973731	171287	193397	8.7	9.8
Connaught	1418859	245624	239529	17.3	16.9
Ireland	8175124	1040816	1000000	12.7	12.2

Source: see text.

Table 10. County-level emigration and death rates  
(correlation coefficients)

	Emigration rates	Death rates	Emigration/Deaths
Emigration rates	1.000		
Death rates	0.147	1.000	
Emigration/Deaths	0.620	-0.605	1.000

Source: see text.

Table 11. Deaths, emigration, wages and potatoes  
(correlation coefficients)

	Death rates	Emigration rates	Emigration/Deaths
Wages	-0.820	-0.353	0.383
Potato Dependency	0.333	0.038	-0.215
Decline in potato acreage 1845-47	0.374	0.423	-0.038
Decline in potato acreage 1845-48	0.456	0.442	-0.055

Note: the wage data are for 1836, and were obtained from Liam Kennedy. Potato dependency was defined as the potato acreage per capita in 1845. Potato data are from Mokyr (1981) and the *Agricultural Statistics*.

Table 12. Wages and emigration before and after the Famine

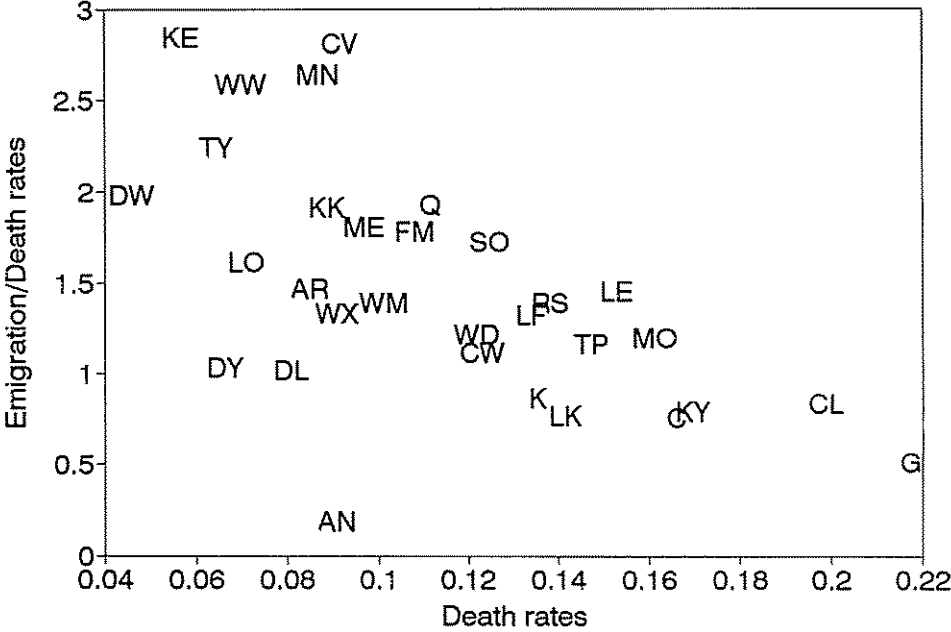
Year	Mean wage	Wage-emigration correlation	Elasticity of emigration w.r.t. wages
1829	61.09	-0.049	-0.08
1835	54.09	-0.023	-0.03
1836a	9.88	-0.202	-0.14
1836b	6.80	0.194	0.10
1850	57.69	-0.547	-0.66
1860	84.25	-0.397	-0.48
1860a	83.25	-0.613	-0.95
1870	94.38	-0.216	-0.42
1880	108.09	-0.489	-0.63

Source: the data are mostly taken from Bowley (1899). 1860a replaces the Bowley numbers for Waterford and Roscommon by more plausible estimates (i.e. 72 d in each case). 1836a is a weighted estimate of a male labourer's daily summer wage, without food, derived from evidence to the Poor Inquiry; 1836b excludes diet. We are grateful to Liam Kennedy for these last estimates.

KEY TO FIGURES 1-3

<u>County</u>	<u>Symbol</u>	<u>County</u>	<u>Symbol</u>
<u>Leinster</u>		<u>Ulster</u>	
Carlow	CW	Antrim	AN
Kildare	KE	Armagh	AR
Kilkenny	KK	Cavan	CV
King's County	K	Derry	DY
Longford	LF	Donegal	DL
Louth	LO	Down	DW
Meath	ME	Fermanagh	FM
Queen's County	Q	Monaghan	MN
Westmeath	WM	Tyrone	TY
Wexford	WX		
Wicklow	WW		
		<u>Connacht</u>	
<u>Munster</u>		Galway	G
Clare	CL	Leitrim	LE
Cork	C	Mayo	MO
Kerry	KY	Roscommon	RS
Limerick	LK	Sligo	SO
Tipperary	TP		
Waterford	WD		

Figure 1. Famine deaths and emigration



# Figure 2. Wages and death rates

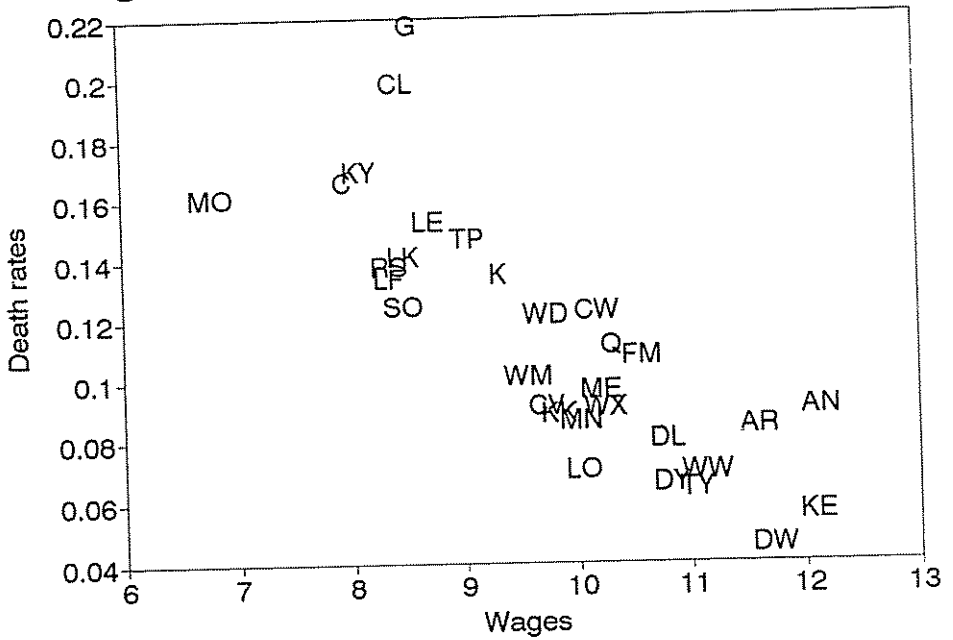




Figure 3. Emigration, deaths and wages

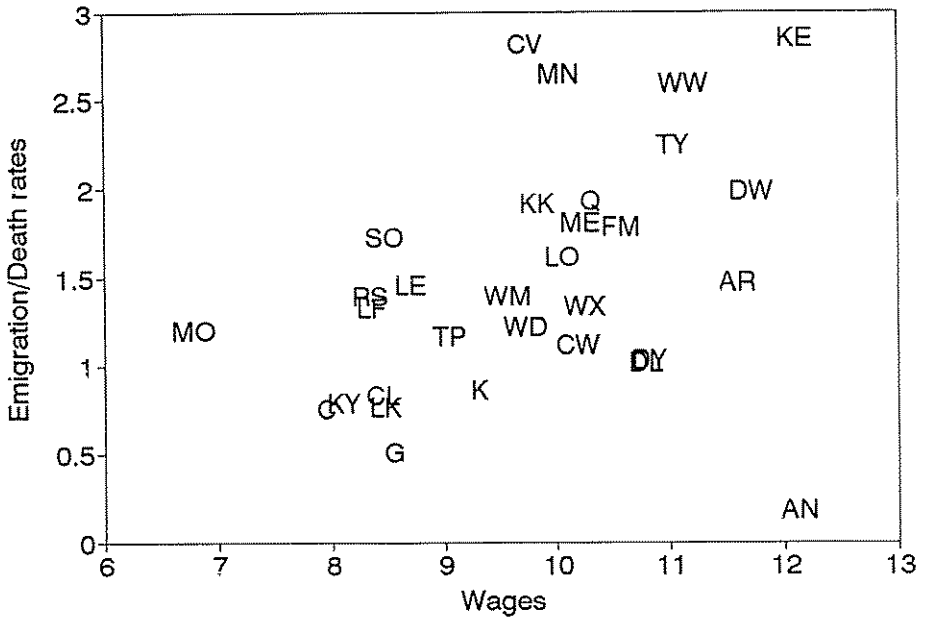


Fig. 4 Actual & hypothetical population 1845-1911 (thousands)

