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EMIGRATION AND POVERTY IN DREAMING

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and

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Abstract

Emigration was a crucial element in Irish population change during the half century before the Great Famine. The size and composition of the outward flow worried some, and caused considerable debate. Majority opinion held that emigration was likely to benefit economically both those who left and those who stayed behind. This paper uses an untapped source - ship passenger lists - to determine some relevant emigrant characteristics, and uses it to check for likely losses to the stay-at-homes from the 'quality' and age structure of the flow.

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1. Introduction

On the eve of the Great Famine of 1845-49, Ireland was widely believed to be one of the poorest nations in Europe. Foreign travellers who commented on Irish poverty often compared Ireland unfavorably to their own countries (Kohl, 1844, p. 23; Inglis, 1835, Vol. I, p. 106; Beaumont, 1839, Vol. I, p. 268; De (Tocqueville,) 1958, p. 131; Foster, 1847, p. 45). Modern historians such as O'Tuathaigh (1972, p. 145) and Clark (1979, p. 41) tend to agree about the symptoms, although they vary considerably in their diagnosis of the causes.

Impressionistic evidence is reinforced by statistics, however rudimentary. Insofar as backwardness and poverty were correlated, Ireland was quite poor. Infant mortality, a widely used indication of backwardness, was over 220 per 1000 live births (Mokyr, 1982, ch. III) or about 50 percent higher than in England, France, the Low Countries, or Scandinavia (Mitchell, 1975, p. 127). Ireland was still very much a rural and agrarian society, more so than her western European neighbours. In 1841, 64 percent of all Irish families designated themselves as chiefly employed in agriculture (Great Britain, Parliamentary Papers, 1843, XXIV, p. xvi). In Britain, the percentage in agriculture was only 22 percent, while in the Low Countries and France the proportion lay between 50 and 55 percent (Bairoch, 1973, p. 468). (In Irish agriculture, moreover, output per worker in 1845 was only slightly over half the British level (O Grada, 1980). The proportion of population living in cities over 2000 was 14 percent which again compared unfavorably with other European countries. Income per capita estimates, however rudimentary and shaky, confirm the conclusion that Ireland was very poor. Per/

for

capita personal income in Ireland circa 1841 was £15 per annum, about 62 percent of British income (Mokyr, 1982, ch. II). According to the numbers produced by Bairoch (1976), this would rank Ireland below Germany, Italy, or Spain, though higher than the Scandinavian countries. /

Nevertheless, contemporary accounts of extreme poverty appear somewhat exaggerated. Tourists, however intelligent and informed, had a tendency to impose their norms and tastes on the Irish, confusing differences in the composition of consumption with poverty. After all, relative prices in Ireland were different from those elsewhere in Europe, with food and fuel relatively cheaper. As a result the Irish were relatively well-fed and healthy, though poorly clothed and housed. Moreover, many of the accounts "blamed" Irish poverty on laziness and recklessly large families (Senior, 1868). Even if these allegations were true, an economist might counter that leisure and children represented forms of consumption, and were thus positively associated with economic welfare.

Such qualifications notwithstanding, it must be admitted that in the first half of the nineteenth century there was little economic progress in Ireland. Apart from a few small enclaves, modern industry made no headway, and the number of persons employed in non-agricultural activities probably declined. The decline in cottage industry, the lack of rapid technological progress in agriculture, the persistence of a subsistence economy based on the potato, and the low level of monetization and commercialization, were all symptoms of a continuing economic malaise. In a world in which economic development was becoming the rule rather than the exception, Ireland's stagnation and inability to cope with shocks

caused her to fall behind. Backwardness led to vulnerability, and when the potato blight struck, Ireland suffered a blow of unprecedented severity.

7 Prefamine Ireland was unique in another respect. For decades, it had been sending its sons and daughters overseas. While in other parts of Europe emigration did not attain significant dimensions before the middle of the nineteenth century, emigration from Ireland was quite substantial (in the fifty years before) the famine.

How many Irish emigrated before the famine? Connell (1950, p. 27) estimated that between 1780 and 1845 1.75 million persons emigrated from Ireland. More reliable are the figures presented by Adams (1932), whose data indicate that between 1825 and 1845 the total number of emigrants overseas was 825,000. To that figure, we must add emigration to Great Britain. In 1841, 419,000 Irish-born were living in Britain, implying a somewhat higher gross number of emigrants, since many of the Irish lived in high-mortality urban slums. At least 500,000 Irish immigrants can thus be assumed to have settled in Britain by 1841. Allowing further for overseas migration in 1815-25, and for migration to Britain in 1841-45, an estimate of 1.5 million for the period 1815-45 seems reasonable. This estimate is slightly higher than that of Verrière (1979, p. 79), who underestimates emigration to Great Britain. The estimate of 1.5 million persons in thirty years comes to about .7 percent of the population annually. As the crude birth rate was about 3.9 percent and the crude death rate about 2.4 percent, we can conclude that emigration removed almost half of the annual increase. For comparative purposes, note that German emigration in the 1850's removed only .2 percent of the population, which amounted to a

drainage of one sixth of the natural population increase.

In this paper we examine the nexus between emigration and poverty. The relation between the two phenomena is quite complex, since the causal chain ran in both directions. It is often maintained that poverty caused emigration, the wretched economic conditions in pre-famine Ireland operating as "push factors" (Adams, 1932). This view is plausible, given even the bleakest assessment of the trend in living standards in either America or Britain before 1845. Our present discussion, however, will be directed toward the other causal relation: did emigration relieve or exacerbate the poverty of the non-emigrants? From the outset it should be stressed that we do not maintain that emigration was the primary cause of Ireland's economic hardships. Rather, we focus on the cost and benefits of emigration from the point of view of those who remained behind. If it can be shown that on balance emigration reduced the income per capita in Ireland (i.e., emigration entailed a positive cost), it follows that a self-enforcing feed-back ("vicious circle") model may be a good description of the prefamine Irish economy. However, the degree to which poverty, through emigration, can breed more poverty depends not only on the sign of the partial derivative of income with respect to emigration, but also on the magnitude of the effect.

→ At first glance, it may appear that pre-1845 emigration raised the living standards of non-emigrants over what they would have been in the absence of emigration. For many of those who left, the alternative to emigration would have been to exercise their claim to an already tiny and fragmented holding. Thus, by foregoing claims on land, emigrants made life easier for those of their kin who chose

--- or were chosen --- to remain. The population pressure model implied by this scenario is far from incontrovertibly established, however (Mokyr, 1980a; Mokyr, 1982, ch. III). There is no evidence to support the simple-minded view that before the Famine, part of the labor force was "redundant" in the sense that its consumption exceeded its marginal product. ^{*} The notion that Ireland on the eve of the Famine was a labor-surplus economy appears to us as unfounded. Of course ^f(there were some people whose consumption exceeded their productivity,) but as we shall show below, it was not from the ranks of those that most emigrants came. On the other hand it seems likely that the total number of people who would have perished during the Famine years would have been larger had emigration not taken place. ^{*} From that point of view emigration was a beneficial phenomenon. From the standpoint of the living standards of those who remained behind, however, the effects of emigration are more ambiguous.)

In the framework of the simple two factor land-labor model, the emigration of labor reduces the labor-land ratio and thus increases the marginal product of labor. At the same time, however, the average income of those who remained behind is reduced (see below). Moreover, the demographic and personal characteristics of the emigration could have had important consequences to those who remained in Ireland. The self-selective, non-random aspect of emigration is an issue of concern to both contemporary and modern writers and the case of prefamine Ireland represents a unique opportunity to study the consequences of international migration on the country of origin.

2. The Emigration Debate

The emigration issue provoked enormous controversy in prefamine

Ireland. The debate centered more on the wisdom of public funding for colonization than on the desirability of more rather than less voluntary emigration. Whatever their views on the former, most political economists and public figures would have heartily supported more of the latter --- even if, as the more Malthusian-minded insisted, the respite would be only temporary. To Ricardo's fear that emigration would provide no remedy because capital would follow the emigrants, Archbishop Richard Whately of Dublin replied that those whose capital was idle at home were "probably consulting the interests of their country, as well as their own, by emigrating" (Black, 1960, pp. 203-38). Whately chaired the famous Poor Law Commission whose intensive investigations into the economic and social conditions of the country led to the recommendation that Ireland solve the problem of poverty by providing the means of emigration to the poor (Great Britain, 1836, Vol XXX, p. 26).

✓ In sum, majority opinion before the Famine held that emigration was likely to benefit both those who left and those who stayed behind. Yet the view that emigration inflicted a loss upon those who remained behind did not disappear. Apprehension that "the bone and sinew of the country" were weakening and its "life-blood" ebbing away frequently recur in contemporaneous accounts of the outflow (Keep, 1955). Couched in more sober language, these claims amount to a variant of the modern "brain drain" argument, although its proponents were less concerned with the export of intelligence per se than with qualities such as drive, entrepreneurial talent, willingness to bear risk, physical strength, and acquired skills. It thus comes as no surprise that one of the main objections made to Ireland's only major planned emigration, the Peter Robinson scheme

of 1823-25, was that it would entice away the "most industrious and well-disposed", leaving behind "the most desirous to get rid of" (Cameron, 1976, pp. 34-35). Many witnesses testifying before the Poor Inquiry made similar points. One of them remarked that "unfortunately for Ireland (the emigrants) have generally been the most industrious, well-behaved, and in most cases, the most monied of their class, thus leaving the worst and all the riff-raff as an increased burden on the country" (Great Britain, 1836, Vol. XXXIII, App. F, p. 134; see also Blacker, 1846, p. 7; Sadler, 1829, pp. 78-104). Many later students of Irish emigration have found these fears justified: economist Hubert Oldham wrote in 1913 of a "perpetual debasement of the human currency ---- very similar to Gresham's Law" (Oldham, 1913, pp. 213-14), a line repeated by George O'Brien (1921, pp. 218-19; see also Adams, 1932, p. 194). The opposing viewpoint is represented by Meenan, who sees emigration as a venture involving little enterprise or risk (Meenan, 1972, p. 346). However, given the general consensus that the relative quality of the Irish emigrant flow declined over the course of the century, Meenan's argument has more validity for the later nineteenth and twentieth centuries than earlier.

Appeal to the Law of Diminishing Returns suggests that the emigration of some workers can only benefit those who stayed (The Economist, 1863; Geary, 1935-36). Nevertheless it is easily shown that even where the labor force is perfectly homogeneous, the emigration of labor may reduce the income per capita of those who stay. There is no contradiction here: though emigration causes wages to rise, the loss to owners of other inputs (e.g. landlords) more than offsets this rise (Berry and Soligo, 1969). The loss may seem a small price to pay, however, for the favorable distributional

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consequences. Assuming (more realistically) that the emigrants carried some capital with them, the standard result remains that any withdrawal will hurt those who remain behind, unless it happens to leave the original capital-labor ratio undisturbed (Berry and Soligo, 1969; Bhagwati and Rodriguez, 1975). Like education or professional experience, "entrepreneurial talent" and "drive" may be thought of as capital in this context. However, to the extent that emigration entails giving up customary rights to land and other property, those who stayed behind stood to gain. The simple models which produce such results have been refined in a number of directions. For example, if the emigrants are high savers --- and typically they leave at a stage in life which would justify that assumption --- their leaving could again result in a reduced income for non-emigrants (Rodriguez, 1975). Or, if the emigrant abandons his claim to a share in public property in the home country, those who remain benefit (Usher, 1977).

Thus, the sometimes vaguely stated intuitions of anti-emigration writers find some support in simple economic theory. The potential relevance of the scenarios just described prompt the new examination of pre-Famine emigrant characteristics, undertaken in Section 3.

*₂ [The second manner in which emigration could have injured those who stayed at home has long been understood by economists,] although it does not seem to have featured in pre-Famine discussions of Irish emigration. Emigrants tended to be a non-representative group in aspects other than "drive" or "skill". A disproportionate number of them were clustered around the prime working age, that is, the proportion of young adults was larger than in the population "at

risk." ³ Emigrants thus arrived in their country of adoption "fully grown", conferring a gain on the country which was receiving shipments of "instant adults." Unless the emigrants sent back ^{increased dependency on Econ.} sufficient remittances, the home country had to pay for their upbringing and education, but did not draw the benefits thereof. As early as 1870, one of New York State's Commissioners of Emigration claimed that this source was worth four hundred million dollars annually to the United States (Kapp, 1870, pp. 114-17). Recently, Paul Uselding, Larry Neal, and Peter Hill, have underlined with varying degrees of enthusiasm the relevance of this life-cycle effect of the U.S. economy, and estimated some of the resultant gains (Uselding, 1971; Neal and Uselding, 1972; Hill, 1975). William Farr and Alfred Marshall were among the earliest writers to recognize the analogous losses to the country of origin. For Farr, the benefits to those who left were obvious, yet emigration seemed like "the export of precious goods for which there is no return," and calculated the money value of those leaving the U.K. between the 1830's and 1870's at about £35 million annually (Farr, 1885, pp. 59-64). Alfred Marshall's position on this issue, expressed in a long footnote, is worth citing (Marshall, 1898, pp. 647-48):

Many estimates have been made of the addition to the wealth of a country caused by the arrival of an immigrant whose cost of rearing in his early years was defrayed elsewhere, and who is likely to produce more than he consumes in his country of adoption ... we should calculate the value of the immigrant ... (by) "discount(ing)" the probable value of all the future services that he would render ... and deduct from them the sum of the "discounted" values of all the wealth and direct services of other people he would consume ... or again we might estimate his value at the money cost of production which his native country had incurred for him ... Both of the suggested methods of valuation are open to great objections when used as the basis of a public policy with regard to immigration ... But they

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are much less misleading when applied to estimate the injury done to a country, such as Ireland, by the loss through emigration of a great many young people, whose bringing up has cost the country much, and who if they had stayed would have produced more than they consumed; while the old and the infirm stay behind to consume more than they produce.

The point has also been recognized by Irish commentators, although they have been reluctant to measure putative losses (De Valera, 1980, p. 152; Meenan, 1972, pp. 347-48; Commission on Emigration, 1956, par. 316). In Section IV we shall propose a method of capturing the life-cycle loss from emigration in pre-famine Ireland, which is constructed very much in the spirit of Marshall's analysis.

3. Who were the Emigrants?

The existing literature goes a long way toward a description of the pre-famine emigrant. Adams (1932) reports that [pre-famine emigration included] more males and emigrants travelling in family groups than the later emigrants, and that they drew disproportionately from the farming and artisanal classes. S.H. Cousens has used age-cohort analysis to analyze the regional origins of the emigrants, and found Ulster and the northern midlands most heavily represented (Cousens, 1965). No systematic research has been carried out, however, on the age and occupational structure of the outflow. For this paper we have drawn on an old but neglected source, emigrant passenger lists and similar materials. Although these data cannot resolve all outstanding issues, they can be put to good use by economic historians if the appropriate questions are asked of them. A recent attempt to describe and study the passenger lists is Erickson (1981).

A detailed description of the sources has been provided

elsewhere (Mokyr, 1982; O'Gráda, 1981). In all, these sources provide information on the age and sex of over thirty thousand Irish emigrants who made the Atlantic crossing between 1803 and 1846. For the most part, they also provide a declared occupation, and in some cases region and even village of origin in Ireland. The earliest data used are a by-product of British war-time legislation aimed at curbing the migration of sailors to America (Jones, 1969, pp. 48-68). The bulk of the data come from the U.S. immigration archives and originated from legislation passed in 1819, which obliged ship captains arriving at any U.S. port from a foreign country to compile a list of passengers and present it to the local customs collector. At least in theory, the shipmaster swore to the list in the collector's presence (United States, 1975, p. 87). The earliest lists produced by this legislation were published contemporaneously (United States, 1821); most of the rest, arranged chronologically by port, are kept in the National Immigration Archives in Philadelphia (formerly in the National Archives in Washington D.C.). For this paper, we utilize all lists of Irish arrivals in the port of Boston between 1822 and 1839, and a sample of the (much more numerous) arrivals of Irish immigrants in New York between 1820 and 1846. The sampling procedure used for the New York data consisted of choosing every tenth ship if it included Irish passengers, plus all ships carrying Irish immigrants where place of origin within Ireland was listed. Also included for analysis are some eighteen hundred county Derry people, who emigrated to various parts of North America during the 1830's. They can be found in the unpublished Ordnance Survey Memoirs, part of the abortive scheme to match Ireland's first scientific mapping survey with detailed socioeconomic and antiquarian reports for each area covered (Andrews, 1977;

Johnson, 1959). The following Table summarizes the data for Ireland:

(Table 1 here)

These data typically contain the name, sex, age, and occupation of each immigrant. A few lists provide additional detail, such as place of origin in Ireland, religion, and port of destination. The sources are far from perfect: some lists were visibly compiled in a hurry, first names and occupations omitted. Not surprisingly, the quality of the data declines after 1846, when bureaucratic niceties were increasingly ignored under the pressure of work. Nevertheless, we have found no reason to believe that these data are consistently and grossly misleading.

The lists bear out some earlier generalizations based on scantier data. For instance, more children and older persons and fewer women left before 1845 than toward the end of the century. In this respect Irish prefamine emigration resembled later Irish emigration less than that from southern and eastern Europe. In all cases analyzed, "family" emigration exceeded that of unaccompanied individuals. However, our lists suggest an increase in the unaccompanied and female component over time, as well as a rise in the proportion of labourers (O'Grada, 1981).

We have also included in the analysis a sample of 4096 emigrants from Sweden, compiled by Olsson (1967). The Swedish data cover the same period, but are heavily weighted toward the later years: 83 percent of the sample emigrated in the years 1845-50. Since Olsson also used passenger lists, his data provide a convenient control on the reliability of those lists.

4. The Life Cycle Effect

As Marshall pointed out, the cost of emigration stems partly from the fact that over the average person's life cycle, consumption and income are not equal in each year. A somewhat simplified description of the pattern of consumption and income divides the cycle into three stages: childhood, in which current consumption exceeds current income, adulthood, during which saving is positive, and retirement, when once again the person consumes more than he produces. It is assumed that there is no real accumulation in this model: like the Social Security system, the entire system is constructed on a "pay as you go" basis. Adults pay for the upbringing of the children as well as the maintenance of the aged.

The emigration of adults imposes a cost on the economy because the number of people who maintain the system is reduced. Any "pay as you go" system is vulnerable to changes in the age structure. Another way of looking at the issue is by noting that emigration removes the primary workers and thus reduces the labor force participation rate and income per capita. In peasant societies the participation rate is hard to define, let alone calculate. We will therefore cling to the life cycle model for our computations of the cost of emigration.

It should be noted that it is not assumed that the workers necessarily support the dependent population exclusively through vertical family relations. The emigration of prime-aged workers left a higher proportion of dependents in the population, and the cost of emigration could fall on the dependents themselves, on the remaining close relatives, on more remote relatives (siblings, nephews), or on society as a whole (voluntary charity or the poor rates after the

Poor Law of 1838). For our present purposes the exact identity of the non-emigrants who paid the cost of emigration does not matter much.

Let $C(A)$ be consumption at age A and $Q(A)$ income at age A . Define net savings at age A as:

$$(1) S(A) = Q(A) - C(A)$$

Clearly, $S(A)$ is negative in childhood and old age, and positive in the prime years. We now define the central concept in this discussion, α , the cost of an emigrant aged A to those who remain behind, to be denoted by $\alpha(A)$.

$$(2) \alpha(A) = \int_0^A S(A) dA$$

As long as the individual has not fully paid back his childhood debt, $\alpha(A)$ is positive. At first his cumulative debt to society rises, but once his current earnings starts to exceed current consumption, α starts to decline. Eventually, the value of α turns negative: instead of imposing a cost on those staying behind, older emigrants actually relieve the latter from the need to support them.

Note that eq.(2), in contrast to Marshall's suggestions, does not discount the flows of (negative and positive) savings to age zero. Such a discounting would be incorrect, since people do not usually pay interest on the "loans" provided to them by their parents in childhood. The principal is paid back, in part to the parents in retirement and in part to the next generation. In the absence of economic growth, however, these undiscounted flows are equal to each other, and no discounting is called for. Precisely the same point has been made in a very different context, by David and

Temin (1976, p. 197).

The economic logic behind the definition in eq.(2) does not require a social security system of any special form. In a centrally managed system, the cost of the emigration or death of a F.I.C.A. payer to those who depend on those payments is immediate. In a family-based pension system, the costs can be avoided only if all families emigrated in toto. In that event, however, the age structure of the emigrating population should have been identical to that of the population at risk, which was clearly not the case.

There is a further constraint on the function $\alpha(A)$. In the absence of net accumulation, it must be true that total net savings of adults equal total dissavings of the infant and aged in each year. In a stationary population this is tantamount to an assumption that the expected life time saving of the average individual is zero. One way of expressing that constraint is:

$$(3) \quad E[\alpha(A).P(A)] = 0$$

where $P(A)$ is the proportion persons aged A in the population. Eq.(3) implies that the departure of a group of emigrants whose age structure is identical to that of the population at risk imposes no cost on those who stay.

Note that eq.(3) assumes implicitly that the population is not growing appreciably. Since population was actually growing, this assumption introduces a mild distortion in the function α . If population were growing due to higher birth rates or reduced infant mortality, the true values of α would be somewhat lower than those calculated here, whereas if population were growing due to increased life expectancy, the reverse would be the case. In the absence of

unequivocal indications in one direction or another, we ignore the bias, which in any event would be small. Eq.(3) also assumes that income per capita is not growing, which is probably a realistic approximation for the thirty years before the Famine. If income per capita were actually growing, our computation of the α function would be biased downward, because then each person would pay back more than he had borrowed as a child, so that failure to repay because of emigration would deprive society of a somewhat larger amount.

We will approximate the function $\alpha(A)$ by postulating it to be a polynomial of the fourth degree:

$$(4) \alpha(A) = \alpha_1 A + \alpha_2 A^2 + \alpha_3 A^3 + \alpha_4 A^4$$

where the α 's on the right hand side of eq.(4) are constants yet to be determined. These coefficients should be such that α peaks at some age A^* , then declines and turns negative at age A^{**} . For ages higher than A^{**} , $\alpha(A)$ is negative, but for the very old the "benefit" of emigrants becomes small because the expected value of their "pensions" which they forego by emigrating becomes very small. We chose another age, A^{***} , at which we predetermine another value of α . A^{***} was chosen such that half the people who reach age A^* survive to A^{***} . At some point around A^{***} (but not necessarily at A^{***}), $\alpha(A)$ reaches a trough and starts rising again, coming arbitrarily close to 0 at A^{****} . The form of the function is described by fig. 1.

(Fig. 1 here)

The four coefficients in eq.(4) are determined by the solution

of the following four equations:

$$(5) \alpha_1 A^* + \alpha_2 (A^*)^2 + \alpha_3 (A^*)^3 + \alpha_4 (A^*)^4 = \alpha(A^*)$$

$$(6) \alpha_1 + 2\alpha_2 (A^*) + 3\alpha_3 (A^*)^2 + 4\alpha_4 (A^*)^3 = 0$$

$$(7) \alpha_1 A^{***} + \alpha_2 (A^{***})^2 + \alpha_3 (A^{***})^3 + \alpha_4 (A^{***})^4 = \alpha(A^{***})$$

$$(8) \alpha_1 A^{****} + \alpha_2 (A^{****})^2 + \alpha_3 (A^{****})^3 + \alpha_4 (A^{****})^4 = 0$$

The interpretation of the system (5) - (8) is as follows. Eq.(5) sets the value of α at A^* . For our computations we have set $A^*=15$, and assumed for $\alpha(A^*)$ a lower bound of £50 and an upper bound of £100 (see below). Eq.(6) assures that A^* is an extremum (and in fact it turns out to be a maximum, as required, in all our computations). Eq.(7) sets the value of $\alpha(A^{***})$. Life tables suggest that the life expectancy at age fifteen is approximately thirty five years, which yields A^{***} at about fifty. The value of $\alpha(A^{***})$ is calculated iteratively as explained below. Eq.(8) sets the value of $\alpha(A^{****})$ to zero. A^{****} is allowed to vary between eighty and a hundred.

A brief explanation of the values of $\alpha(A^*)$ used in eq.(5) is in order. Evidence on child productivity and consumption before the Famine is patchy. While in general there were few organized markets for child labor, and domestic service was unlikely to have employed large numbers of children under thirteen, child labor was widely used to perform simple tasks around the farm and home. Rather than attempt the probably impossible estimation of age-specific consumption and production for each year between zero and A^* separately, we shall assume simply that until age fifteen no children produced more than they consumed. This assumption seems to square well with modern research on the subject (Mueller, 1976;

Mamdani, 1972, pp. 78, 131; Lindert, 1980, pp. 5-69).

A number of justifications can be brought forward for our range of £50 - £100 for $\alpha(A^*)$. Food expenditure surveys, for instance, suggest an average cumulative outlay of five or six times the annual adult level for children between birth and age fifteen (Mueller, 1976). Although other expenses of upbringing may have been proportionately smaller than food, some allowance should also be made for the opportunity cost of the mother's time. The pre famine average income per capita of about £15 indicates that our selection is reasonable. The only near-contemporary estimate of total upbringing cost is that made by Engel for Prussia in the 1860's (cited by Kapp, 1870, p. 146). Engel found that the cost of rearing a child to age fifteen in Prussia was 750 Thaler, or £115. The implied gap between pre famine Ireland and Prussia twenty years later does not seem far-fetched. Our range is also consistent with modern data on upbringing cost. Recent estimates of what it cost to rear a fifteen year old in the U.S. in the early 1970's produced a sum five to eight times per capita income. Adjusting for a higher than unity expenditure elasticity of children with respect to income, our range again appears plausible (Reed and McIntosh, 1972; Becker and Lewis, 1974).

The algorithm which computes the values of the α coefficients in eq.(4) thus "searches" over three dimensions: the value of $\alpha(A^*)$, which is either 50 or 100; the values of A^{***} (80, 90, or 100) and the value of $\alpha(A^{***})$ which is determined by iteration. Only solutions which satisfied eq.(3) were allowed. To accomplish this, we constructed a life table on the basis of the very crude age statistics provided by the 1821 census, complemented by the

Coale-Demeny life tables, model West (Coale and Demeny, 1966, p.8).

The results of the computation of the polynomials which satisfy the restrictions imposed on it are presented below in Table 2. In our further computations we will present only the figures for the highest and lowest estimates of the cost of emigration.

(Table 2 here)

Table 3 below presents the lower and upper bounds of the average value of α in the various samples of passengers utilized.

(Table 3 here)

The mean values of α in our most representative samples is between £25 and £55. If we assume that the New York and Boston emigrants are a representative sample of all Irish emigration (including emigration to Great Britain), we arrive at a total cost of between £37.5 million and £82.5 million over 30 years, which amounts to between 1 percent and 2.2 percent of net personal income, which was about £125 million around 1840 (Mokyr, 1982). This figure is not overwhelmingly large, but neither is it altogether negligible. If, for instance, a large proportion of this loss came out of what little (gross) saving took place, emigration could well have contributed to the slowness of capital accumulation in pre-famine Ireland. The midpoint between our bounds of the cumulative loss due to emigration over thirty years, £60 million, is equal to three times the value of the stock of animals (an important form of agricultural capital) as reported by the 1841 census.

An alternative way of indicating the cost of emigration is to consider the dependency ratio, which is the total population aged 0-14 and over 60, divided by the population aged 15-59 (Wrigley and Schofield, 1981, pp. 443-450). The association of this measure with the economic notion of a "dependent population" i.e., that proportion of the population which consumes more than it produces is hazardous for long-term and cross-sectional comparisons. In the first half of the nineteenth century the opportunities for children and the elderly to find employment changed dramatically everywhere in north-western Europe (including Ireland): the collapse of rural cottage industries and the rise of modern industries in some regions probably changed the age-profile of the labor force quite substantially. Still, the figures are consistent with a significant cost of emigration on this account. The dependency ratio in Ireland in 1821 was .846, while England's was .848. Twenty years later, Ireland's ratio (.808) was almost the same as before, while England's had dropped to .758. The decline in the crude birth rate in England after 1815 was probably largely responsible for the fall in the dependency ratio there (Wrigley and Schofield, 1981, pp. 534-535). Recent research indicates that the birth rate in Ireland may have experienced a similar decline during the prefamine decades, though the evidence here is less satisfactory (Boyle and O'Grada, 1982; Mokyr and O Grada, 1982). If this was indeed the case, it seems reasonable to suggest that emigration deprived Ireland from the pursuant advantages of a lower dependency ratio. In 1871, when emigration had been a central feature of Irish demography for over half a century, the dependency ratio was .856, as compared to England's .771.

As indicated earlier in the computation of the loss from the

life-cycle effect, we must make some allowance for emigrant remittances. Reviewing the evidence on remittances from America in the 1850's and 1860's, Irish politician John Francis Maguire claimed, "in the history of the world there is nothing to match this" (Maguire, 1870, p. 332). Averaged over all the Irish-born in the United States at the time, the sums mentioned --- less than £1 per emigrant annually --- seem less impressive although the possibility remains that Maguire's calculations are underestimates (O'Gráda, 1980b). It is usually assumed that remittances were proportionally smaller before the Famine and largely took the form of prepaid passages. Since the earlier emigration contained a higher share of dependents and the mechanics of getting money across the Atlantic were presumably costlier and riskier, this supposition is a plausible approximation. Nevertheless, there is some evidence to suggest that even before the Famine, remittances contributed more than passage money. First, the testimonies before the Poor Law Inquiry suggest that many of the Irish in Britain sent money home on a regular basis, though usually in small amounts (Great Britain, 1836, XXXIII, pp. 2,5,6,22,23,86). Similarly, the records of the Canada Company, which encouraged settlement from Ireland in the 1830's and 1840's show that many immigrants took advantage of its services of remitting money to their friends and dependents free of charge (Archives of Ontario, Series C-7). Finally, there are the estimates of prefamine remittances reported by Hancock in 1873: £125,000 according to banker Robert Murray, £160,000 according to the New York correspondent of The Times (Hancock, 1873). Allowing for Canada and Britain, an annual average of £150,000 - £200,000 in the prefamine decade with smaller flows before seems plausible. While significant, these remittances do not make much of a dent in

The lifecycle losses

the life cycle losses.

5. Emigrant 'Quality'

Compared to the age structure aspect, the problem of "quality" of the emigrants is harder to determine. A priori reasoning is of little help in this respect. On the one hand, one could argue that the successful and well-educated would have a low propensity to emigrate. Moreover, pressure to stay on the farm would likely have been exerted by parents on their hardest working sons and daughters. On the other hand, the act of emigration required resourcefulness and a willingness to bear risk. Since emigration was a risky venture, the emigrants most likely to succeed were the ones most richly endowed with drive, ambition, and endurance. It could also be maintained that emigrants had a lower rate of time preference (and thus would be higher savers, *ceteris paribus*), as emigration itself was an investment-type of decision.

If emigrants could be clearly categorized by motivation into either "push" or "pull" types, some of the ambivalence could be removed. A movement of emigrants who are primarily "pulled", i.e. responded to an increase in the demand for labor in the receiving country, would likely be made up of those with a large endowment of energy, ambition, and access to information. "Push" forces, on the other hand, might be expected to force out first the marginal and more vulnerable in any sector or industry. The flood of Famine emigrants has to be considered as almost entirely "push" and thus as of comparatively low quality. Whether the prefamine emigrants can be characterized as largely motivated by "push" factors is harder to determine. Since the period 1845-45 was, as noted, an era of de-industrialization and impoverishment, at least some of the

emigrants were likely to fall into the same category, and provide some a priori consideration against a major "brain drain" before 1845.

One piece of information which could serve as a proxy for the "quality" of emigrants and may thus help to resolve the debate, can be extracted from the passenger lists. While these lists do not provide information about the literacy rates or educational attainments of the emigrants, we can approximate their numeracy by measuring the degree of age-heaping. The key here is that people with poor arithmetical capability would be more inclined to report a "round" age than educated persons. It is also possible that more sophisticated people are more acutely aware of the notion of time, including their own age. Numeracy, of course, is not the same as literacy, and neither is necessarily a good proxy for "ambition" or "intelligence", let alone "productivity". Nonetheless there is some evidence to support the use of age-heaping as a measure of these qualities, faute de mieux. In 1841, the county based correlation (32 observations) between one crude measure of age heaping (the proportion males reporting age 30 relative to all males reporting ages 30-34) and literacy was $-.600$ ($t=-4.11$), and between heaping and income per capita the raw correlation was $-.494$ ($t=-3.11$), both coefficients statistically significant at the 1 percent and better level. By the standard of Whipple's index, a common index of age-heaping, the propensity of the Irish to age-heap in 1841 put them in the same league as places such as Sarawak and Turkey a century later. An alternative index devised by Smith places pre-famine Ireland between Haiti and El Salvador in 1950 (United Nations, 1964, pp. 19-21; Smith and Zopf, 1976, pp. 151-56).

Both passenger lists and the 1841 and 1851 censuses provide year-by-year age distributions. A comparison of the two sources could tell us therefore whether those who left were more or less numerate and educated than those who stayed behind. For the purpose of this paper, we utilize the following index of the severity of age-heaping. First, we approximate the "true" age distribution of the population aged between fifteen and thirty four years, since this age group accounted for most of the emigrants. The smoothening was carried out by using Graybill's weighted moving average of the Sprague coefficients (Shryock and Siegel, 1973, pp. 700-702, 878, Table C-5), a powerful smoothening technique which does not preserve precisely the subtotals of each age group. The next step is to calculate for each age i ($i=15,16,\dots,34$) the proportion of each age in the reported population $\frac{n_i}{\sum n_i}$ and in the smoothened population $\frac{\hat{n}_i}{\sum \hat{n}_i}$. The heaping index, γ , is then defined as

$$(9) \quad \gamma = \sum \left(\frac{n_i}{\sum n_i} - \frac{\hat{n}_i}{\sum \hat{n}_i} \right)^2$$

The results of the analysis of age-heaping are reported in tables 4 to 6. Table 4 reports the value of γ for Ireland and its four provinces in 1841 and 1851, as well as for the U.S. in 1880 and 1970, and for Mexico in 1960.

(Table 4 here)

Tables 5 and 6 provide the basic results for the deheaping analysis of the passenger lists. Table 5 presents the summary results for all our samples and Table 6 presents the results for the New York sample, broken down by subperiod.

(Table 5 here)

(Table 6 here)

A brief comparison of tables 5 - 6 and table 4 reveals that the emigrants consistently and significantly reported their ages with less accuracy than the population at large. Heaping varies considerably within various samples of emigrants, but in no emigrant group is it less than in the 1841 census or even the (slightly more severely heaped) 1851 census. Among our samples the Derry emigrants show an amazing degree of heaping, in part attributable to the unusual way in which the data were collected (largely by relying on local informants for lists of those already departed).

The plausibility of the results as a reflection of historical reality rather than an artifact created by sloppy sea captains is supported by three facts contained in tables 5 and 6. First, there is a tendency toward more heaping among females than among males, a difference which would have disappeared if the captains had carelessly jotted down passengers' ages without querying them. Two of our six samples seem to indicate otherwise, but in the Boston case at least, this is an artifact of the radically different age structures of the two sexes. Age-specific measures of heaping restore the finding of less heaping among male emigrants to Boston. Second, there is a significant rise in γ for the years after 1845, which is what we would expect if the value of γ served as a good proxy for the "quality" of the emigrants. Third, the degree of heaping among the Swedish emigrants is significantly lower than that of the Irish, which indicates once again that indeed the

characteristics of the passengers and not those of the captain determined the value of γ . We suggest therefore that the age-heaping analysis is inconsistent with the hypothesis that pre-famine emigration constituted in any sense a "brain-drain" from Ireland.

The finding that emigrants consistently heaped more than the census population might seem consistent with a reverse "brain drain", i.e., the emigration of the less educated and less able. The possibility that the high quality of the 1841 census, relative to later enumerations, led to a slight understatement of the heaping phenomenon should be noted, however. The Irish population as enumerated in 1851 and 1861 displays somewhat greater age-heaping than that of 1841. The bias is not enough to restore the "brain drain" argument; we may still reject the one-tailed null hypothesis that emigrants heaped less than the population at large.

A final use to which the passenger lists can be put is to determine the occupational structure of the emigrants. Declared occupations are of course very thin reeds upon which to rely, but the ubiquity of this kind of information for many countries in Europe, both from occupational censuses and probate records, make it an irresistible source. What we shall therefore attempt is to compare the occupational structure of the passengers with those of the Irish population at large.

Historians generally have described population movements from Ireland as overwhelmingly proletarian in nature (Thernstrom, 1973, pp. 130-33; Katz, 1975, pp. 25-26, 65-68; Lees, 1979, p. 83; Handlin, 1977, pp. 54-87). Admittedly, their conclusion is based largely on the immigrants' occupations in the New World. Whether the

emigrants moved down the occupational ladder as they crossed the ocean is unknown. Passenger lists provide a promising means of comparing the home occupations of pre-famine emigrants with the occupational distribution of the Irish population in 1841.

(Table 7 here)

(Table 8 here)

Tables 7 and 8 summarize our findings. The results should be interpreted with some caution. The 1803-06 data are particularly suspect, because an unknown share of those classified as laborers were in fact skilled or semi-skilled artisans (Jones, 1969, pp. 59-60). For the rest, it is likely that some of those who called themselves "farmers" were in fact laborers, though it is hard to adjust for this discrepancy. Such problems aside, the census and lists between them contain well over four hundred different occupations. The reason for this diversity is that both census enumerators and ship masters seem to have allowed the respondents great latitude in describing their occupations (Almquist, 1980). Nonetheless, practically all of the respondents could be grouped into one or another of the first five categories in Tables 7 and 8.

The tables indicate that the proportion of laborers and servants in the emigrant population was always large and probably rising over time. The trend in the proportion of farmers is difficult to interpret, but an apparent rise in the number of artisans was met by a fall in the share of workers in the textile

trades. A comparison with the census data (Table 9) reveals a high proportion of laborers among the emigrants, though there is also a disproportionate number of artisans. The latter could be seen as consistent with a "human capital drain," but the differences are too small for strong inferences. A more detailed comparison (Table 9) of the share of the main non-textile categories in the census and the lists of 1840-46 supports this contention: the share of artisans is larger among the emigrants, but only slightly so. Moreover, it could be maintained that some proportion of skilled craftsmen emigrating were structurally unemployed or in imminent danger of becoming so (e.g. hand-loom weavers). On the other hand, our passenger lists do not refer at all to the Irish emigration to Britain and Scotland, and if the proportion of artisans among those emigrants was higher, the "brain drain" would be reinforced. It is interesting to note that few occupations in the lists can be regarded as "employers of labor." The Boston data contain only one "ironfounder", twenty seven "merchants" and a few "manufacturers" and "brewers". The New York data indicate that less than 2.5 percent of all adult males were commercial, most of whom were presumably small pedlars.

(Table 9 here)

6. Conclusions

With the exception of major wars, no greater cataclysm has affected Europe than the Great Irish Famine since the crises of the seventeenth century. Before it had run its deadly course, the Famine swept away between a million and a million and a half and forced the emigration of nearly as many more (Mokyr, 1980b; Verrire, 1979, pp.

1840 famine
GRAIN
↓
FOLLOWS
by 1840's

60-67). The sheer vulnerability of the potato economy and the inevitability of the crisis are still the subjects of controversy (O'Tuathaigh, 1972, pp. 127-39; Gibbon, 1975; Mokyr, 1980a). In the absence of emigration to Great Britain and North America, the population of Ireland in 1845 have been even higher. Although the rate of natural increase might have been reduced somewhat, this reduction would not have compensated for the emigration. Against this must be balanced the character and composition of the emigration flows. First, because the emigrants consisted disproportionately of persons in their prime age, the population at risk in 1845 consisted of a larger than normal proportion of children and aged, people whose resilience to the diseases which inevitably accompanied the Great Hunger was lower. Second, the character of emigration affected the economic performance of an economy consisting, by definition, of those who chose to remain in Ireland.

Our sources indicate that the "quality" of the emigrant flow was not of decisive magnitude. Admittedly, our data are a poor filter for all the relevant qualities which may have distinguished the emigrants; it is still conceivable that the unmeasurable characteristics of the emigrants may well have been those qualities that were in short supply in Ireland in 1845: ingenuity, initiative, a willingness to take risk and to submit to discipline. There remains, after all, the unresolved issue of the comparative failure of Ireland to industrialize in the nineteenth century. As matters stand, emigration cannot be fully absolved from responsibility for the tardiness of the industrialization process. All we can say is that the evidence from certain measurable characteristics does not point to an effect of major magnitude. (For some further attempts to

come to grips with non-measurable characteristics of the emigrants and the possible nexus they provided between emigration and backwardness, see Mokyr (1982, ch. VIII).) The results, coupled with the Swedish data, underline how sensitive the losses were to the age distribution of the emigrants. They also suggest that, in view of size and age-structure, (earnings foregone were proportionately much greater in postfamine) Ireland. It would be interesting to check exactly how significant the postfamine losses were to Ireland, as well as in other parts of Europe from which emigration was substantial in the second half of the nineteenth century. It seems clear, however, that for any population which experiences large-scale emigration, the financial losses inflicted on those who stayed home are outweighed by the gains to those who emigrated. Economic historians ought to keep in mind this dilemma when writing "national" economic history. The reference group chosen is always those who remain, and the welfare gain to the rest is implicitly set at zero.

Finally, throughout this paper we have treated children as an investment good, basically a form of old age insurance. In dealing with the welfare aspects of emigration, however, one must consider some further ramifications of mass emigration. The obvious point is, of course, that emigration further reduced the welfare of those who remained, because it deprived them of the company of their children and grandchildren in old age. It is conceivable, however, that this cost was offset, at least in part, by the fact that the opportunities of emigration in themselves increased the number of children born (Farr, 1885, p. 62; Kennedy, 1973, pp. 195-196). Easterlin (1976) has maintained that the standards of comfort that parents anticipate for their children has a major effect on birth

rates. Evidence from Germany, similarly, suggests that areas of heavy out-migration were also areas of relatively modest fertility decline before 1914 (Knodel, 1974, pp. 188-222). While it is unlikely that higher birth rates could have fully compensated for emigration --- after all, Ireland's population declined for decades after the Famine --- this feedback effect may have somewhat reduced the solitude of the ageing Irish parents, whose offspring was continuously pulled away by "distant magnets."

Table 1: Sources of Emigrants Used

Years	Destination	Source	Number of Emigrants
1803-06	North America	(1)	3603
1819-20	U.S.A.	(2)	1675
1830-39	North America	(3)	1813
*1822-39	Boston	(4)	7000
1820-48	New York	(4)	30534

(1) Public Record Office, London.

(2) United States, 1821.

(3) Ordnance Survey Memoirs, Royal Irish Academy, Dublin.

(4) United States Immigration Archives.

Table 2: Restrictions and Computed Parameters of the Emigration Cost Function

	1	2	3	4	5	6
A*	15	15	15	15	15	15
A**	33.7	34.7	34.1	33.7	34.7	34.2
A***	50	50	50	50	50	50
A****	80	90	100	80	90	100
$\alpha(A^*)$	50	50	50	100	100	100
$\alpha(A^{***})$	-74	-67	-70	-148	-134	-139

Table 3: Values of α per emigrant, in £

Sample	Lower bound	Upper bound	Aver. of bounds
1803-06, Ireland	19.05	41.38	30.72
1819-20, Ireland	19.49	41.39	30.44
1830-39, Derry	24.40	50.17	37.29
1820-48, New York	27.19	56.46	41.82
1822-39, Boston	26.02	54.63	40.32
1820-50, Sweden	14.01	30.99	22.50

Table 4: Values of γ for Selected Populations

Population	Males	Females	Total
Ireland, 1841	54.18	72.36	66.09
Ulster, 1841	47.46	61.54	54.49
Leinster, 1841	43.98	66.40	54.80
Munster, 1841	57.72	88.21	72.32
Connaught, 1841	80.14	117.70	98.98

Ireland, 1851	63.23	89.24	88.42
Ulster, 1851	53.52	57.89	62.33
Leinster, 1851	50.00	61.80	74.88
Munster, 1851	72.13	115.50	92.27
Connaught, 1851	97.00	117.53	140.44
U.S. 1880			10.23
U.S. 1970			1.16
Mexico, 1960			22.72

Sources: Irish censuses of 1841 and 1851; Mokyr, 1982.

Table 5 : Values of γ , for different samples, by sex.

Sample	Males	Females	Total
1803-06, Ireland	89.8	130.8	96.3
1819-20, Ireland	146.0	108.5	106.5
1830-39, Derry	262.9	319.0	268.5
1820-48, New York	113.2	158.7	122.9
1822-39, Boston	125.9	117.0	111.9
1820-50, Sweden	22.1	27.9	20.5

Sources: Passenger lists, see text.

Table 6: Values of γ , New York sample only, by subperiod and sex.

Period	Males	Females	Total
1820-24	103.6	209.8	107.4
1825-29	113.1	170.2	114.2
1830-34	96.0	109.5	96.7
1835-39	100.5	143.9	104.9
1840-44	92.2	141.5	103.8
1845-46	158.7	175.1	150.0
1847-48	217.0	296.3	239.9
Total	113.2	158.7	112.9

Sources: Passenger lists, see text.

Table 7: Occupation of Irish Emigrants to Boston and New York,
compared to Census Data (in percentages)

Occupational						
Category	1	2	3	4	5	6
<u>Boston, 1822-1839</u>						
Males	62.7	3.5	10.4	20.5	2.7	0.2
Females	78.6	11.1	0.5	8.1	1.0	0.7
<u>New York, 1820-1848</u>						
Males	60.5	7.0	15.7	13.3	3.6	--
Females	63.3	24.4	9.2	2.3	0.8	--
<u>Census, 1841</u>						
Males	55.4	7.1	20.7	10.5	4.9	1.5
Females	33.7	59.9	1.9	0.7	3.4	0.4

Legend of occupational categories:

1 = laborers, servants

2 = textile workers

3 = farmers

4 = other artisans

5 = white collar

6 = other

Sources: Passenger lists (see text); Great Britain, 1843, Vol. XXIV
(Census of Ireland for 1841).

Table 8: Emigrants' Occupations, 1800-46

Occupational

Category 1803-06 (U.S.) 1819-20 (U.S.) 1822-39 (Boston) 1820-46 (N.Y.)

	-----	-----	-----	-----
1	1004 (36.9)	184 (26.6)	2031 (62.5)	9053 (57.3)
2	467 (17.2)	103 (14.9)	232 (7.1)	1824 (11.5)
3	949 (34.9)	234 (33.9)	259 (8.0)	2149 (13.6)
4	28 (1.0)	79 (11.4)	619 (19.1)	2223 (14.1)
5	267 (9.8)	88 (12.7)	104 (3.2)	329 (2.1)
6	3 (0.1)	3 (0.4)	4 (0.1)	234 (1.5)

Legend: See Table 7

Source: Passenger lists.

Table 9: Artisans in the New York Emigrant Lists, 1840-46 and the 1841 Census (percentages of total labor force)

	1841 census	Emigrants, 1840-44	Emigrants, 1845-46
Carpenters	1.12	1.86	0.70
Other Woodworkers	0.52	0.68	0.61
Construction workers	0.98	1.00	1.04
Metal Workers	1.09	1.21	0.81
Artisans in Food			
Processing	0.83	1.51	0.70
Others	0.35	1.23	0.85

Sources: Passenger lists (see text); Great Britain, 1843, Vol. XXIV (Census of Ireland for 1841).

Fig. 1: the α function

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