

CENTRE FOR ECONOMIC HISTORY  
THE AUSTRALIAN NATIONAL UNIVERSITY  
DISCUSSION PAPER SERIES



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DISCUSSION PAPER NO. 2019-07

JULY 2019

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# Emigration from the UK 1870-1913: Quantity and Quality

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June 2019

## ABSTRACT

In this paper I revisit the determinants of emigration from the UK during the age of mass migration from 1870 to 1913. During those years the cumulative gross outflow was 10 million while the net outflow of nearly 6 million amounted to 13 percent of the UK population in 1913. I focus on the determinants of emigration to the three principal destinations, the USA, Canada and Australia and New Zealand combined. In the absence of restrictive immigration policies, the flow of emigration to these destinations responded to economic shocks and trends. I also investigate differences in the skill content of emigration, as represented by the occupational composition of adult male emigrants to these three destinations. Emigrants to Australia and New Zealand were more skilled on average than those heading across the Atlantic, a feature that does not correspond well with skill differentials in the manner predicted by the Roy model. While assisted passages (subsidised fares) increased the volume of emigration to Australia and New Zealand they cannot account for its higher skill content.

*Acknowledgements:* I am grateful for useful advice and for help with data to William Coleman, Drew Keeling, Martine Mariotti, Chris Minns, Jeff Williamson and Glenn Withers.

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## Introduction

In this paper I re-examine the economic forces that underpin emigration from the UK during the age of mass migration from 1870 to 1913. Emigration from the UK accounted for about one third of the gross flow from Europe to the New World during these years and four fifths of them headed for the United States, Canada, Australia and New Zealand. As there were almost no restrictions on British emigration to these destinations this migration has often been seen as a laboratory in which to examine the economic forces driving international migration in the absence of restrictive immigration policies, which attenuate or obscure the underlying drivers (Hatton 2004). While the ups and downs in the volume of emigration have been a traditional focus of the modelling of migration in this era, more recently the spotlight has turned towards understanding the composition of emigration, in particular who was selected into emigration and why.

Much of the literature on migrant selectivity has focused on emigration flows from one origin country to one destination. While some attention has been devoted to comparing the volume and composition of emigration from different European countries or regions, principally to the United States, much less attention has been devoted to flows from a given country to different destinations. Here I focus on migration from one common source country, the UK, to three major New World destinations, the United States, Canada and Australia and New Zealand combined. Comparing emigration streams from one source country has two advantages. One is that the data originate from a common source and so the measurement issues that plague studies of international migration are avoided. More importantly, given a single source country, with substantial flows to alternative destinations, any differences that emerge will be due to differences between the destinations rather than differences between the sources.

The analysis of emigration flows is motivated with a basic utility maximising model that takes account of economic incentives, short-term shocks and network effects (Hatton 1995a). By allowing for year effects, which absorb common origin effects, this version of the model focuses solely on differences between destinations in the incentive to migrate. The results are in line with those found in a long list of previous studies: the key forces are real wage rates, business cycle shocks as represented by unemployment rates, and network effects as captured by the stock of previous emigrants at a destination. In addition to these findings I

examine the influence of different components of the costs of emigration. The costs of passage seem to have little influence, perhaps because of measurement issues. But nearly half of the emigrants to Australia and New Zealand travelled on assisted passages, which brought the costs of travel to the antipodes closer to those for crossing the Atlantic. This seems to have been important in sustaining the flow to much more distant shores.

A novel feature of the analysis is to examine trends and fluctuations in the occupational structure of emigration. I use data published in annual reports by the UK Board of Trade to calculate the skill content of emigration to the three destinations. Over the years from 1877 to 1913 average skills among non-agricultural adult males were highest among emigrants to Australia and New Zealand, followed by the United States and then Canada. But the wage differentials for skill in manual occupations were highest in the United States followed by Canada and then Australia. The lack of correspondence between the skill premium and the skill content of migration when comparing Australia with the US is at odds with the well-known prediction of the Roy model. One possibility is that the cost reducing effect of assisted passages, which would favour the unskilled, was more than offset by targeting assistance to more skilled workers. But the econometric evidence suggests the opposite: if anything, the effect of subsidies was to reduce the average skills of migrants to Australia. The high relative skill content of migration to Australia and New Zealand could be due to stronger network effects serving to lower the skill content of migration to the United States but it remains something of a mystery.

The rest of the paper is laid out as follows. In the next section I briefly summarise the relevant migration theory, emphasising the implications of the Roy model. This is followed by a short literature review which summarise some of the key findings that are relevant to the issues addressed here. Trends and fluctuations in the volume of emigration are outlined and panel econometric results for total flows are presented and interpreted. The occupational structure and the skill content of migration is presented for the three major destinations together with blue collar skill premia in three cities. Panel regressions of the share of skilled among adult male emigrants are presented and interpreted. The findings are summarised in a brief conclusion.

## The age of mass migration: theory and evidence

### *Theoretical Framework*

Economic models of migration build upon the early work of Sjaastad (1962), Becker (1964) and others. Essentially the migration decision depends on the expected discounted present value of the stream of returns at the destination as compared with the origin, minus the costs of migration. Thus the probability of migration for any individual will be greater the higher the return abroad, the lower the return at home, the lower the costs and the longer the period over which they are amortised. But it is important to recognise that migrating to another continent involves a distribution of non-economic costs and benefits that vary across individuals. So for a given positive net present value only a proportion will migrate; but the key prediction of migration theory is that as the net benefit increases so does the proportion that migrates. As future returns are uncertain, the dynamics of expectations formation will also matter. In particular, a short-term negative shock at the destination may exert a large negative influence due to the option value of waiting.<sup>1</sup> This basic approach has been adapted to include features such as poverty constraints, family migration, migrant networks and return migration (see Bodvarsson et al., 2015).

Further insight can be gained by means of a diagram representing the Roy model as applied to international migration by Borjas (1987) and many others since. In Figure 1, the individual's skill-level is on the horizontal axis and the wage rate is on the vertical axis. The upward sloping curves represent the relationship between the wage, assumed to be in present value terms, and the skill level. The curve WK<sub>h</sub> represents the origin country and the parallel solid line, WK<sub>f1</sub>, represents the wage in a destination net of migration costs. As the wage in the destination exceeds that at home throughout the skill distribution, all potential migrants have an incentive to migrate, although only some will. As the gap increases, due to a higher wage difference or lower migration costs, a larger proportion will emigrate. Subsidies to migrants would have a similar effect, as would help from friends and relatives at the destination, although this will affect only those potential migrants with networks at the destination.

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<sup>1</sup> This means that while, on a present value calculation, it might be worth emigrating today even though unemployment was high in the destination, in present value terms it would be better still to wait a year or two if conditions were expected to improve.

Suppose instead that  $WKf_2$  and  $WKf_3$  represent the wage curves of two alternative destinations (2 and 3) with the same mean wage, also net of migration costs. The incentive to migrate to these countries differs across potential migrants with different skills. Only those with skills lower than  $K_2$  will have an incentive to migrate to destination 2 while only those with skills higher than  $K_3$  will have an incentive to migrate to destination 3. Thus, from a given origin, destination 3 should attract higher skilled migrants than destination 2.<sup>2</sup> Migration costs and immigration policies could affect the slope of the destination country curves. The costs of emigration may be a more binding constraint for low-skilled potential migrants, because they are a larger share of income, which would tend to make the foreign wage curve steeper. But assistance from previous emigrants—the friends and relatives effect—could mitigate this effect by easing the poverty constraint, particularly for the low skilled. Finally, migration policies could also influence the slope of the destination wage curve. On one hand subsidies and free passages would favour the low-skilled; on the other hand, such incentives may be targeted specifically to potential migrants further up in the skill distribution.

#### *International migration 1850-1913*

The age of mass migration from 1850 to 1913 witnessed a vast flow of migrants from Europe to destinations in the Americas and Australasia. Over this period 41 million people left European shores to establish a new life in the so-called New World. About one third of European emigrants came from the UK, which then included Ireland, and 90 percent of these went to four destinations, the United States, Canada, Australia and New Zealand. A large literature has examined this era of mass migration. The older time series literature, based on the push-pull model, examined the ups and downs of total migration by origin and by destination. A more recent literature has explored the selection of migrants, often based on individual level data from censuses and ships lists. Yet few of these studies have captured the link between the characteristics of different emigrant groups and the economic incentives facing them.

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<sup>2</sup> As the destination wage curve is rotated from  $WKf_2$  to  $WKf_3$  the proportion with an incentive to migrate first increases and then declines. On the other hand, at each extreme some potential migrants have a much larger incentive to migrate, which may offset the inverse U-shape relating the total volume of emigration to the slope of the destination wage curve.

The traditional time series model of migrant flows can be motivated by an underlying model in which the individual (or household) decision to emigrate depends on the relative wage in the destination compared with the home country and the probability of employment at home and abroad (Hatton 1995a). This model has been augmented to include the age structure of the origin population, recognising that the present value of migration is higher for younger people with longer horizons. It has often been augmented also with some measure of the stock of previous emigrants from the same source country in order to account for the so-called friends and relatives effect. This helps to capture the effect of migrant networks in providing information, subsidising the passage and assimilating into the host country labour market. Although this variable is simply the sum of past migration depreciated by mortality and return migration its strong link with remittance flows supports the 'friends and relatives' interpretation (Magee and Thompson 2006).

A number of studies have used this framework, or can be interpreted within it. These include studies for emigrant streams from the UK (Hatton 1995a; 2004) from Ireland (Hatton and Williamson, 1993) and from the Scandinavian countries (Quigley, 1972; Larsen 1982; Hatton 1995b). The push-pull model is strongly supported for well-established migration streams and it indicates that both origin and destination variables matter. While short run fluctuations are largely accounted for by the business cycle, longer term trends can be accounted for by the slowly changing income gaps between origin and destination countries, as well as by the slowly-evolving migrant stock.

With few exceptions these studies fail to account for the influence of migration costs on a given migration stream. But using quarterly data for 1899-1913, Deltas et al. (2008) find that passenger numbers on routes to the US and Canada were 22 percent lower at times when cartels were keeping prices up. Other elements of costs also mattered. The depreciation of the Peseta between 1882 and 1905 increased the travel costs for Spanish emigrants. Sánchez-Alonso (2000a) finds that this reduced emigration during those years by as much as 30 percent. In some cases, travel costs were heavily subsidised. Assisted passages to Australia substantially reduced the costs for UK emigrants in 1911-13, leading to a surge of emigration (Pope, 1981). The effect of assisted passages on the volume and composition of UK emigration in the late nineteenth century has received little attention in subsequent quantitative work and this will be investigated further below.

Following the migration economics literature, attention has turned towards immigrant selection and specifically whether immigrants from Europe were positively or negatively selected from the origin populations. In their pioneering paper Abramitsky et al. (2012) match individuals in the censuses of Norway and the United States to study self-selection into migration and the return to migration. They find that Norwegians who emigrated to the United States between 1865 and 1900 were negatively selected in the sense that they came from poorer than average backgrounds in Norway, which they argue is consistent with the Roy model. They also find evidence that sons who were less likely to inherit land were more likely to emigrate (Abramitsky et al., 2013). Using microdata from Irish censuses of 1901 and 1911 with the 1910 census Connor (2019) also finds evidence that young men emigrating to the US were negatively selected. In particular, they were more often sons of farmers or illiterate men, and these were often supported by migrant networks. While these studies relate to the family backgrounds of migrants, there is also evidence along other dimensions. Spitzer and Zimran (2018) find that Italian emigrants in the early 20th century were shorter than the average Italian left behind, suggesting that they had a worse health environment than stayers. Negative selection has also been found for Irish emigrants prior to 1850 based on comparing the age-heaping reported in the arrival records and in the Irish census (Mokyr and Ó Gráda, 1982).

These studies typically focus on migrants from a single origin to a single destination and they do not make comparisons across origins or across destinations. So while they make useful observations they do not directly address the issues raised by the Roy model, noted above. One important exception is Stolz and Baten (2012) who test the Roy model on origin-destination dyads for 5 origin countries and 52 destinations over decades from 1820 to 1909. Their measure of skill-selection is the level of numeracy as reflected by age heaping in census returns of migrants as compared with the origin populations. And the return to skills is proxied by gini coefficients constructed from the variance in stature among origin and destination populations. The coefficient on relative inequality across sources offers strong support for the Roy model: migrants to a destination from more equal origins were more negatively selected on numeracy. They also find that sharing a common language is associated with positive selection while wars and upheavals at the origin lead to negative selectivity.



There is a long standing interest in immigrant quality as reflected in the declared occupations of migrants (see for example, Erickson, 1994; Cohn 1992; Wegge 2002). While occupations provide direct evidence on the skill content of emigration, such studies rarely make comparisons across destination countries or over time. One exception is Green et al. (2002) who compare British immigrants in the US and Canadian censuses at the turn of the century. They find that these immigrants were mainly blue collar and that the occupational compositions were similar, as was the occupational wage structure. Based on the occupations of the emigrant flows from the UK from 1877 to 1913, Pope and Withers (1994) find that those travelling to Australia and New Zealand were more skilled on average than those heading for Canada and the US. However, they did not explore the determinants of these differences in skills and their evolution over time, something that will be attempted below.

### **Total emigration flows from the UK to Australia, Canada and the United States**

#### *Trends and fluctuations in UK emigration*

The basic source for emigration from the UK is the statistics recorded by the UK Board of Trade on passenger movements to extra-European ports. From 1853 to 1913 the outflow of British citizens amounted to 12.9 million, 10.1 million of whom departed after 1870. Most of these passengers were emigrants travelling in the steerage compartments of emigrant ships. About three fifths of the emigrants were male, about three fifths were single and, among the adults, more than four fifths were aged 18-45. This represents a substantial labour migration of prime age adults, some of whom were travelling as families with children. They came from all parts of the UK with a particularly heavy concentration from Ireland, especially in the 1850s and 1860s. But there was also a substantial return flow. From 1871 to 1913 the cumulative net outflow amounted to 5.9 million, equivalent to 13.1 percent of the UK population in 1913.

These annual passenger movements are plotted in Figure 2. The gross UK outflow shows an overall upward trend marked by substantial annual fluctuations with some evidence of long swings. Outflows were heaviest in the decade from the early 1860s, in the 1880s, and in the decade prior to the First World War. Figure 2 also shows the net movement, which may be a better measure of permanent emigration as it removes return migrants and short-term visitors. The fluctuations in gross and net movements are very similar and the correlation between these two series for 1871-1913 is 0.93.

Most of the UK emigrants travelled to four main destinations, the United States, Canada, Australia and New Zealand. From 1871 to 1913 these countries account for 88 percent for the gross outflow of UK citizens to extra-European ports and 93 percent of the net outflow. The majority of these emigrants went to the USA, which accounts for 62 percent of the gross outflow to these four countries and 55 percent of the UK total gross outflow. As Figure 3 shows, it also accounts for much of year to year fluctuation in the UK total. For Canada and Australia/New Zealand the numbers are relatively small until the turn of the century when there is a steep increase, especially for Canada. As a result, movements to Canada and Australia/NZ are positively correlated (0.6) but neither is significantly correlated with flows to the US.

The costs of migration are not easy to measure but the available evidence suggests that the cost of a third class (steerage) passage to Australia was more than twice that across the Atlantic. The cost of travel fell over the period, perhaps more steeply to the antipodes as steam replaced sail only in the 1880s, and travel times also fell steeply.<sup>3</sup> But incentives were provided for emigrants to Australia and New Zealand in the form of assisted passages. These assisted passages accounted for 45 percent of all emigrants from the UK from 1870 to 1913. As Figure 4 illustrates, the share of all emigrants to Australia and New Zealand who migrated with assisted passages was particularly high from the early 1870s to the mid-1880s and again in the five years before 1914. In contrast, Canadian recruitment schemes were modest (and specifically targeted at prospective farmers) and there were no subsidies for emigration to the United States.

Assisted emigrants to Australia and New Zealand were transported in ships chartered by governments in the respective colonies and were recruited by agents located in Britain. In some cases employers applied for emigrants with specific skills or for agricultural workers in return for land orders.<sup>4</sup> Some migrants travelled free but most paid up to half the cost, which

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<sup>3</sup> Most of the transition from sail to steam on the Atlantic routes took place in the 1860s. By 1873 97 percent of passengers from Europe to New York travelled by steamship (Cohn 2005, p. 472).

<sup>4</sup> From 1840 to 1973 the Colonial Land and Emigration Commission in the UK played an important in assisted migration. In the earlier years it was responsible for the management of land sales and allocation some of the proceeds to promote and regulate emigration, echoing the scheme proposed by Edward Wakefield. But as land sales became the responsibility of the individual colonies, the influence of the Commissioners waned (Hitchens, 1931).

brought the cost closer to that for a passage across the Atlantic.<sup>5</sup> In 1907 assisted male immigrants travelling third class to New Zealand paid £12 (2 berth cabin) or £10 (4 berth cabin) as compared with the total cost of £21 and £19 respectively. Rates charged to female domestic servants were £6.16s and £4.16s respectively. Similar rates prevailed in Australia until 1912 when minimum rates of £6 were agreed for farmers, farm hands, skilled artisans and nominated, assisted or indented male immigrants, and £3 for adult women. That compares with fares across the Atlantic that averaged £5.7s in 1910-1913 but that were mainly in the range of £2.10s -£4.10s during the previous 25 years (see Keeling, 1999).

### *Estimating the determinants of emigration*

In order to estimate the determinants of flows of emigrants from UK to the three destinations, I use a version of the push-pull model of migration that has been widely applied to historical migration flows. In this model, the difference in expected utility between home and abroad depends, not only on the wage differential but also on employment probabilities and on factors that affect migration costs. It also includes dynamics arising from the formation of expectations, and the full derivation can be found in Hatton (1995a). The version of the model used here is similar to that in Hatton (2004) except that the key focus is on differences in the attractiveness of different destinations. The estimating equation is:

$$m_{jt} = \alpha_1 m_{jt-1} + \alpha_2 m_{jt-2} + \alpha_3 s_{jt-1} + \alpha_4 \Delta \ln e_{jt} + \alpha_5 \ln w_{jt} + \alpha_6 c_{jt-1} + \alpha_7 a_{jt} + \theta_j + \mu_t + \varepsilon_{jt} \quad (1)$$

Where  $m_{jt}$  is the ratio of emigrants to country  $j$  to the home country population at time  $t$ , and the first two terms on the right hand side are lags of the dependent variable.  $s_{jt-1}$  is the stock of previous emigrants residing in country  $j$  at time  $t-1$  divided by the home country population. This represents the well-known network effect where friends and relatives at the destination help to reduce the costs and risks of emigration and may also influence preferences for a given destination.  $\Delta \ln e_{jt}$  is change in the log of the employment rate, which represents the probability of employment at the destination and  $\ln w_{jt-1}$  is the log of the real wage in destination  $j$  at time  $t$ , where both coefficients are expected to be positive.  $c_{jt-1}$  is an index of passenger fares divided by the unskilled UK wage rate, which is expected to be negative, and  $a_{jt}$

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<sup>5</sup> As Richards (1993, p. 254) noted for mid-century: "The assisted immigration scheme did not reduce the cost much, if at all, below those of America."

is the number of assisted passages divided by home population, which is expected to be positive.  $\theta_j$  is a set of country dummies and  $\mu_t$  is a set of year effects, which absorb all period shocks including common origin effects. Hence there are no separate home country variables and the coefficients are estimated from differences between destinations.

The sources and derivation of the data series are detailed in the data appendix. The dependent variable is the ratio of gross or net UK emigration to each of three destinations the USA, Canada and Australia/New Zealand divided by the UK population. The stock of previous emigrants from the UK is calculated by using net flows to interpolate census benchmarks and is taken as a ratio to the population of the UK. Real wage rates for unskilled labour are taken from Williamson (1995). Employment rates are the complement of the unemployment rates taken or calculated from sources described in the data appendix. Passage costs, which come from McDonald and Shlomowitz (1991) for Australia and New Zealand, and Keeling (2008) for the US and Canada, are extrapolated as described in the appendix and divided by the UK unskilled wage. Finally, the number of assisted passages to Australian and New Zealand is the sum of those financed by the five Australian colonies and New Zealand, divided by the UK population and it takes the value zero for the US and Canada.

The results of estimating the model for the three destinations on annual time series for 1872 to 1913 are reported in Table 1. These equations are estimated with period random effects, which is not rejected against the alternative of fixed effects. Two lags of the dependent variable were found to be statistically significant in all the equations but lags of the other variables (apart from those included in the table) were not found to be significant. Thus long run coefficients differ from short run coefficients and can be calculated by taking the lag structure into account. The stock of previous migrants from the UK at a particular destination captures the so-called friends and relatives effect, which reflects the cost-reducing and uncertainty-reducing effects that migrant networks provide. According to the coefficient in column (1) an addition of one thousand to the migrant stock increased the annual flow of emigrants to a destination by 33 per annum in the short run and 127 per annum in the long run.<sup>6</sup> As might be expected the effect for net migration (col. 2) is somewhat smaller.

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<sup>6</sup> The long run effect of a unit change the immigrant stock calculated from the lag structure is:  $0.030 / (1 - 1.075 + 0.335) = 1.269$ .

The change in the employment rate has a highly significant coefficient, which underlines the importance of the short run business cycle. In column (1) an increase of one percent the destination employment rate is associated with a decline the emigration rate to a destination of 0.12 per thousand. The coefficient is even larger for net migration (col. 2) as would be expected if a slump overseas also induces return migration. But as the variable is entered as a change it is a very short run effect; the hypothesis of equal and opposite coefficients on the current and lagged variable cannot be rejected. The real wage at the destination takes a positive coefficient in columns (1) and (2) regressions but is only significant for the gross emigration rate. For gross emigration an increase of 10 percent in the destination wage is associated with an increase in the emigration rate of 0.7 per thousand in the short run and 2.5 per thousand in the long run. The passage cost variable takes a highly insignificant positive coefficient. This could be because it fails to capture the decline in forgone earnings because of decreasing voyage durations, not to mention the costs of overland travel.

The number of assisted passages applies only to Australia/New Zealand, and takes the value zero for the other two migration streams. Both the current and lagged values take significant coefficients but with opposite signs. A coefficient of less than one would imply that one more assisted passage generates less than one more migrant and that some emigrants substituted from unassisted into assisted passages. On the other hand, a coefficient larger than one suggests that assisted passages 'crowded in' unassisted migrants. Although the coefficient on the current value is larger than one the overall long run effect, taking the dynamics into account, is 1.03 for gross emigration (col. 1) and 0.86 for net migration (col. 2).<sup>7</sup>

However, there is an obvious endogeneity issue, as assisted emigration forms part of total emigration. An instrumental variable approach is not feasible here because the assisted passages are only relevant to one of the three migration streams. An alternative is to use a prediction based on a regression of the number of assisted passages on the total value of government social expenditure in Australia and New Zealand combined and a time trend.<sup>8</sup> In columns (3) and (4) the coefficients on the predicted number of assisted passages (divided by the UK population) are very similar in magnitude to those in columns (1) and (2) but are far

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<sup>7</sup> Calculated respectively as:  $(1.128-0.861)/(1-1.075+0.335) = 1.13$  and  $(1.199-0.949)/(1-1.038+0.330) = 0.86$ .

<sup>8</sup> Duncan (1963, p. 289) illustrated a positive, but not perfect, correlation between appropriations for immigration voted by the New South Wales legislature and the number of assisted immigrants in 1877 to 1886. The expenditure used here is much wider and includes health, education and a range of other social services.

less significant. It is worth noting also that the coefficients on the other variables are very little changed. Not surprisingly the long run coefficients for assisted migrants are also similar: 1.11 for gross migration (col.3) and 1.08 for net (col 4). These coefficients provide little evidence that potential migrants simply substituted assisted migration for unassisted migration, with little effect on the overall numbers. Rather, it appears that the policy of assisted passages made a substantial contribution to total emigration to Australia and New Zealand. However, the levels of significance are low and so it is not possible to make strong statements.

## **The occupational composition of emigration from the UK to Australia, Canada and the United States**

### *Skills and occupations of emigrants*

While the variations in total numbers emigrating have often been explored, variations in the occupational composition have been somewhat neglected. From 1877 the Board of Trade recorded the occupations of adult passengers emigrating from the UK and presented the results in annual reports to parliament. Until 1902 around 40 specific occupations are listed plus 'other trades' and 'occupation not stated'. From 1903 occupations are reported only in the following groups: agricultural, commercial and professional, skilled trades, labourers, and miscellaneous/not stated. These are listed by destination for adult males aged 12 and over; for females there is a short list of occupations but most are recorded as occupation not stated. These occupations were reported on board ships to the major destinations and, as with the total flow, it is not possible to separate Australia and New Zealand. As occupations were self-reported it is possible that occupational status was inflated in some cases, but there is no reason to think that any bias would differ by destination.

Among adults emigrating to the USA 56.6 percent were male as compared with 64.3 percent of those going Canada and 52.9 percent of those going to Australia and New Zealand. Of the males 32.0 percent of those bound for the USA were in agricultural occupations compared with 14.3 percent of those bound for Canada and 23.2 percent of those bound for Australia and New Zealand. As Figure 5 shows the agricultural share of emigrants going to Australia and New Zealand fell steeply from the late 1870s to 1893, and then gradually increased. While this might have been a result of the depression there is no such decline in the agricultural

share going to the USA, which had an equally severe depression. Among adult male emigrants to Canada there was a sharp increase in the mid-1880s but surprisingly low shares in the boom on the prairies in the decade before 1914.

A narrow definition of the skill content of male immigration can be calculated by taking the number of skilled migrants as a percentage of skilled plus labourers, which is illustrated in Figure 6. For all three destinations there is a sharp fall in the percentage skilled in the late 1870s, which continues through the early 1880s for emigrants to Canada and the USA, followed by an upward trend from the early 1890s. But the most striking feature of the graph is the overall differences between the three destinations. Over the whole period, the percentage skilled is 64.0 percent for Australia and New Zealand, 38.7 percent for the USA and only 26.1 percent for Canada. However, labourers and skilled trades account for only about two thirds of non-agricultural adult males going to the USA and Canada and less than half of those going to Australia and New Zealand. An alternative definition of the skill share includes commercial and professional occupations as skilled and miscellaneous/not stated as unskilled. Using this definition reduces the differences somewhat although the ordering is the same. On this broader definition the percentage skilled is 51.3 percent for Australia and New Zealand, 37.2 percent for the USA and 30.8 percent for Canada. These results are broadly consistent with those of Pope and Withers (1994, p. 257) using the same data source but slightly different definitions.<sup>9</sup>

How does the skill content of immigration to these three destinations compare with the skill premium? The Roy model outlined above would suggest that a higher return to skills should attract more skilled immigrants. Figure 7 plots skill differentials, as represented by the daily wage ratio of bricklayers to building labourers in Chicago, Sydney and Toronto from 1879 to 1913. These series are taken from Allen (1994) with some backward extrapolation for Toronto before 1900 (see appendix).<sup>10</sup> As most male emigrants were in blue collar occupations they should capture relative incentives across the manual skill distribution. And, as these are ubiquitous trades in major cities, they should be reasonably representative across countries and over time. Overall the skill premium was much higher in the United States than in Canada

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<sup>9</sup> Withers (1989) uses this and comparable sources for later years to construct a skill index for immigrants to Australia for 1877 to 1986.

<sup>10</sup> Allen's series for San Francisco and Vancouver are not used here as most UK migrants to North America went to the east coast.

or Australia, a finding that is consistent with other evidence (Shergold 1982; Phelps Brown 1979, Ch 2.).<sup>11</sup> On average for 1882 to 1913 the ratio is 2.97 for the US, 1.85 for Canada and 1.49 for Australia. This due to the fact that real unskilled wages were higher, and skilled wages were lower, in Canada and Australia than in the US, although the Canadian skilled wage was much closer to the American level.

This pattern is somewhat at odds with what would be expected from the Roy model. The skill content of emigration is higher for the USA than for Canada, which is consistent with the higher skill premium. But the wage ratios would suggest that workers heading for Australia should have been less skilled than those emigrating across the Atlantic, especially when compared with the United States. Yet the evidence in Figure 7 indicates the exact opposite. And as there is virtually no trend in any of the skill premia over three decades this alone cannot explain trends in the skill composition, particularly the upward trend from the 1890s. But it is likely that other variables mattered. One possibility is that the higher cost of emigrating to the antipodes acted as a greater deterrent to unskilled workers. But in that case it should also have influenced the total flow, which is not what was found in Table 1. Another possibility is that assisted passages to Australia and New Zealand, while lowering the cost of emigration, nevertheless managed to select more highly skilled migrants. These issues are investigated below.

Up to mid-century the priority had been for agricultural workers, often financed by land sales, following the schemes promoted by Edward Wakefield in the 1840s. By the late nineteenth century agricultural workers were still a priority, particularly in Queensland, but elsewhere the needs were more diverse and included a range of craft and mechanical skills, which were sometimes linked to public works projects. A variety of methods were used by immigration agents from each of the colonies to target the most desirable immigrants.<sup>12</sup> The UK government did not sponsor emigration but the Emigrants' Information office provided information for prospective migrants to a range of colonial destinations, which included

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<sup>11</sup> However, using census data from the turn of the century, Green et. al. (2002) find little evidence of differences between the US and Canada in relative earnings across different occupations.

<sup>12</sup> The types of migrants sought were healthy, single, under 35 and well up from lowest rungs of society (Richards 1993). Agents seeking agricultural workers for Queensland focused their recruitment efforts on rural counties in the East and Southwest of England, the West of Ireland and the Northeast of Scotland (Camm 1981; 1985). But even in these counties recruits were often from urban backgrounds (Duncan 1963).



details of wages, prices, rents as well as occupations in demand and the available terms for acquiring land.<sup>13</sup>

### *Estimating the determinants of the skill mix*

Estimation of the skill composition is motivated by the Roy model outlined above. The model to be estimated is as follows:

$$k_{jt} = \beta_1 k_{jt-1} + \beta_2 m_{jt-1} + \alpha_3 s_{jt-1} + \beta_4 r_{jt-1} + \alpha_5 c_{jt-1} + \alpha_6 a_{jt} + \theta_j + \mu_t + \varepsilon_{jt} \quad (2)$$

Where  $k_{jt}$  is the share of skilled among adult male emigrants to the three destinations,  $j$ , as shown in Figure 7. One lag of the dependent variable is included to capture persistence in the skill share. As before,  $m_{jt-1}$  is the one-year lag of the emigration rate and  $s_{jt-1}$  is the stock of previous emigrants residing in country  $j$  at time  $t-1$  divided by the home country population. If friends and relatives at the destination reduced the costs and uncertainty of emigration then, by favouring the unskilled, that might be expected to reduce the share of skilled emigrants.  $r_{jt-1}$  is the skilled to unskilled wage ratio lagged one year, which the Roy model would predict should take a positive coefficient.  $c_{jt-1}$  is the passage cost, which if the cost of passage deterred the unskilled, should take a positive coefficient.  $a_{jt}$  is the share of assisted emigrants among all emigrants (only for Australia and New Zealand; zero otherwise). The coefficient could be negative or positive depending on whether the cost-reducing effect, which would favour the unskilled, dominated any selection effect favouring the skilled.

The sources and definitions of these variables are as noted above and detailed in the appendix. The model is estimated as before with country dummies,  $\theta_j$  and year effects,  $\mu_t$ . No separate origin variables are included as the year effects capture all origin country effects as well as common international shocks. The regressions in Table 2 are estimated with random year effects as these cannot be rejected against fixed effects. The narrow definition of the share skilled is used as the dependent variable in columns (1) and (3), while the broad definition is used in columns (2) and (4).

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<sup>13</sup> These took the form of handbooks for each colony, and after 1901 for individual Australian states. The 1906 edition provided wage rates for around 100 occupations including artisans, factory workers, miners and municipal workmen (Paton ed. 1906, pp. 36-38). It also included details on assisted passages and advice on travel (1906, p. 13-15).

In all the regressions there is strong persistence in the skill mix, as reflected in the coefficient on the lagged dependent variable. In column (1) the lagged emigration rate gives a significant positive coefficient, suggesting that the skill content increased with the volume of emigration. The negative coefficient on the emigrant stock is consistent with the idea that friends and relatives at the destination made it easier for the low-skilled to emigrate. The skill premium gives a positive coefficient, as would be predicted by the Roy model, but it is not significant (using the current rather than the lagged variable produces a similar result). The share of emigrants on assisted passages gives a negative coefficient but it too is not significant. Thus there is no evidence that assisted passages were the reason why emigration to Australia and New Zealand was more skilled than the flow to the USA. Finally, the passage cost gives a positive coefficient, as would be expected if higher costs inhibited unskilled migration but, consistent with the result for total immigration, it too is not significant. Turning to the broad definition of the skill mix in column (2), the most notable difference is that the wage premium and the share of assisted passages become significant at the 10 percent level. The latter probably reflects the fact that assisted passages were not offered to migrants in professional or commercial occupations, who are included among the skilled in the broader definition of the skill mix.

Columns (3) and (4) differ from (1) and (2) in two respects. First, the predicted number of assisted passages (as explained above, and divided by total emigration) is included in place of the actual share. Second, they also include the share of adult male emigrants who were Irish, which is another possible reason for the difference in the skill composition between Australia/New Zealand. Green et al. (2002) note that the Irish in the US and Canada in 1900/01 were more often unskilled than those from other parts of the UK. Irish emigration fell in the decades after the great famine both in absolute numbers and as a share of emigration from the UK (Hatton and Williamson, 1993). But the share Irish among adult males going to the US fell less steeply than that going to Australia and New Zealand. Over the years from 1877 to 1913 the Irish accounted for 31.3 percent of adult male migrants heading for the US compared with 10.5 percent for Australia and New Zealand, and only 6.3 percent for Canada. So while the Irish content might account the higher average skills of migrants to Australia/New Zealand compared with the US it cannot account for the lower skill content of migration to Canada, which had very few Irish migrants.

For the narrow definition of skills in column (3), the predicted assisted migration share gives an insignificant negative coefficient (as in col. 1). But the share of adult male migrants who were Irish gives a strong negative coefficient, which suggests that the declining share of migrants from Ireland raised the average skills of migrants to Australia and New Zealand, at least among manual workers. In contrast, the broad definition of skills in column (4) gives a strongly significant negative coefficient on the share of assisted passages in total migration. As noted above, this is probably because assisted passages were not offered to migrants with professional and commercial occupations who are classified as skilled on the broad definition. On the other hand, the share Irish loses significance, perhaps because there were few Irish among the group of trades described as miscellaneous and not stated, who are classified and unskilled in the broad definition. It is worth noting, however, that in the Table 2 regressions the destination dummy for Australia and New Zealand is small and insignificant. This means that, relative to the US, there is no significant positive effect in levels that is not accounted for by the variables included in the model. This contrasts with the larger and more significant negative coefficients on the dummy for Canada, especially on the narrow definition of the skill mix.

On any comparison of the occupational structure the UK emigrants to Australia and New Zealand were more skilled than those heading for the United States. The Irish content may account for part of the difference. Another possibility is that the difference in travel costs mattered, as suggested by the coefficient in column (4). That might become clearer if the passage costs could be better measured and we were able to account for the difference foregone earnings due to the voyage length. It is also likely that the larger network of previous migrants in the United States provided more opportunities for emigration among the unskilled, which would be consistent with the negative coefficients on the emigrant stock. Weaker network effects, due to the smaller emigrant stock, would help to explain the higher skill content of emigration to Australia/New Zealand compared with the US (but not with Canada). But one thing that does *not* explain the difference in migrant skills is assisted migration, which, if anything, reduced the skill content of migration from the UK to Australia and New Zealand.

## Conclusion

In this paper I re-examine emigration from the UK to the three major destinations which make up four fifths of emigration from the UK in 1871-1913. These series exhibit sharp fluctuations that differ between destinations. Following the tradition of push-pull migration models, these ups and downs can be accounted for by trends in real wages, business cycle shocks and network effects. In a setting where common origin country effects are absorbed, they illustrate once more a high degree of responsiveness of emigration to foreign conditions at different destinations in the absence of restrictive immigration policies. Although any conclusion must be tentative, the provision of assisted passages by the colonial governments to nearly half of the emigrants to Australia and New Zealand appears to be an important influence on the total numbers.

I examine for the first time the differences between destinations and variations over time in the skills of adult male migrants derived from their occupational composition. One key finding is that emigrants to Australia and New Zealand were on average more skilled than those heading across the Atlantic. As the premium for skill among blue collar workers was lower in Australia, this finding is at odds with the prediction of the Roy model. A number of questions remain about how far this Roy model reversal can be accounted for by the Irish content of migration, by differences in the total cost of travel to the antipodes as compared with travel across the Atlantic, or by differences in the size and depth of migrant networks. But assisted passages do not help to resolve the puzzle. Any effect of skill-selective targeting on the skill content of migration seems to have been more than offset by the cost-reducing effect favouring the unskilled.

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**Table 1 Emigration from the UK to three destinations: USA, Canada and Australia/New Zealand, 1872-1913**

Independent variable	(1) UK gross	(2) UK net	(3) UK gross	(3) UK net
Emigration rate, t-1	1.075*** (12.79)	1.038*** (12.81)	1.104*** (12.50)	1.063*** (12.47)
Emigration rate, t-2	-0.335*** (-3.94)	-0.330*** (-4.05)	-0.361*** (-3.98)	-0.348*** (-3.98)
Emigrant stock/home population, t-1	0.030*** (3.14)	0.023** (2.55)	0.027*** (2.75)	0.020** (2.10)
Change in log destination employment rate, t	12.347*** (4.13)	14.777*** (4.73)	13.599*** (4.26)	15.904*** (4.78)
Log real wage rate, t-1	0.663** (2.09)	0.513 (1.64)	0.637* (1.87)	0.469 (1.38)
Passage cost/wage index, t-1	0.012 (0.09)	0.042 (0.29)	-0.016 (-0.11)	0.014 (0.09)
Assisted passage rate (Aus and NZ only), t	1.128*** (4.20)	1.199*** (4.22)		
Predicted assisted passage rate (Aus and NZ only), t			1.192* (1.92)	1.301** (1.98)
Assisted passage rate (Aus and NZ only), t-1	-0.861*** (-2.94)	-0.949*** (-3.08)	-0.907* (-1.71)	-0.992* (-1.77)
Dummy: Australia and New Zealand	1.249*** (2.69)	1.079** (2.19)	1.082** (2.23)	0.882* (1.71)
Dummy: Canada	0.749* (1.83)	0.630 (1.44)	0.630 (1.46)	0.470 (1.02)
R-squared-within	0.96	0.89	0.95	0.86
R-squared-overall	0.92	0.83	0.91	0.82
Breusch-Pagan test (p-value)	0.00	0.00	0.01	0.04
Hausman test (p-value)	0.30	0.41	0.23	0.29
Observations	126	126	126	126

Notes: Dependent variable is emigration per thousand of the UK population to Australia/New Zealand, Canada and the United States. Estimated with year random effects. The Breusch-Pagan test is for random year effects against the pooled regression; the Hausman test is for fixed year effects against random effects. 'z' statistics in parentheses are from standard errors clustered by year; significance levels: \*\*\* 1%, \*\* 5%, \*10%.

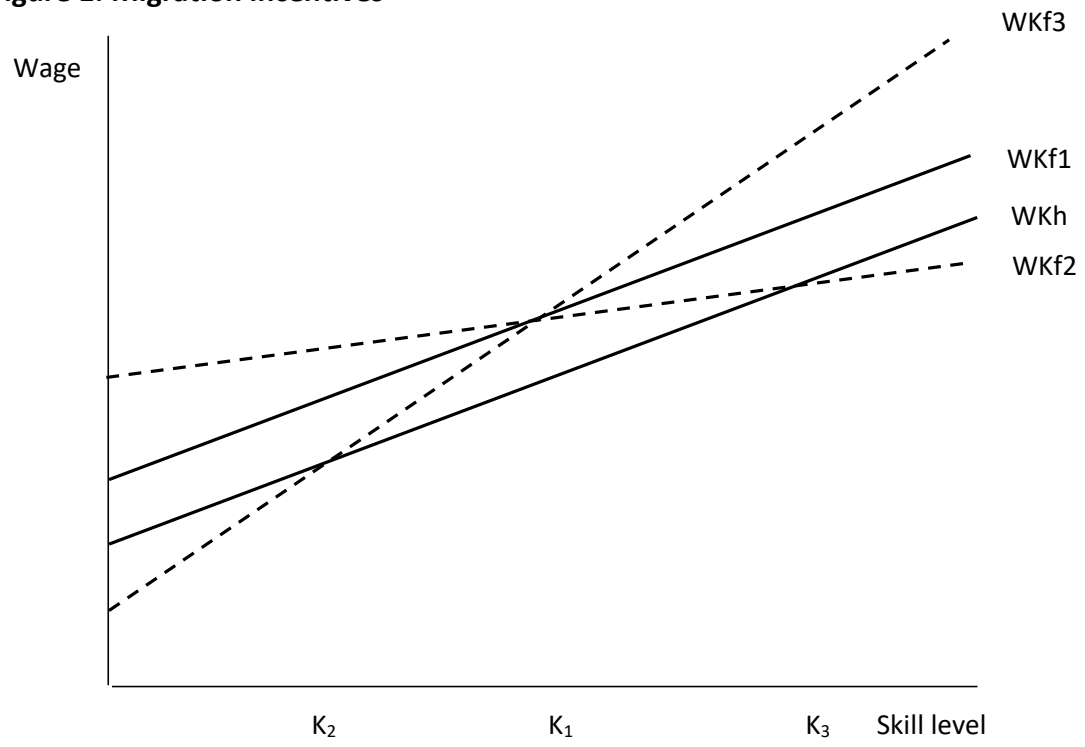


**Table 2: Share skilled in adult male emigration from the UK to three destinations: USA, Canada and Australia/New Zealand, 1878-1913**

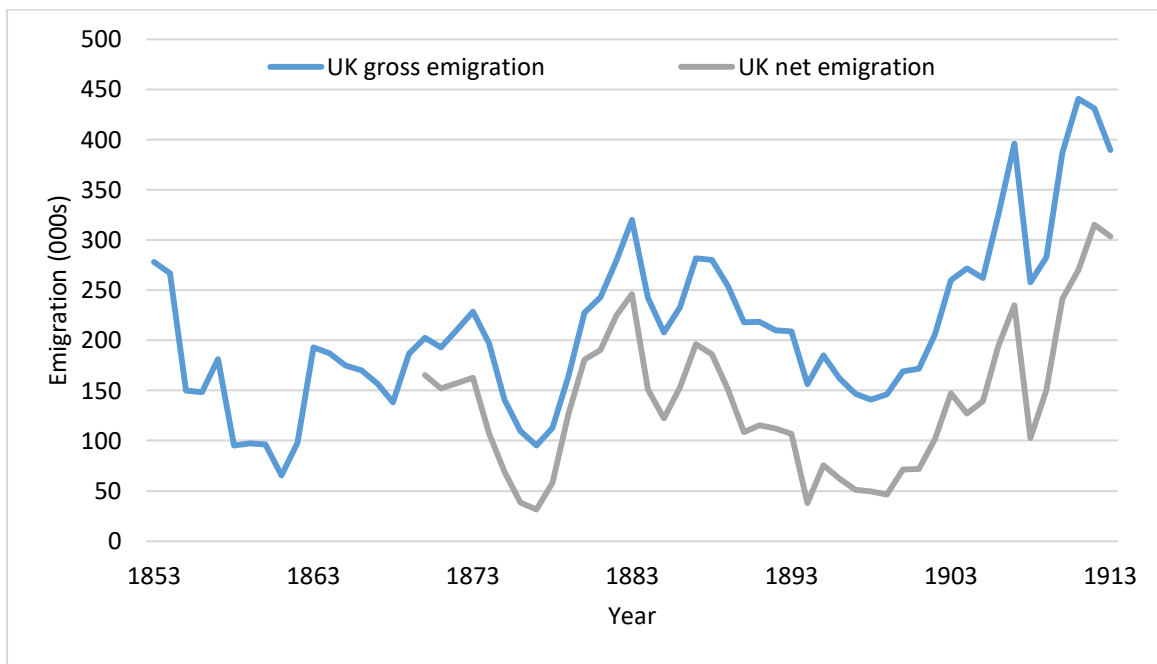
Independent variable	(1) Share skilled (narrow)	(2) Share skilled (broad)	(3) Share skilled (narrow)	(3) Share skilled (broad)
Share skilled, t-1	0.701*** (9.66)	0.674*** (9.95)	0.679*** (9.64)	0.629*** (10.06)
Emigration rate, t-1	0.024** (2.42)	0.010 (1.09)	0.016* (1.70)	0.007 (0.81)
Emigrant stock/home population, t-1	-0.005*** (-2.94)	-0.003** (-2.27)	-0.003** (-1.97)	-0.002* (-1.88)
Wage ratio (skilled/unskilled), t-1	0.068 (1.43)	0.078* (1.79)	0.062 (1.35)	0.075* (1.86)
Assisted passage share (Aus and NZ only), t	-0.066 (-1.06)	-0.102* (-1.75)		
Predicted assisted passage share (Aus and NZ only), t			-0.029 (-0.64)	-0.146*** (-3.66)
Passage cost/wage index, t-1	0.002 (0.08)	0.023 (0.85)	0.034 (1.12)	0.052** (1.98)
Share of adult males Irish, t- 1			-0.479*** (-2.69)	-0.251 (-1.63)
Dummy: Canada	-0.202* (-1.91)	-0.099 (-1.14)	-0.251** (-2.43)	-0.136* (-1.67)
Dummy: Australia and New Zealand	0.024 (0.29)	0.049 (0.66)	-0.063 (-0.73)	0.015 (0.20)
R-squared-within	0.92	0.86	0.92	0.88
R-squared-overall	0.90	0.81	0.91	0.83
Breusch-Pagan test (p-value)	0.37	0.03	0.46	0.03
Hausman test (p-value)	0.33	0.51	0.48	0.58
Observations	108	108	108	108

Notes: Dependent variable is emigration per thousand of the UK population to Australia/New Zealand, Canada and the United States. Estimated with year random effects. The Breusch-Pagan test is for random year effects against the pooled regression; the Hausman test is for fixed year effects against random effects. 'z' statistics in parentheses are from standard errors clustered by year; significance levels: \*\*\* 1%, \*\* 5%, \*10%.

Figure 1: Migration incentives

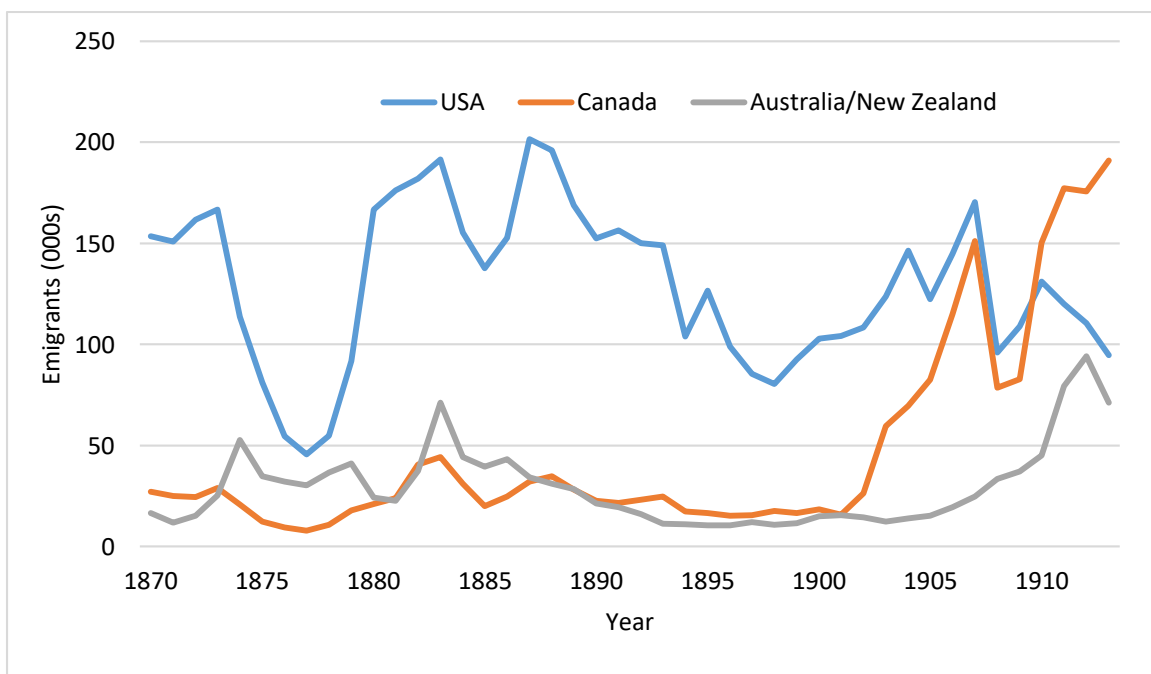


**Figure 2: UK Gross and Net Outward Passenger Movement 1853-1913**



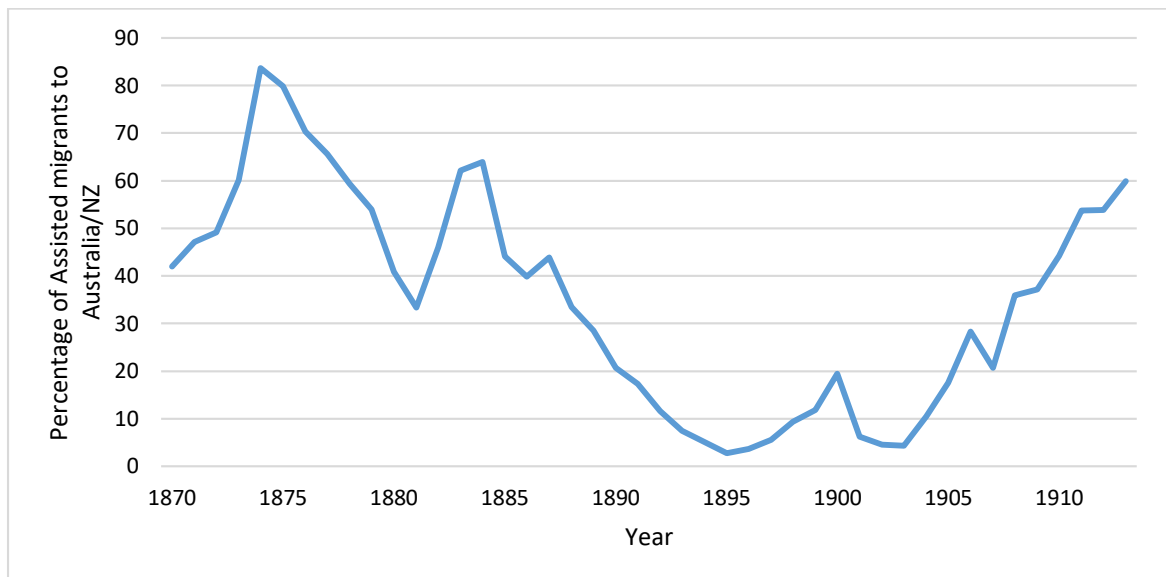
Source: See appendix.

**Figure 3: Gross Passenger Movement from the UK to Australia/New Zealand, Canada and the USA, 1870-1913**



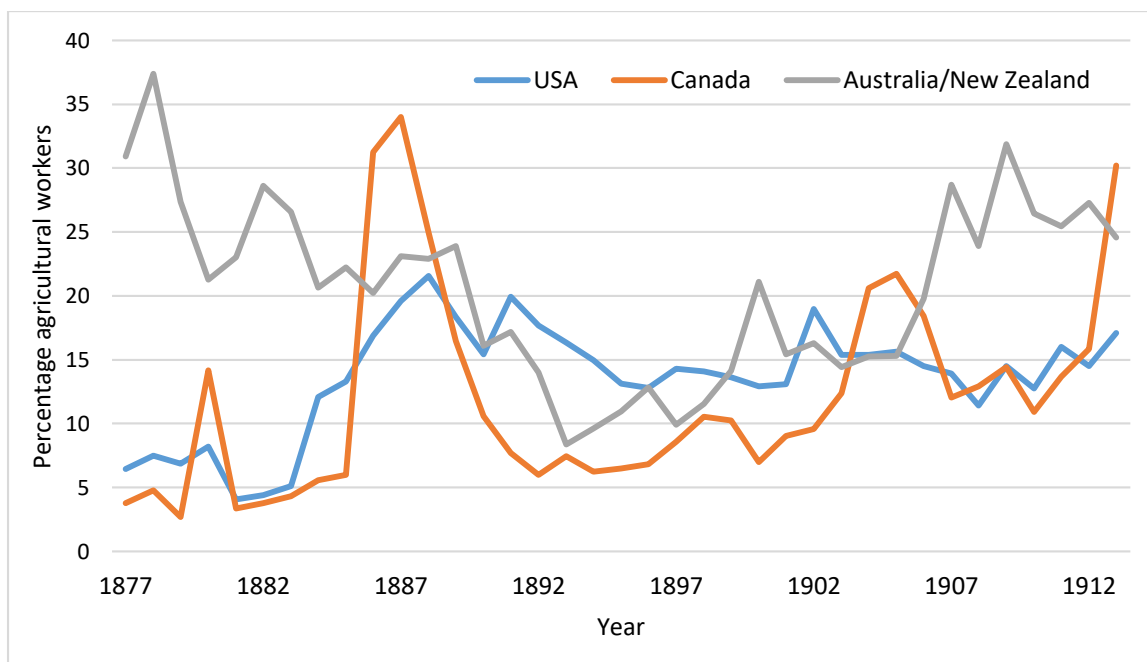
Source: See appendix.

**Figure 4: Percentage of Assisted Migrants in Gross Emigration to Australia and New Zealand, 1870-1913**



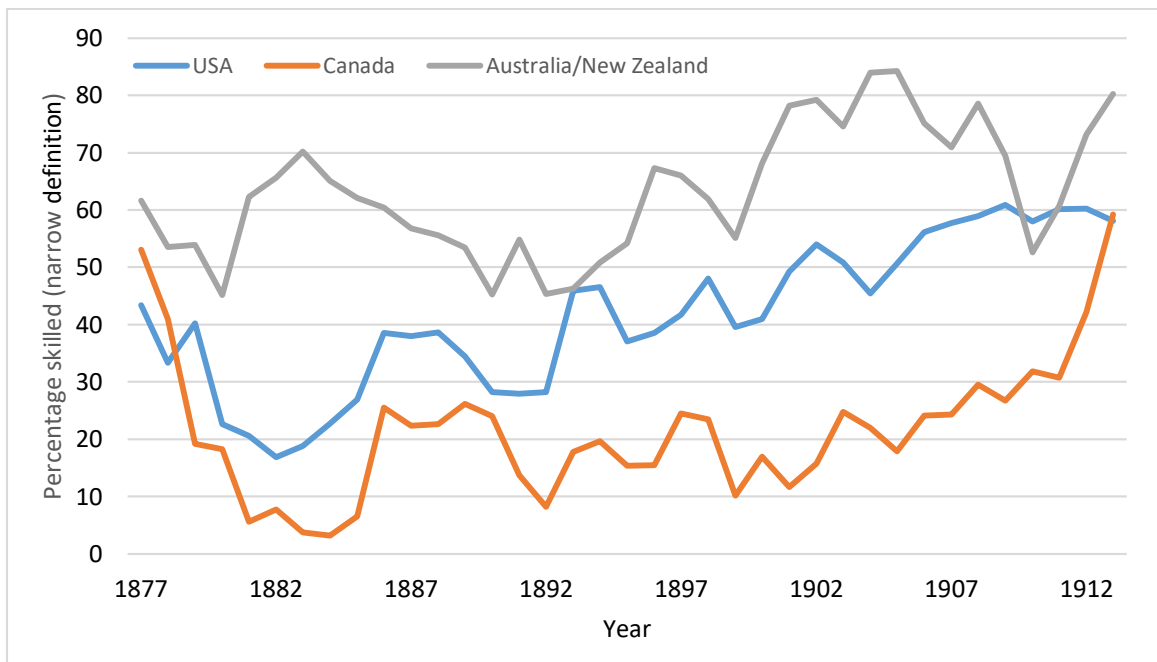
Source: See appendix.

**Figure 5: Percentage of agricultural workers in adult male emigrants to USA, Canada and Australia/New Zealand**



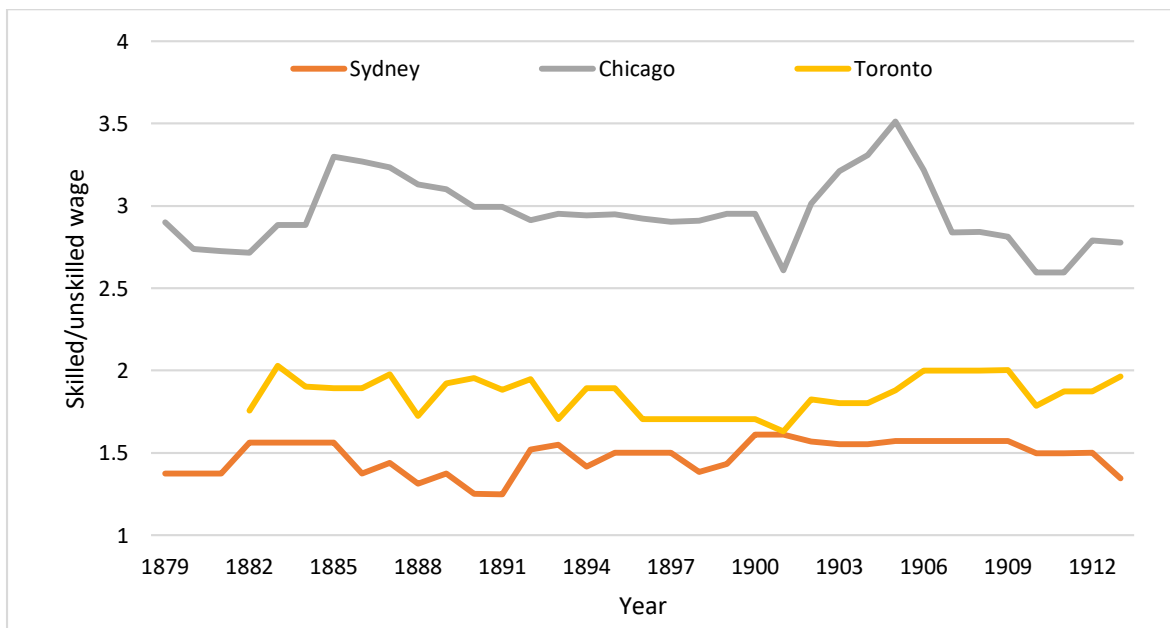
Source: See appendix.

**Figure 6: Percentage skilled (narrow definition) in adult male emigrants to USA, Canada and Australia/New Zealand**



Source: See appendix.

**Figure 7: Skill Differentials in the Building Trades: Sydney, Chicago and Toronto, 1879 to 1913**



Source: See appendix.

## Appendix: Data sources

*Emigration and population:* Gross and net passenger movements from N. H. Carrier and J. R. Jeffrey, *External Migration: A Study of the Available Statistics, 1815-1950* (General Register Office, London: HMSO, 1953), Table D/F/G (1). Inward movement for 1870-76 from I. Ferenczi and W. F. Willcox, *International Migrations*, vol. I (New York: NBER, 1929), Table XII, p. 640. Population from B. R. Mitchell and P. Deane, *Abstract of British Historical Statistics* (Cambridge: Cambridge University Press, 1962)

*Emigrant occupations:* From reports to parliament by the Board of Trade under the title "Statistical Tables Relating to Emigration and Immigration from and into the United Kingdom." Until 1902 these are listed as specific occupations plus other trades and not distinguished; from 1903 occupations are reported only in the following groups: agricultural, commercial and professional, skilled trades, labourers and other trades and not stated. The share of Irish in adult male passengers is taken from the same source.

*Assisted emigration to Australia and New Zealand:* Total assisted from F. K. Crowley, "The British contribution to the Australian population, 1860-1919," *University Studies in History*, 1954(4) Appendix II, p. 87; with amendments from R. Haines and R. Shlomowitz, "Immigration from the United Kingdom to colonial Australia: A statistical analysis," *Journal of Australian Studies*, 16(34) (1992), Table 2, p. 47-48. New Zealand assisted migration from Ferenczi and Willcox (1929), p. 1004. The predictions of assisted migration are based on a regression of assisted migration on the value of government social expenditure for Australia and New Zealand combined and a time trend. For Australia expenditure is from A. Barnard, "Government financial data, 1850-1982," ANU Source Papers in Economic History, 13 (1986), Table 1 Col. D. For New Zealand expenditure from Statistics New Zealand, Long term data series D2.2, D2.3 and D2.6, at: [http://archive.stats.govt.nz/browse\\_for\\_stats/economic\\_indicators/NationalAccounts/long-term-data-series.aspx#](http://archive.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/long-term-data-series.aspx#).

*Passage fares:* USA and Canada steerage fares on the Cunard line 1883-1913 from D. Keeling, 'The Voyage Abstracts of the Cunard Line as a Source of Transatlantic Passenger Fares, 1883-1914,' *Business Archives Sources and History* 96 (2008), pp. 15-36, Appendix I, updated by the author; 1870-1883 New York/UK steerage fares from, Dupont, B, Keeling, D. and Weiss, T. (2017), 'First cabin fares from New York to the British Isles, 1826-1914,' *Research in Economic History*, 33, pp. 19-63, Table A5, p. 62. Australia to 1885 from J. McDonald and R. Shlomowitz, 'Passenger Fares on Sailing Vessels to Australia in the Nineteenth Century' *Explorations in Economic History*, 28 (1991), Table 1 p. 196; extended to 1913 with freight cost index for UK to Southeast Asia from S. I. Shah Mohammed and J. G. Williamson, 'Freight rates and productivity gains in British tramp shipping 1869-1950,' *Explorations in Economic History*, 42(2) (2004), Table 1 p. 179-80. Converted into real terms using the UK cost of living index from C. H. Feinstein, "Changes in Nominal Wages, the Cost of Living, and Real Wages in the United Kingdom over Two Centuries, 1780-1990," in P. Scholliers and V. Zamagni (eds.), *Labour's Reward*, Aldershot: Edward Elgar (1995), Table A.24 pp. 263-5.

*Migrant stock:* Benchmarks for the population born in the UK and in Great Britain, residing in the United States and Canada in census years from Carrier and Jeffrey (1953), Table 3. Australia from D. Lucas, 'United Kingdom-born people in Australia', in 1996 Census Community Profiles (Canberra: Department of Immigration and Multicultural Affairs, 2000), p. 3. New Zealand from Census of Population (Wellington: Government Printer, various dates). Annual migrant stock series were calculated by interpolating between census benchmarks using the relationship  $St = NM + dSt-i$ , where

S is the stock, NM is net passenger movement detailed above, and d is a parameter calculated for each interval between censuses.

*Unemployment rates:* United States from J. R. Vernon, 'Unemployment Rates in Post-Bellum America, 1869-1899', *Journal of Macroeconomics* 16 (1994), p. 710. For Canada an unemployment rate was constructed by regressing a non-linear transformation of the employment rate on the deviation of per capita real income from its logarithmic trend 1916-1926 and then extrapolating backwards. The employment rate was taken from W. Galenson and A. Zellner, 'International Comparison of Unemployment Rates', in National Bureau of Economic Research, *The Measurement and Behaviour of Unemployment* (Princeton, NJ: Princeton University Press, 1957), PP- 439\_480, and real GNP per capita from M. C. Urquhart, 'New Estimates of Gross National Product: Canada, 1870-1926', in S. L. Engerman and L. E. Gallman (eds.), *Long Term Factors in American Economic Growth* (Chicago, IL: National Bureau of Economic Research, 1986), pp. 9-94. Australia from N. G. Butlin, 'An Index of Engineering Unemployment, 1852-1943', *Economic Record* 22 (1946), pp. 241-60. This index was transformed using the relationship between unemployment in production industries and total unemployment estimated in UK from G. R. Boyer and T. J. Hatton, 'A New Index of British Unemployment, 1870-1913', *Journal of Economic History* 62 (2002).

*Real wage rates:* Purchasing power parity adjusted unskilled wage rates for Great Britain, Ireland, USA, Canada and Australia from J. G. Williamson, 'The evolution of global labor markets since 1830: background evidence and hypotheses', *Explorations in Economic History* 32 (1995), pp. 141-96. An index for the UK is calculated by giving a weight of 0.3 to Ireland and 0.7 to Great Britain.

*Skill premium:* Ratio of bricklayers' to building labourers' wage rates for Chicago, Toronto and Sydney from Allen, R.C. 'Real incomes in the English-speaking world, 1879-1913,' in G. Grantham and M. MacKinnon (eds.), *Labour market evolution: The economic history of market integration, wage flexibility and the employment relation*, (London: Routledge, 1994) Series for Toronto carried back from 1900 using the mean of the range for carpenters and general labourers from M. C. Urquhart and K. A. H. Buckley, *Historical Statistics of Canada*, (Toronto: Cambridge University Press, 1965) Series D198, D199, D204 and D205, pp. 94-95. These series are taken back to 1877-8 on the basis of  $0.788 + 0.212(Y/W)$ , where Y is real GDP per capita and W is the real wage, respectively from Maddison at: <https://www.rug.nl/ggdc/historicaldevelopment/maddison/> and Williamson (1995).