

Transatlantic wage gaps and the migration decision: Europe–Canada in the 1920s

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Abstract As has been seen in other contexts, workers in similar occupations earned much higher wages in Canada than Europe during the 1920s. This observation and related aspects of immigration are addressed with a life-cycle model of the migration decision. The characteristics of immigrants from five European countries: Ireland, Italy, the Netherlands, Poland, and Sweden, are explored in a way that sheds light not just on those population flows but on the process of immigration generally. We draw on passenger manifests from immigrant ships for information on the individual migrants. Simulations, based partly on the these manifests, reveal that the costs of migration, borrowing constraints, concern for status, and country-specific taste preferences account for key immigrant characteristics, and help explain the large wage differentials that persisted despite Canada’s relatively open immigration policy.

Keywords Immigration · Wage differentials · Borrowing constraints · Status

JEL Classification J61 · N32 · N34

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1 Introduction

Historical research on international migration has shifted in recent years from the performance of immigrants and their impact on destination countries to the factors that determine the characteristics of immigrants. Underlying this question are the incentives to migrate. Motives varied, but the large movements, especially to the New World, are now seen as having been due primarily to economic factors—the expectation of higher living standards. Put starkly migration took place because wages in the receiving country, appropriately adjusted, exceeded those in the home country. This approach to migration has produced important insights, but one feature hard to reconcile is the apparently insufficient response to wage differentials of those in the sending countries. Consider some late-nineteenth-century comparisons between the New and the Old World, when government restrictions on immigration were minimal. Williamson (1995, 154–156) estimates, for example, that in the 1870s wages were 70 % higher in the USA than in Britain, 100 % higher than in Germany, and 340 % higher than in Italy.¹ Contrast these gaps with the sort of equilibrium differentials one might expect in a world where migrants receive a normal return on their moving costs. Assuming migration costs approximated annual earnings in the sending country, the amortized cost would roughly equal the discount rate.²

Clearly factors other than a normal return on moving costs influenced migration, as is recognized throughout the migration literature. Massey et al. (1993) provide a good generic description of the migration decision:

$$E[R] = \int_0^T \{E[Y_R(t)] - E[Y_H(t)]\}e^{-rt} dt - C, \quad (1)$$

where R is the net return from migration, $Y_{R(H)}$ is income in the receiving (home) country, C is the cost of moving, 0 is emigration time, T is future lifetime, r is the discount rate, and $E[\cdot]$ is the expected value of a variable.³ Each period a decision is made about whether to emigrate. Once the expected net return from migration, $E[R]$, is positive, the individual moves. If the expected return from migration is never positive, the individual remains in the home country. In this formulation, the cost of

¹ Hatton and Williamson (1994, 35) also document the change in the ratio of real wages in sending and receiving countries over the period 1850–1913. Their results for the 1870s are similar. For a discussion of antebellum immigrants, see Ferrie (1999).

² At about this time Liverpool to New York fares for passengers travelling steerage were about \$15–\$20, and the voyage averaged 44 days (Babak 1931, 166; Gould 1979, 612–613). Annual earnings of lower-skilled urban workers in the USA were roughly \$300 (U.S. Bureau of the Census 1975, 164, 165, 168 [based on 1880 with an allowance for unemployment]). The fare of \$20 as a percentage of annual earnings in the sending countries would have been about 10, 15, and 30 % for Britain, Germany, and Italy, respectively.

³ In this formulation, income in both the home and receiving country is uncertain, but the discount rate, moving cost, and future lifetime are known. In most models, as in ours, migration is treated as an individual decision. Certainly there were those who emigrated as a family, but adding this complication should not affect the underlying insights. It might be noted that in our sample of immigrants to Canada, just 7 % were accompanied by a spouse, and only 5 % had accompanying children (Table 3).

moving includes not just the price of a ticket, but also the foregone earnings in transit and any shortfall in earnings during the initial stage of settlement. More importantly, C is also understood to include the *psychic* costs of emigrating, such as separation from family and friends.⁴ The introduction of psychic costs can in principle account for any wage difference between countries, but combining psychic costs with measures of conventional cost hides features of this type of barrier that can have significant implications for our understanding of migration.

An important strand of the migration literature draws on Borjas' (1987) path-breaking work. Taking Roy (1951) as a starting point, Borjas emphasizes the impact of the earnings distribution in the home and sending countries. The idea is that returns to skill differ across countries, and this can affect who migrates. In recent work, Abramitzky et al. (2012) and others also explore the role of self-selection in migration decisions.⁵ In this paper, we capture some features of these migration models by using an approach that shifts the emphasis from income to utility. Rather than comparing incomes in the home and destination countries, potential migrants are assumed to make explicit lifetime utility calculations. Our model includes many of the same elements that have been found to play key roles in migration decisions, but by combining them in a lifetime utility framework, we shed light on the nature of the migrants and, in particular, on cross-country differences in immigrant characteristics. We make the usual assumption that migration entails a psychic cost, but rather than embed it within conventionally defined costs, we introduce a taste parameter. We also include a concept formalized by Roy (1951) and first addressed empirically by Easterlin (1974), namely that utility ("happiness") depends on one's status in society.⁶ In the context of our model, we assume that potential immigrants care not just about their income, as conventionally defined, but also where they are on the income distribution.

Finally, we remove the assumption, implicit in Eq. (1), that migrants can cover the cost of the move by borrowing. Work on historical population flows argues that raising the funds for long-distance migration was a serious obstacle. The borrowing constraint as a barrier to emigration is raised, for example, by Hatton and Williamson both in the introduction to their edited volume on international migration and in *The Age of Mass Migration* (Hatton and Williamson 1994, 8–11; 1998).⁷ And in her discussion of Polish immigration to Canada, Ann Reczyńska

⁴ Chiswick's (2000) approach is much the same, although his model does not include uncertainty and future lifetime is treated as infinite.

⁵ While shedding light on the question of self-selection, our paper emphasizes the role of tastes in determining the wage incentives required by potential migrants and the effect of their position on the wage distribution.

⁶ For a review of research on happiness that includes the impact of place on the income distribution see Frey and Stutzer (2002).

⁷ In their chapter on Italian emigration in the Hatton–Williamson edited volume, Faini and Venturini (1994) also emphasize the role of financial constraints in limiting migration. An inability to borrow was even more restrictive in earlier years. During the seventeenth and eighteenth centuries more than half the free immigrants to the Thirteen Colonies came as indentured servants, an arrangement that emerged to deal with a borrowing constraint faced by low-wage workers in Europe. Unable to pay for their passage, workers signed indenture contracts that were sold in America. See, for example, Galenson (1981); among his many publications on indentured servitude, Grubb (1985, 1994).

(1996, 14) points out that “because of the high cost of travel, especially overseas, the poorest people contributed little to the wave of emigration”. Here we formalize the borrowing constraint by requiring that, unless they receive funding from family or friends, migrants must save in order to cover the cost of the passage and other expenses associated with moving to a new country. There is a considerable literature on “chain” migration that highlights how relatives and friends helped new arrivals to the USA (Wegge 1998a, b; Rosenbloom 2002, 17–24). Many immigrants to Canada also received support, but it tended to come in the form of information, and social and economic contacts.⁸ There is little evidence of significant financial aid. More than 85 % of the immigrants in our sample reported to the immigration agents that they paid their own fare.⁹

The taste parameter, concern for status, and a borrowing constraint are all part of a life-cycle model, where an individual chooses optimal migration time, and based on that optimal time, compares lifetime utility if they do or do not migrate. In Armstrong and Lewis (2012), we considered migration from the Netherlands to Canada using a life-cycle framework where our emphasis was on savings and migration time. Here we extend the analysis to four more European countries: Ireland, Italy, Poland, and Sweden. The workers in these countries were paid a wide range of wages and had different characteristics, such as language, that would have affected their ability to integrate into the Canadian economy. The variety of experiences has led us to shift the focus towards the role of tastes and the importance of status in affecting migration decisions. One can find in the migration literature features similar to those in our model. What we offer is a unified approach. Specifically, potential migrants are motivated by the single objective of maximizing lifetime utility. The result is a range of useful and perhaps surprising insights related to the large occupational wage gaps between Canada and Europe during the 1920s.

We draw on a range of sources. Wages and prices across countries are drawn mainly from the *International Labour Review*, which allows us to document the gap in wages between Canada and Europe. Estimates of per capita income, now available for a wide range of countries, help us introduce status as a factor in migration decisions. But perhaps most importantly, we make use of the immigration passenger lists of ships that arrived in Canadian ports over the period 1925–1929. Earlier manifests have been used to analyse the ages and occupations of immigrants (Green and Green 1993; Green and MacKinnon 2001), but in 1925 the number of questions was expanded to include the immigrant’s contact person in Canada, their cash holdings on arrival, and a statement of whether they paid their own fare. The additional information plays a key role in our analysis.

⁸ For a discussion of chain migration from Italy to North America that has a focus on Canada, see Sturino (1990).

⁹ Employment agencies were in operation in addition to the more informal arrangements for those nationalities who already had established communities in Canada. Still, unlike the indication in Rosenbloom (2002) for the USA, a large majority of immigrants to Canada paid their own travel costs. The breakdown for the five countries in our sample over the period, 1925 to 1929, is: Ireland—61 %; Italy—96 %; Netherlands—95 %; Poland—85 %; Sweden—94 %.

2 Canadian policy and immigration during the 1920s

As had been the case before World War I, Canadian immigration policy in the 1920s was guided primarily by economic considerations. Whereas in the late nineteenth and early twentieth century the objective was to populate the Prairies, the end of hostilities in Europe brought a shift in policy towards labour market demands. In practice, a preferential system was set up to encourage immigrants from “acceptable” countries in terms of race and background, the argument being that these immigrants would assimilate more easily. The *Canada Yearbook* of 1929 (pp. 165–166) lays out the criteria: “...preferable settlers are those who speak the English language—those coming from the United Kingdom and the United States. Next in order of readiness of assimilation are the Scandinavians and the Dutch, who readily learn English and are already acquainted with the working of free democratic institutions. Settlers from Southern and Eastern Europe, however desirable from a purely economic point of view, are less readily assimilated”.¹⁰

Immediately after the war, immigration policy was highly restrictive due to concerns about the lack of work for returning soldiers. Prohibitions were imposed on nationals of enemy countries, and others deemed politically dangerous.¹¹ Those who were permitted entry but were without employment or families already living in Canada were required to have \$250 cash upon arrival. As the post-war recession eased, the government of MacKenzie King reduced restrictions including removal of the cash requirement. To attract agricultural workers, the Dominion government looked increasing towards continental Europe. Called the Railway Agreement, provisions were negotiated in 1924 and 1925 with the Canadian National Railway (CNR) and Canadian Pacific Railway (CPR) whereby farm workers were recruited, especially from the non-preferred countries of Eastern Europe.¹²

By 1926, a semi-official four-tiered admissions system was in effect. Britons and Americans entered freely as long as they could demonstrate the capacity to support themselves or had employment lined up. Those from preferred countries (Northern Europe and Scandinavia) could enter if they had family or they intended to pursue a designated occupation, such as farm work. Those from non-preferred countries (Southern and Eastern Europe) required special permits and could enter only if their occupation was in a designated category. In many cases, ethnic organizations and immigrant aid societies helped secure permits. Those from other countries were effectively excluded. Canada’s relatively open immigration policy of the 1920s contrasted with the highly restrictive 1921 and 1924 “per centum” acts in the USA. The sharp policy difference likely contributed to the considerable flow of

¹⁰ This statement corresponds quite well to Borjas (1987), which finds that the wages of immigrants with the characteristics described in the *Canada Yearbook* converged more rapidly to the wages of natives. Similar findings for immigrants from English-speaking countries to Canada during the early twentieth century are reported in Inwood et al. (2015).

¹¹ Among the prohibited groups were Mennonites, Hutterites, and Doukhobors.

¹² Kelley and Trebilcock (1998, 195) estimate that under the Railway Agreement, 185,000 Europeans entered Canada between 1925 and 1929.

immigrants in the latter half of the decade.¹³ In this paper, we deal with part of that flow.

Of the five immigrant groups considered, the Irish were by far the most established. In 1921, 1.1 million or 12 % of the Canadian population were of Irish origin. Irish immigration to Canada in the 1920s was set against the backdrop of the Republican struggle against Great Britain and the declaration of the Irish Free State in 1922. In 1923, the Irish government lifted its ban on promoting emigration and departures increased. A sizeable share of those emigrating from the south were Protestants seeking to flee a hostile political and economic environment. Meanwhile, Unionists in the North generally opposed immigration on the grounds of maintaining their numbers.

Another group with an established presence were the Italians, who were concentrated in the cities, especially Toronto and Montreal. Despite the employment prospects in the Prairies and rural areas of Ontario, Italian immigrants in the 1920s were drawn predominantly to these urban centres with their more familiar cultural environments.¹⁴ In the early to middle part of the decade, the Italian government encouraged overseas emigration in order to relieve economic pressure, especially in the rural south, but in 1927 this policy was reversed by Mussolini and Italian immigration fell to a trickle.

The Dutch government also adopted a pro-emigration policy following the war, in response to high unemployment. Potential emigres from the Netherlands, a preferred country, were aided by full-time immigration recruitment agents working for the CNR and CPR. The agents arranged for passage and offered post-arrival assistance. Also promoting Dutch emigration were a number of public and semi-public institutions that provided information to prospective immigrants and helped them secure employment. Partly as a result of these efforts, Dutch immigration increased from close to zero in the early 1920s to about 1500 per year from 1926 to the end of the decade.

Prominent among those nationalities to benefit from the Railway Agreement were the Poles. A chaotic political and economic situation in the newly proclaimed Polish Republic and low entry quotas to the USA contributed to a wave of emigration to Canada. Supporting this flow was the Polish government, which was struggling to cope with weak economic conditions. Most Polish immigrants had contracts stipulating farm work, generally in one of the Prairie Provinces. Still, many opted for employment in the extractive industries or moved to the large eastern cities. Realizing this, the Canadian Immigration Office organized direct, supervised rail transportation to work destinations (Reczyńska 1996, 140–162).

¹³ On the impact of US immigration policy on immigration to Canada see Kelley and Trebilcock (1998, 210) and Lew and Cater (2002).

¹⁴ Since moving to a city conflicted with the official objective of attracting agricultural workers, a system emerged whereby prospective immigrants would obtain, via a family or acquaintance in Canada, an offer of employment from a Canadian farmer. The offer would then be used to gain entry into Canada even if the immigrant had no intention of taking the job. Since the supply of legitimate invitations fell short of the demand, a market arose in which a farmer would sign a fraudulent invitation in exchange for a payment of between \$25 and \$75. In time, even farmers with bona fide requests for workers demanded these kickbacks (Ramirez 1989; Sturino 1988).

Table 1 Arrivals to Canada by nationality in the 1920s

	Ireland	Italy	Netherlands	Poland	Sweden	Total
1920	2751	1165	154	112	241	4423
1921	6384	3880	595	5861	715	17,435
1922	3572	2413	183	7923	442	14,533
1923	3668	2074	119	4300	948	11,109
1924	9719	6379	1149	5419	3536	26,202
1925	9379	2349	1637	3456	2138	18,959
1926	8118	1590	1155	8128	1076	20,067
1927	11,553	3313	1567	18,010	2061	36,504
1928	11,722	3574	1625	19,067	2652	38,640
1929	12,966	782	1239	25,805	2742	43,534
Total	79,832	27,519	9423	98,081	16,551	231,406
Population ^a (thousands)	4361	37,398	6848	23,968	5876	78,451

On the low value for Italy in 1929, see text

Sources: 1926, 1927–1928, and 1930 *Canada Yearbooks*; Maddison (2003); Leacy (1983, A1)

^a In 1920 the Canadian population was 8,556,000

Despite a reduction in the quota stipulated in the Railway Agreement, Polish immigration to Canada was high throughout the 1920s, and especially so during the latter part of the decade.

Like the Netherlands, Canadian immigration policy treated Sweden as a preferred country. A recession in 1923 contributed to a peak in emigration to Canada in the early 1920s; meanwhile, the Canadian government continually pressed the Swedish authorities to allow advertising to attract more immigrants. During the 1920s, the increase in Swedish immigration to Canada also saw a shift from emigrating families to single men (St. Jean 2004, 40). Many of them settled in British Columbia finding work on the railways or in mining, logging, and fishing. In the latter part of the 1920s, however, an economic boom in Sweden led the government to discourage emigration.

Table 1 reports immigration to Canada from the five countries. There was little in 1920, a residual effect of the war, but arrivals jumped to 17,400 in 1921 and continued to increase during the decade. For the entire period, Ireland and Poland were the most important source countries, with Poland becoming the dominant sender of immigrants. Still, emigration to Canada had a small to negligible effect on the populations of all the sending countries. The average was 0.29 %, but with significant differences. Perhaps surprisingly, Italy sent proportionately the fewest, just 0.07 % of its 1920 population; the Netherlands rate was twice that, 0.14 %, while Sweden and Poland had percentage rates of 0.28 and 0.41, respectively. By far the highest emigration rate to Canada was from Ireland at 1.83 % or twenty-five times the rate from Italy. The impact on Canada was, of course, much greater. Immigration from the five countries totalled just under 3 % of the 1920 Canadian population.¹⁵

¹⁵ Immigration from all countries was 1,264,000 or 14.9 % of the 1920 Canadian population (Leacy 1983, A350). There was little return migration among these groups.

We shed light on these immigrants by turning to the passenger lists of arrivals from 1925 to 1929, when immigration from the five countries totalled 158,000.¹⁶ We have observations on 22,095 adult male arrivals and their families of whom 4965 were identified as being of Irish nationality; 4904 were identified as Italian; 2976 as Dutch; 4815 as Polish; and 4435 as Swedish.¹⁷ The passenger lists include information on the immigrant's age, occupation in the country of origin, intended occupation, contact person in Canada, whether they paid their own passage, and cash holdings on arrival. Wives and children accompanying the male household heads are also identified. Quebec City, Halifax, and Saint John (New Brunswick) were the principle ports of entry.

The savings of new immigrants are derived by adding the cost of the journey, if the immigrant paid their own passage, to cash on arrival. In the late 1920s, the transatlantic fare for an adult travelling third class from Belfast, Ireland to Quebec City was \$90 (see Table 2). Those coming from continental Europe paid somewhat more, the highest fares being from Stockholm at \$118. Those moving further into the interior by rail paid an additional \$10. For those coming with families, we include the fares of the other family members and assume those under age 18 paid half the adult fare.

We assign an immigrant's occupation in the originating country to one of four wage classes. Those who were farmers or other agricultural workers are placed in the low wage class, with the exception of those farmers who arrived with more than \$500 cash. We assume these immigrants, of whom there were very few, intended to purchase farms. We put them in the high wage class. Unskilled workers are placed in the medium-low wage class, and skilled workers in the medium-high wage class.¹⁸ Professionals and entrepreneurs are considered to be high wage types. The immigrant's contact in Canada is categorized as: employer, family, or other.

Table 3 reports sample statistics. The mean age of the immigrants was just over 28 years, with Poles and Italians slightly older. The dispersion across nationalities of cash holdings was more pronounced. The Irish, Italians, and Swedes averaged about \$75, while Dutch immigrants brought more than twice that amount and the Poles far less. Adding the cost of the journey to immigrants' cash holdings brings total savings for all but the Dutch to between \$140 and \$200. The Dutch saved more

¹⁶ The records were retrieved from the Canadian Library and Archives Immigration Passenger List database through the website, *ancestry.ca*. Records for each individual arrival are searchable by name, nationality, data of arrival, and other criteria. The search results provide a link to the original passenger list record which has the information to construct the data set. We initially searched for records by year and nationality and drew roughly equally sized samples for each year (1925–1929) based on the alphabetized order of the search results. This should insure that the samples for each country are random. In the case of observations of immigrants from the Netherlands, fewer than 1000 legible records could be retrieved for each year, which accounts for the smaller sample size for that country.

¹⁷ Students and visitors are excluded.

¹⁸ The assignment of occupations to wage classes is based on weekly wages reported in the *Labour Gazette* (Canada) in the period 1925–1929. The wage classes are: *low* - less than \$17.50, *medium low* - \$17.50–\$22.50, *medium high* - \$22.50–\$30.00, *high* - over \$30.00. Ideally the assignment would be based on wages in the originating countries, but we have less occupational data for Europe. The Canadian data, however, are a good substitute for our purposes (Armstrong and Lewis 2012, 747).

Table 2 One-way transatlantic fares in the late 1920s (Cdn dollars)

Origin	Ireland (Belfast)	Netherlands (Rotterdam)	Sweden (Stockholm)	Poland (Danzig)	Italy (Turin)
Third class	90	113	118	107	95
Cabin class	122	153	159	144	128
First class	188	236	247	224	199

Sources: Canadian Pacific Railway (1925a, b)

Table 3 Characteristics of European immigrants to Canada, 1925–1929

	Ireland	Italy	Netherlands	Poland	Sweden	All
Age						
Mean	27.8	28.9	27.4	29.2	26.8	28.1
Median	25.0	26.0	25.0	28.0	25.0	26.0
SD	8.4	9.7	7.9	6.8	7.9	8.3
Mean cash on arrival (dollars)	78.2	75.3	163.9	45.6	74.5	81.3
Mean savings (dollars)	141.4	173.8	316.1	161.1	199.9	188.2
Accompanied by wife (%)	9.1	1.7	16.8	8.0	3.0	7.0
Accompanied by children (%)	7.0	1.3	12.1	6.4	2.1	5.3
Intended occupation						
Agriculture (%)	79.4	78.4	91.9	95.8	92.6	87.1
Non-agriculture (%)	20.6	21.6	8.1	4.2	7.4	12.9
Contact (%)						
Employer	4.4	33.3	24.5	8.2	1.5	11.9
Family	25.3	51.6	16.4	12.9	23.2	26.8
Other	70.4	15.1	59.1	78.9	75.2	61.3
Wage class (%)						
High	2.3	2.4	7.6	0.7	2.4	2.7
Medium high	10.0	6.8	10.0	2.2	8.5	7.3
Medium low	15.7	17.2	7.6	1.2	10.1	10.7
Low	72.0	73.6	74.8	95.9	79.0	79.3
Observations	4965	4904	2976	4815	4435	22,095

See text for variable definitions. Source: Canada, library and archives, passenger lists 1865–1935

than \$300.¹⁹ More than 90 % of the Dutch, Polish and Swedish immigrants stated the intention of entering agriculture, as compared to 80 % of the Irish and Italians. The difference was likely due to the concentration of the Irish and Italians in

¹⁹ Part of the difference in average savings between the Dutch and the other nationalities is attributable to the fact that the Dutch immigrants were far more likely to be travelling with families. This influences the amount of savings directly through the added cost of fares and indirectly through a greater cash requirement after arrival.

Canada's urban centres. There were marked differences across nationalities in an immigrant's Canadian contact. Italians received the most initial support; 85 % were meeting an employer or family member. Next were the Dutch at 40 %. The picture was very different for the other immigrants. More than 70 % had neither an employer nor a family member as a contact, and fewer than 10 % were meeting an employer. We would not want to understate, however, the ability of these immigrants to integrate into the Canadian workforce. Immigration rules and the Railway Agreement, together referred to as the "farm labour system", directed new immigrants to farm work, which was the intended occupation of the vast majority.²⁰ Across countries, the wage classes of the immigrants were similar. Other than the Dutch, about 90 % were drawn from the low and medium-low wage classes, with the Poles being even more predominantly (over 95 %) in the lowest wage occupations.

3 The decision to migrate: a life-cycle model²¹

We address immigration to Canada from the five countries with a life-cycle model. A potential emigrant faces two related decisions: when and whether to migrate. Affecting these decisions are their inability to borrow for the move and a taste preference between the home and receiving countries, typically in favour of the home country. Lifetime utility of the non-migrant is:

$$U^H = \int_0^T \{u[c(t)] + \tau\} e^{-\rho t} dt, \quad (2)$$

where u is per-period utility, c is consumption, τ is the per-period utility benefit of living in the home country, ρ is the pure rate of time preference, and T is lifetime. The emigrant loses the benefit, τ , after they migrate, and so their lifetime utility is given by:

$$U = \int_0^{t_0} \{u[c(t)] + \tau\} e^{-\rho t} dt + \int_{t_0}^T u[c(t)] e^{-\rho t} dt, \quad (3)$$

where t_0 is migration time. There is no non-labour income initially, and the wage depends on whether the agent is in the home or receiving country. Given a moving cost, K , the income stream over the lifetime is given by:

²⁰ On Italian immigration and the farm labour system, see Sturino (1988).

²¹ The model follows Armstrong and Lewis (2012), which looked specifically at migration to Canada from the Netherlands. In that paper the emphasis was on savings and the timing of migration. Although both are important elements here, our focus is on the wage differentials between Canada and five source countries and on showing how differences across these countries shed light on the characteristics of the immigrants.

$$y(t) = \begin{cases} w_h(t) & 0 \leq t < t_0 \\ w_h(t_0) - K & t = t_0 \\ w_r(t) & t_0 < t \leq T \end{cases} \quad (4)$$

where $w_h(t)$, $w_r(t)$ is the wage of the immigrant in the home, receiving country. Migrants are unable to borrow to pay for the move, implying:

$$\int_0^{t_0} c(t)e^{-rt} dt \leq \int_0^{t_0} y(t)e^{-rt} dt, \quad (5)$$

where r is the discount rate. The constraint will be satisfied with equality, allowing the optimization to be segmented into the periods before and after migration.²² Prior to migration, optimal consumption is determined by the home country wage and the costs of emigrating:

$$\max_{c(t)} U_0 = \int_0^{t_0} u[c(t)]e^{-\rho t} dt + \lambda \left\{ \int_0^{t_0} [w_h(t) - c(t)]e^{-rt} dt - Ke^{-rt} \right\}. \quad (6)$$

The first-order conditions yield the solutions:

$$u'[c^*(t)] = u'[c^*(0)]e^{(\rho-r)t} \quad 0 \leq t < t_0 \quad (7)$$

and

$$\int_0^{t_0} [w_h(t) - c^*(t)]e^{-rt} dt - Ke^{-rt_0} = 0, \quad (8)$$

where $c^*(t)$ is optimal consumption at time, t . Equation (8) requires that cumulative savings at migration time equal the cost of migration. In the second period, t_0 to T , the agent chooses optimal consumption based on the wage in the receiving country. The optimization solution takes the same form as Eq. (7). Migration time is chosen to maximize lifetime utility under the assumption that the agent chooses the optimal consumption paths during the periods before and after migration:

$$\max_{t_0} U = \int_0^{t_0} \{u[c^*(t)] + \tau\}e^{-\rho t} dt + \int_{t_0}^T u[c^*(t)]e^{-\rho t} dt. \quad (9)$$

Finally, the decision to migrate requires that lifetime utility, assuming migration is at the optimal time, is at least as great as lifetime utility if the person does not migrate

$$\int_0^{t_0} \{u[c^*(t)] + \tau\}e^{-\rho t} dt + \int_{t_0}^T u[c^*(t)]e^{-\rho t} dt \geq \int_0^T \{u[c_h^*(t)] + \tau\}e^{-\rho t} dt, \quad (10)$$

²² An approach that solves the model with a single lifetime optimization equation leads to the same results.

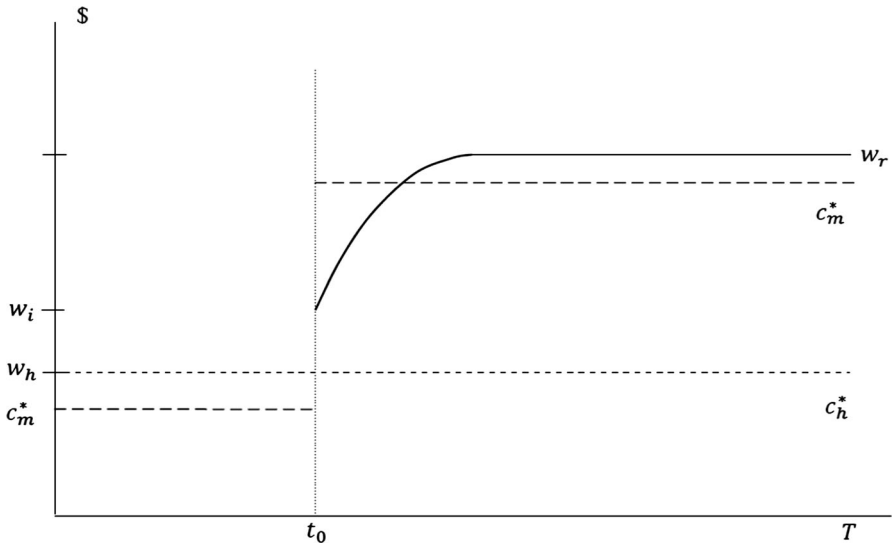


Fig. 1 Wage and consumption paths for emigrants and non-emigrants

where $c_h^*(t)$ is optimal consumption of the non-migrant. Figure 1 illustrates possible consumption and wage profiles for the migrant and non-migrant. We assume that the migrant initially receives wage, w_i , which adjusts upwards over time to the wage of natives.²³ The decision to migrate is based on a comparison of the consumption profiles of the immigrant, c_m^* , and non-migrant, c_h^* , where an important consideration is a possible taste preference for the home country.

4 Interpreting the migration decision

Wage differentials between Europe and the USA in the late nineteenth century far exceeded a normal return on moving costs. The same was true of the five European countries in our study and Canada in the 1920s. The *International Labour Review* reports prices and wages by occupation for a range of cities in Canada and Europe. Based largely on this information, we have derived purchasing-power-parity (PPP) adjusted wage rates by occupation, with the Canadian wage rate in each occupation normalized to one.²⁴ Striking, and consistent with findings from other sources, are the large wage gaps for the same occupation between Canada and Europe. There are also significant differences in wage gaps across source countries (see Table 4). Bricklayers and masons received the highest wage. In that occupation the ratio of

²³ To simplify the figure the discount rate, r , is set equal to the pure rate of time preference, ρ . In the simulations, r exceeds ρ .

²⁴ The *International Labour Review* reports wage rates in local currency. As well it provides detailed price data along with weights for a standardized consumer budget. We have used these series to develop PPP measures. Our results are generally similar to those in Williamson (1995). The calculations are for 1929, but any year from 1925 to 1929 would give similar results. Details are in the Appendix of ESM.

Table 4 Hourly wages in Canada and Europe, 1929 (Canada/Europe—PPP)

Occupation	Ireland	Italy	Netherlands	Poland	Sweden	Canada: \$ per hour
Building						
Bricklayers and masons	2.61	6.24	2.99	4.54	2.01	1.26
Carpenters and joiners	1.96	4.69	2.31	3.57	1.67	0.94
Plumbers	2.20	5.86	2.60		2.28	1.06
Painters (general)	1.72	3.75	2.19	3.43	1.34	0.82
Structural iron workers	1.99	5.28	2.40		2.13	0.95
Concrete workers	1.52	2.41	1.19	2.42	1.06	0.47
Labourers (general)	1.49	3.17	1.23	3.14	1.04	0.46
Mechanical engineering						
Fitters and turners	1.56	3.80	1.91	3.08	1.76	0.70
Ironmoulders (sand)	1.53	3.73	2.02	2.55	1.59	0.71
Patternmakers	1.71	3.25	2.22		1.86	0.78
Unskilled labourers	1.49	3.56	1.58	3.51	1.34	0.45
Furniture making						
Cabinet makers	1.33	3.02	1.81		1.68	0.64
Upholsterers	1.60	3.68	2.15		1.82	0.77
French polishers	1.29	3.30	1.84		1.60	0.61
Printing and bookbinding						
Hand compositors	1.82	3.31	2.61	2.53	2.03	0.84
Machine compositors	1.68	2.82	2.27	1.86	1.82	0.84
Machine minders	1.70	3.06	2.44		1.93	0.81
Bookbinders	1.63	3.27	2.47	2.66	2.10	0.80
Electrical installation (buildings)						
Electrical fitters (skilled)	1.86	3.82	2.59	3.52	2.03	0.92
Transport						
Tram and bus drivers	1.59	2.89	1.48		1.25	0.56
Tram and bus conductors	1.93	3.11	1.59	2.71	1.25	0.56
Motor drivers (van and lorry)	1.18	2.84	1.56	2.59	1.18	0.46
Horse drivers (one horse)	1.30	2.83	1.47		1.24	0.42
Railway goods porters	1.83	3.39	2.33		1.21	0.50
Railway permanent way labourers	1.70	2.39	2.22		1.15	0.45
Local authorities						
Unskilled labourers	1.49	3.37	1.55	2.56	1.11	0.49

Source: International Labour Review. See Appendix of ESM for details. The Canadian wages given in the *International Labour Review* correspond very closely to those in the reports of the Department of Labour of Canada (Leacy 1983, E248–E267)

Table 5 Occupation, country of emigration, and the wage ratio

ln Cdn wage	Italy	Netherlands	Poland	Sweden	Constant
0.718 (20.11)**	0.739 (17.15)**	0.180 (4.17)**	0.555 (10.78)**	−0.067 (1.55)	0.535 (11.44)**

Dependent variable: ln Canadian wage/foreign wage; benchmark: Ireland

$R^2 = 0.85$; $N = 118$

Source: Table 4

** indicates statistical significance at 1% confidence level; absolute value of t -statistics in parentheses

the Canadian to the foreign wage was 2.0 for Sweden, somewhat higher for Ireland and the Netherlands, 4.5 for Poland, and more than 6 for Italy.²⁵ The ranking was similar in other occupations. In general, wage ratios were lowest for Sweden and greatest for Poland and Italy.

Apparent in Table 4 is a positive relation between the Canadian wage and the wage ratio. For example, unskilled labourers in Canada received 1.1 times the wage of unskilled labourers in Sweden, whereas the ratio for bricklayers and masons, a high-wage occupation, was 2.0. This pattern holds across countries. The relation between the country, the occupational wage, and the wage ratio is highlighted in Table 5, which reports estimates from the following regression:

$$\ln \left(\frac{w_c^i}{w_j^i} \right) = \alpha + \gamma_j + \beta \ln w_c^i + \varepsilon_j^i, \quad (11)$$

where i is occupation, and w_j^i is the wage in country j (C —Canada); γ_j is a country fixed effect. The elasticity of the Canadian–foreign wage ratio with respect to the Canadian wage is large, 0.72, and highly significant. The results also confirm the large difference in wage ratios across countries. For example, the wage ratio was 73 % ($e^{.55} - 1$) higher for Polish than for Irish workers.

A small fraction of the populations of these European countries emigrated to Canada despite the large wage differentials. Canada did impose restrictions that varied by region, but other than the possible constraint that immigrants initially be farm workers, immigration was relatively open. This means that economic conditions in Canada and the sending countries rather than immigration policy were paramount.²⁶ We therefore apply our life-cycle model of migration, deriving the optimal migration time and taste parameter consistent with each wage differential. It should be emphasized that our intention is not to test our model of migration or the parameter specifications, which are based on a range of sources.

²⁵ The high ratio for Italy possibly reflects too low a PPP measure. The exchange rate in 1929 was 19.0 lira to the (Cdn) dollar. We derive a lower PPP rate of 17.3, based on the *International Labour Review*, but it may have been still less (Williamson 1995, 90).

²⁶ As shown in Table 1, a negligible share of the sending country's population emigrated to Canada. Although larger, the impact of immigration on the Canadian population (and workforce) was also very small. Thus, the general equilibrium effect of migration on wage rates could hardly have been significant. Treating the wage ratios as exogenous therefore seems appropriate.

Rather it is to show how a unified approach to migration can lead to important insights. The model could be applied to immigrants from a range of circumstances as described in Table 3. Here we narrow the focus to males in the medium–low (unskilled) and medium–high (skilled) wage classes, who arrived without family members and paid their own fare.²⁷

Potentially important to the migration decision were the savings required for the passage and the lost earnings associated with preparing for the move and travelling to Canada. For the purpose of the simulation, we add to the fare and cash savings the loss of 6-weeks earnings (based on wages in the home country).²⁸ Cash holdings on arrival varied by country, wage class, and other immigrant characteristics. Table 6 describes the relationship estimated from the passenger lists, which we use to derive the implied cash savings of the medium–low and medium–high wage immigrants. Cash savings increased with wage class and varied markedly by country. The savings of those in the medium–low wage class ranged from \$58 for the Poles to \$115 for the Dutch, while immigrants in the medium–high wage class saved \$30 more than those in the medium–low wage class.²⁹

Simulations are based on a constant-elasticity Stone–Geary utility function

$$u(c) = \frac{(c - s)^{1-\delta}}{1 - \delta}, \quad (12)$$

where s can be interpreted as subsistence consumption and δ is the inverse of the intertemporal rate of time preference.³⁰ The subsistence constraint, s , is key to our understanding of migration, especially if potential immigrants are unable to borrow. Unless immigrants can reach a minimal level of consumption during the adjustment process, migration is clearly ruled out. This means decisions about when and whether to migrate only come into play once that basic constraint is met. It also implies that those close to subsistence will not migrate, being unable to acquire the funds necessary for the move.³¹

²⁷ The medium–low wage class includes unskilled workers and labourers as described in Table 4 (the low wage class is made up mainly of farm workers). The medium–high wage class comprises skilled workers. The allocation of the occupations in Table 4 to the two groups is detailed in the Appendix of ESM.

²⁸ The fare is assumed to include the ocean passage (Table 2) plus \$10 for rail transport, which was the rate to Ontario. We assume cash holdings on arrival do not include that rail cost. The ocean crossing itself took about one week. There was the additional time, more significant for those from Eastern Europe, to reach the point of embarkation.

²⁹ These values are for a single male, family contact, non-spring arrival, intending to go into agriculture.

³⁰ Where there is uncertainty, δ , can be interpreted as relative risk aversion. In our model there is no uncertainty. Still, the term, δ , is important in that it affects the “utility” cost of migration arising from the unequal consumption streams as described in Fig. 1. A higher value of δ increases the cost.

³¹ It has been observed that immigrants to America were not generally drawn from the poorest groups. Selection tended to be from the middle, or lower-middle part of the income distribution. There may have been a variety of reasons, but the need to save enough to provide for subsistence was an important factor. This point is made by Chiswick and Hatton (2003) who discuss migration to the USA in the late nineteenth century: “In...least developed countries and regions, despite the large incentive to emigrate, those who had the most to gain were simply too poor to finance the move”. Faini and Venturini (1994) argue that the growth in wages in Italy helps explain the surge in emigration from that country.

Table 6 Cash holdings and age of immigrants

	Cash holdings	Age
<i>Country of origin</i>		
Italy	28.33 (5.35)**	1.78 (10.02)**
Netherlands	42.28 (7.57)**	−1.16 (6.19)**
Poland	−14.98 (3.11)**	1.92 (11.90)**
Sweden	5.38 (−1.11)	−0.15 (0.92)
Travelling with wife	130.12 (15.96)**	4.58 (16.79)**
Number of children	35.27 (12.74)**	2.01 (21.68)**
<i>Contact in Canada</i>		
Employer	−37.32 (7.13)**	0.62 (3.51)**
Family	−24.06 (5.93)**	−0.89 (6.52)**
<i>Wage class in home country</i>		
Medium–low	43.10 (7.00)**	0.01 (0.05)
Medium–high	73.13 (10.14)**	0.85 (3.52)**
High	659.21 (64.89)**	4.88 (14.35)**
Arrived in spring	−12.21 (3.62)**	−0.59 (5.21)**
<i>Intended occupation</i>		
Non-agricultural	−48.02 (7.52)**	1.12 (5.23)**
Constant	53.92 (12.50)**	26.98 (186.79)**
N	22,095	22,095
R ²	0.23	0.13

Benchmarks: country of origin—Ireland; contact in Canada—other; wage class in home country—low

See text for variable definitions

Source: Canada, library and archives, passenger lists 1865–1935

** (*) indicates the estimated statistical significance at 1 % (5 %) confidence; *t*-statistics in parentheses

Recognizing that subsistence, s , played an important role in the migration decision, the interpretation of s is equally important. From pamphlets and other sources of advice to prospective emigrants, including advice about their initial savings, it is clear that bare subsistence was not being recommended, but rather a level of consumption more in keeping with the living standards of the sending country. Accordingly, we treat s not as the amount required for basic survival, but

rather a level that reflected a minimal living standard based on the country's average income. There has been considerable work on this measure, some based on official poverty lines and others on more informal surveys. For the USA, Kilpatrick (1973) estimated elasticities of various measures of minimum income with respect to average income over the period 1957–1971. He also reports elasticities for periods that include the early twentieth century. Based on this work, subsistence, s , is calculated as a geometrically weighted average of basic subsistence (1/3) and per capita income in each country (2/3).³²

As noted above, we focus on adult males who arrived with no accompanying family members. Also, following the *International Labour Review's* classification of occupations (Table 4), we divide workers into “unskilled”, corresponding roughly to our medium–low wage category, and “skilled”, corresponding to our medium–high wage group.³³ For these two groups, Table 7 presents the values used in the simulations where, to simplify the presentation, all values have been normalized to the annual earnings of unskilled workers in the home country. We illustrate the calculation for Irish unskilled workers. Their hourly wage was 13.6 pence, implying annual earnings of 121.5£.³⁴ The wage of unskilled workers in Canada was 71 % higher.³⁵ During this period, the vast majority of immigrants began as farm workers, in large part because Canada's immigration rules favoured those who intended to enter agriculture. Of Irish male immigrants, 80 % indicated farm worker or the equivalent as their intended occupation, and over 90 % of immigrants from the Netherlands, Poland, and Sweden expressed this intention (see Table 3). Including board, the earnings of farm workers in Canada were about 30 % below even the earnings of unskilled labourers.³⁶ We therefore put an immigrant's initial wage at 70 % of the Canadian unskilled wage. It is assumed that, after 10 years, immigrants receive the Canadian wage corresponding to their occupation

³² The weights selected are well within the range of reported elasticities, although somewhat at the low end. Higher elasticities with respect to per capita income would tend to strengthen our conclusion about the role of subsistence in migration decisions. This treatment of subsistence is in keeping with the sort of advice prospective immigrants were given by friends and family who had already come to Canada. For example, Ganzevoort's (1999) translation of letters home from Dutch immigrants to Canada in the late 1920s includes: “...please note that those who wish to emigrate would do well to bring along a small sum of money, about 100 guilders (p. 39)”. This equalled subsistence in the Netherlands for two months, based on our weighting.

³³ In general, occupations listed as unskilled labourer are in the unskilled category. Higher-paid occupations are in the skilled category. The precise division is given in the Appendix of ESM.

³⁴ Annual hours are put at 2150, close to the value derived by Huberman and Minns (2007, 548) for 1929. Although there was some variation, we apply this value across countries. The Irish unskilled wage is based on the average wage of labourers in Mechanical Engineering, Transport, and Local Authorities (Table 4).

³⁵ In the simulations, therefore, the Irish unskilled wage is 1, and the Canadian unskilled wage is 1.71.

³⁶ For a discussion of the earnings of immigrant farm workers see Armstrong and Lewis (2012, 741–742).

Table 7 Values for simulating the migration decision: wages, savings, and subsistence (unskilled home wage = 1)

	Home wage	Canadian wage	Savings	Subsistence	
Ireland					
Unskilled	1	1.71	0.37	0.37	
Skilled	1.46	2.96	0.46	0.37	
Italy					
Unskilled	1	3.10	0.61	0.60	
Skilled	1.39	5.76	0.73	0.60	
Netherlands					
Unskilled	1	1.72	0.53	0.47	
Skilled	1.34	2.94	0.61	0.47	
Poland					
Unskilled	1	3.04	0.75	0.60	
Skilled	1.83	5.86	0.93	0.60	
Sweden					
Unskilled	1	1.32	0.36	0.42	
Skilled	1.35	2.45	0.43	0.42	
Cash savings					
	Ireland	Italy	Netherlands	Poland	Sweden
Unskilled ^a	73.0	101.3	115.2	58.0	78.3
Skilled ^b	103.0	131.3	145.3	88.0	108.4

The normalizations are

Ireland: 121.5£ $\approx$ \$595 (E), \$618 (PPP)

Italy: 5697 lira $\approx$ \$300 (E), \$330 (PPP)

Netherlands: 1274 fl $\approx$ \$515 (E), \$624 (PPP)

Poland: 2102 zloty $\approx$ \$237 (E), \$330 (PPP)

Sweden: 2669 kr $\approx$ \$721 (E), \$753 (PPP)

Wages are converted at PPP; cash savings and the fare are converted at the exchange rate (E). Subsistence is based on the following values for basic subsistence (\$1 per day—US-1990 prices) and GDP per capita

Ireland (£): 8.60; 54.95

Italy (lira): 755.8; 3976

Netherlands (fl): 88.9; 833

Poland: (normalized) subsistence takes the Italian value

Sweden (kr): 154.8; 1626

The implied subsistence values are augmented (50 %) to the adult male equivalent. Cash savings are derived from the cash regression in Table 6 and are based on a single male, family contact, non-spring arrival, intending to go into agriculture

Sources: for per capita GDP: Kennedy (1971, p. 3)—Ireland; Johansson (1967, pp. 151, 157)—Sweden; Mitchell (1981, p. 823)—Italy; Von Bochove and Haitker (1987, p. 6)—Netherlands

^a Medium–low wage class

^b Medium–high wage class

in the home country.³⁷ The transatlantic fare from Ireland was \$90 (see Table 2) to which \$10 is added for the cost of rail in Canada. Estimated cash holdings on arrival were \$73 to which a further 6 weeks of lost earnings, based on the Irish wage, is added. Converting the Canadian dollar values at the exchange rate of 4.9 to pounds sterling implies total savings of £44.6 or 0.37 based on the normalization. Subsistence is derived as a geometrically weighted average of basic subsistence, £8.6 (weight 1/3), and per capita GDP in 1929, £55.0 (weight 2/3). The result, £29.6, is increased by 50 % to correspond to the adult male equivalent, or £44.4, which has a normalized value of 0.37.

From Eqs. (9), (10), and (12), we derive the optimal migration time and the implied taste parameter, τ , consistent with wages in each European country and Canada.³⁸ Consider unskilled migrants from Ireland (see Table 8). Optimal migration time is 3.5 years after the beginning of the planning horizon, and the equilibrium taste parameter is 0.72. Note that this is the value that equates the lifetime utility of the migrant and non-migrant, so it represents taste for the home country of the marginal migrant. Consumption varied over the life cycle, but at migration time the taste parameter implies that Irish migrants needed 34.1 % more consumption in Canada to achieve the same per-period utility.³⁹ The actual consumption differential is 53.8 %. The difference is due to the borrowing constraint, which prevents full consumption smoothing and therefore reduces lifetime utility.

The results across skill levels and countries reveal large differences both in optimal migration times and in the implied taste parameter. In all cases, optimal migration time is shorter for the skilled workers. Skilled workers arrived with more cash and their foregone earnings were greater. Nevertheless, their higher wages

³⁷ There is a large literature on the rate of convergence of immigrant earnings associated especially with George Borjas and Barry Chiswick. A summary of some of this literature is in Borjas (1994). Abbott and Beach (1993) have a detailed analysis of wage convergence in Canada in the 1970s. We assume a quadratic wage path that approximates their findings. There are few Canadian studies for the early twentieth century. A recent paper by Inwood et al. (2015) explores the impact of the Great Depression on relative immigrant earnings, finding a large negative impact. But their results for the decade 1911–1921 can be seen as roughly consistent with a 10-year adjustment period for those from English-speaking countries. The adjustment period for those from other countries appears to have been longer. We have assumed the same period of adjustment for all countries, which may account in part for the higher taste parameter estimates for immigrants from Italy and Poland. Although most immigrants began as farm workers in Canada, there is a considerable literature indicating that they quickly shifted to work more suited to their training. Green and Green (2014) find that despite the high proportion of immigrants in the 1920s who began as farm workers, the occupational distribution of those immigrants corresponded very closely to that of the native population by 1931. On the relative earnings of immigrants to the USA in the late nineteenth and early twentieth centuries, see Minns (2000). His results strengthen “the ‘optimistic’ view of immigrant progress in America (p. 349)”.

³⁸ Based on the values in Table 7 and the assumed parameter values, a Fortran programme is used to derive the optimal migration time for a given value of τ . At this value the lifetime utilities of the emigrant and non-emigrant are compared. The programme then searches for the τ that equates the lifetime utility of the emigrant and non-emigrant.

³⁹ Equivalent consumption is derived from: $\frac{(c^E - s_j)^{1-\delta}}{1-\delta} = \tau + \frac{(c_j - s_j)^{1-\delta}}{1-\delta}$ where c^E is the consumption in Canada equivalent to consumption, c_j in home country, j . For unskilled workers in Ireland the values are: $c_j = .91$, $\tau = .72$, and $s_j = .37$ (see Tables 7, 8); $\delta = 2$. Since $r > \rho$ consumption is increasing over time which would affect the comparisons in other years slightly.

Table 8 Simulation results: optimal migration time and implied taste premium

	Optimal	Implied taste	Consumption at migration			Consumption premium	
	Migration time: years	Parameter	Home	Canada		Actual	Equivalent
				Actual	Equivalent	Per cent	
Ireland							
Unskilled	3.5	0.72	0.91	1.40	1.22	53.8	34.1
Skilled	2.4	0.45	1.29	2.24	2.03	73.6	57.3
Italy							
Unskilled	8.7	1.86	0.97	2.44	1.80	151.2	85.3
Skilled	5.6	0.97	1.31	4.22	2.89	222.0	120.4
Netherlands							
Unskilled	5.5	0.91	0.95	1.41	1.31	49.0	38.5
Skilled	3.8	0.63	1.24	2.23	1.96	80.0	58.3
Poland							
Unskilled	9.8	1.80	0.98	2.38	1.76	144.0	80.1
Skilled	4.5	0.55	1.69	4.31	3.35	154.3	97.7
Sweden							
Unskilled	3.3	0.45	0.93	1.10	1.08	18.3	16.3
Skilled	2.4	0.47	1.23	1.87	1.73	52.0	40.5

Based on the text, Eqs. (9), (10), and (12), and Table 7, with $\delta = 2.0$, $r = 0.04$, $\rho = 0.02$, and $T = 45$. Also see fn. 39

more offset these differences, so that skilled workers optimally saved for a shorter period. For example, optimal migration time was 2.4 years for skilled Irish workers as compared to 3.5 years for unskilled workers. There were large differences across countries in the optimal saving period. The period was longest for unskilled workers from Italy and Poland, 8.7 and 9.8 years, respectively.

The regression based on age at time of immigration gives mixed support for the simulation results (see Table 6). If the planning horizon begins at age 20, then unskilled workers (i.e. those in the medium–low wage class), who came from Italy, the Netherlands, and Poland, migrated at ages that correspond quite well to the simulations. A single immigrant from Poland arrived, according to the regression, at about age 30, which seems consistent with the roughly 10-year delay implied by the simulation. Reczyńska (1996, 14) points to the difficulty faced especially by poorer Poles in acquiring the funds necessary to emigrate. Estimated ages are similar for Italian immigrants, while the Dutch came about 3 years sooner, both consistent with the migration times given by the simulations. We would not want to overstate the correspondence, however. Immigrants from Ireland and Sweden were about 2 years younger than those from Italy and Poland, but the simulations give a difference of close to 5 years.

The simulations do less well at predicting the migration age of skilled workers. The coefficient on the medium–high wage class, 0.85, implies that skilled workers

migrated at older ages, yet the simulations generate a shorter period of saving, for example, 5.6 years as compared to 8.7 years for the Italians. Clearly factors other than the need to save affected the migration age of skilled workers. Most plausibly, skilled immigrants spent more time accumulating human capital before beginning to acquire the funds to emigrate. Indeed, the estimated difference in age between skilled and unskilled immigrants of just under 1 year is less than the training period most skilled workers would have required. So even though the ages at migration of skilled workers appear higher than the ages suggested by the simulations, the need to accumulate savings likely played a role in the timing decisions of skilled workers as well.⁴⁰

Directly related to our understanding of the large wage gaps between North America and Europe is the taste parameter, τ , with its implications for worker preferences. The taste parameter enters additively (Eq. 2), which means that, for a given parameter value, the premium increases markedly with consumption. This is a property of the iso-elastic Stone–Geary utility function (Eq. 12).⁴¹ To illustrate, we compare skilled and unskilled immigrants from Sweden. The derived taste parameters were almost identical, 0.45 for unskilled workers and 0.47 for skilled workers. Yet the implied increase in consumption in Canada required for equivalence in terms of utility was 16.3 % for unskilled workers as compared to 40.5 % for skilled workers.⁴² The relationship between consumption and the equivalent differential in consumption is illustrated in Fig. 2. The actual consumption differentials implied by the wage rates in Canada and Sweden were somewhat greater, reflecting the inability to fully smooth consumption. For example, at migration time skilled workers from Sweden consumed 52.0 % more in Canada than they would have in their home country. Of this differential, 80 % is accounted for by tastes and 20 % by the borrowing constraint.

There were large differences in taste parameters across countries. The wage differential was smallest for unskilled workers from Sweden, just 32 % (see Table 7). This leads to an implied taste preference parameter of 0.45. At the normalized unskilled Swedish wage, the non-migrant consumed 0.93 at migration time. The consumption equivalent in Canada was 1.08, a difference of 16.3 %. The differential was much greater for skilled workers, 40.5 %. The taste premiums for Ireland and the Netherlands were somewhat higher. The equivalent consumption differential for the Dutch was 38.5 % for unskilled workers and 58.3 % for skilled workers. The impact of taste was much greater for immigrants from the low-income countries, Italy and Poland. According to the simulation, Italian unskilled workers

⁴⁰ A breakdown of age at migration by both skill and country of origin reveals that the skilled immigrants from Italy and Poland were in fact slightly younger than the unskilled.

⁴¹ The assumed elasticity, δ , of 2 implies sharply diminishing marginal utility of consumption. As well, because of the subsistence constraint, the effect on utility of increases in consumption diminishes with consumption. Because of these two factors, the same (additive) taste parameter gives rise to a much larger consumption effect on high-wage than low-wage workers.

⁴² For unskilled (skilled) workers in Sweden the values are: $c_j = .93$ (1.23), $\tau = 0.45$ (.47), and $s_j = .42$ (.42). See Tables 7 and 8. Note that the greater required increase in consumption for skilled workers is due primarily to the concavity of the utility function. The subsistence constraint also has an impact, since for skilled workers the effect of a wage increase on *net* consumption is less.

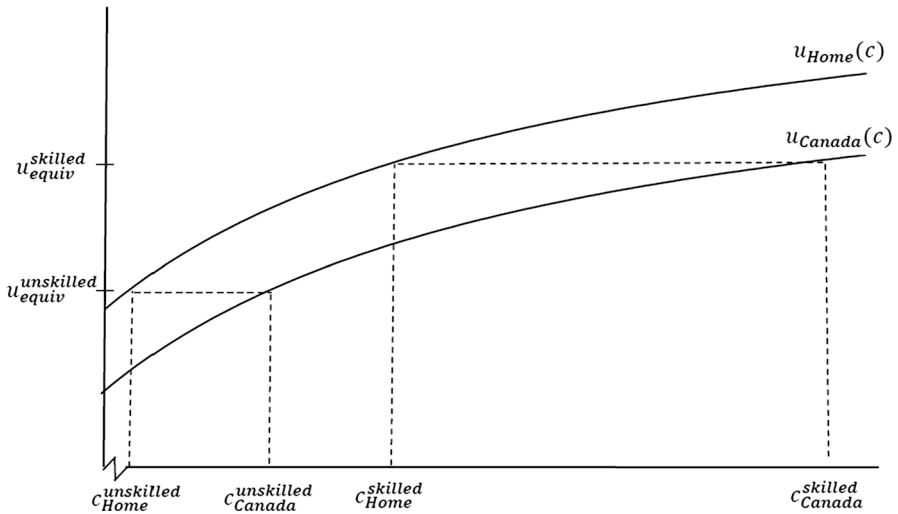


Fig. 2 Consumption premiums for skilled and unskilled emigrants

needed an increase in consumption of 85 % to receive the same utility, and skilled workers, 120 %. The differentials were almost as great for prospective Polish migrants, 80 and 98 %.

Emerging from these calculations, which are based on observed wages in Canada and Europe, are dramatically different implied locational preferences across countries. The importance of status is a central theme of the international migration literature, as developed by Roy (1951), and it is a key finding of Easterlin (1974) and the more recent work that he spawned. The idea is that potential migrants consider not just their real income as conventionally defined, but also their place on the income distribution. Abramitzky et al. (2012) apply this approach to Norway finding that migrants to the USA in the late nineteenth century were negatively selected. To help reconcile the seemingly anomalous taste parameter results, we introduce status to the model through the Stone–Geary utility function (Eq. 12). Rather than assuming the utility function in the home and receiving country differs only by an additive taste preference parameter, we allow the subsistence parameter to change as well. Immigrants are now assumed to base utility after migration on subsistence *in Canada* rather than in the home country. That is, after migration, subsistence in the utility function is determined by a weighted average of basic subsistence and Canadian per capita GDP.

Despite the literature showing a strong connection between one's relative income in a society and reported "happiness", it is hard to find explicit statements by immigrants or prospective immigrants that their status in Canada would be a concern. At the same time, a strong connection has been found between incomes in the home country and the degree to which newcomers were accepted. Canada's "preferred" countries were from the high-income parts of Europe, and the selection mirrored the views of Canadians. As Perin (1989, 16) puts it, the Italian immigrant

Table 9 Simulation results: implied taste premium based on subsistence in Canada

	Subsistence	Optimal	Implied taste	Consumption at migration			Consumption premium	
				Home	Canada		Actual	Equivalent
					Actual	Equivalent		
	Canada	Migration time	Parameter				Per cent	
Ireland								
Unskilled	0.59	3.2	0.55	0.92	1.44	1.16	55.7	26.2
Skilled	0.59	2.2	0.40	1.32	2.28	1.90	73.3	43.9
Italy								
Unskilled	1.09	8.3	1.74	0.97	2.54	1.64	162.3	68.9
Skilled	1.09	5.4	0.94	1.31	4.31	2.73	229.5	108.2
Netherlands								
Unskilled	0.58	5.4	0.82	0.95	1.43	1.25	50.8	32.2
Skilled	0.58	3.8	0.61	1.24	2.25	1.92	81.4	54.8
Poland								
Unskilled	1.09	9.5	1.68	0.97	2.49	1.61	155.1	64.9
Skilled	1.09	4.3	0.53	1.69	4.41	3.19	160.3	88.7
Sweden								
Unskilled	0.48	3.2	0.35	0.93	1.11	1.04	19.8	11.9
Skilled	0.48	2.4	0.45	1.23	1.88	1.69	52.4	37.1

See Table 8

was seen as “too much of a peasant”, and Poles were often viewed as especially different.⁴³ Such attitudes were not often held about immigrants from Western Europe.

Table 9 reports the results of the adjusted simulations. Consider unskilled workers from Ireland. Normalized to the Irish unskilled wage, subsistence in Canada was 0.59 rather than 0.37. This means that, taste preferences aside, the Irish worker needed 59 % $(.59-.37)/.37$ more consumption in Canada to equalize per-period utility. Given actual wages in the two countries and including the costs of migration and the borrowing constraint, the adjusted taste parameter, τ , that equalizes the lifetime utility of the migrant and non-migrant is 0.55. This translates to 26 % of the consumption of the non-migrant at migration time. The implication is that, after adjusting for the difference in perceived subsistence, unskilled Irish workers required an increase in consumption in Canada of 26 % to make them indifferent between moving and staying. Skilled workers from Ireland required a premium of 44 %.

Allowing for a change in perceived subsistence reduces the difference across countries in their implied preference for the home country over Canada. Sweden has

⁴³ Although his reference is to US immigration in the late nineteenth century, John Higham (1985, 65–66) singles out Italians and Poles as groups that were especially looked down on: “The Italians were often thought to be the most degraded of the European newcomers”. He also points to a Polish colony in Illinois that was shunned by those in the area.

the lowest required consumption premium for unskilled workers, just 12 %, reflecting the small wage gap between Canada and Sweden. Ireland and Sweden have required consumption premiums for unskilled workers that are somewhat higher, roughly 30 %; while for Ireland, the Netherlands, and Sweden, the required consumption premium for skilled workers is similar at about 40–50 %. There remain significantly larger implied consumption premiums for the lower income countries, Italy and Poland. Still, these are much reduced from the values that do not include the subsistence adjustment, and they are far less than the actual consumption differentials. The implication is that although tastes mattered, especially for skilled workers, a significant part of the wage gap can be explained by a difference in perceptions about subsistence and, as derived earlier, by the borrowing constraint.

The results of Tables 9 lead to a unified account of the late-1920s wage differentials between Canada and Europe. There were dramatically large and varying wage differentials for similar occupations across countries, but once account is taken of the cost of migration, including the difficulty of borrowing to cover the costs and concern for status, a large part of the difference disappears. Consider unskilled workers from the Netherlands, for whom wage rates were 72 % higher in Canada (see Table 7). Allowing for the cost of migration and the 10-year adjustment period to reach the Canadian wage leads to a consumption gain (at migration time) of 51 %. Including the impact of the borrowing constraint and the higher level of subsistence in Canada reduces the differential to 32 %. We take this to be the taste component. Unskilled workers from Italy eventually received a wage premium in Canada of 210 %. This is reduced to 69 % once adjustments are made for the cost of migration, the borrowing constraint, and the much lower subsistence in Italy. For all countries, the consumption-equivalent taste premium was higher for skilled than for unskilled workers. This points to the implication suggested by the utility function that family and friends, local culture and food, and other amenities specific to the home country were especially important to higher wage workers.⁴⁴ As Ganzevoort (1988, 37) concludes based on his study of letters and other documents related to Dutch migration to Canada, “emigration seemed to hold little appeal to the middle and upper classes”.

Finally, in Table 10, we provide a full breakdown of the sources of the wage gaps. The first column “actual” shows the percentage wage gap between Canada and Europe, and the subsequent columns describe how much each factor contributed to that gap.⁴⁵ We illustrate by considering the cases of unskilled workers from a

⁴⁴ It should be emphasized that the greater importance of these factors to skilled workers arises not from a difference in their utility functions, as the earlier example of Swedish workers illustrates. Rather, it is due to the concavity of the utility function and the subsistence constraint, which implies that with rising consumption non-pecuniary factors are given increasing importance.

⁴⁵ It should be pointed out that the wage and price data are drawn mainly from the *International Labour Review* for 1929. The advantage of this source is that it provides detailed information for the same (reported) occupations and the same consumption goods. Refinement and additional sources might lead to somewhat different wage comparisons and, of course, different simulation results. The wage ratio for skilled workers from Italy seems high, for example. The objective here, however, has not been to develop a new set of international wage comparisons, but rather to ask what implications can be drawn about migration from the international wage data, possibly imperfect, that currently exists. Williamson (1995) presents a long-term review of international wages. For the 1920s his sources and results are similar to ours.

Table 10 Decomposing the wage differentials

	Actual	Migration cost	Borrowing constraint	“Roy” effect	Taste
Ireland					
Unskilled	71	15.3	5.7	23.8	26.2
Skilled	103	29.4	12.7	16.7	43.9
Italy					
Unskilled	210	47.7	42.8	50.5	68.9
Skilled	314	84.9	83.8	37.4	108.2
Netherlands					
Unskilled	72	21.2	7.0	11.6	32.2
Skilled	119	38.0	17.6	8.9	54.8
Poland					
Unskilled	204	48.9	39.9	50.3	64.9
Skilled	220	59.9	42.7	29.0	88.7
Sweden					
Unskilled	32	12.2	1.5	6.5	11.9
Skilled	82	29.1	10.4	4.9	37.1

See Table 9

low-income country, Poland, and skilled workers from a high-income country, Sweden. The wage gap for skilled Swedish workers was 82 %. Although apparently large, the advantage of migrating seems relatively modest once the appropriate adjustments are made. The cost of migration and the 10-year period to reach the Canadian wage account for 29 percentage points of the differential, implying that the skilled immigrant could expect to consume 53 % more once they moved to Canada. The simulated period prior to migration is just 2.4 years (see Table 9); still, the much lower consumption during that time, due to the borrowing constraint, has a significant impact on lifetime utility. Immigrants need a 10 % increase in consumption to compensate for the effect. Sweden was a relatively high-income country in the late 1920s, so the Roy effect is small, just 5 %. We attribute the remaining 37 % to a preference for Sweden. Focussing on the consumption differential of 53 %, the taste parameter accounts for 70 %, the borrowing constraint for 20 %, and the Roy effect for 10 %. The breakdowns are similar for the other high-income countries, Ireland and the Netherlands. Overall, borrowing constraints, concern for status, and psychic costs accounted for roughly 70–80 % of the observed wage differentials between Canada and Europe.

The wage of unskilled workers in Canada was three times that in Poland; the differential was 204 %, about equally due to the migration cost, the borrowing constraint, the Roy effect, and taste. In comparison with the previous breakdown, two factors stand out. First, the effect of the borrowing constraint is much greater, 40 %. Polish unskilled emigres are simulated to save much longer, 9.5 years, and the long period of low consumption means much greater future consumption is needed as compensation. Second is the larger Roy effect of 50 %. Normalized to the Polish unskilled wage rate, subsistence in Canada was 1.09 (see Table 9). This

means the Polish unskilled wage rate was less than the Canadian poverty line. Had emigres viewed their utility in terms of that higher threshold, they needed an offsetting increase in consumption of 50 per cent.⁴⁶ The remaining taste effect, 65 %, is slightly higher than the values for skilled workers from the high-income countries. It should be noted that our definition of unskilled does not include the lowest-paid workers. In the low-income countries of Poland and Italy, unskilled workers were relatively higher on the income distribution and this may have influenced their decision to move. The larger derived taste effects may also be due to the assumption that the wage of workers from all countries converged to the Canadian wage after 10 years. Inwood et al. (2015), using individual census data, find that over the period 1911–1921 convergence was less than this for immigrants from non-preferred countries such as Italy and Poland. If we assume that the wages of these immigrants converged to 80 % rather than 100 % of the Canadian wage in their occupation, much of the difference in the taste component disappears.⁴⁷

One feature of international migration not captured by our approach is return migration. Once a potential migrant determines that lifetime utility is higher if they move, return migration is ruled out. In order to highlight what we see as key features of the migration decision, we have assumed that future wages and, more importantly, tastes are known with certainty. By allowing for uncertainty about the future wage or the taste parameter, return migration could be introduced as a possibility. For example, if labour market conditions in Canada turned out to be worse than an immigrant expected or they underestimated their taste preference for the home country, an immigrant could very well choose to return. Certainly barriers to returning would be less. It would be easier to save for return migration since wages in Canada were higher, and there would be a smaller adjustment cost. In fact, it appears that in the 1920s there was almost no return migration from Canada to Europe.⁴⁸

5 Conclusion

There were large wage differentials between countries in the New and Old World from at least the nineteenth century to well into the twentieth. These differentials far exceeded amortization values based on moving costs, and they persisted even during periods of open immigration policy. Building on recent work, we develop an approach that allows us to break down the sources of the wage differences. We

⁴⁶ This reflects the difference in subsistence between Poland, 0.60, and Canada, 1.09 (see Tables 7 and 9).

⁴⁷ The implied consumption difference due to taste for the home country falls from 69 to 46 % for Italian unskilled workers and from 65 to 42 % for Polish unskilled workers. These values are not much different from the taste effects derived for the other countries (see Appendix of ESM). It should be noted, though, that convergence may have been incomplete for workers from the preferred countries as well.

⁴⁸ Immigration to the European countries in 1924, for example, was: Ireland—333 (British North America); Italy—495 (Canada); Netherlands—269 (Americas); Sweden—142 (Americas excluding the USA). Ferenczi (1969, 735, 754, 760, 840). To the extent that return migrants were not counted as immigrants, the numbers would have been higher. Return migration to Poland over the period 1925–1929 was 3407, which was less than 5 % of Polish immigration to Canada during that time (Reczyńska 1996, 93; and Table 1).

begin with the marginal immigrant, who is indifferent about migrating, and ask what features of their utility function and the market are consistent with wages in their home country and the potential receiving country. The analysis is based on a life-cycle model that includes two features that may have influenced migration decisions. First, we assume that emigrants cannot borrow to pay for the move; second, we allow for the impact of status by assuming views about subsistence change once a person migrates.

We apply the model to immigration to Canada from five European countries: Ireland, Italy, the Netherlands, Poland, and Sweden in the late 1920s. This was a time when relatively open immigration policy in Canada contrasted with highly restrictive policies in the USA, which contributed to a large increase in arrivals, especially from Eastern Europe. As has been observed in other contexts, the gap in wages for the same occupation between Canada and Europe was large and variable. The difference was especially great for skilled workers and workers from low-income countries. Our approach goes some distance in accounting for the wage gaps and explaining their connection to the migration decision. Three features stand out. Constraints on borrowing had a potentially large impact on the wage necessary to attract workers to Canada. Those from lower-wage countries, especially, needed much higher wages in Canada to compensate for the loss in utility associated with the years they had to save for the move. Second were the much larger proportional wage gaps for skilled as compared to unskilled workers. A taste preference for the home country can be introduced in different ways, but if the parameter is assumed additive, the greater compensation required by skilled workers arises from the standard concave, in this case iso-elastic, utility function. Magnifying the effect is the subsistence constraint, which leads to a greater proportional effect on the *net* consumption of low-wage workers. Finally, we introduce an aspect that, although identified by Roy and Easterlin some time ago, has more recently become an important aspect of the migration literature. This is the idea that relative status matters. In our framework status is just one element and is introduced in a limited way. We assume that when people move their view of subsistence changes according to the living standards of their country of residence. Subsistence, as we derive it, was much higher in Canada than in the low-income countries of Italy and Poland. As a result, workers from these countries needed a large increase consumption simply to maintain what they may have perceived to be the same living standard.

The evidence we have compiled on the decision to migrate to Canada could certainly be subject to refinement. This includes the cross-country occupational wage data and related consumer price data from the *International Labour Review*. As well, we have chosen parameter values that, although in line with other work based on life-cycle models, could also be adjusted. At the same time, the information from the passenger lists, especially the saving-related data, provides a rare window on the behaviour of immigrants, including their decision to migrate and the timing of their migration.

The inverse of the intertemporal rate of time preference, δ , is a potentially important parameter. The value that we assume ($\delta = 2$) is at the low end of existing estimates. For consumers with a higher value, the utility cost of an unequal consumption stream is greater, making migration less desirable. Assuming a higher

value of δ would therefore lead to a smaller implied taste parameter. We see our results then as more-likely overstating the role of taste preferences in the migration decision.⁴⁹ Another parameter affecting the migration decision is ρ , the pure rate of time preference. Those more willing to put off consumption to the future (smaller ρ) will tend to be those who migrate. This result like the one based on a change in parameter, δ , depends on there being a borrowing constraint.⁵⁰

It should be emphasized that the taste preference values that we derive are for the “marginal” migrant, someone just indifferent between moving and staying. Since a very small fraction of the population of these European countries emigrated to Canada, it follows that nearly all would have had a stronger taste preference for their home country. Given that Canadian immigration policy in the 1920s was relatively open, we treat observed wages in Canada and Europe as giving equilibrium differentials. We then ask, in the context of a model of lifetime utility with a borrowing constraint, what parameters are consistent with those wages. The results help address a range of questions related to migration to Canada and to international migration generally: (1) Why were wage gaps for the same occupation so large; (2) why were the proportional wage gaps greater for skilled workers; (3) why were the (equilibrium) wage gaps greater for workers from poorer countries; (4) why did those from poorer countries come at older ages; (5) why was the offer of immediate employment, such as facilitated by the Railway Agreement, so important to migration, especially from Poland; (6) why has it been found historically that the poorest did not emigrate despite the apparently large gains, and why did rising wages in poor countries lead to increased emigration. Further analysis of the wage and price data might lead to some adjustment of the wage ratios, and different measures of the cost of migration and other utility parameters could lead to a somewhat different breakdown of the sources of the wage differentials. Still, the insights we bring to the process of migration have a bearing not just on the population flows to Canada in the late 1920s, but on the mass migrations from the Old to the New World, both historical and recent.

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⁴⁹ An early estimate of the intertemporal elasticity of substitution by Hall (1988) put it close to zero, implying almost no willingness to substitute consumption between periods. The value we assume is within the range of Epstein and Zin (1991) who put the value between 0.2 and 0.8 (δ between 1.25 and 5). If, for example, we assume $\delta = 5$, and apply it to unskilled Irish workers, the implied equilibrium taste effect is reduced from 26 to 18 % of consumption at migration time, implying less emigration. It is generally recognized that those who are more risk averse are less likely to emigrate. There is no uncertainty in our model; instead a higher value of δ discourages migration because of the greater impact of an unequal consumption stream on utility.

⁵⁰ These calculations assume the borrowing constraint applies only to the migration cost. If instead new migrants are unable to borrow after arrival, they would be forced to consume less over the 10-year adjustment period. This would increase the impact of the borrowing constraint and also reduce the implied taste preference effect.

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