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Intergenerational mobility in a mid-Atlantic economy: Canada,1871-1901.[*]

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Abstract

This paper uses new linked full-count census data for Canada to document intergenerational occupational mobility from 1871 to1901. We find significant differences between Canadian regions and language groups, with linguistic minorities experiencing notably lower rates of intergenerational mobility. International comparisons place Canada midway between other economies in the Americas and the most mobile European societies. Decompositions of overall mobility show that the Canadian experience shared the New World feature of high mobility from manual occupations, but also the Old World feature of greater persistence in white collar jobs.

Introduction

The development of new complete count census databases, and "big historical data" of all kinds, has launched a new wave of research into historical social mobility (Long and Ferrie 2007, 2013; Modalsli 2017; Perez 2019; Ward 2020a, 2020b). Two patterns are apparent in international comparisons of intergenerational mobility over the long run. First, prior to 1900 "New World" economies in the Americas demonstrate higher rates of mobility between sons and fathers than "Old World" economies in Europe (Perez 2019). Second, these worlds have experienced a reversal since 1900: intergenerational mobility in the Americas has declined notably while it has increased in Europe.[1]

Nineteenth century Canada shared many features that influence mobility patterns with the United States and other settler economies. Relative labour scarcity drove population expansion

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[1] See Behrman, Gaviria, Szekely, Birdsall, and Galiani (2001) for contemporary Latin American evidence. Clark, Leigh, and Pottenger (2020) find low rates of intergenerational mobility in Australia using a different methodological approach.

to new opportunities on the western frontier and drove immigration from Europe to urban areas where industry and service-based activities were expanding rapidly. But earlier scholarship related to social mobility has emphasized rigidities in the Canadian case. Porter (1965) highlighted the role of ethnicity, religion, and class as entry barriers to elite positions in Canada. Political institutions and the model of governance applied in Canada were largely inherited from Britain. The linguistic divide between English and French Canadians may have led to segmented labour markets which would serve to constrain opportunities for mobility. More broadly, while the Canadian economy clearly resembles the United States and other frontier nations in terms of factor abundance, it is more distinctly "mid-Atlantic" when one considers taxation, the role of government, and, especially since the 1950s, the extent of social and labour market policies (Helliwell 1993, Riddell 1999).

Canada's distinctive set of opportunities and constraints have obvious potential to shape intergenerational mobility, and may speak particularly well to recent debates about the intersection of culture, institutions, and initial conditions in shaping the path of economic inequality (Alesina, Cozzi, and Mantovan 2012; Alesina and Giuliano 2015). While recent research suggests that intergenerational mobility in contemporary Canada is significantly higher than in the United States (Corak and Heinz 1999; Chetty 2016), little is known about Canadian mobility patterns before the 1980s, and as a result, the path of intergenerational mobility over the longer run.

In this paper we use newly linked records from the 1871 and 1901 Census of Canada to provide evidence on late 19th century intergenerational mobility. These data represent the first attempt to create a comprehensive national historical sample of linked Canadian records.[2] The linkage exercise generates a sample of over 32,000 employed young men in 1901 connected to their childhood homes in 1871, and therefore the economic status of parents and household heads at that time. The data is sufficiently rich to allow for an exploration of mobility differences among Canadian regions and demographic groups. Our regional estimates show that Quebec and the Maritimes (Eastern Canada) exhibited significantly less intergenerational mobility than Ontario. We also find large differences in mobility by ethnicity, with English and French speakers less mobile in regions where they were language minorities. Placing our national results in international context, we find that rates of intergenerational mobility in Canada lay between those of the US and other New World economies and available European comparisons, with

[2] See Torres and Dillon (2015) for a linked sample between 1852 and 1881.

components of the Canadian mobility experience showing features of both New World and Old World economies.

Linked Canadian Census Data, 1871-1901

The data underlying this paper are linked records from full-count databases of the Canadian Censuses between 1871 and 1901. Linked records over this 30-year span are drawn from successful consecutive linkages of 1871-81, 1881-91, 1891-1901. We use a machine learning approach to link individual records (Antonie, et al 2014). Time-invariant characteristics (age, sex, birthplace) are used to generate a feature vector for all records; these vectors then serve as inputs in a support vector machine (SVM) in which classification and matching takes place. Supervised learning is initiated with matching in a test environment where true links are known.[3] The methodology derived from the test environment is then employed to link between consecutive full count census data. The SVM approach used here identifies unique matches at the outset (where one record in 1871 can unambiguously be linked to one record in 1881, for example); multiple matches are disambiguated in a second stage using information on co-resident family members (Richards 2013).

Our algorithm allows us to link approximately 15 percent of all records over any decade interval. Disambiguation roughly doubles the size of the linked sample, although the procedure used to sort between multiple candidate links over-represents individuals in families that remain co-resident over each 10-year window. A trade-off exists between increasing sample size and introducing linked records more selective on less representative characteristics when using family information to disambiguate. Our view is that this process is worthwhile if it allows researchers to address questions where large sample size is essential (Antonie et. al., 2020).

Canadian Census data from 1871 and 1901 includes a range of personal, household, and geographic characteristics: age, household size, place of birth, place of residence, ethnic origin,

[3] We have four sets of true links: 8331 members of Ontario industrial proprietor families, 1759 residents of Logan Township, Ontario; 223 family members at St. James Presbyterian Church in Toronto and 1403 families of 300 Quebec City boys who were ten years old in 1871. We confirm true links by 1) finding in both censuses at least one other household member with matching vital information, ensuring consistency with church records where available (Toronto and Quebec City), 3) ensuring that significant contradictory information makes a link improbable (for example, when one family member matches, but three others do not) and 4) determining there is no other likely match in the 1881 Canadian census or the 1880 U.S. census. The proprietors were linked in preparation for Inwood and Reid (2001). The Logan records were linked in preparation for Baskerville (2015). Andrew Hinson generated the St. James links or his doctoral dissertation (2010). The Quebec City links were made by the project *Population et histoire sociale de la ville de Québec* (www.phsvq.cieq.ulaval.ca) and kindly provided to us by Marc St-Hilaire.

and religious affiliation. Individual earnings were first collected as part of the 1901 Census and are not available in the 1871 data. As a result, we take the path followed by most studies of mobility prior to 1950 by focusing on occupational outcomes. Focusing on occupations (rather than occupational incomes) allows us to situate our findings in the broader international literature. As occupations were not collected as part of the original complete-count digitisation, we have subsequently scraped and appended occupations to the linked sample.

We follow the international literature in examining mobility across four broad occupational groups. We assign scraped occupational strings to these groups using the following procedure. First, we manually assign each string a 4-digit occupation code from the OCCHISCO scheme prepared by IPUMS for US data. We then convert OCCHISCO to the HISCO structure using a crosswalk provided by Evan Roberts. HISCO codes are then placed in 12 HISCLASS categories, following the classification generated by van Leeuwen and Maas (2011). Finally, we take the 12 categories and place them into four broad groups: white-collar occupations, skilled and semi-skilled manual occupations, unskilled occupations, and farm occupations.[4] This approach, which follows Perez (2019) with minor modifications to accommodate occupation strings unique to Canadian census, allows for the cleanest possible international comparisons.[5] Sensitivity tests to the classification of potentially contestable occupational strings across the 12 HISCLASS groups reveal little or no effect on the resulting mobility calculations.[6] To alleviate concerns that intermediate steps in our occupation coding shape the results, we reproduce all of our main results in Appendix B where the four occupation groups created directly from the OCCHISCO codes following the groupings used in Long and Ferrie (2013). A more substantial issue is whether the four occupational grouping we use may conceal significant differences in mobility. In Appendix C1 we demonstrate that our results are not sensitive to an alternative 5-way grouping that separates high income, white collar occupations (professionals and proprietors) from medium to low income clerical and sales occupations. Appendix C2 shows that mobility patterns are similarly unchanged if we separate unskilled farm workers from other unskilled labourers.

[4] We assign HISCLASS groups 1 to 5 (higher managers, higher professionals, lower managers, lower professionals, clerical, sales) to white-collar, groups 6, 7, and 9 (foremen, skilled workers, lower skilled workers) as skilled/semiskilled, groups 10 to 12 (lower-skilled farm workers, unskilled, unskilled farm workers) as unskilled, and group 8 (farmers and fishermen) as farming.

[5] 60000-64990 are classified as agricultural workers in the IPUMS/NAPP occupation system. We assign codes 60000-61990 to farm and the remainder to unskilled

[6] These results are available on request.

Our assessment of mobility is based on male children age 0 to 14 in 1871 (age 30 to 44 in 1901), and male heads of household aged 18 to 88 in 1871, where both report a classifiable occupation.[7] For this population we are able to link 32,365 individuals between the 1871 and 1901 Census samples. This represents about 5 percent of the 1871 full count census population in the age group[8]; 65 percent of these linked records are unique links with 35 percent added to the sample through disambiguation. Summary statistics for the linked sample are reported in Table 1. We focus on male children in our analysis because of the low linkage rates for women due to changes in surname associated with marriage, and the strong likelihood that those women we can link (i.e. those with a constant surname in 1871 and 1901) were not representative of the population of young women as a whole. While we expect that the vast majority of male household heads were the fathers of the young men present in 1871, that enumeration did not enquire formally into family relationships among household members. As linkage rates vary for different subsets of the population, we also present summary statistics with weights that account for relative linkage frequencies. This exercise has a negligible effect on the summary characteristics of our linked sample.[9]

[7] We allow for ages 28-46 in 1901 because of possible differences in enumeration dates could vary the age of respondents once per linkage. Appendix Figure A.3 illustrates the overlap between 1871 and 1901 age distributions.
[8] In total, 34,880 of 731,511 records are linked. The estimation sample size falls to 32,484 when accounting for missing observations of occupation or key covariates and then to 32,365 due to some OCCHISCO codes that do map to a HISCLASS value.
[9] Our weighting procedure is similar to Bailey (2020). We establish males age 0-14 in the 1871 as a reference population and estimate the propensity to be successfully linked through to 1901 using a probit model. The inverse fitted values form our weights. Linkage covariates include age and household size as well as indicators for province, marital status, religion, ethnicity and birthplace. Common support assumptions appear satisfied in Appendix Figure A.2; almost no observations have weight values outside the common support. 34,880 of 731,511 observations are linked. Further results using the weighted sample are available on request.

Table 1: Linked and unlinked sample characteristics, 1871

	(1)	(2)	(3)	(4)
	1871 full count	1871-1901 linked	1871-1901 linked, weighted	Unique links
1871 Age	6.8 (4.3)***	6.6 (4.2)	6.9 (4.3)	6.9 (4.2)***
% hhlds with 5+ children	0.55***	0.53	0.56	0.55***
Born NS	0.10***	0.14	0.11	0.15***
Born NB	0.08***	0.10	0.08	0.12***
Born QC	0.34***	0.21	0.32	0.21
Born ON	0.44***	0.53	0.45	0.49***
Born UK & Ireland	0.02**	0.01	0.01	0.01**
Born Elsewhere	0.04***	0.01	0.03	0.03
Reside NS	0.11	0.14	0.11	0.16***
Reside NB	0.08	0.09	0.08	0.12***
Reside QC	0.34	0.21	0.33	0.21
Reside ON	0.48	0.54	0.48	0.52***
Head white collar	*0.08*	0.08	0.08	0.08*
Head skilled/semi skilled	*0.19*	0.16	0.15	0.16**
Head unskilled	*0.19*	0.13	0.14	0.14*
Head farm	*0.54*	0.64	0.64	0.62***
French Eth.	0.32***	0.18	0.31	0.18
Anglo Eth.	0.60***	0.71	0.61	0.68***
No Female >22 in hhld	0.01***	0.02	0.03	0.02
N	733,355	32,365	32,365	17,256

Notes: See text for sample descriptions. *,**, and *** denote significant differences between each linked sample and the full sample at 90, 95, and 99 percent confidence intervals. Full count sample limited to males aged 0 to 14 in 1871. Unique links refers to all three linkages: 71-81, 81-91 and 91-01. Head occupation "unclassified" are omitted. Children defined as individuals enumerated with the same household id age 0-17, inclusive. Proportions of occupations for heads in 1871 (italics) are drawn from a 7% sample of the Census file. Anglophone includes ethnicities reported as English, Welsh, Scottish, Irish and North American. Standard deviations for age in parentheses.

Table 1 summarises characteristics in 1871 from the complete count data (Col. 1) to compare to the linked sample (Col. 2) for the same age cohort in order to assess how linkage performs in terms of the representativeness of the resulting. This comparison gives some sense of the extent to which linked sample is representative of the broader population. In addition to the unweighted sample in Column 2, we show 1871 summary statistics when linkage weights are applied (col. 3). Finally, we include the same descriptive measure for unique matches (col. 4) to give a sense of the potential implications of the disambiguation process used in our linkage method. Comparing the linked sample and full count data, we see that linkage is somewhat skewed towards younger, anglophone individuals, born Ontario or the Maritimes. This difference likely reflects two features of linkage with these data. First, it is more difficult to track

French names consistently over time because name heterogeneity is more limited than for Anglophones. Second, census information in parts of Quebec appears to be somewhat incomplete for 1901. In particular, occupations in Montreal are not recorded with the same consistency as in other parts of the country (and we do not use observations for which occupation was unrecorded or unreadable). We also note that full sample information is not available for all characteristics – occupations were not recorded in the complete transcriptions for example. We therefore use the seven percent sample of the 1871 Census (prepared at the University of Guelph) to compare means where that is the best available information. In comparison to the unweighted linked sample, it is not clear that disambiguation makes this situation much worse overall – unique links (Col. 4) are only modestly closer on age and family size, while birthplaces are more mixed.

Canadian Intergenerational Mobility

We begin our analysis of intergenerational mobility by constructing the transition matrix from male head (father) occupation in 1871 to young male (son) in 1901. Table 2a reports the number of observations and shares in each cell. The results show significant occupational continuity, particularly for high-skill occupations and farming. For non-farm occupations where there is an apparent skill hierarchy, it is possible to examine the degree of monotonicity (akin to the correlation) of father-son occupations using the Goodman and Kruskal (1954) γ statistic. Our estimate $\hat{\gamma} = 0.488$ suggests a moderate relationship between occupation ranks of father and son.[10] These are clusters of occupations where substantial capital was often required. Table 2a also suggests greater upward mobility than downward mobility, with the proportions moving unambiguously up from unskilled or semi-skilled exceeding the share moving down from white collar or semi-skilled. As there are some dimensions in which unweighted sample proportions are some distance from complete count and weighted sample proportions in Table 1, we also provide the transition matrix for the weighted linked sample in Table 2b. Transition matrix shares are largely unaffected if observations are reweighted to account for linkage propensities. A visual representation of all of the transitions in the (unweighted) data is provided in Figure 1.

[10] Asymptotic standard error of 0.012. Possible values for γ range from -1 to 1.

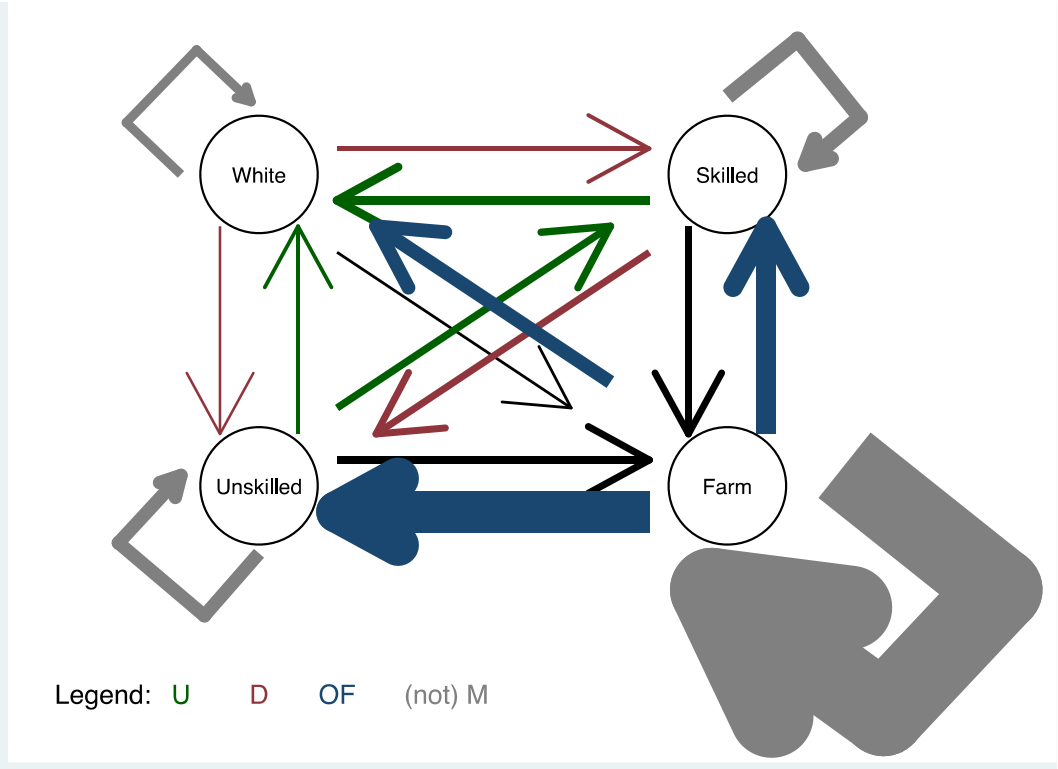
Table 2: Full Canadian Transition Matrix, 1871-1901

a) Unweighted	Father				
Son	White collar	Skilled/semi-skilled	Unskilled	Farm	Total
White collar	1215 (0.49)	1142 (0.23)	499 (0.12)	1810 (0.09)	4,666
Skilled/semi-skilled	545 (0.22)	2049 (0.41)	980 (0.23)	2548 (0.12)	6,122
Unskilled	352 (0.14)	925 (0.18)	1768 (0.42)	5420 (0.26)	8,465
Farm	367 (0.15)	907 (0.18)	927 (0.22)	10,911 (0.53)	13,112
Total	2,479	5,023	4,174	20,689	32,365

b) Weighted	Father				
Son	White collar	Skilled/semi-skilled	Unskilled	Farm	Total
White collar	24592 (0.48)	23,236 (0.23)	10,617 (0.12)	35,722 (0.08)	94,167
Skilled/semi-skilled	12,120 (0.24)	42479 (0.42)	22540 (0.25)	52885 (0.13)	130,024
Unskilled	6747 (0.13)	18,100 (0.18)	36436 (0.4)	106,767 (0.25)	168,049
Farm	7613 (0.15)	17510 (0.17)	20,858 (0.23)	227,546 (0.54)	273,526
Total	51,071	101,324	90,451	422,920	665,765

Notes: Column shares in parentheses. Weighted values rounded to nearest integer. Linkage weights similar to Bailey (2020) are described in the main text.

Figure 1: Canadian Intergenerational transitions, 1871-1901



Notes: Arrow size scaled to represent relative number of transitions. Persistence in occupation (inverse of our measure M) from father to son is shown by returning arrows (grey). International comparisons provided in Appendix Figure A.4

With over 32,000 linked observations between fathers and sons, we have sufficient data to compute measures of mobility for Canadian regions and for major subgroups of the Canadian population. We compute mobility estimates for three Canadian regions of origin: Ontario, Quebec, and the Maritimes. If economic dynamism and access to labour markets matter for intergenerational mobility, it would not be surprising to see differences across these regions. Ontario and Quebec were by far the largest provinces in Canada in 1871, while the Maritimes region combines the smaller east coast provinces of New Brunswick and Nova Scotia. In addition to size, there were significant differences in economic structure between the regions. As the region furthest to the West, Ontario was closer to the Canadian frontier than Quebec or the Maritimes, which would mean lower cost to migrate to opportunities in labour scarce environments. Ontario also saw more rapid urbanization after 1871 than the other regions, had

more industry in 1871, and experienced faster industrial growth between 1871 and 1901.[11] Quebec is distinctive in that the majority of the population were primarily French speaking Canadians, who had lower rates of outmigration to other parts of Canada in the late 19th and early 20th century (Green, MacKinnon, and Minns 2005). While Quebec was less urban and industrial than Ontario, Montreal was the largest city in Canada at this time, and the economic centre of the country. The Maritime region was relatively remote to opportunities on the Western frontier; much of the region urbanized more slowly and experienced slower rates of growth and structural change in this period (Inwood 1991; Inwood and Irwin 2003). We also compute mobility measures for two further splits of the Canadian population: Francophones versus Anglophones (French-speaking or English-speaking Canadians) and interprovincial migrants versus stayers. The comparison between movers and stayers provides a sense of the association between migration and the ability of those who move to change places on the economic ladder

Separate transition matrices for Ontario, Quebec, the Maritimes, English Canadians, French Canadians, movers, and stayer are listed in Appendix Tables 1a to 1g. We calculate a series of summary measures of intergenerational mobility to compare these occupational matrices. The first, M, captures overall mobility as the share of all off-diagonal cells. The second and third measures exploit the skill ranking in non-farm occupations. Upward mobility, U, comprises the share of unskilled moving up from unskilled to skilled or white collar and from skilled to white collar. Downward mobility, D, comprises the share of white collar moving down to skilled or unskilled and the share of skilled moving down to unskilled. Our final measure, OF, is the share of young males from farm proprietor households moving to one of the other three sectors. Comparisons of raw figures for M, U, D, and OF may be problematic due to differences in marginal frequencies of occupation groups between the three regions. We apply the Deming and Stephan (1940) algorithm to standardize each region's transition matrix against an Ontario benchmark.

[11] By 1901 43 percent of Ontario's population resided in an urban area (40 percent for Quebec, 26 percent for the Maritimes). Manufacturing output per capita in Ontario was 17 percent higher than in Quebec and 53 percent above the Maritimes (1890).

Table 3: 19th Century Group and Regional mobility in Canada, 1871-1901

	M	U	D	OF
Canada 1871-1901	**.51**	**.28**	**.19**	**.47**
Canada 1871-1901, weighted	.50	.29	.19	.46
Ontario 1871-1901	.52	.31	.19	.47
Quebec 1871-1901	.48	.27	.19	.43
Maritimes 1871-1901	.52	.23	.20	.52
Rescaled to Ontario 1871-1901…	*M'*	*U'*	*D'*	*OF'*
Quebec 1871-1901	*.49*	*.30*	*.19*	*.45*
Maritimes 1871-1901	*.48*	*.26*	*.20*	*.45*
	M	U	D	OF
Francophone 1871-1901	.48	.26	.18	.44
Anglophone 1871-1901	.52	.29	.20	.49
Stayer 1871-1901	.50	.27	.19	.47
Mover 1871-1901	.60	.33	.21	.55

Notes: Regional classification scheme is based on 1871 region of residence, Ethnicity French or Anglophone (English, welsh, Irish, Scottish or North American) based on 1871(household. Mobility status based on any difference in reported province of residence between 1871 and 1901. Deming and Stephan (1940) algorithm used to calculate M', U', D', and OF'

Comparison of four mobility measures for Canada and the three regions in Table 3 shows greater intergenerational mobility in Ontario, with the differences relative to Quebec and the Maritimes clearest after standardizing through iterative proportional fitting. There does appear to have been a broad East-West gradient in economic mobility, though one that also fits with the differences in regional economic activity.[12] Comparisons of the Francophone and Anglophone linked populations show moderately more intergenerational mobility among Anglophones across all four measures. The starkest difference is when we compare interprovincial movers and stayers, where movers had much higher rates of overall mobility and off-farm movement. Finally, we also compute these mobility statistics for the weighted all-Canadian sample: these are quite close to the unweighted results, offering further reassurance that our procedure to disambiguate multiple links does not have substantive effects on the results.

[12] This is confirmed by a test of the degree of monotonicity in the father-son non-farm occupational movements by region. $\hat{\gamma}$ values are 0.544, 0.512 and 0.425 (with standard errors of 0.022, 0.025 and 0.019) are statistically different for the Maritimes, Quebec and Ontario. The strength of a father-son occupation relationship among non-farm occupations is strongest in the Maritimes and weakest in Ontario.

A single metric, the Altham statistic (Altham 1970; Altham and Ferrie 2007), can be used to summarize an occupational contingency table with r rows and s columns. The general form of this statistic $d(\boldsymbol{P},\boldsymbol{Q})$ compares the column-row associations between any two contingency tables $\boldsymbol{P}$ and $\boldsymbol{Q}$ using the following formula:

$$d(\boldsymbol{P},\boldsymbol{Q}) = \left[\sum_{i=1}^{r}\sum_{j=1}^{s}\sum_{l=1}^{r}\sum_{m=1}^{s}\left|log\left(\frac{p_{ij}p_{lm}q_{im}q_{lj}}{p_{im}p_{lj}q_{ij}q_{lm}}\right)\right|^2\right]^{1/2} \qquad (1),$$

When a counterfactual table $\boldsymbol{J}$ with independent rows and columns is used as the comparison, $d(\boldsymbol{P},\boldsymbol{J})$ provides a ranking of mobility in table $\boldsymbol{P}$ against the benchmark of complete occupational mobility.[13] We compute $d(\boldsymbol{P},\boldsymbol{J})$ for Canada 1871-1901, for each of the three regions and for two demographic splits used in Table 3. We then compute pairwise comparisons $d(\boldsymbol{P},\boldsymbol{Q})$ to verify whether differences in these ranking of Altham statistics across these tables are statistically significant. The likelihood ratio statistic, G^2, can be used to test a null hypothesis that column and row associations across the two tables do not differ (Agresti 2002).[14] Our $(\boldsymbol{P},\boldsymbol{Q})$ comparisons include Ontario to Quebec and to the Maritimes, Francophones to Anglophones, and movers to stayers.

[13] Probabilities $p_{ij}$and q_{ij} are shares of first generation in occupation group i whose corresponding second generation is in occupation group j in economies P and Q, respectively. Thus, $p_{ij} = n_{ij}/\sum_i n_{ij}$. The Altham statistic can also be expressed using four-way odds ratios: $d(\boldsymbol{P},\boldsymbol{Q}) = \sqrt{\left[\sum_{i=1}^{r}\sum_{j=1}^{s}\sum_{l=1}^{r}\sum_{m=1}^{s}\Theta_{ijlm}{}^2\right]}$

[14] The test statistic $G^2 = -2\sum_i\sum_j n_{ij}\ln\left(\frac{n_{ij}n}{n_{i+}n_{j+}}\right)$ where $n_{i+} = \sum_i n_{ij}$. G^2 is asymptotically χ^2 with $(r-1)(s-1)$ degrees of freedom.

Table 4: Canadian Altham Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	$d(\boldsymbol{P},\boldsymbol{J})$	G^2	$d(\boldsymbol{Q},\boldsymbol{J})$	G^2	$d(\boldsymbol{P},\boldsymbol{Q})$	G^2
CAN 1871-1901	*16.0*	*6648****				
CAN 1871-1901, weighted	*16.2*	*6859****				
ONT 1871-1901	*15.1*	*3387****				
QUE 1871-1901			*17.6*	*1718****	*5.1*	*92.2****
MAR 1871-1901			*16.8*	*1705****	*6.1*	*194****
Franco 1871-1901	17.8	1299***				
Anglo 1871-1901			15.6	4777***	4.5	41.3***
Stayer 1871-1901	16.7	6495***				
Mover 1871-1901			9.2	224***	8.3	185***
Franco in Quebec	17.1	1062***				
Anglo in Quebec			18.0	620***	5.5	21.7***
Franco outside Quebec	21.4	242***				
Anglo outside Quebec			15.4	4173***	9.0	26.7**

Notes: G^2 for weighted sample calculated using normalized inverse propensity score weights that sum to N. Regional classification scheme is based on 1871 region of residence, Ethnicity French or Anglophone (English, welsh, Irish, Scottish or North American) based on 1871(household. Mobility status based on any difference in reported province of residence between 1871 and 1901.

Column (1): distance from row/column independence ($\boldsymbol{J}$), to base sample ($\boldsymbol{P}$)
Column (2): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{P},\boldsymbol{J}) = 0$
Column (3): distance from independence ($\boldsymbol{J}$) to comparison mobility table ($\boldsymbol{Q}$)
Column (4): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{Q},\boldsymbol{J}) = 0$
Column (5): distance between base transition matrix ($\boldsymbol{P}$) and each comparison country's transition matrix ($\boldsymbol{Q}$)
Column (6): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{P},\boldsymbol{Q}) = 0$

The patterns documented in Table 4 are reinforced in regional Altham statistics. There is a clear ranking in terms of regional mobility. Ontario sits comfortably ahead of the Maritimes and Quebec with the differences between each significant at the 1 percent level.[15] Differences in the Altham statistic between Francophones and Anglophones are in line with the mobility measures presented in Table 3. Comparison of the regional results with anglophone/francophone differences invites the question of whether the modest-looking mobility gap between French speakers and English speakers mostly reflects the geographical distribution of each population across regions. While sample sizes are much smaller, we have also calculated Altham statistics

[15] $d(\boldsymbol{P},\boldsymbol{Q})$ between Quebec and the Maritimes is 4.9. with a G^2 statistic of 38 (significant at the 1 percent level).

for Anglophone and Francophone Canadians within Quebec and outside of Quebec. The most striking pattern here is the particularly low mobility among French-speakers outside of Quebec, with an Altham statistic of close to 20. As we will see in the section on international comparisons, this comes quite close to the mobility score of less mobile European countries. We also find lower mobility among Anglophones in Quebec than among Francophones. These patterns can be reconciled to a story of a segmented provincial labour market, with opportunities for language minorities less fluid in each case. Finally, the Altham statistics reinforce the existence of large differences in mobility between movers and stayers, as in previous results.

Our comparisons go beyond the Altham statistic, which has the disadvantage of masking which particular intergenerational transitions are responsible for the variation in overall mobility. Modalsli (2017) uses two-way odds ratios $\Theta_{i,i}$ to measure the likelihood of same occupation across generations $p_{ii}/(1-p_{ii})$, normalized to account for the availability of occupation i relative to all other occupations $(-i)$. We extend this calculation to examine two-way odds ratios for all intergenerational comparisons, $\Theta_{i,j} = \ln\left[\frac{p_{ij}/(1-p_{ij})}{p_{-ij}/(1-p_{-ij})}\right]$

Table 5 displays the matrix of $\exp(\Theta_{i,j})$. The diagonal elements, $\exp(\Theta_{i,i})$, provide a metric similar in spirit to measures of dynastic bias computed by Dal Bo et. al. (2007) that indicate the extent to which the second generation were over-represented in the occupational group of their father depending on how far the odds ratio lies above one. The off-diagonal elements show whether sons of were over- or under-represented in each intergenerational occupational transition.

In Figure 2 we offer a visual comparison of two-way odds ratios for Quebec, Maritimes and Ontario, by presenting the relative odds ratios between Ontario and the other two regions. The relative ratios are plotted on a log scale for symmetry. This means that a relative ratio of zero indicating identical odds ratios. We extend this approach to compare Francophones and Anglophones nationally (Figure 3a), as well as the split comparison inside and outside of Quebec (Figure 3b).

Table 5: Two-way odds ratios of relative representation of sons by father occupation

(a) Canada

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	9.2 (0.044)	1.8 (0.038)	0.8 (0.051)	0.3 (0.033)
Skilled/Unskilled	1.4 (0.051)	3.5 (0.033)	1.4 (0.040)	0.3 (0.029)
Unskilled	0.5 (0.059)	0.5 (0.039)	2.4 (0.034)	1.0 (0.026)
Farm	0.3 (0.058)	0.2 (0.039)	0.4 (0.039)	4.8 (0.027)

(b) Ontario

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	6.6 (0.060)	1.9 (0.050)	0.9 (0.071)	0.3 (0.043)
Skilled/Unskilled	1.2 (0.071)	4.3 (0.045)	1.8 (0.056)	0.3 (0.040)
Unskilled	0.5 (0.083)	0.5 (0.055)	1.4 (0.054)	1.4 (0.039)
Farm	0.2 (0.077)	0.3 (0.050)	0.5 (0.054)	4.2 (0.037)

(c) Quebec

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	8.6 (0.090)	2.3 (0.084)	0.8 (0.111)	0.2 (0.074)
Skilled/Unskilled	1.3 (0.098)	3.8 (0.073)	1.3 (0.084)	0.4 (0.061)
Unskilled	0.4 (0.134)	0.7 (0.091)	2.7 (0.076)	0.9 (0.060)
Farm	0.2 (0.114)	0.2 (0.093)	0.4 (0.082)	5.9 (0.060)

(d) Maritimes

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	8.4 (0.093)	1.8 (0.083)	0.7 (0.095)	0.3 (0.071)
Skilled/Unskilled	1.2 (0.109)	3.3 (0.070)	0.9 (0.078)	0.5 (0.060)
Unskilled	0.4 (0.109)	0.6 (0.070)	3.6 (0.061)	0.7 (0.048)
Farm	0.2 (0.138)	0.4 (0.080)	0.2 (0.083)	5.4 (0.058)

(e) Anglophone

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	7.1 (0.050)	1.9 (0.044)	0.9 (0.057)	0.3 (0.038)
Skilled/Unskilled	1.2 (0.059)	3.9 (0.039)	1.4 (0.048)	0.3 (0.035)
Unskilled	0.4 (0.067)	0.6 (0.045)	2.1 (0.042)	1.1 (0.031)
Farm	0.2 (0.066)	0.3 (0.045)	0.4 (0.048)	4.7 (0.033)

(f) Francophone

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	8.2 (0.112)	2.6 (0.097)	0.6 (0.138)	0.3 (0.085)
Skilled/Unskilled	1.4 (0.121)	4.2 (0.080)	1.2 (0.089)	0.3 (0.066)
Unskilled	0.4 (0.154)	0.7 (0.095)	2.9 (0.077)	0.8 (0.062)
Farm	0.3 (0.134)	0.2 (0.101)	0.4 (0.083)	5.2 (0.064)

(g) Quebec Francophones

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	7.3 (0.121)	2.4 (0.108)	0.7 (0.150)	0.3 (0.093)
Skilled/Unskilled	1.4 (0.128)	4.5 (0.087)	1.3 (0.099)	0.3 (0.072)

Unskilled	0.5 (0.165)	0.7 (0.108)	2.7 (0.089)	0.8 (0.071)
Farm	0.3 (0.144)	0.2 (0.114)	0.4 (0.095)	5.4 (0.071)

(h) Quebec Anglophones

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	9.3 (0.141)	2.3 (0.140)	1.0 (0.172)	0.1 (0.129)
Skilled/Unskilled	1.1 (0.162)	2.6 (0.142)	1.4 (0.164)	0.5 (0.116)
Unskilled	0.3 (0.234)	0.7 (0.173)	2.7 (0.147)	1.1 (0.114)
Farm	0.2 (0.189)	0.2 (0.168)	0.3 (0.172)	7.1 (0.114)

(i) Ontario/Maritime Francophones

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	16.6 (0.298)	3.5 (0.228)	0.3 (0.357)	0.2 (0.217)
Skilled/Unskilled	1.1 (0.375)	3.2 (0.203)	1.0 (0.212)	0.5 (0.172)
Unskilled	0.2 (0.438)	0.6 (0.204)	3.1 (0.159)	0.7 (0.133)
Farm	0.2 (0.388)	0.3 (0.218)	0.4 (0.174)	4.0 (0.143)

(j) Ontario/Maritime Anglophones

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	6.7 (0.054)	1.9 (0.046)	0.9 (0.061)	0.3 (0.039)
Skilled/Unskilled	1.2 (0.063)	4.0 (0.041)	1.4 (0.05)	0.3 (0.037)
Unskilled	0.5 (0.07)	0.6 (0.047)	2.1 (0.043)	1.1 (0.033)
Farm	0.2 (0.071)	0.3 (0.047)	0.4 (0.05)	4.5 (0.034)

(k) Mover

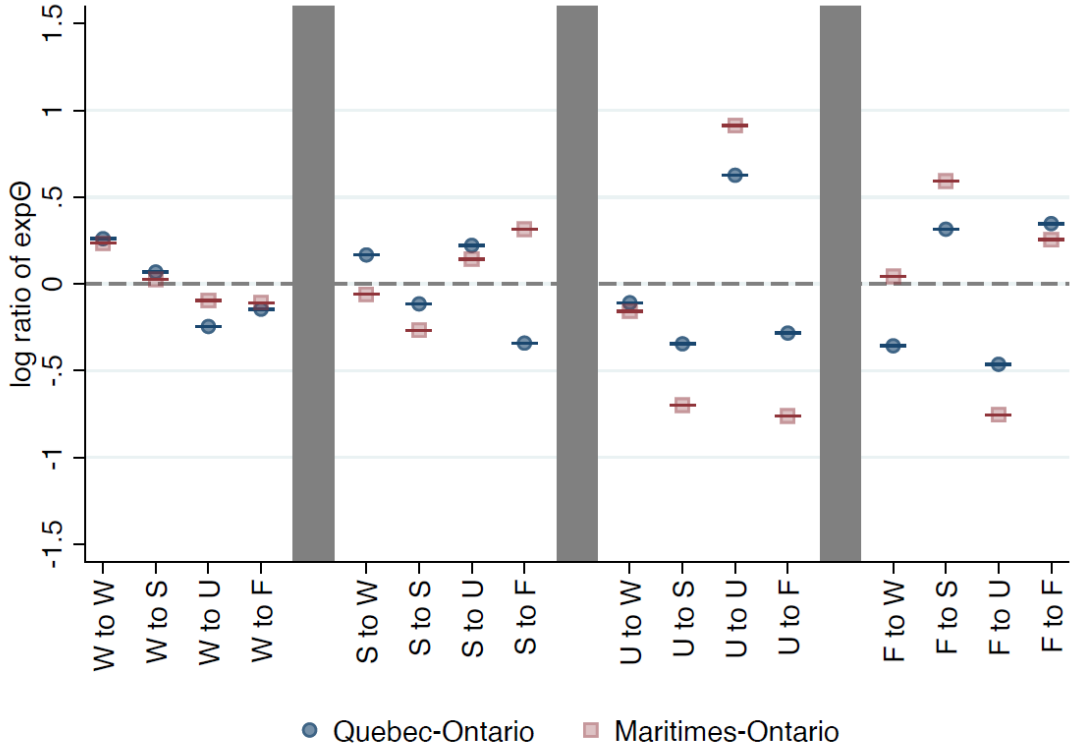
	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	3.9 (0.119)	1.3 (0.110)	0.9 (0.148)	0.4 (0.092)
Skilled/Unskilled	0.8 (0.139)	1.8 (0.106)	1.1 (0.139)	0.7 (0.089)
Unskilled	0.6 (0.182)	0.8 (0.139)	1.4 (0.154)	1.2 (0.107)
Farm	0.4 (0.142)	0.5 (0.109)	0.9 (0.127)	2.3 (0.083)

(l) Stayer

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	7.9 (0.048)	2.1 (0.041)	0.8 (0.054)	0.3 (0.035)
Skilled/Unskilled	1.3 (0.055)	4.3 (0.035)	1.4 (0.041)	0.3 (0.031)
Unskilled	0.4 (0.063)	0.6 (0.041)	2.4 (0.036)	1.0 (0.027)
Farm	0.2 (0.064)	0.3 (0.042)	0.3 (0.041)	5.2 (0.029)

Notes: Authors' calculations of $e^{\Theta_{i,j}}$. Odds ratios $\Theta_{i,j}$ are calculated following equation (2). Standard errors in parentheses calculated from equation 3.1 in Agresti (2002).

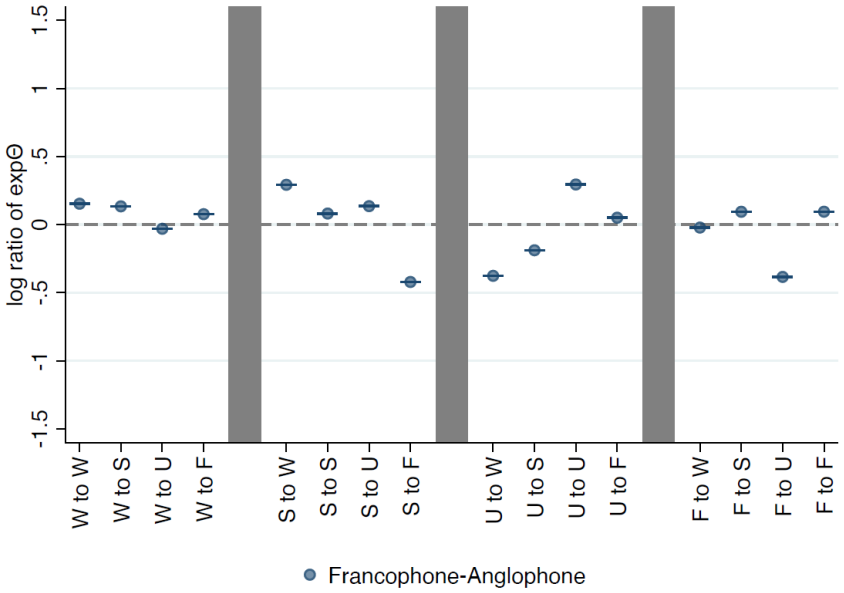
Figure 2: Relative odds-ratios for occupational transitions in Canadian regions



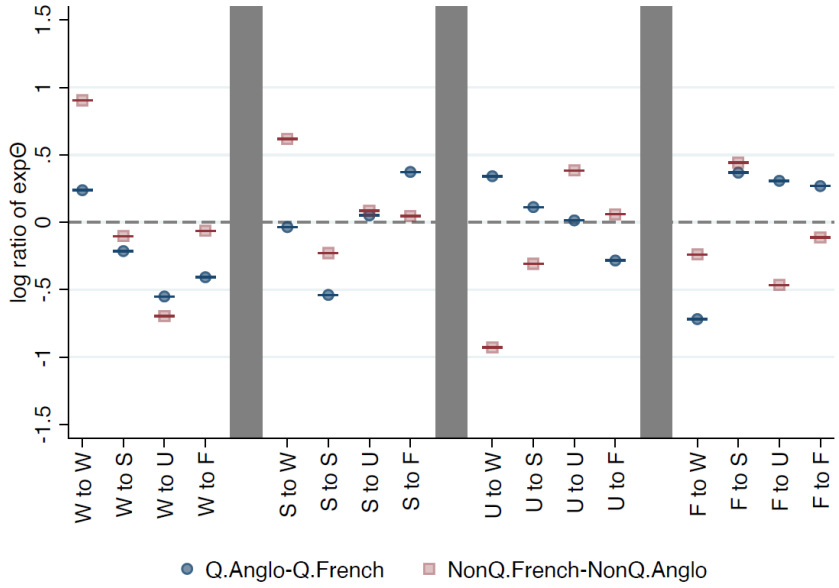
Notes: Figures are the log ratio of odds-ratios for father-son occupational transitions between two sectors. See the text for details on how odds-ratios are computed. WC=white-collar, SS=skilled and semi-skilled, US=unskilled, FM=farm operator.

Figure 3: Relative odds-ratios for occupational transitions by language group

a) Francophone relative to Anglophone



b) Francophone/Anglophone, inside and outside of Quebec



Notes: Figures are the log ratio of odds-ratios for father-son occupational transitions between two sectors. See the text for details on how odds-ratios are computed. WC=white-collar, SS=skilled and semi-skilled, US=unskilled, FM=farm operator.

Comparisons of the three Canadian regions reveal that higher mobility in Ontario is associated with less intergenerational persistence in white-collar occupations (though the odds ratio is still quite high), farming, and especially unskilled work. Perhaps the most striking finding is that the sons of unskilled fathers in Ontario are more overrepresented in skilled and semi-skilled jobs than in their father's occupation class, in stark contrast to the other two regions. This finding indicates that a key difference between Ontario and the rest of the country was more fluid movement off of the bottom of the occupational ladder. Differences between English and French speaking Canadians show a more modest pattern of more intergenerational Francophone persistence in white-collar, farm, and unskilled activities (Figure 3a). In comparing francophones and anglophones within and outside of Quebec (Figure 3b), it appears that high persistence in white-collar work (and to a lesser extent unskilled) is a major contributor to low mobility among French-speaking Canadians. Within Quebec, we find similar high persistence in white-collar work matched by the farm sector for English-speaking Canadians, who actually appear fairly mobile relative to francophones in the manual sectors. We find much more generalised differences in intergenerational persistence in movers than stayers, with two-way odds ratios on the diagonal about twice as large in the stayer sample.

International Comparisons

Where does Canadian historic mobility sit between the New World and Old World models? We use the mobility measures outlined above to compare intergeneration mobility in Canada to six comparable samples. Table 3 shows aggregate mobility measures for Canada (M, U, D, and OF) compared to figures computed from transition matrices for 20 year spans from the US 1860-1880 and 1880-1900 (Long and Ferrie 2013, Table 5), a 26 year span from Argentina during 1869-1895 and 30 year spans in the US 1850-1880 and the UK 1851-1881 (Perez 2019, Table 1), a 30 year span in Sweden 1880-1910 (Berger et al. 2020, Table A.5) and a 35 year span in Norway 1865 -1900 (Modalsli 2017, Table A5b).[16] We also compute M', U', D', and OF' after adjusting for differences in occupational prevalence using the Deming-Stephan (1940) algorithm between Canada and each comparator.

Table 6: 19th Century Mobility in Canada and elsewhere

	M	U	D	OF
Canada 1871-1901	**.51**	**.28**	**.20**	**.47**
US 1850-1880	.46	.29	.18	.38
US 1860-1880	.50	.31	.21	.43
US 1880-1900	.53	.30	.19	.52
Argentina 1869-1895	.55	.27	.19	.49
UK 1851-1881	.45	.28	.12	.63
Norway 1865-1900	.46	.37	.08	.39
Sweden 1880-1910	.54	.33	.15	.53
	M'	U'	D'	OF'
Canada rescaled to…				
US 1850-1880	.45	.31	.15	.37
US 1860-1880	.48	.31	.16	.42
US 1880-1900	.54	.32	.16	.54
Argentina 1869-1895	.51	.29	.18	.45
UK 1851-1881	.54	.33	.15	.79
Norway 1865-1900	.48	.31	.15	.42
Sweden 1880-1910	.57	.36	.14	.57

Notes: Canadian figures calculated in this paper. 20 year US and UK figures calculated from transition matrices in Long and Ferrie (2013). Argentine figures and 30 year US and UK figures calculated from transition matrix in Perez (2019). Norwegian figures calculated from transition matrix in the appendix of Modalsli (2017). Swedish figures calculated from transition matrix in the appendix of Berger et al. (2020). Deming and Stephan (1940) algorithm used to generate M' U' D' and OF'

[16] Where multiple sources report transition tables for the same population we use the larger sample.

Table 6 shows that mobility in Canada from 1871 to 1901 was broadly similar to the US in the three comparison samples. Overall mobility (M) was slightly higher in Canada 1871-1901 than the US before 1880, with lower intergenerational among Canadian farmers. The US 1880-1900 linked sample appears to show more mobility, increased movement away from farming, and more upward occupational mobility among non-farming occupations relative to Canadians in the same decades. The other New World comparator, Argentina 1869-1895 has the highest mobility rate M but broadly similar measures to Canada on the other metrics in Table 3. These differences are notably reduced, however, when comparing the Canadian transition matrix for occupational prevalence to the US or Argentina

Larger differences are apparent when comparing Canada to the UK or Norway, where overall mobility was lower in the late 19th century, with notably lower downward mobility and different patterns of off-farm movement. Controlling for occupational prevalence enhances difference between Canada and the UK, with much more mobility in Canada across all measures, while moderating differences between Canada and Norway while also showing positive differences favouring Canada.

Table 7 compares Altham statistics for Canada and the other six countries. Comparing occupational holdings to independence ($\boldsymbol{d(P,J)}$) shows that Canadian intergenerational mobility has a clear rank position between the more mobile New World economies (Argentina and the US) and less mobile Old World European economies (Norway, Sweden, and the UK). Note also that results for all three Canadian regions (Table 4) lie in the same interval between US 1850-1880 and Sweden 1880-1910. That Canada lay somewhere on the mid-point between the US/Argentina and Sweden is reinforced by measures of the distance in column/row associations between each pair of occupational matrices d(P,Q). Canadian mobility patterns are close to equidistant between Argentina, US 1850-1880, and Sweden (d(P,Q) of 3.9, 4.0, and 4.7), and much further from Norway or the UK (d(P,Q) of 10.1 and 10.2).

Table 7: Altham Statistics for Canada 1871-1901 and comparison countries

	(1)	(2)	(3)	(4)	(5)	(6)
	$d(\boldsymbol{P},\boldsymbol{J})$	G^2	$d(\boldsymbol{Q},\boldsymbol{J})$	G^2	$d(\boldsymbol{P},\boldsymbol{Q})$	G^2
CAN 1871-1901	15.9	6145***				
US 1850-1880			14.6	32962***	4.0	283***
UK 1851-1881			20.8	800***	10.2	153***
ARG 1869-1895			13.4	2101***	3.9	130***
NOR 1865-1900			24.1	19245***	10.1	867***
US 1860-1880			12.1	385***	5.6	50***
US 1880-1900			14.8	557***	4.1	26***
Sweden 1880-1910			17.9	61404***	4.7	477***

Notes: Canadian figures calculated in this paper. 20 year US and UK figures calculated from transition matrices in Long and Ferrie (2013). Argentine figures and 30 year US and UK figures calculated from transition matrix in Perez (2019). Norwegian figures calculated from transition matrix in the appendix of Modalsli (2017). Swedish figures calculated from transition matrix in the appendix of Berger et al. (2020).

Column (1): distance from row/column independence ($\boldsymbol{J}$), to Canada 1871-1901 ($\boldsymbol{P}$)
Column (2): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{P},\boldsymbol{J}) = 0$
Column (3): distance from independence ($\boldsymbol{J}$) to comparison mobility table ($\boldsymbol{Q}$)
Column (4): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{Q},\boldsymbol{J}) = 0$
Column (5): distance between Canadian transition matrix ($\boldsymbol{P}$)
and each comparison country's transition matrix ($\boldsymbol{Q}$)
Column (6): Likelihood Ratio test statistic χ^2_9, akin to testing $H_0: d(\boldsymbol{P},\boldsymbol{Q}) = 0$

To explore the underlying occupational trends that account for mobility differences between Canada and other Countries, we present two-way odds ratios for each economy in Table 8. Here we limit attention to the six samples for which we have longer linkage windows, and exclude US 1860-1880 and US 1880-1900. Figure 4 compares log relative odds ratios between each country and Canada

Table 8: Two-way odds ratios of relative representation of sons by father occupation

(a) Canada 1871-1901

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	9.2 (0.044)	1.8 (0.038)	0.8 (0.051)	0.3 (0.033)
Skilled/Unskilled	1.4 (0.051)	3.5 (0.033)	1.4 (0.040)	0.3 (0.029)
Unskilled	0.5 (0.059)	0.5 (0.039)	2.4 (0.034)	1.0 (0.026)
Farm	0.3 (0.058)	0.2 (0.039)	0.4 (0.039)	4.8 (0.027)

(b) US 1850-1880

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	6.2 (0.018)	1.4 (0.015)	0.7 (0.028)	0.4 (0.012)
Skilled/Unskilled	0.9 (0.022)	3.8 (0.013)	2.0 (0.02)	0.3 (0.012)
Unskilled	0.6 (0.031)	1.0 (0.018)	2.6 (0.022)	0.8 (0.015)
Farm	0.2 (0.021)	0.3 (0.014)	0.4 (0.021)	5.0 (0.011)

(c) Argentina 1869-1895

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	5.6 (0.053)	1.5 (0.055)	0.6 (0.062)	0.3 (0.047)
Skilled/Unskilled	0.9 (0.075)	3.0 (0.059)	1.0 (0.066)	0.5 (0.055)
Unskilled	0.4 (0.072)	0.7 (0.061)	2.3 (0.048)	1.0 (0.041)
Farm	0.4 (0.059)	0.5 (0.057)	0.7 (0.049)	3.0 (0.039)

(d) UK 1851-1881

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	5.6 (0.053)	1.5 (0.055)	0.6 (0.062)	0.3 (0.047)
Skilled/Unskilled	0.9 (0.075)	3.0 (0.059)	1.0 (0.066)	0.5 (0.055)
Unskilled	0.4 (0.072)	0.7 (0.061)	2.3 (0.048)	1.0 (0.041)
Farm	0.4 (0.059)	0.5 (0.057)	0.7 (0.049)	3.0 (0.039)

(e) Norway 1865-1900

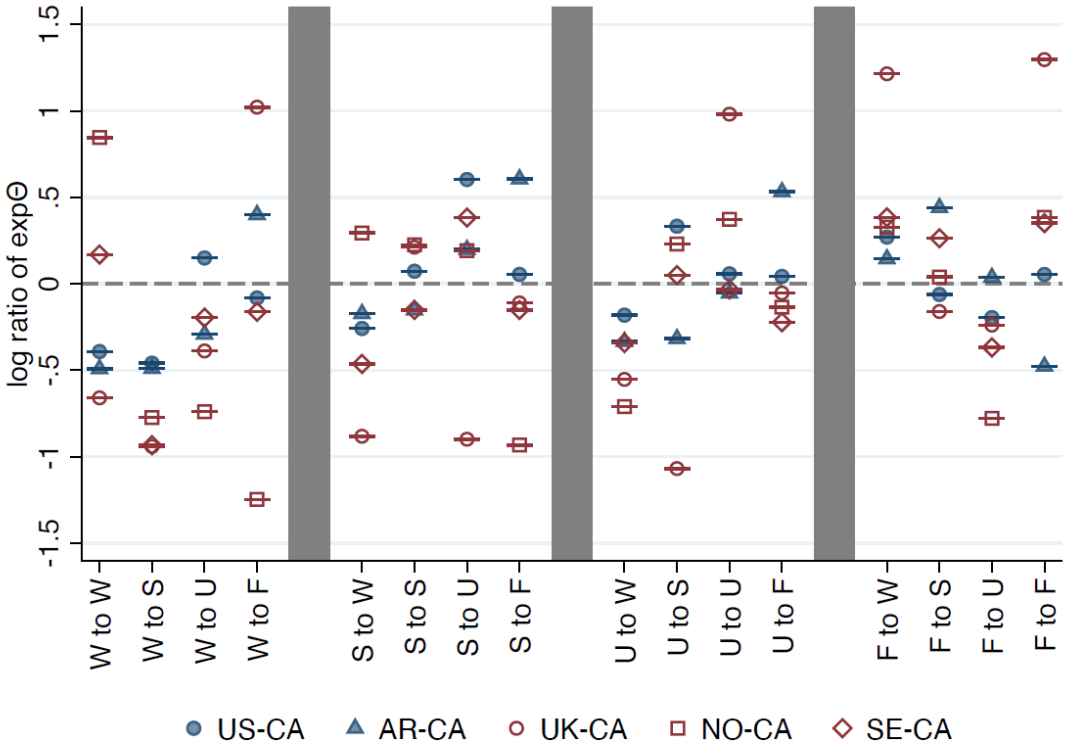
	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	21.4 (0.042)	2.4 (0.032)	0.4 (0.034)	0.4 (0.025)
Skilled/Unskilled	0.7 (0.049)	4.4 (0.028)	1.8 (0.021)	0.3 (0.020)
Unskilled	0.2 (0.076)	0.7 (0.038)	3.6 (0.022)	0.5 (0.021)
Farm	0.1 (0.076)	0.1 (0.048)	0.3 (0.021)	7.0 (0.020)

(f) Sweden 1880-1910

	Fathers			
Sons	White Collar	Skilled/Unskilled	Unskilled	Farm
White Collar	10.9 (0.016)	1.1 (0.015)	0.6 (0.015)	0.4 (0.012)
Skilled/Unskilled	0.6 (0.018)	3.0 (0.011)	1.5 (0.01)	0.4 (0.009)
Unskilled	0.4 (0.022)	0.8 (0.013)	2.4 (0.01)	0.7 (0.01)
Farm	0.2 (0.026)	0.2 (0.017)	0.3 (0.013)	6.8 (0.011)

Notes: Authors' calculations of $e^{\Theta_{i,j}}$. Odds ratios $\Theta_{i,j}$ are calculated following equation (2). Standard errors in parentheses calculated from equation 3.1 in Agresti (2002).

Figure 4: Relative odds-ratios for occupational transitions – international comparisons



Notes: Figures are the log ratio of odds-ratios for father-son occupational transitions between two sectors. See the text for details on how odds-ratios are computed. WC=white-collar, SS=skilled and semi-skilled, US=unskilled, FM=farm operator.

The focus on occupational transitions through the two-way odds ratios in Table 8 provides clear indications of which parts of each economy featured particularly high or low mobility rates. New World comparisons between Canada, the US and Argentina show higher rates of persistence in white-collar occupations (relative immobility) in Canada as contributing factors for somewhat lower overall mobility in Table 7, though Canadians shares the common New World feature or relatively fluid mobility out of manual occupations in the skilled/semi-skilled and unskilled sectors. Relative elite persistence in white-collar occupations as compared to the US is seen in all Canadian regions (Table 5), and appears to be one feature of the Canadian mobility experience that divergence consistently from that of its southern neighbours. Another notable feature of comparisons across the Americas is the low persistence in farming in Argentina, as well a relatively high rates of entry into agriculture from other sectors.

Sharper differences are evident when comparing Canada and other New World economies to Europe. Persistence in farming was notably higher in all European economies. A similar picture

of stronger occupational inheritance is apparent in white-collar work for Norway and Sweden. The odds ratio on white-collar persistence is quite a bit lower in British data, but this reflects relatively high rate of transition into agriculture (a sector which encompasses a range of economic outcomes including elite status for some), while movement into skilled manual activities are less prevalent than in the New World economies. At the other end of the occupational distribution, persistence in unskilled work in the UK and Norway was much higher than in any New World settings (including the less mobile Canadian regions), while persistence in skilled work appears only modestly larger. Mobility out of manual work in Sweden appears to be comparable to the New World case studies. Broadly speaking, Canada shared the New World pattern of high mobility out of unskilled work and farming, but looks a bit more European in terms of persistence in elite occupations. The other intermediate case is Sweden, which has high persistence in farm and white collar work, where access to capital and ownership are important, but appear quite mobile in manual occupations.[17]

Given the importance of differences in occupational persistence in farming and white-collar work to explaining mobility patterns across the six countries, we have also computed partial Altham Statistics (see Modasli 2017) that allow for comparisons of the contribution of persistence in each of the four sectors as well as estimates of overall mobility net of the persistence in each sector.[18] Appendix Table 9 lists the full set of partial Altham Statistics, one for each of the four occupational groupings. Figure 5 illustrates how the Altham statistic is decomposed for each of the four categories. For farming (bottom left), the length of the ray from the origin is the Altham statistic $\boldsymbol{d(P,J)}$. The horizontal coordinate for each country is $\boldsymbol{d_F}$ and the vertical coordinate is $\boldsymbol{d_{NF}}$.

[17] We have also constructed 5-group Altham Statistics where we in one version we divide the white-collar grouping into high- and low-white collar, and in a second extract an additional category for unskilled farming. These results are presented in Appendix C. This procedure appears to improve Canada's ranking relative to the United States (see Appendix Table C13 and C23).

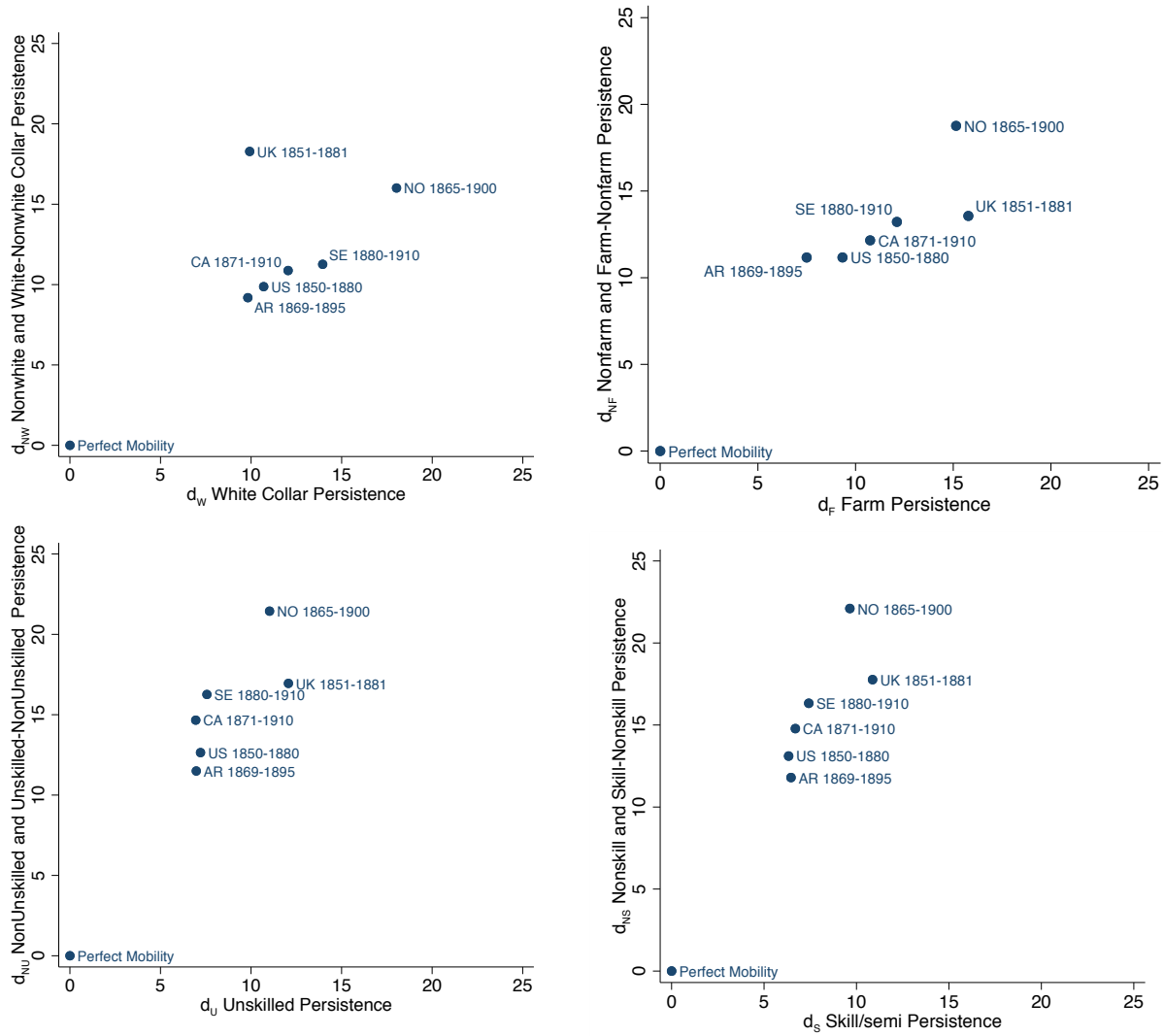
[18] For example, we derive a Partial Altham statistic for farming $\boldsymbol{d_F}$ and non-farming $\boldsymbol{d_{NF}}$, where $\boldsymbol{d(P,J)} = \sqrt{(d_F^2 + d_{NF}^2)}$. First we calculate all of the 4-way odds ratios Θ_{ijlm}, which represent the log term in equation (1). We then calculate $\boldsymbol{d_F}$ as the root of the sum the squares of these odds ratios separately among all transitions involving a farm-farm transition (father to son farming persistence). Note that $\boldsymbol{d_W + d_S + d_U + d_F \neq d(P,J)}$. For further details see Modalsli (2017).

Table 9: Partial Altham Statistics

	White Collar		Skilled / Semi-skilled		Unkilled		Farm	
	d_W	d_{NW}	d_S	d_{NS}	d_U	d_{NU}	d_F	d_{NF}
Canada 1871-1901	12.0	10.9	6.7	14.8	6.9	14.7	10.7	12.2
US 1850-1880	10.7	9.8	6.3	13.1	7.2	12.6	9.3	11.2
ARG 1869-1895	9.8	9.2	6.5	11.8	7.0	11.5	7.5	11.2
UK 1851-1181	9.9	18.3	10.8	17.8	12.1	16.9	15.8	13.6
NOR 1865-1900	18.0	16.0	9.6	22.1	11.0	21.4	15.1	18.8
SWE 1880-1910	13.9	11.2	7.4	16.3	7.6	16.3	12.1	13.2

Notes: See text for calculation details.

Figure 5: Partitioned Altham Statistics



Notes: See text for details, and Table 9 for underlying figures.

The partial Altham Statistics confirm the importance of high-persistence in two key sectors identified in the odds ratios in Table 8. Partitioning on white-collar persistence confirms that mobility differences outside of this sector were relatively modest in the New World, and that Swedish mobility outside of the white-collar occupation category was relatively close to that across the Atlantic.[19] These figures provide further support for the views of Porter (1965) regarding the exclusive nature of elite occupations in Canada prior to the 1960s. As one would predict from the pattern of odds ratios shown earlier, Altham Statistics partitioned on farming show lower mobility gaps away from agriculture, particularly within the New World. These results make clear that mobility differences between European and American economies were not due to structural differences between settler and more industrialised economies. Partial Altham statistics for the two manual sectors (skilled/semi-skilled and unskilled) reinforce the earlier patterns regarding Swedish intergenerational mobility being much closer to Canadian intergenerational mobility for this part of the occupational distribution.

Conclusions

Our analysis of intergenerational mobility in late 19th Century Canada fits well with the view of Canada as a "mid-Atlantic" economy and society that shared characteristics of both New World and Old World labour markets. Aggregate Canadian mobility lay about midway between Argentina/US and Sweden, the most mobile of European economies for which we have evidence. Mobility differences between Canada and the other New World economies lay largely in greater persistence in white-collar occupations and farming. These are the two sectors where ownership and access to capital are often a pre-requisite. This pattern fits with the views of Canadian sociologists describing access to elite occupations in the mid-20th century (Porter 1965), and it appears to be a dimension in which Canada leans more towards Old World patterns than either the US or Argentina. Intergenerational mobility from manual work in Canada was almost indistinguishable from outcomes elsewhere in the Americas. On this dimension Canada is clearly aligned with New World patterns in terms of opportunities available to the young. Finally, our findings suggest that Canada has avoided much of the marked decline in intergenerational mobility over the course of 20th century seen elsewhere in the Americas. These results provide tentative support for Alesina, Cozzi and Mantovan's (2012) model of ideology and redistribution, with initial similarities in inequality between Canada and the US were by the

[19] The partitioned Altham statistic groups the 4-way odds ratios for mobility among occupations other than white-collar together with 4-way odds ratios for persistence in these non-white collar occupations.

late 20th century swamped by the effects of differences in attitudes towards wealth and income inequality.[20]

While our results show that all Canadian origin regions in 1871 (Ontario, Quebec, and the Maritimes) had mobility outcomes that lay between New World and Old World outcomes, sharper differences are evident when looking at outcomes for Canada's two main linguistic groups. Anglophones were moderately more mobile than Francophones, but more interesting is the contrast between the two inside and outside of Quebec. Francophones has a small mobility advantage within Quebec, and a large disadvantage outside of Quebec. This finding is indicative of labour market segmentation along linguistic lines, with the Quebec disadvantage for Anglophones likely mediated by the presence of Montreal, Canada's largest city and a source of a wide range of opportunities for both English and French speaking Canadians

New linked records for Canada 1871-1901 allow us to present a first portrait of Canadian intergenerational mobility patterns in international context. These international and internal comparisons can be reinforced in future work that fully exploits the large sample of linked individual records now available. Individual-level analysis of mobility outcomes should be instructive in revealing how language may have interacted with geographical mobility to shape intergenerational outcomes for linguistic minorities. Shifting the focus from regions to smaller geographical units will reveal where local opportunities lay a century ago, and comparisons to present-day Canadian patterns (Corak 2020) may be informative in understanding why Canadian mobility rates have held up better over time than elsewhere in the Americas.

[20] Evidence for Canada-US differences in attitudes towards income inequality from the 1980 are documented in Svallfors (1997, Table 3).

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APPENDIX

A) Supplemental tables and figures

Figure A.1 Aggregate trends in occupational groups: Linked sample

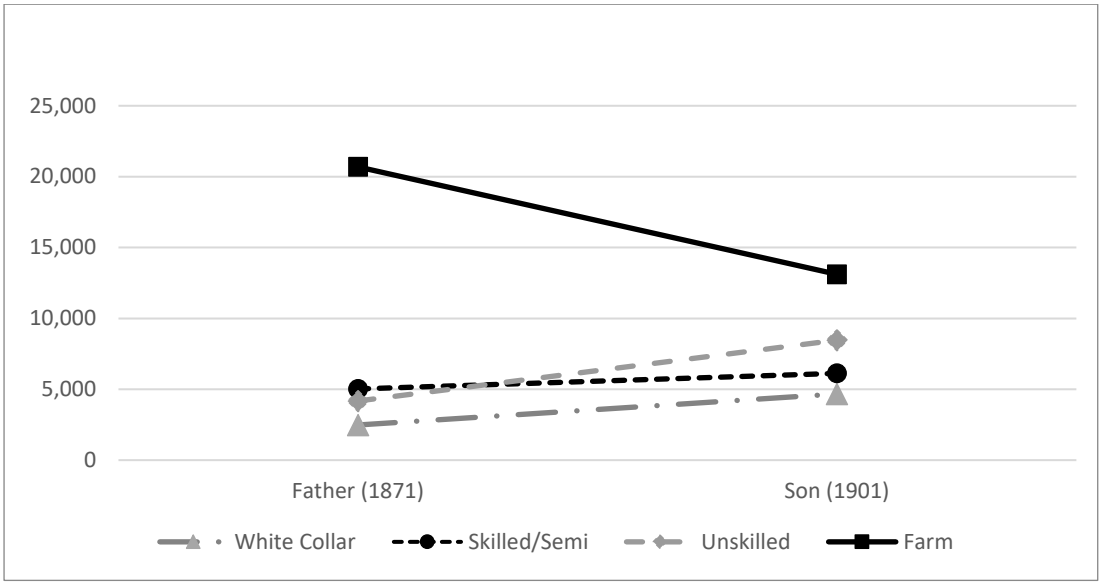
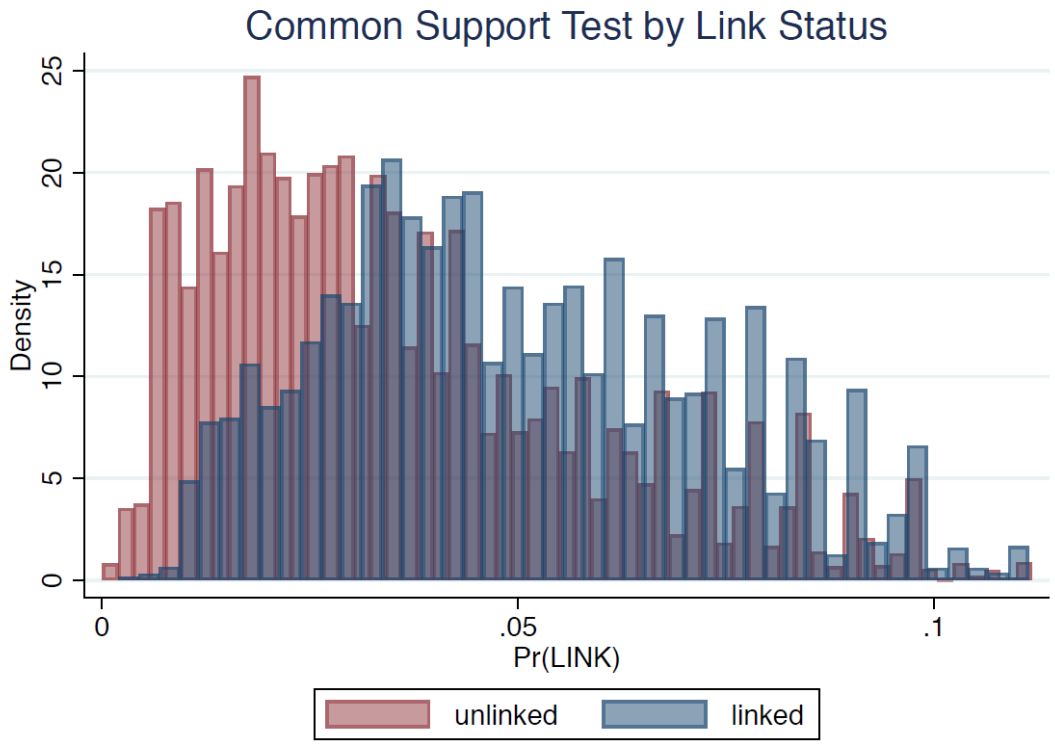
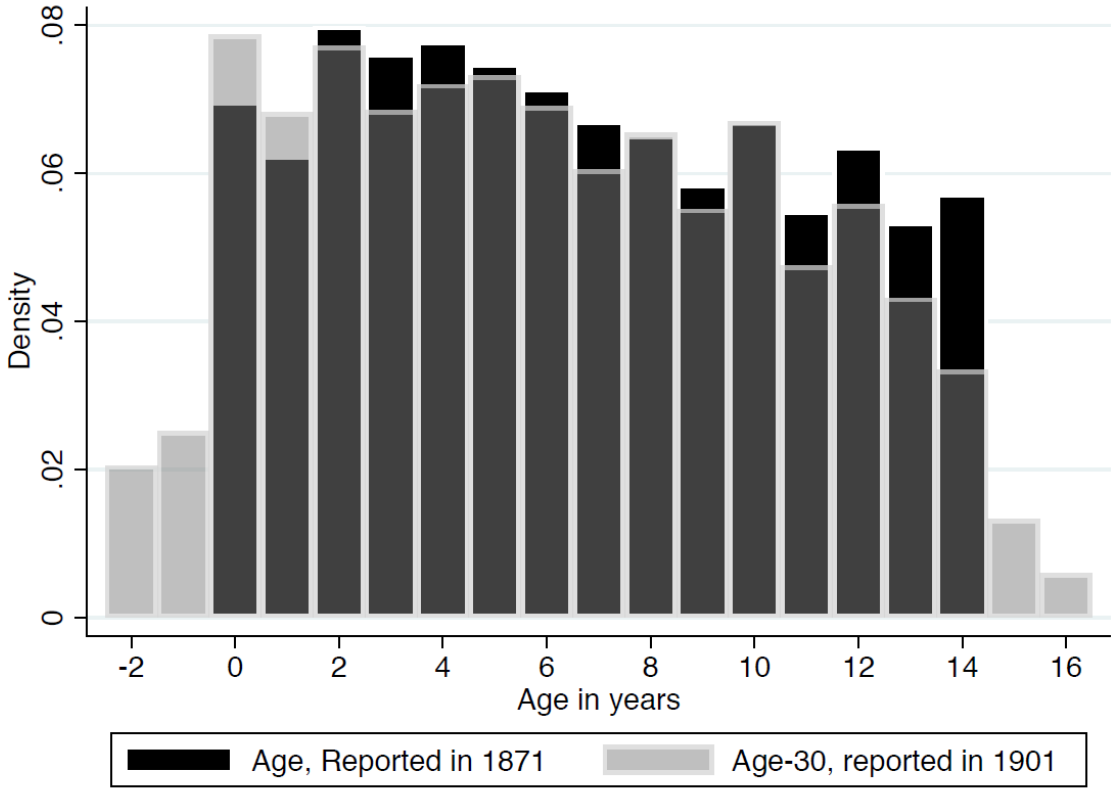


Figure A.2: Diagnostics for inverse propensity score linking weights



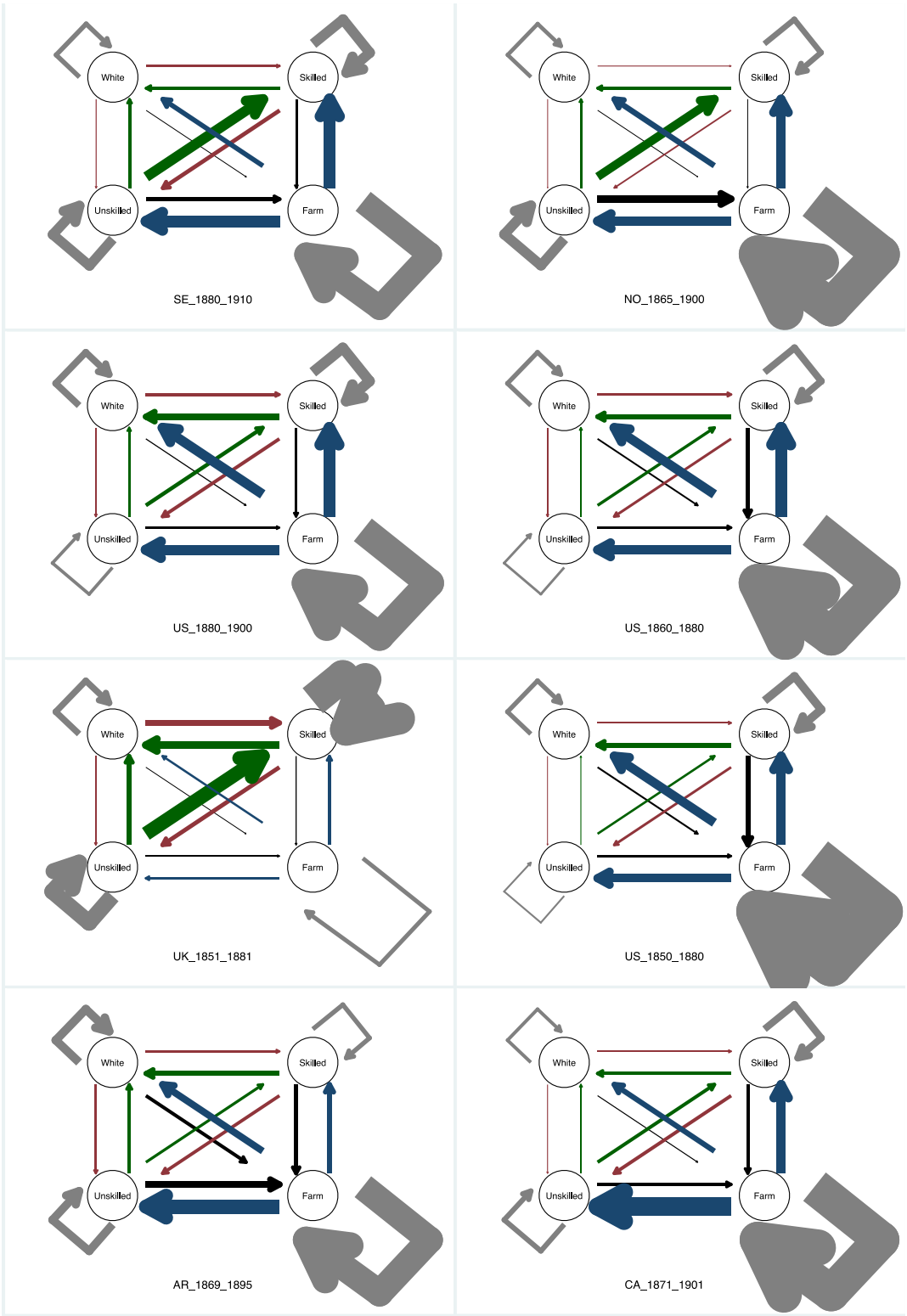
Notes: Pr(LINK) are fitted values from probit regression for successful linkage of observations from 1871 full count. Relative densities shown over support [0,1].

Figure A.3: Histogram of age distributions 1871 and 1901 for linked observations



Notes: Our linkage procedure allows for 2-year age discrepancy between 1871 and 1901 to account for differences in survey collection timing over the 4 census rounds that we link.

Figure A.4: International occupational transitions



Notes: Figures comparable to Canada 1871-1901 (Figure 1 of the main text). Arrow size scaled to represent relative number of transitions. Green arrows represent U moves, red arrows represent D moves and navy arrows represent OF moves. Persistence in occupation (inverse of our measure M) from father to son is shown by returning arrows (grey).

B) Results using OCCHISCO groupings

This section contains a full set of results computed using alternative occupation classifications. We group OCCHISCO codes into 4 categories similar to Long and Ferrie (2013). White collar includes Proprietors and professionals, clerical works and sales workers (Codes 0 – 30000). Unskilled comprises service workers, labourers including agricultural labourers, primary industry workers and farmer's sons (codes 50000 – 60000; 62710 – 69999; 99120 – 99439). Farm includes farmers and farm owners (codes 6000 – 62709). Skilled/Semi-skilled includes craftsmen and operatives (all remaining codes ranging from 70000 – 98900).

Table B.1 below shows that the main difference between the two groupings is the assignment of skilled/semi-skilled and workers white collar workers. There are also a few observations that are lost because we are unable to assign them a HISCLASS coding. However, the main results of the paper are largely unchanged regardless of which occupational grouping we use.

Table B.1: Concordance between 4-group occupational assignment methods

Original Groups: Sons 1901	HISCLASS Groupings: Sons 1901					
	Unclass.	White	Skill/Semi	Unskilled	Farm	Total
Unclassified	2,357	0	0	0	0	2,357
White	4	4,232	246	11	0	4493
Skill/Semi	1	242	5,731	684	0	6658
Unskilled	43	310	259	7,864	9	8485
Farm	10	9	0	0	13,207	13,226
Total	2,415	4,793	6,236	8,559	13,216	35,219

Original Groups: Fathers 1871	HISCLASS Groupings: Fathers 1871					
	Unclass.	White	Skill/Semi	Unskilled	Farm	Total
Unclassified	421	4	0	0	0	425
White	6	2,331	95	35	0	2467
Skill/Semi	0	114	5,198	425	0	5737
Unskilled	6	288	105	4,001	4	4404
Farm	66	0	0	0	22,120	22,186
Total	499	2,737	5,398	4,461	22,124	35,219

Notes: See main text for details on occupational coding

Table B2: Linked and unlinked sample characteristics, 1871

	(1)	(2)	(3)	(4)
	1871 full count	1871-1901 linked	1871-1901 linked, weighted	Unique links
1871 Age	6.8 (4.3)***	6.6 (4.2)	6.9 (4.3)	6.9 (4.2)***
% hhlds with 5+ kids	0.55***	0.53	0.56	0.55***
Born NS	0.10***	0.14	0.11	0.15***
Born NB	0.08***	0.10	0.08	0.12***
Born QC	0.34***	0.22	0.33	0.21
Born ON	0.44***	0.53	0.45	0.49***
Born UK & Ireland	0.02**	0.01	0.01	0.01**
Born Elsewhere	0.04***	0.01	0.03	0.03
Reside NS	0.11	0.14	0.11	0.16***
Reside NB	0.08	0.10	0.08	0.12***
Reside QC	0.34	0.22	0.33	0.21
Reside ON	0.48	0.54	0.48	0.52***
Head white collar	*0.08*	0.07	0.07	0.07*
Head skilled/semi skilled	*0.19*	0.17	0.16	0.17**
Head unskilled	*0.19*	0.13	0.14	0.13
Head farm	*0.54*	0.64	0.64	0.62***
French Eth.	0.32***	0.19	0.31	0.18
Anglo Eth.	0.60***	0.71	0.60	0.68***
No Female >22 in hhld	0.01***	0.03	0.03	0.02***
N	733,355	32,484	32,484	17,309

Notes: See text for sample descriptions. *,**, and *** denote significant differences between each linked sample and the full sample at 90, 95, and 99 percent confidence intervals. Unique links refers to all three linkages: 71-81, 81-91 and 91-01. Head occupation "unclassified" are omitted. Column (1) is identical the same column in main text Table 1. "Full count" sample limited to males aged 0 to 14 in 1871. Kids defined as individuals enumerated with the same household id age 0-17, inclusive. Column 1 numbers in italics (father occupations) generated from the 7% 1871 census sample file. Anglophone includes ethnicities reported as English, Welsh, Scottish, Irish and North American.

Table B3: Full Canadian Transition Matrix, 1871-1901

a) Unweighted

	Father				
Son	White collar	Skilled/semi-skilled	Unskilled	Farm	Total
White collar	1134 (.51)	1103 (.21)	488 (.12)	1654 (.08)	4379
Skilled/semi-skilled	495 (.22)	2217 (.41)	1098 (.27)	2737 (.13)	6547
Unskilled	292 (.13)	1085 (.20)	1592 (.39)	5438 (.26)	8407
Farm	323 (.14)	949 (.18)	931 (.23)	10,948 (.53)	13,151
Total	2244	5354	4109	20,777	32,484

b) Weighted

	Father				
Son	White collar	Skilled/semi-skilled	Unskilled	Farm	Total
White collar	22,505 (.49)	22,362 (.21)	10,850 (.12)	32,442 (.08)	88,158
Skilled/semi-skilled	10,858 (.24)	45,121 (.42)	25,173 (.28)	56,237 (.13)	137,388
Unskilled	5,802 (.13)	21,402 (.20)	33,313 (.37)	108,028 (.25)	168,544
Farm	6,705 (.15)	18,162 (.17)	21,189 (.23)	228,871 (.54)	274,926
Total	45,868	107,046	90,524	425,578	669,016

Notes: See main text for details of occupational coding. Column shares in parentheses. Weighted values rounded to nearest integer. Linkage weights similar to Bailey (2020) are described in the main text.

Table B4: 19th Century mobility in Canada, 1871-1901

	M	U	D	OF
Canada 1871-1901	**.51**	**.28**	**.20**	**.47**
Canada 1871-1901, weighted	.51	.30	.19	.46
Ontario 1871-1901	.52	.31	.19	.47
Quebec 1871-1901	.48	.29	.19	.43
Maritimes 1871-1901	.52	.23	.22	.52
Rescaled to Ontario 1871-1901…	*M'*	*U'*	*D'*	*OF'*
Quebec 1871-1901	*.50*	*.29*	*.21*	*.45*
Maritimes 1871-1901	*.48*	*.26*	*.20*	*.44*
	M	U	D	OF
Francophone 1871-1901	.48	.27	.19	.43
Anglophone 1871-1901	.52	.29	.20	.49
Stayer 1871-1901	.50	.28	.20	.47
Mover 1871-1901	.60	.31	.24	.55
	M	U	D	OF
Canada 1871-1901	**.51**	**.28**	**.19**	**.47**
Canada 1871-1901, weighted	.50	.29	.19	.46

Notes: See main text for calculation details.

Table B5: Canadian Altham Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	$d(\boldsymbol{P},\boldsymbol{J})$	G^2	$d(\boldsymbol{Q},\boldsymbol{J})$	G^2	$d(\boldsymbol{P},\boldsymbol{Q})$	G^2
CAN 1871-1901	*16.2*	*6570****				
CAN 1871-1901, weighted	*16.3*	*6708****				
ONT 1871-1901	*15.4*	*3358****				
QUE 1871-1901			*17.8*	*1688****	*5.1*	*87.9****
MAR 1871-1901			*17.6*	*3356****	*5.9*	*169****
Franco 1871-1901	17.7	1255***				
Anglo 1871-1901			16.0	4788***	4.1	41.8***
Stayer 1871-1901	17.0	6442***				
Mover 1871-1901			9.9	230***	8.7	197***
Franco in Quebec	17.3	1054***				
Anglo in Quebec			18.2	602***	6.0	27.5***
Franco outside Quebec	19.6	204***				
Anglo outside Quebec			15.8	4213***	6.2	17.5**

Notes: G^2 for weighted sample calculated using normalized inverse propensity score weights that sum to N.

Table B6: Two-way odds ratios of relative representation of sons by father occupation

(a) Canada

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	8.5 (0.046)	1.9 (0.039)	0.8 (0.051)	0.3 (0.034)
Skilled/Semi-skilled	1.1 (0.053)	3.7 (0.032)	1.5 (0.038)	0.3 (0.028)
Unskilled	0.4 (0.064)	0.7 (0.037)	2.0 (0.035)	1.0 (0.026)
Farm	0.2 (0.061)	0.3 (0.038)	0.4 (0.039)	4.8 (0.027)

(b) Ontario

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	7.5 (0.063)	1.9 (0.051)	0.9 (0.070)	0.3 (0.044)
Skilled/Semi-skilled	1.1 (0.075)	4.1 (0.044)	1.9 (0.054)	0.3 (0.040)
Unskilled	0.4 (0.090)	0.6 (0.053)	1.3 (0.053)	1.4 (0.038)
Farm	0.2 (0.082)	0.3 (0.050)	0.5 (0.053)	4.2 (0.037)

(c) Quebec

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	9.3 (0.094)	2.4 (0.086)	0.9 (0.107)	0.2 (0.077)
Skilled/Semi-skilled	1.3 (0.102)	3.6 (0.072)	1.4 (0.080)	0.4 (0.060)
Unskilled	0.3 (0.146)	0.8 (0.086)	2.3 (0.075)	0.9 (0.059)
Farm	0.2 (0.120)	0.2 (0.093)	0.4 (0.080)	5.9 (0.060)

(d) Maritimes

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	10.6 (0.097)	1.6 (0.083)	0.7 (0.106)	0.3 (0.074)
Skilled/Semi-skilled	1.0 (0.111)	3.2 (0.063)	1.1 (0.074)	0.4 (0.056)
Unskilled	0.4 (0.119)	0.7 (0.065)	3.0 (0.063)	0.8 (0.049)
Farm	0.2 (0.148)	0.3 (0.075)	0.2 (0.088)	5.4 (0.058)

(e) Anglophone

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	8.3 (0.052)	1.8 (0.044)	0.9 (0.059)	0.3 (0.039)
Skilled/Semi-skilled	1.1 (0.061)	3.7 (0.038)	1.6 (0.046)	0.3 (0.034)
Unskilled	0.4 (0.073)	0.7 (0.043)	1.8 (0.043)	1.2 (0.032)
Farm	0.2 (0.07)	0.3 (0.044)	0.4 (0.048)	4.7 (0.032)

(f) Francophone

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	9.0 (0.118)	2.5 (0.1)	0.7 (0.132)	0.3 (0.089)
Skilled/Semi-skilled	1.3 (0.127)	4.0 (0.079)	1.3 (0.086)	0.3 (0.066)
Unskilled	0.4 (0.166)	0.8 (0.09)	2.5 (0.076)	0.8 (0.062)
Farm	0.3 (0.142)	0.2 (0.101)	0.4 (0.082)	5.2 (0.064)

(g) Quebec Francophones

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	8.2 (0.127)	2.4 (0.110)	0.8 (0.146)	0.3 (0.096)
Skilled/Semi-skilled	1.4 (0.134)	4.3 (0.087)	1.4 (0.095)	0.3 (0.071)
Unskilled	0.4 (0.179)	0.7 (0.103)	2.4 (0.087)	0.8 (0.070)
Farm	0.3 (0.151)	0.2 (0.114)	0.4 (0.093)	5.4 (0.071)

(h) Quebec Anglophones

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	9.6 (0.147)	2.3 (0.140)	1.2 (0.164)	0.1 (0.135)
Skilled/Semi-skilled	1.1 (0.166)	2.2 (0.139)	1.6 (0.152)	0.5 (0.113)
Unskilled	0.3 (0.258)	0.9 (0.158)	2.0 (0.148)	1.1 (0.114)
Farm	0.2 (0.201)	0.2 (0.168)	0.3 (0.166)	7.1 (0.114)

(i) Ontario/Maritime Francophones

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	16.4 (0.324)	3.0 (0.239)	0.6 (0.309)	0.2 (0.232)
Skilled/Semi-skilled	0.9 (0.42)	3.0 (0.196)	1.1 (0.204)	0.5 (0.167)
Unskilled	0.3 (0.443)	0.8 (0.188)	2.4 (0.158)	0.7 (0.133)
Farm	0.3 (0.416)	0.3 (0.216)	0.4 (0.173)	4.1 (0.143)

(j) Ontario/Maritime Anglophones

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	8.0 (0.056)	1.8 (0.046)	0.9 (0.063)	0.3 (0.041)
Skilled/Semi-skilled	1.1 (0.066)	3.8 (0.039)	1.6 (0.049)	0.3 (0.036)
Unskilled	0.4 (0.076)	0.6 (0.045)	1.8 (0.045)	1.2 (0.033)
Farm	0.2 (0.075)	0.3 (0.045)	0.4 (0.05)	4.5 (0.034)

(k) Mover

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	4.5 (0.124)	1.1 (0.117)	0.8 (0.154)	0.5 (0.095)
Skilled/Semi-skilled	0.8 (0.143)	1.8 (0.104)	1.2 (0.132)	0.7 (0.088)
Unskilled	0.6 (0.185)	1.1 (0.124)	1.1 (0.150)	1.1 (0.102)
Farm	0.4 (0.15)	0.5 (0.109)	0.9 (0.123)	2.3 (0.083)

(l) Stayer

	Fathers			
Sons	White Collar	Skilled/Semi-skilled	Unskilled	Farm
White Collar	9.2 (0.05)	2.0 (0.041)	0.9 (0.055)	0.3 (0.036)
Skilled/Semi-skilled	1.2 (0.057)	4.0 (0.034)	1.6 (0.04)	0.3 (0.03)
Unskilled	0.4 (0.068)	0.7 (0.038)	2.1 (0.036)	1.0 (0.028)
Farm	0.2 (0.067)	0.2 (0.041)	0.4 (0.042)	5.2 (0.029)

Notes: Authors' calculations $e^{\Theta_{i,j}}$. Odds ratios $\Theta_{i,j}$ are calculated following equation (2). Standard errors in parentheses calculated from equation 3.1 in Agresti (2002)

Table B7: Partial Altham Statistics for Canada 1871-1901

	White Collar		Skilled / Semi-skilled		Unkilled		Farm	
	d_W	d_{NW}	d_S	d_{NS}	d_U	d_{NU}	d_F	d_{NF}
Canada 1871-1901	12.0	10.9	6.7	14.8	6.9	14.7	10.7	12.2

Notes: See main text for calculation details.

C) Results with 5 occupation groups

The main results of this paper suggest that intergenerational immobility among white collar occupations is a defining feature of the Canadian labour market from 1871-1910. However, this pattern may be partly due to implicit thresholds in occupational group assignments.

To further test sensitivity among white collar workers, we present results here that are based on two different 5-group OCCHISCO systems, similar to the robustness exercises presented in Perez (2019). In section C.1, white collar workers are split into high-white collar (professional workers with HISCLASS codes 1-3) and low-white collar (clerical and sales workers with HISCLASS codes 4 and 5). In section C.2, we split unskilled workers into unskilled farm workers (HISCLASS 10 and 12) and unskilled non-farm workers (HISCLASS 11).

C.1) High and Low White Collar distinction

Table C.11: Full Canadian Transition Matrix, 1871-1901

a) Unweighted

	Father					
Son	High White Collar	Low White Collar	Skilled/semi-skilled	Unskilled	Farm	Total
High White collar	233 (0.24)	218 (0.14)	384 (0.08)	163 (0.04)	702 (0.03)	1700
Low White Collar	215 (0.22)	549 (0.36)	757 (0.15)	336 (0.08)	1108 (0.05)	2966
Skilled/semi-skilled	203 (0.21)	342 (0.23)	2049 (0.41)	980 (0.23)	2548 (0.12)	6122
Unskilled	156 (0.16)	196 (0.13)	925 (0.18)	1768 (0.42)	5420 (0.26)	8465
Farm	152 (0.16)	215 (0.14)	907 (0.18)	927 (0.22)	10911 (0.53)	13112
Total	959	1520	5,023	4,174	20,689	32365

b) Weighted

	Father					
Son	High White Collar	Low White Collar	Skilled/semi-skilled	Unskilled	Farm	Total
High White collar	4528 (0.23)	4318 (0.14)	8103 (0.08)	3593 (0.04)	13728 (0.03)	34270
Low White collar	4616 (0.24)	11129 (0.35)	15133 (0.15)	7024 (0.08)	21994 (0.05)	59896
Skilled/semi-skilled	4452 (0.23)	7668 (0.24)	42479 (0.42)	22540 (0.25)	52885 (0.13)	130024
Unskilled	2844 (0.15)	3903 (0.12)	18100 (0.18)	36436 (0.40)	106767 (0.25)	168050
Farm	3098 (0.16)	4514 (0.14)	17510 (0.17)	20858 (0.23)	227546 (0.54)	273526
Total	19538	31532	101325	90451	422920	665766

Notes: See main text for details on occupational coding. Column shares in parentheses. Weighted values rounded to nearest integer. Linkage weights similar to Bailey (2020) are described in the main text.

Table C12: 19th Century mobility in Canada, 1871-1901

	M	U	D	OF
Canada 1871-1901	**.52**	**.30**	**.22**	**.47**
Canada 1871-1901, weighted	.52	.31	.21	.46

Notes: See main text for calculation details.

Table C13: Altham Statistics for Canada 1871-1901 and comparison countries

	(1)	(2)	(3)	(4)
	$d(\boldsymbol{P},\boldsymbol{J})$	G^2	$d(\boldsymbol{Q},\boldsymbol{J})$	G^2
CAN 1871-1901	*26.8*	*6734****		
CAN 1871-1901, weighted	*27.0*	*6925****		
US 1850-1880			*28.0*	– *****
UK 1851-1881			*32.6*	– *****
ARG 1869-1895			*23.3*	– *****
NOR 1865-1900			*44.7*	– *****
SWE 1880-1910			*31.3*	– –

Notes: G^2 for weighted sample calculated using normalized inverse propensity score weights that sum to N. Values for $d(\boldsymbol{Q},\boldsymbol{J})$ taken from Perez (2019) and Berger et al. (2020), where values for G^2 are not provided. $d(\boldsymbol{P},\boldsymbol{Q})$ cannot be calculated without microdata or all of the 4-way odds ratios for all populations.

Table C14: Two-way odds ratios of relative representation of sons by father occupation

(a) Canada

	Fathers				
Sons	High White Collar	Low White Collar	Skilled/ Semi-skilled	Unskilled	Farm
High White Collar	6.5 (0.080)	3.3 (0.078)	1.6 (0.06)	0.7 (0.084)	0.4 (0.051)
Low White Collar	3.0 (0.079)	6.7 (0.057)	2.0 (0.045)	1.5 (0.060)	0.3 (0.040)
Skilled/Semi	1.2 (0.080)	1.3 (0.063)	3.9 (0.033)	2.5 (0.040)	0.3 (0.029)
Unskilled	0.5 (0.088)	0.4 (0.078)	0.6 (0.039)	4.2 (0.034)	1.0 (0.026)
Farm	0.3 (0.089)	0.2 (0.075)	0.3 (0.039)	0.6 (0.039)	4.8 (0.027)

C.2) Farm and Non-Farm Unskilled distinction

Table C.21: Full Canadian Transition Matrix, 1871-1901

a) Unweighted

	Father					
Son	White Collar	Skilled/semi-skilled	Unskilled Nonfarm	Unskilled Farm	Farm	Total
White Collar	1215 (0.49)	1142 (0.23)	383 (0.13)	116 (0.09)	1810 (0.09)	4666
Skilled/semi-skilled	545 (0.22)	2049 (0.41)	807 (0.28)	173 (0.14)	2548 (0.12)	6122
Unskilled Nonfarm	146 (0.06)	422 (0.08)	522 (0.18)	113 (0.10)	1396 (0.07)	2619
Unskilled Farm	206 (0.08)	503 (0.10)	485 (0.17)	628 (0.49)	4024 (0.19)	5846
Farm	367 (0.15)	907 (0.18)	698 (0.24)	229 (0.18)	10911 (0.53)	13112
Total	2479	5023	2895	1279	20689	32365

b) Weighted

	Father					
Son	White Collar	Skilled/semi-skilled	Unskilled Nonfarm	Unskilled Farm	Farm	Total
White Collar	24592 (0.48)	23236 (0.23)	8356 (0.13)	2262 (0.09)	35722 (0.08)	94168
Skilled/semi-skilled	12120 (0.24)	42479 (0.42)	19304 (0.29)	3237 (0.13)	52885 (0.13)	130025
Unskilled Nonfarm	3119 (0.06)	9045 (0.09)	12686 (0.19)	2585 (0.11)	29902 (0.07)	57337
Unskilled Farm	3623 (0.07)	9055 (0.09)	9859 (0.15)	11305 (0.47)	76866 (0.18)	110708
Farm	7613 (0.15)	17510 (0.17)	16015 (0.24)	4842 (0.20)	227546 (0.54)	273526
Total	51067	101325	66220	24231	422920	665764

Notes: Column shares in parentheses. Weighted values rounded to nearest integer. Linkage weights similar to Bailey (2020) are described in the main text.

Table C22: 19th Century mobility in Canada, 1871-1901

	M	U	D	OF
Canada 1871-1901	**.53**	**.29**	**.24**	**.47**
Canada 1871-1901, weighted	.52	.30	.24	.46

Notes: See main text for calculation details.

Table C23: Altham Statistics for Canada 1871-1901 and comparison countries

	(1)	(2)	(3)	(4)
	$d(\boldsymbol{P},\boldsymbol{J})$	G^2	$d(\boldsymbol{Q},\boldsymbol{J})$	G^2
CAN 1871-1901	*25.7*	*7320****		
CAN 1871-1901, weighted	*26.3*	*7587****		
US 1850-1880			*30.5*	– ***
UK 1851-1881			*32.4*	– ***
ARG 1869-1895			*22.3*	– ***
NOR 1865-1900			*37.1*	– ***
SWE 1880-1910			*26.4*	– –

Notes: G^2 for weighted sample calculated using normalized inverse propensity score weights that sum to N. Values for $d(\boldsymbol{Q},\boldsymbol{J})$ taken from Perez (2019) and Berger et al. (2020), where values for G^2 are not provided. $d(\boldsymbol{P},\boldsymbol{Q})$ cannot be calculated without microdata or all of the 4-way odds ratios for all populations.

Table C24: Two-way odds ratios of relative representation of sons by father occupation

(a) Canada

	Fathers				
Sons	High White Collar	Low White Collar	Skilled/ Semiskilled	Unskilled	Farm
High White Collar	7.4 (0.044)	2 (0.038)	0.9 (0.057)	0.6 (0.099)	0.3 (0.033)
Low White Collar	1.2 (0.050)	3.9 (0.033)	1.8 (0.044)	1.2 (0.083)	0.3 (0.029)
Skilled/Semi	0.7 (0.087)	1.0 (0.056)	2.9 (0.053)	2.1 (0.094)	0.6 (0.041)
Unskilled	0.4 (0.073)	0.5 (0.049)	0.9 (0.052)	7.5 (0.058)	1.3 (0.031)
Farm	0.2 (0.058)	0.3 (0.039)	0.4 (0.045)	0.5 (0.074)	4.8 (0.027)

Notes: See main text for calculation details.