

Language Skills in the New Economy and the Deteriorating Labour Market Performance of Canada's Immigrant Workers

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- Deteriorating labour market performance of new immigrants (Picot and Sweetman 2005)
- Shift in source countries away from Europe to Asia
- Importance of literacy skills in earnings outcomes (Ferrer, Green and Riddell 2006)
- Observed even after conditioning on immigrant source country (Aydemir and Skuterud 2005)
- Deterioration appears to have continued even while the source country distribution has stabilized (at least among women).

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Country of origin of recent immigrants, 1971-2006

Censuses

Arrival	U.S.	U.K.	Italy	E. Europe	Asia	Africa
1965-1970	0.083	0.195	0.125	0.005	0.139	0.033
1971-1975	–	–	–	–	–	–
1976-1980	0.066	0.128	0.017	0.014	0.409	0.053
1981-1985	0.057	0.076	0.009	0.005	0.453	0.051
1986-1990	0.028	0.036	0.005	0.010	0.515	0.073
1991-1995	0.018	0.023	0.003	0.021	0.591	0.073
1996-2000	0.020	0.018	0.002	0.048	0.614	0.086
2001-2005	0.021	0.020	0.002	0.084	0.602	0.105

Proportion of recent immigrants with English/French mother tongue and home language, 1971-2006 Censuses

Arrival	Mother tongue		Home language	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
1966-1970	0.455	0.482	0.546	0.562
1976-1980	0.403	0.430	0.495	0.491
1981-1985	0.281	0.315	0.338	0.358
1986-1990	0.201	0.231	0.305	0.328
1991-1995	0.161	0.169	0.258	0.265
1996-2000	0.161	0.152	0.282	0.280
2001-2005	0.179	0.169	0.284	0.285

Relative log weekly earnings of recent immigrants by period of arrival, 1971-2006 Censuses

Arrival	Men		Women	
	(1)	(2)	(1)	(2)
1966-1970	-0.058 (0.013)	-0.020 (0.030)	0.015 (0.018)	0.040 (0.034)
1976-1980	-0.234 (0.017)	-0.087 (0.033)	-0.184 (0.020)	-0.115 (0.035)
1981-1985	-0.392 (0.019)	-0.211 (0.034)	-0.222 (0.021)	-0.141 (0.036)
1986-1990	-0.374 (0.014)	-0.158 (0.032)	-0.211 (0.016)	-0.119 (0.034)
1991-1995	-0.507 (0.013)	-0.281 (0.032)	-0.356 (0.015)	-0.260 (0.033)
1996-2000	-0.395 (0.013)	-0.158 (0.032)	-0.345 (0.015)	-0.243 (0.034)
2001-2005	-0.535 (0.013)	-0.288 (0.032)	-0.502 (0.015)	-0.390 (0.033)
N	857,570		749,790	

Notes: Samples restricted to full-year full-time workers and to native-born and recent immigrants. Estimates are from censored linear regressions, which include controls for age (quartic), education (3 categories), and fixed year effects. Specification (2) also includes controls for region/country of birth. Robust standard errors in parentheses.

Model of wage determination

Wage for worker i employed in sector j is determined by:

$$w_{ij} = f_j(h_i; s_i) + e_i, \text{ where } E(e_i) = E(e_i|h_i, s_i) = 0$$

where s_i are non-cognitive (soft) skills fully determined at birth and h_i are cognitive (hard) skills, which are determined by:

$$h_i = g(\text{educ}_i, \text{exp}_i, l_i) + u_i, \text{ where } E(u_i) = E(u_i|\text{educ}_i, \text{exp}_i, l_i) = 0$$

where educ_i is years of education; exp_i is years of work experience; and l_i is language ability.

Assume population mean of u_i is independent of immigrant status.

Consequently, any gap in immigrant cognitive skills, conditional on education and experience, must be due to differences in mean language abilities.

Immigrant wage gap defined

Assume the difference in mean log wages can be approximated locally by linear functions. If:

$$w_{ij} = \beta_{0j} + \beta_{1j}educ_i + \beta_{2j}exp_i + \beta_{3j}l_i + u_i + \alpha_j s_i + e_{ij}$$

then partialing out the effects of $educ_i$ and exp_i , we can equivalently write:

$$w_{ij} = \beta_{3j}\tilde{l}_i + v_{ij}$$

where $E(v_{ij}) = E(u_i + \alpha_j s_i + e_{ij}) = 0$. Assuming that the population means of s_i and e_{ij} are independent of immigrant status, the mean immigrant wage gap in the population is simply:

$$\bar{w}_m - \bar{w}_n = \sum_j \beta_{3j}(s_{mj}\tilde{l}_{mj} - s_{nj}\tilde{l}_{nj})$$

where s_{mj} and s_{nj} is the share of immigrant and native-born workers, respectively, employed in sector j .

Sources of immigrant wage gap

$$\bar{w}_m - \bar{w}_n = \sum_j \beta_{3j} (s_{mj} \bar{l}_{mj} - s_{nj} \bar{l}_{nj})$$

- 1 Single language return ($\beta_{3j} = \beta_3 \forall j$) $\Rightarrow \bar{w}_m - \bar{w}_n = \beta_3 (\bar{l}_m - \bar{l}_n) < 0$ if $\bar{l}_m < \bar{l}_n$.
- 2 Equal mean conditional language skills in all sectors ($\bar{l}_{mj} = \bar{l}_{nj} = 0 \forall j$) $\Rightarrow \bar{w}_m = \bar{w}_n$.
- 3 Increasing language return (β_{3k} increases) $\Rightarrow \bar{w}_m - \bar{w}_n$ increases if $s_{mk} \bar{l}_{mk} < s_{nk} \bar{l}_{nk}$. A sufficient condition is that the mean immigrant (native) language ability in sector k is negative (positive), that is $\bar{l}_{mk} < 0$ and ($\bar{l}_{nk} > 0$).
- 4 Sectoral distribution of immigrant and native-born employment equivalent ($s_{mj} = s_{nj} \forall j$) and common proportional shift from sector k to sector $k+1 \Rightarrow \bar{w}_m - \bar{w}_n$ increases if $\beta_{3,k+1} > \beta_{3k}$ and $\bar{l}_{m,k+1} - \bar{l}_{n,k+1} \geq \bar{l}_{mk} - \bar{l}_{nk}$.

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Sources of changing language returns

- Structural employment shift away from goods-producing towards service-producing industries, resulting from international trade flows.
- Changing production technology *within* sectors leading to increased demand for skills, including language skills (SBTC hypothesis).
- Organization of work within workplaces (Taylorism to TQM).

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Identification?

- Key hypothesis is that the average return to language skills in the population has increased over time.
- Need data on language abilities of immigrants spanning the period from the 1980s to the 2000s.
- Solution \Rightarrow exploit three data sources:
 - ① 2003 International Adult Literacy and Life Skills Survey (IALSS): cognitive test scores on 4 dimensions
 - ② Matched Career Handbook – Labour Force Survey (CH-LFS): occupation attribute data on 3 dimensions matched with immigrant employment shares
 - ③ 1971-2006 Census PUMFs: English/French mother tongue and home language indicators

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Mean immigrant cognitive skill gaps by mother tongue and home language, 2003 IALLS

	Men				Women			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Prose literacy	-58.092*	-27.717*	-38.523	-8.914*	-62.877*	-33.260*	-44.194*	-19.555*
	(3.808)	(5.639)	(22.025)	(4.307)	(4.018)	(4.668)	(8.518)	(6.190)
Document literacy	-53.103*	-25.051*	-27.455	-5.848	-55.872*	-29.918*	-43.580*	-15.941*
	(3.826)	(5.687)	(21.438)	(4.643)	(3.983)	(4.209)	(12.480)	(6.581)
Numeracy	-48.567*	-22.487*	-42.519*	-6.599	-45.859*	-22.305*	-52.028*	-16.541*
	(3.691)	(4.891)	(18.407)	(4.631)	(3.979)	(3.786)	(13.196)	(6.849)
Problem solving	-55.781*	-26.883*	-29.680	-11.411*	-56.883*	-34.427*	-50.136*	-23.275*
	(3.397)	(4.742)	(21.453)	(4.960)	(3.635)	(3.683)	(9.774)	(6.614)
Average skill	-53.885*	-25.534*	-34.545	-8.193	-55.373*	-29.978*	-47.485*	-18.828*
	(3.536)	(5.113)	(20.422)	(4.469)	(3.745)	(3.920)	(10.698)	(6.432)
Foreign mother tongue	Yes	Yes	No	No	Yes	Yes	No	No
Foreign home language	Yes	No	Yes	No	Yes	No	Yes	No
Immigrant obs.	251	222	8	489	374	198	7	247
Native obs.	3,832	3,832	3,832	3,832	4,165	4,165	4,165	4,165

Notes: Estimates are from OLS regressions of standardized skill scores (unweighted average of 5 levels) on an immigrant dummy and controls for age (5 categories) and education (postsecondary credential and university degree). Average skill is the unweighted average of the 4 skill type scores. Samples are restricted to individuals who are either currently employed or self-employed, and who worked for 12 months and normally every week of every month in the previous year. Robust standard errors are in parentheses. * indicates statistical significance at the 5% level.

Estimated coefficients from ordered probit earnings regression, 2003 IALLS

	Men			Women		
	(1)	(2)	(3)	(1)	(2)	(3)
Immigrant	-0.4149* (0.0746)	-0.1056 (0.1298)	0.0886 (0.4135)	-0.2542* (0.0658)	-0.0014 (0.1419)	0.1465 (0.4948)
<i>Foreign language:</i>						
Both	–	-0.6057* (0.1468)	-0.3478* (0.1561)	–	-0.5184* (0.1553)	-0.2139 (0.1561)
Mother tongue	–	0.0793 (0.1611)	0.1895 (0.1583)	–	-0.1388 (0.1713)	-0.0355 (0.1519)
Home language	–	-0.3894 (0.2483)	-0.1475 (0.2556)	–	-0.9714 (0.9237)	-0.7811 (0.8643)
(Neither)	–	–	–	–	–	–
<i>Test scores:</i>						
Average skill			0.0064* (0.0010)			0.0087* (0.0009)
Average skill*immigrant			-0.0005 (0.0014)			0.0000 (0.0016)

Notes: Dependent variable is annual income quintile. Sample restricted to individuals who are either currently employed or self-employed, and who worked for 12 months and normally every week of every month in the previous year. Regressions include controls for age (5 categories); education (postsecondary credential and university degree); usual weekly hours of work (quadratic); and separate indicators of foreign mother tongue and/or home language for native-born workers. Robust standard errors in parentheses. * indicates significance at the 5% level.

Log weekly earnings regressions with interactions of arrival cohort and language, men, 1971-2006 Censuses

Arrival	Immigrant	Both ^a	Mother tongue ^a	Home language ^a
1966-1970	-0.065** (0.032)			
1976-1980	-0.136*** (0.038)			
1981-1985	-0.184*** (0.045)			
1986-1990	-0.121*** (0.041)			
1991-1995	-0.192*** (0.042)			
1996-2000	-0.081* (0.043)			
2001-2005	-0.216*** (0.042)			
Obs.		857,570		

^a There are no interactions of 1966-1970 cohort and the language indicators Both, Mother tongue and Home language. These coefficients are the language indicators on their own with any cohort interaction.

Notes: Samples restricted to full-year (49-52 week), full-time (usual weekly hours 30 or more) workers and to recent immigrants (5 years or less since migration). Estimates are from a linear censored regression model, which also includes a full set of fixed year effects; age controls; education controls; region of birth controls; and a separate set of language indicators for native-born workers. Robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Log weekly earnings regressions with interactions of arrival cohort and language, men, 1971-2006 Censuses

Arrival	Immigrant	Both ^a	Mother tongue ^a	Home language ^a
1966-1970	-0.065** (0.032)	0.008 (0.034)	0.129*** (0.047)	0.011 (0.099)
1976-1980	-0.136*** (0.038)	-0.019 (0.048)	-0.039 (0.069)	0.085 (0.133)
1981-1985	-0.184*** (0.045)	-0.084 (0.053)	-0.308*** (0.082)	-0.168 (0.142)
1986-1990	-0.121*** (0.041)	-0.120** (0.047)	-0.176*** (0.066)	-0.238* (0.142)
1991-1995	-0.192*** (0.042)	-0.184*** (0.047)	-0.207*** (0.066)	-0.325** (0.146)
1996-2000	-0.081* (0.043)	-0.168*** (0.048)	-0.223*** (0.065)	-0.240* (0.137)
2001-2005	-0.216*** (0.042)	-0.167*** (0.048)	-0.235*** (0.064)	-0.071 (0.122)
Obs.	857,570			

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Log weekly earnings regressions with interactions of arrival cohort and language, women, 1971-2006 Censuses

Arrival	Immigrant	Both ^a	Mother tongue ^a	Home language ^a
1966-1970	-0.007 (0.038)			
1976-1980	-0.227*** (0.041)			
1981-1985	-0.099** (0.046)			
1986-1990	-0.131*** (0.042)			
1991-1995	-0.219*** (0.044)			
1996-2000	-0.140*** (0.046)			
2001-2005	-0.243*** (0.045)			
Obs.		749,790		

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Log weekly earnings regressions with interactions of arrival cohort and language, women, 1971-2006 Censuses

Arrival	Immigrant	Both ^a	Mother tongue ^a	Home language ^a
1966-1970	-0.007 (0.038)	-0.058 (0.043)	-0.137** (0.059)	0.432*** (0.140)
1976-1980	-0.227*** (0.041)	0.064 (0.059)	0.242*** (0.089)	-0.344** (0.174)
1981-1985	-0.099** (0.046)	-0.167*** (0.062)	-0.107 (0.100)	-0.384** (0.184)
1986-1990	-0.131*** (0.042)	-0.075 (0.055)	0.024 (0.078)	-0.730*** (0.182)
1991-1995	-0.219*** (0.044)	-0.150*** (0.056)	0.023 (0.077)	-0.882*** (0.184)
1996-2000	-0.140*** (0.046)	-0.218*** (0.058)	-0.093 (0.076)	-0.906*** (0.181)
2001-2005	-0.243*** (0.045)	-0.290*** (0.058)	-0.121 (0.076)	-0.624*** (0.163)
Obs.	749,790			

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Occupations (NOC-S) with highest immigrant shares, men, CH-LFS

Occupation	Verbal	Numerical	General	Share
Taxi and Limousine Drivers	4	4	4	0.583
Electronics Assemblers	4	4	3	0.550
Software Engineers	2	1	1	0.463
Hairstylists	3	4	3	0.459
Furniture and Fixture Assemblers	4	4	4	0.459
Mixing Machine Operators - Plastics Processing	4	4	3	0.440
Chemists	1	1	1	0.434
Mechanical Engineers	2	1	1	0.426
Restaurant and Food Service Managers	3	3	3	0.423
Machining Tool Operators	3	3	3	0.420
AVERAGE	3.0	2.9	2.6	

Notes: Share is the proportion of individuals in the occupation who are foreign born. Sample includes both currently employed and unemployed who worked sometime in the previous year. Occupation attribute data from HRSDC's Career Handbook. Employment share data from 2006-2009 Labour Force Survey (LFS).

Occupations (NOC-S) with lowest immigrant shares, men, CH-LFS

Occupation	Verbal	Numerical	General	Share
Oil and Gas Well Drillers and Well Servicers	3	4	3	0.044
Heavy Equipment Operators (Except Crane)	4	4	3	0.057
Police Officers (Except Commissioned)	3	3	3	0.064
Correctional Service Officers	4	4	3	0.068
Farmers and Farm Managers	3	3	3	0.078
Amusement Attraction Operators	4	4	4	0.078
Steamfitters and Pipefitters	3	3	3	0.079
Landscaping and Grounds Maintenance Labourers	4	5	4	0.081
Heavy-Duty Equipment Mechanics	4	3	3	0.087
General Farm Workers	4	4	4	0.094
AVERAGE	3.6	3.7	3.3	

Notes: Share is the proportion of individuals in the occupation who are foreign born. Sample includes both currently employed and unemployed who worked sometime in the previous year. Occupation attribute data from HRSDC's Career Handbook. Employment share data from 2006-2009 Labour Force Survey (LFS).

Occupations(NOC-S) with highest immigrant shares, women, CH-LFS

Occupation	Verbal	Numerical	General	Share
Sewing Machine Operators	4	4	4	0.682
Labourers in Rubber and Plastic Prod. Manuf.	5	5	4	0.647
Ironing, Pressing and Finishing Occupations	4	5	4	0.629
Electrical and Electronics Engineers	2	1	1	0.629
Electronics Assemblers	4	4	3	0.567
Software Engineers	2	1	1	0.557
Mixing Machine Operators - Plastics Processing	4	4	3	0.542
Other Labourers in Proc., Manuf. and Utilities	4	4	4	0.522
Plastic Products Assemblers and Finishers	4	4	4	0.512
Harvesting Labourers	4	4	4	0.511
AVERAGE	3.7	3.6	3.2	

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Occupations (NOC-S) with lowest immigrant shares, women, CH-LFS

Occupation	Verbal	Numerical	General	Share
Recreation and Sport Instructors	3	4	3	0.066
Dental Hygienists	3	3	3	0.099
Elementary School and Kindergarten Teachers	2	3	2	0.105
Lawyers and Quebec Notaries	1	3	1	0.111
Managers in Health Care	1	2	1	0.113
Family, Marriage and Other Related Counsellors	2	3	2	0.115
Social Policy Researchers	2	3	2	0.117
Food and Beverage Servers	4	4	4	0.118
Kinesiologists	2	3	3	0.119
Farmers and Farm Managers	3	3	3	0.121
AVERAGE	2.3	3.1	2.4	

Notes: Share is the proportion of individuals in the occupation who are foreign born. Sample includes both currently employed and unemployed who worked sometime in the previous year. Occupation attribute data from HRSDC's Career Handbook. Employment share data from 2006-2009 Labour Force Survey (LFS).

- Allowing language returns to vary across arrival cohorts and industries/occupations suggests that:
 - 1 Employment shift away from unskilled manufacturing, where language returns are low, continues to contribute to immigrant earnings gap among women.
 - 2 Employment shift towards high-technology industries, most notably the IT sector, where language returns appear large, seems to have contributed to the earnings deterioration of immigrant men.
 - 3 Most of the increase in language returns for both men and women appears to have occurred *within* sectors.

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Summary

- Language skills may be more important in explaining the labour market challenges of immigrants than previously thought.
- Improving the average language skills of arrival cohorts may not be sufficient to overcome earnings deterioration.
- More analysis is needed to understand the persistent deterioration in earnings of recent immigrant women with a foreign mother tongue and home language.
- Are average language skills declining within this group or does it reflect an increase in the value of these skills as we suggest here?

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