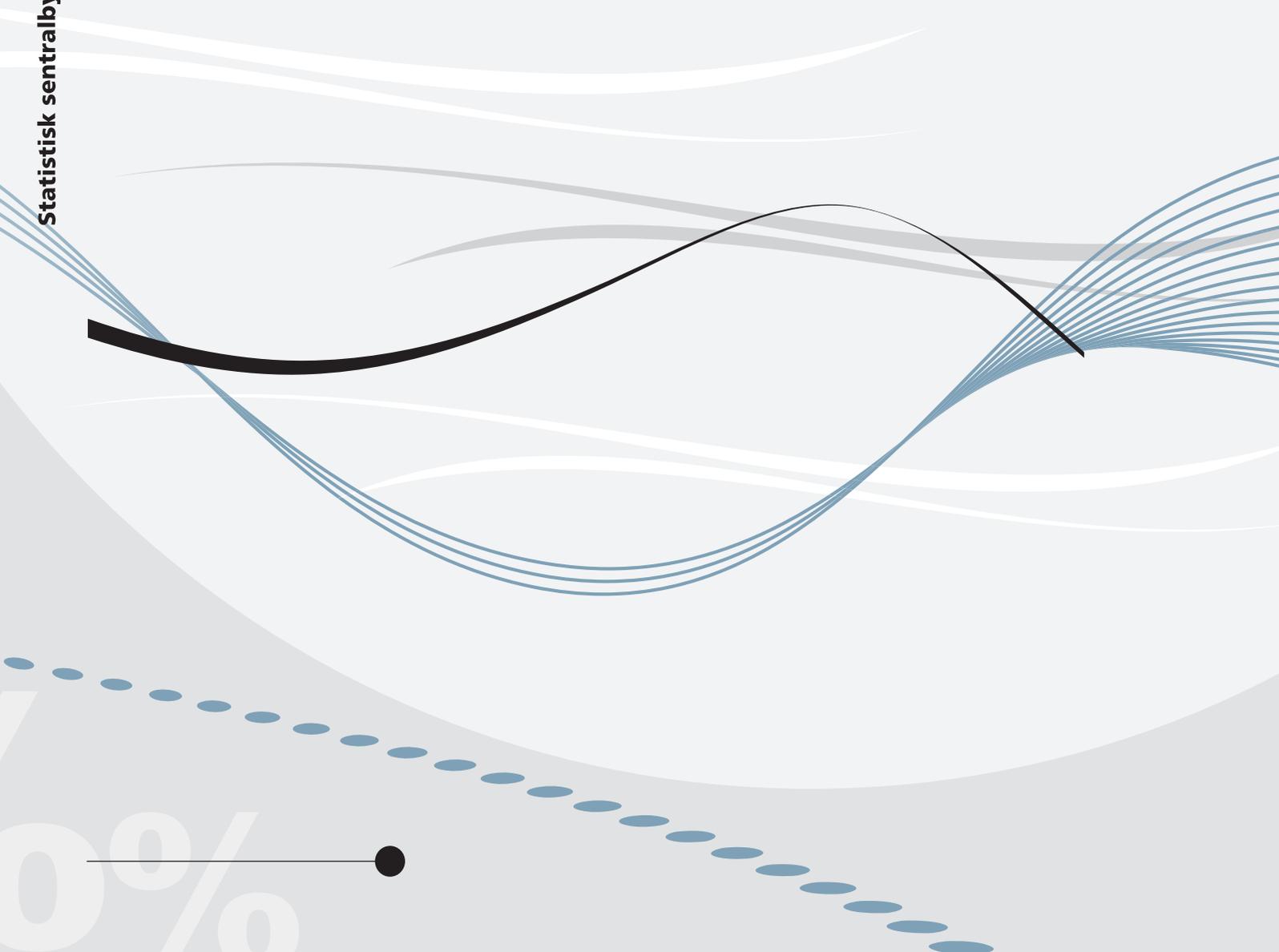


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Oddbjørn Raaum*

## **Immigrant skills and employment**

Cross-country evidence from the Adult Literacy  
and Life Skills Survey





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### Cross-country evidence from the Adult Literacy and Life Skills Survey

**Abstract:**

This paper studies the distributions of literacy skills, education, and employment of immigrants and natives in three host countries: Canada, the United States, and Norway. For natives, we uncover remarkably stable relations between literacy skills, schooling, and employment across countries. For immigrants, the relations differ strongly: whereas literacy skills form only a weak determinant of immigrant employment in the North American labor markets, in Norway literacy is much more important for immigrant than native employment. We investigate various sources of this discrepancy and fail to uncover evidence that the finding reflects differential immigrant sorting across host countries. Instead, results show that literacy skills are particularly important for groups characterized by low employment in the Norwegian labor market, consistent with the hypothesis that a compressed wage structure, employment protection, and social insurance with high replacement ratios create adverse employment effects for immigrants.

**Keywords:** Immigrants, literacy skills, employment

**JEL classification:** J15, J24, J61

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## **Sammendrag**

Dette arbeidet analyserer sammenhengen mellom leseferdigheter, utdanning og sysselsetting for innvandrere og innenlandsfødte i Canada, USA og Norge. For innenlandsfødte finner vi stabile sammenhenger mellom leseferdigheter, utdanning og sysselsetting på tvers av land. For innvandrere er det derimot store variasjoner: Mens leseferdigheter ikke ser ut til å ha stor betydning for innvandreres sysselsetting i nordamerikanske arbeidsmarkeder, er leseferdigheter mye viktigere for sysselsetting for innvandrere enn for innenlandsfødte i Norge. Vi undersøker flere potensielle kilder til dette, og finner ikke støtte for at funnene drives av sortering av innvandrere på tvers av land. Vi finner isteden at leseferdigheter generelt er viktigere for sysselsetting innenfor grupper som har lav arbeidsmarkedsdeltakelse i Norge enn i USA og Canada. Dette er konsistent med en hypotese om at lav lønns-spredning, sterkt stillingsvern og gunstige trygdeordninger kan ha negative sysselsettingseffekter for innvandrere.

# 1. Introduction

Employment of foreign-born falls short of natives in most developed countries. According to the OECD (2008), employment rates of immigrants in the OECD area are on average 6.4 percentage points below those of natives. But there are important differences across labor markets: immigrants in North America are relatively more successful than immigrants in Europe. To illustrate, while unemployment rates are similar for immigrants and natives in Canada and United States, they are two to three times higher for immigrants in Northern Europe (OECD, 2008; Chart 5.3). The OECD data also show that the schooling gradient in the native-immigrant employment differential varies across host countries. In North America, immigrants with low educational attainment have higher employment rates than natives. In Europe, this is reversed: native-immigrant employment differentials are particularly large among those with low education.

The labor market performance of foreign-born varies across host countries either because of differences in the immigrant populations, or because labor markets and institutions differ in how they stimulate immigrant employment. Selective immigration can arise both from individual choice and from admission policies. Comparing groups with similar educational attainment, immigrants in North America may well differ in terms of other skills, ability, motivation, or cultural background when compared to those who settle in Europe. Alternatively, labor market institutions and welfare policies may offer different opportunities for immigrants across host countries. While the flexible labor markets of North America typically are considered favorable for employment prospects of low-skilled immigrants ready to accept low-paying jobs, the regulated European markets with strict employment protection and centralized wage setting may raise implicit barriers for immigrant employment (Bisin et al, 2010; Picot and Sweetman, 2011). A compressed wage structure means that wages of low-skilled workers will be relatively high, in turn leading to a smaller service sector and fewer low-skilled jobs. If the skill distribution of immigrants is more dispersed than that of natives, employment prospects of low-skilled immigrants can be seriously hampered by the lack of jobs that match their skills. Such mechanisms are likely reinforced by the welfare state if incentives to work are weakened by universal social insurance (Bratsberg et al, 2010).

This paper studies employment and skills among immigrants and natives in three host countries: Canada, the United States, and Norway. High-skilled immigrants may prefer North America to Europe because of higher pecuniary returns to skills. We use data drawn from the Adult Literacy and Life

Skills Survey (ALL), which includes comparable skill measures collected from literacy tests.<sup>1</sup> The extensive information on individual skills provided by the data enables us to test whether the variation in employment performance of immigrants across destination countries can be explained by sorting on cognitive skills. Further, comparable measures of skill across countries allow us to test the labor market flexibility hypothesis by studying the associations between education, literacy, and employment, with a focus on the role of skills among groups with low labor market participation rates. Because the skill measures are based on the same survey instrument, they also offer the potential for improved comparative study of the importance of immigrant skills and human capital relative to traditional approaches found in the literature based on immigrant educational attainment, which often confound the roles of attainment and school quality.

Our reduced-form employment equations will reflect several mechanisms that relate skills to employment and labor force participation. From a labor supply perspective, skills such as schooling and literacy affect hours worked through their effects on wages and preferences. Wage returns to schooling and literacy scores are much higher in the United States than in Europe (Blau and Kahn, 2005), and evidence from Canada shows that wage effects of literacy are similar for natives and immigrants (Ferrer et al, 2006). Given a positive labor supply wage elasticity we would expect associations between literacy and employment to be stronger in the US than in Norway. With labor market frictions, demand factors such as job arrival rates are likely to differ across skill groups. When wages are not perfectly flexible, employers will tend to prefer workers with high skills, and schooling and literacy will have direct effects on employment via the frequency of job offers. Comparing the skill gradients in employment among immigrants and natives across countries, both supply and demand factors can vary across labor markets and we therefore discuss the patterns of reduced-form results without claiming strict identification of the mechanisms at work.

## **2. Data**

The Adult Literacy and Life Skills Survey (ALL) is an internationally comparative survey of adult skills collected in 2003 and administered by Statistics Canada and the Educational Testing Service. The main elements of the survey are direct assessments of literacy, numeracy, and problem solving skills in nationally representative samples using commonplace tasks of varying degree of difficulty and drawn from a range of topics and knowledge areas. The survey also collected background information on respondents such as education and training prior to the survey, as well as current health

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<sup>1</sup> Green and Riddell (2012) use these same data and countries, along with data from the 1994 International Adult Literacy Survey (IALS), to study ageing and cohort effects on literacy skill formation.

and employment status. According to the survey, *literacy* is the capability to use “... printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” (Statistics Canada, 2002; p. 7). The survey concept of numeracy covers functional demands of different life contexts, the nature of adults’ mathematical and statistical knowledge and skills, and how such skills are applied or used in different circumstances. The concept extends beyond just applying arithmetical skills to interpret printed materials, to the possession of number sense, estimation skills, measurement and statistical literacy.

In the public use micro data, the results of the ALL survey are reported along four scales – two literacy scales (prose and document understanding), one numeracy scale, and one scale capturing problem solving – with each scale ranging from 0 to 500 points.<sup>2</sup> Respondents in all participant countries were given the same tasks. Literacy proficiencies were estimated from respondents’ performance on the cognitive tasks administered in the assessment. The assessment included both multiple-choice questions with a fixed number of alternative answers, and open-ended items that were ultimately classified as correct, incorrect, or omitted. The study took several steps to ensure consistency within and between countries, including making sure that scorers were scoring consistently, fixing ambiguities in the scoring guides, correcting any systematic scoring errors, and checking comparability of scores across countries. Responses to assessment items were scored separately by each country. To determine inter-country scoring reliability for each item, two evaluating groups from other countries scored the responses of a subset of examinees. This procedure identified and eliminated poorly constructed items, ambiguous scoring criteria, erroneous translations of items or scoring criteria, erroneous printing of items or scoring criteria, scorer inaccuracies, and situations in which one country consistently scored differently from others. In cases of scoring asymmetries, original scores for that item were corrected for the entire sample.

From the individual assessments and background responses provided in the public use micro data, we constructed measures for educational attainment and literacy skill for respondents in three of the participating countries: Canada, the United States, and Norway.<sup>3</sup> Based on the survey responses, the top panels of Figure 1 display the (population-weighted) frequency distributions of educational attainment in the foreign and native-born samples from the three countries. Foreign-born individuals are more likely to hold advanced degrees than natives in all three countries, while the US stands out

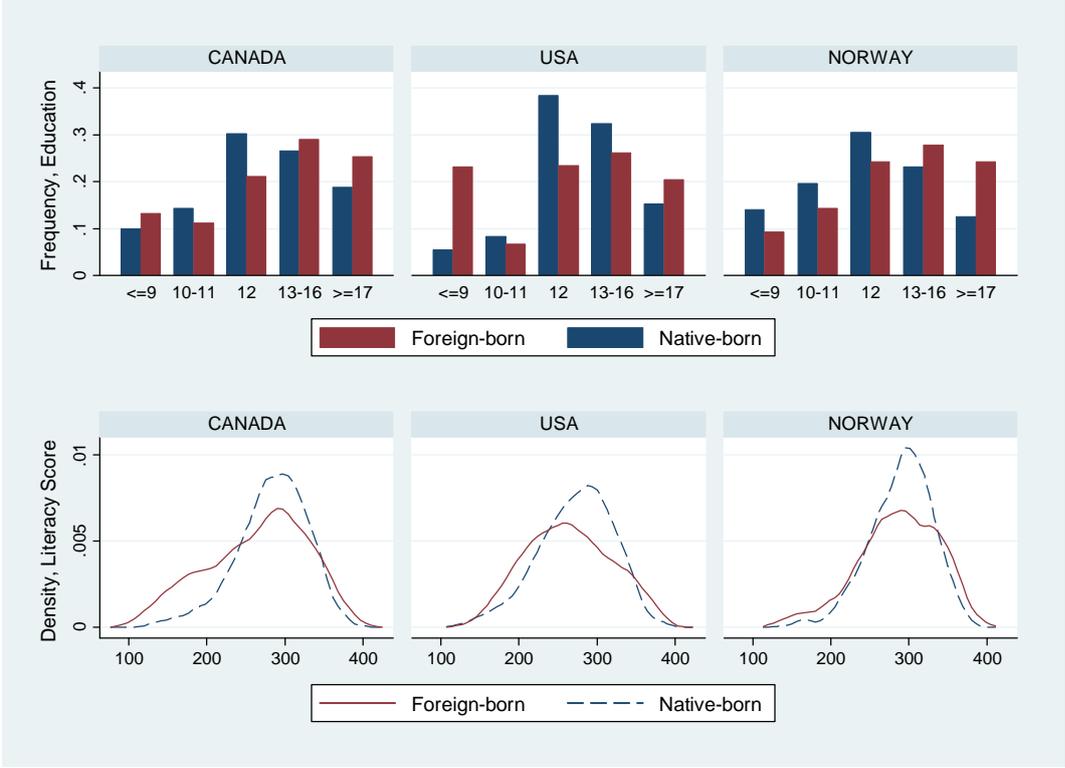
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<sup>2</sup> The problem solving section was omitted from the US survey. For consistency, we therefore only consider scores from the remaining three sections (prose literacy, document literacy, and numeracy) in Canada and Norway as well.

<sup>3</sup> In addition, Bermuda, Italy, and Switzerland participated in the survey, but are not included in the present study.

with a much higher fraction of immigrants with low educational attainment than any of the other groups in the figure; a point emphasized elsewhere in the literature (OECD, 2008; Card, 2009). We construct the measure of literacy skill by taking the average score along the three literacy scales of document, prose, and numeracy for each respondent. The bottom panels of Figure 1 trace the Kernel density estimate of the literacy skill distributions of foreign and native-born in the three countries. The panels illustrate that literacy scores are more dispersed in the foreign-born than the native-born population—regardless of host country, immigrants are more likely than natives to place in the bottom and top tails of the skill distribution.

**Figure 1. Distribution of educational attainment and literacy score of foreign and native-born population by host country**



NOTE: Samples are restricted to individuals aged 25-64 and not enrolled in school at time of the survey. The Norwegian data are augmented with the supplemental immigrant sample. All statistics are weighted using survey weights, with the Norwegian sample reweighted to account for the supplemental sample.

Table 1 lists sample means of the two skill measures and other variables to be used in the empirical analyses below. All statistics (and the regression analyses below) are weighted by the population survey weights provided by the statistical agencies of each participating country. As the table shows, the average years of completed schooling is higher among immigrants than natives in Canada and Norway, but not in the US, and average literacy scores of immigrants fall below natives in all three

countries. The standard deviations of the literacy score variable confirm the greater immigrant dispersion revealed by Figure 1. Other variables display only minor differences across the various population groups, with the exception that the immigrant population of Canada is significantly older than those of the US and Norway.

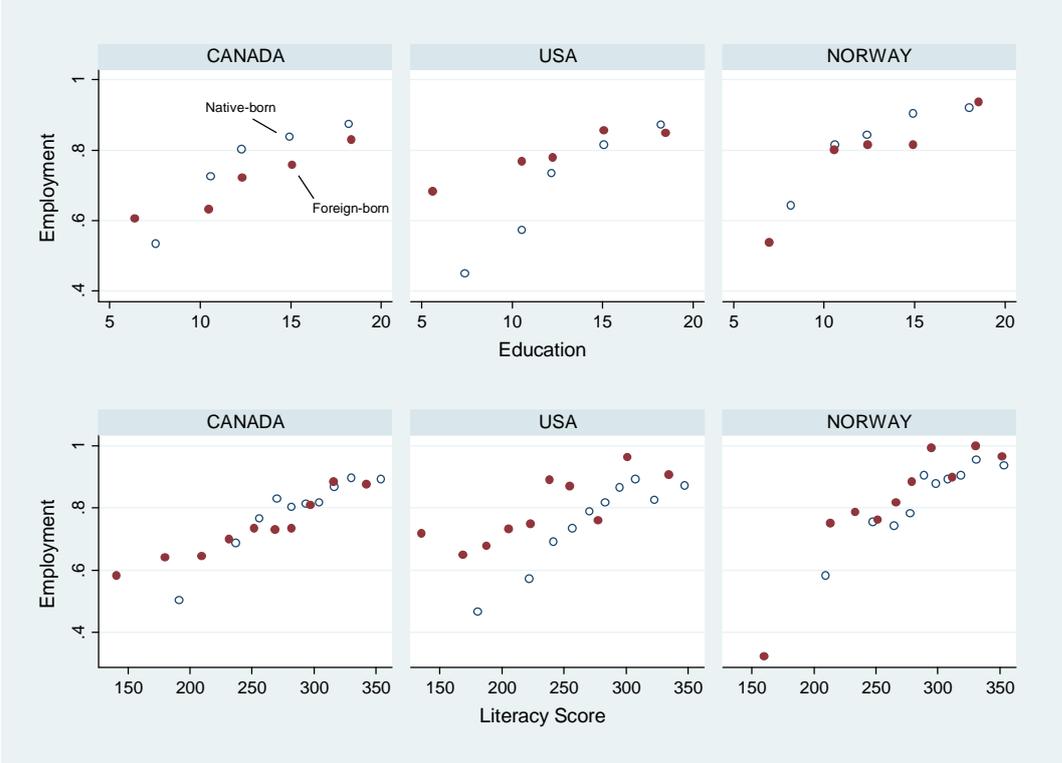
**Table 1. Sample descriptive statistics**

	Canada		USA		Norway	
	Foreign-born	Natives	Foreign-born	Natives	Foreign-born	Natives
Employment	0.734	0.787	0.791	0.753	0.817	0.833
Schooling	13.7	13.4	12.6	13.6	13.8	12.7
Mean literacy score	251.9	283.4	232.3	272.8	269.0	289.8
Std. dev. literacy score	60.0	46.3	59.3	48.1	55.9	40.9
Female	0.507	0.501	0.486	0.516	0.506	0.489
Age>44	0.497	0.464	0.324	0.488	0.302	0.483
Years since arrival>12	0.624		0.601		0.585	
Poor health	0.123	0.118	0.154	0.186	0.168	0.157
Observations	2,931	13,254	337	2,333	460	3,889

NOTE: See notes to Figure 1.

To begin the analyses of employment outcomes of immigrants and natives in the three host countries, in Figure 2 we use scatter plots to display the crude associations between the outcome measure and education and literacy in the various samples. In the top panel each scatter point shows the average years of schooling and the employment rate within each of the five educational attainment levels listed in Figure 1. To construct the scatter points in the bottom panel, we first sorted the data by literacy score separately for each of the six country-by-nativity samples and divided each sample into ten equally large cells, with each cell representing a decile of the relevant literacy distribution. Next we formed the mean literacy score and the employment rate within each cell. The figure demonstrates strong associations between skills and employment in the data. Regardless of country or immigrant status, employment rates are higher among those with high educational attainment or high literacy scores than among those with low attainment or low scores. An interesting pattern to emerge from the plots is that, while the native associations appear to be fairly similar across countries, employment rates of immigrants with low attainment or low literacy scores differ by country. In particular, employment rates of immigrants in the bottom literacy decile and bottom education bracket are much lower in Norway than in Canada and the United States.

**Figure 2: Skills and employment by host country and immigrant status**



NOTE: Top panel shows average years of schooling and employment rate for each of the five educational attainments shown in Figure 1 and bottom panel the average literacy score and employment rate for each of ten deciles of the literacy score distribution of foreign-born and natives respectively.

### 3. Results

In this section, we study the multivariate relationships between schooling, literacy skills, and employment of immigrants and natives in the three countries. Our analyses of employment equations are based on linear probability models, but results are similar if we instead use probit models and evaluate marginal effects at mean values of explanatory variables (see appendix, Table A1). In Table 2, columns (1)-(3), we begin by reporting immigrant-native employment differentials by gender, age, and years since migration.

As the first table row shows, employment rates of recently arrived (i.e., 12 or fewer years of residency) foreign-born men age 25-44 are 7 and 9 percentage points below those of native-born men in Canada and Norway, but on par with natives in the United States. The conventional gender employment gap (of 8-11 percentage points) appears for natives in all three countries. In North America, the gender gap is twice as large for foreign-born as natives. Among natives, employment declines with age in all three countries; the employment rate of 45-64 year olds is 10 to 16 percentage points below that of younger birth cohorts. For immigrants, the age differential is similar to that of

natives in Canada and Norway, but significantly smaller in the United States. Older immigrant cohorts (with more than 12 years in the country) have employment rates that are 6 to 11 percentage points above recent cohorts, but with cross-sectional data we are unable to distinguish between arrival cohort heterogeneity and effects of years since arrival (Borjas, 1985).

**Table 2. Immigrant-native employment differential accounting for educational attainment**

	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.069 (0.014)	0.004 (0.043)	-0.094 (0.042)	-0.072 (0.016)	0.066 (0.044)	-0.106 (0.043)
Female	-0.083 (0.007)	-0.106 (0.018)	-0.103 (0.011)	-0.087 (0.007)	-0.101 (0.017)	-0.107 (0.011)
Foreign-born *Female	-0.107 (0.015)	-0.102 (0.046)	-0.004 (0.047)	-0.088 (0.015)	-0.099 (0.045)	-0.026 (0.047)
Age 45-64	-0.158 (0.007)	-0.104 (0.018)	-0.112 (0.011)	-0.132 (0.007)	-0.103 (0.017)	-0.079 (0.012)
Foreign-born *Age 45-64	0.019 (0.016)	0.087 (0.051)	0.038 (0.053)	0.016 (0.016)	0.088 (0.050)	0.014 (0.052)
YSM>12	0.107 (0.015)	0.059 (0.045)	0.084 (0.048)	0.117 (0.014)	0.064 (0.044)	0.060 (0.047)
Schooling				0.023 (0.001)	0.032 (0.003)	0.022 (0.002)
Foreign-born *Schooling				-0.007 (0.002)	-0.020 (0.005)	0.009 (0.006)
Constant	0.902 (0.006)	0.858 (0.015)	0.938 (0.010)	0.836 (0.007)	0.770 (0.017)	0.885 (0.011)

NOTE: Standard errors are reported in parentheses, Sample sizes are as reported in Table 1. Regressions are weighted using sampling weights. In columns (4)-(6) the foreign-native differentials are evaluated at 11 years of schooling.

Employment relates to educational attainment, with the native association fairly similar across the three countries; see columns (4)-(6). For natives, an additional year of schooling is associated with a 2.2 to 3.2 percentage points higher employment rate. When we control for educational attainment and allow for differential effects by immigrant status, low-education immigrants have higher employment

rates than natives in the United States but significantly lower employment in Canada and Norway (in the table, coefficients of foreign-born are evaluated at 11 years of schooling).<sup>4</sup>

**Table 3. The effect of literacy skill on employment**

	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.013 (0.016)	0.131 (0.044)	-0.017 (0.043)	-0.020 (0.016)	0.107 (0.045)	-0.015 (0.043)
Female	-0.081 (0.007)	-0.094 (0.017)	-0.092 (0.011)	-0.080 (0.007)	-0.093 (0.017)	-0.093 (0.011)
Foreign-born *Female	-0.085 (0.015)	-0.099 (0.044)	-0.022 (0.046)	-0.090 (0.015)	-0.103 (0.044)	-0.013 (0.046)
Age 45-64	-0.120 (0.007)	-0.084 (0.017)	-0.048 (0.012)	-0.117 (0.007)	-0.082 (0.017)	-0.049 (0.012)
Foreign-born *Age 45-64	0.021 (0.016)	0.079 (0.049)	0.002 (0.051)	0.011 (0.016)	0.073 (0.049)	0.012 (0.051)
YSM>12	0.092 (0.014)	0.051 (0.044)	0.039 (0.046)	0.102 (0.014)	0.056 (0.044)	0.029 (0.047)
Schooling	0.012 (0.001)	0.015 (0.003)	0.011 (0.002)	0.009 (0.001)	0.013 (0.004)	0.012 (0.002)
Foreign-born *Schooling	-0.008 (0.002)	-0.017 (0.005)	0.003 (0.006)	-0.000 (0.002)	-0.009 (0.007)	-0.006 (0.008)
Literacy score/ 100	0.140 (0.008)	0.181 (0.020)	0.187 (0.015)	0.170 (0.010)	0.201 (0.022)	0.178 (0.016)
Foreign-born *Lit score/100				-0.088 (0.017)	-0.100 (0.049)	0.095 (0.053)
Constant	0.808 (0.007)	0.761 (0.017)	0.807 (0.012)	0.802 (0.007)	0.760 (0.017)	0.811 (0.012)

NOTE: Foreign-native differentials are evaluated at literacy score of 250 and 11 years of schooling. See also note to Table 2.

An interesting pattern to emerge from Table 2 is the variation in the role of immigrant education across host countries. In line with results from a North American literature studying labor market

<sup>4</sup> An intermediate specification imposing the restriction that the coefficient of education is the same for immigrants and natives yields the following coefficient estimates of the foreign-born variable in Canada, the United States, and Norway: -0.099 (0.014); 0.017 (0.042); and -0.086 (0.041).

outcomes of immigrants (Bratsberg and Ragan, 2002; Sweetman, 2004; Ferrer and Riddell, 2008), the effect of schooling is weaker for immigrants than for natives in Canada and the United States, as shown by the negative interaction terms between foreign-born and schooling in columns (4) and (5). This contrasts with the result for Norway, where the marginal effect of schooling is greater for immigrants (although the immigrant-native differential is not statistically significant in Norway, the coefficient of the immigrant-education interaction term is significantly larger in Norway than in the other two countries). The finding hints that skills are particularly important for immigrant employment in the Norwegian labor market.

In Table 3, we turn to the main contribution of the present study and augment the measurement of skills with literacy scores taken from the ALL surveys. A number of noteworthy patterns appear in the table. First, literacy correlates strongly with employment in all three countries. A one standard deviation increase in literacy score (about 50 points for natives) is associated with a boost in employment of 7 to 9 percentage points; see column (1)-(3). Second, when we condition on literacy score the (native) coefficient of schooling falls by more than one half compared to that in Table 2 for all three countries, reflecting that the two skill measures are highly correlated and also demonstrating that the education effect observed in standard data sets largely proxies for unobserved cognitive skills. The finding parallels a central result of Green and Riddell (2003) who study the effects of education and literacy skills on earnings. Third, the employment disadvantage of low-educated immigrants in Canada and Norway observed in Table 2 vanishes when we account for literacy score; the observed immigrant-native employment differential can broadly be attributed to differences in literacy skills.

Finally, and more important for the present study, the role of immigrant literacy differs across host countries. In Canada and the United States, literacy is a much weaker determinant of employment for foreign-born than for natives, with the coefficient of literacy about half the size for immigrants compared to natives; see columns (4) and (5). In sharp contrast, in Norway literacy skills are more strongly correlated with employment among immigrants than natives. In fact, a 50 points increase in the literacy score raises employment of natives by 9 to 10 percentage points in all three countries, and by 14 points for immigrants in Norway compared to only 5 points for immigrants in Canada and the United States.<sup>5</sup> The apparently lower immigrant returns to schooling in North America seen in Table 2 become less pronounced, indicating that the weaker impact of immigrant skills in truth reflects the negative immigrant-literacy score interaction. Similarly, the seemingly higher returns to immigrant

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<sup>5</sup> These cross-country differences are also statistically significant; when we stack the country-specific samples together and estimate the models in columns (4)-(6) with full sets of country interactions, the Norwegian coefficient of “Foreign-born\*literacy score” is significantly different from those in Canada and the US at the one percent level.

schooling in Norway reflects their stronger relation between literacy and employment. When the model accounts for differential effects of literacy by immigrant status, the immigrant coefficients of schooling are comparable across countries. All in all, Table 3 reveals that for natives, the associations between skills and employment are remarkably similar across the three countries, regardless of whether skills are measured by educational attainment or literacy scores. For immigrants, the employment penalty associated with low levels of literacy is particularly large in Norway while the literacy skill gradient is low for immigrants in the North American labor markets.

## **4. Discussion**

Two empirical patterns stand out from the prior section. First, when we do not consider heterogeneity in returns to literacy skills, immigrants with low educational attainment have better employment prospects in the United States than in Norway—which is consistent with patterns observed elsewhere (OECD, 2008). Because this result holds when we control for literacy, the favorable employment of low-educated immigrants in North America is not the consequence of positive selection on cognitive skills per se. Second, when we allow for separate literacy effects for natives and immigrants, schooling takes a uniform role across host countries while literacy skills become particularly important for immigrant employment in Norway.

Possible explanations for the observed differences in immigrant outcomes broadly fall into two categories: immigrant selection and host-country labor market features. Selection effects arise either from immigration policy or from self-selection whereby migrants choose the host-country that offer the better conditions for their (sometimes, lack of) particular skills (Borjas, 1987). In our context, selective migration could imply that immigrants with similar education and literacy skills nonetheless differ across countries in terms of other productive characteristics. The second set of mechanisms relates to the impacts of labor market institutions (such as wage and employment flexibility) and welfare policy. In welfare states with centralized wage setting and employment protection, low-skilled immigrants risk possessing productivity below the effective minimum wage or may lack economic incentives to work because of high benefits provided by the welfare system.

This section attempts to sort out whether the empirical patterns are consistent with selection or host country market structures and policies, but we first consider the concern that our findings reflect misspecification of the empirical model. If education and literacy are substitute factors in the sense that high literacy skills can compensate for low levels of schooling, differences in the correlation between education and literacy may well generate different empirical patterns of skill and employment across

countries. A greater concentration of immigrants with low skills along both dimensions in Norway could in principle explain why the estimated effect of literacy on employment becomes particularly large for this group.

We investigate this explanation in appendix Table A2. The table lists results from regressions where the model is augmented with an interaction term between schooling and literacy. For natives, we find a negative interaction between the two factors in all three countries. The importance of literacy declines with educational attainment and the effect of schooling is lower for workers with high literacy scores than for those with low scores. For immigrants, the education-literacy interaction effect is zero in Canada and about half the size of that of natives in the United States and Norway. But more important for our study, the patterns from the parsimonious specification of Table 3 persist: immigrants earn high returns to literacy skills in Norway whereas literacy is a weak determinant of immigrant employment in Canada and the United States. For this reason we proceed with the simpler specification used in prior tables.

Another question is whether our measure of literacy skills might reflect language proficiency, and that the variation in immigrant penalties for low literacy in truth captures differences in language adaptation across host countries. Prior studies show that language proficiency is an important determinant of immigrant productivity (Dustmann and van Soest, 2002). Similarly, if communication requirements differ across fields of study, one might expect to see high returns to immigrant schooling in certain fields such as sciences and engineering. Differences in the composition of the immigrant population with respect to field of study may therefore cause discrepancies in observed returns to skills across host countries. We address these questions by studying literacy effects on employment separately using scores from the numeracy and prose/document understanding sections of the ALL surveys. Results are reported in appendix Table A3. As the table shows, there are only minor differences in the structure of coefficients of literacy across the two measures, and in none of the specifications does the reported coefficient differ significantly from that of the composite literacy measure used in Table 3. There is no indication that the discrepancy of coefficients across host countries is the result of systematic differences in returns to or composition of numeracy vs. reading skills or differences in the role of language proficiency.

#### **4.1 Country of origin and host-country schooling**

A third candidate explanation is that of differences in composition of source countries. A large empirical literature has shown that immigrant labor market outcomes correlate strongly with source

country characteristics such as level of economic development and quality of the educational system (Jasso and Rosenzweig, 1986; Bratsberg and Terrell, 2002; Aydemir and Skuterud, 2005) as well as cultural factors (Antecol, 2000; Fernandez and Fogli, 2009; Blau et al, 2011). A concern is therefore that country of origin might be an omitted characteristic in the employment equation. Unfortunately, our Canadian and US data do not contain information about source country, but we are able to investigate whether the large employment penalty for low literacy skills among immigrants in Norway reflect factors related to country of origin. In Figure 3 we first display the distributions of educational attainment and literacy scores separately for immigrants from low and high-income source countries.<sup>6</sup> Among immigrants from low-income countries, we further distinguish between those who completed their schooling prior to arrival and those who acquired some schooling in Norway (combining age at immigration and years of completed schooling to assess whether the immigrant acquired any education after arrival).<sup>7</sup>

**Figure 3: Educational attainment and literacy score by birth region and education source, immigrants in Norway**



<sup>6</sup> We define high-income countries as OECD member states in Europe, North America, Asia, and Oceania. The three most frequent high-income countries in the Norwegian data are Sweden, Denmark, and the United Kingdom, while the three most frequent low-income countries are Pakistan, Vietnam, and Somalia.

<sup>7</sup> For immigrants from high-income source countries we failed to uncover any significant differences in educational attainment, literacy skills, or labor market outcomes among those with and without Norwegian schooling.

As Figure 3 shows, the skill distributions differ substantially across the three immigrant groups. Immigrants from low-income countries and with foreign education only have less schooling than natives, while immigrants from developed countries are extremely well educated. Even among low-income source country immigrants with Norwegian education very few have less than 12 years of schooling. Similar patterns emerge for literacy scores. The distribution of literacy scores for immigrants from low-income countries and educated abroad sits below and displays greater dispersion than those of other groups. Despite their favorable educational attainment, for immigrants from low-income source countries and with Norwegian education the distribution of literacy scores is below that for natives, as high scores are less frequent for this group. Finally, immigrants from high-income countries are not only better educated, they also have higher literacy scores than natives.

**Table 4. Employment regressions accounting for birth region, Norway**

	Sample Mean*	(1)	(2)	(3)	(4)	(5)
Low-income source country	0.601	-0.125 (0.043)	-0.108 (0.042)	-0.115 (0.043)	-0.016 (0.042)	-0.011 (0.044)
High-income source country	0.399	0.059 (0.058)	0.018 (0.057)	-0.001 (0.064)	0.008 (0.056)	-0.046 (0.067)
Schooling	12.8		0.023 (0.002)	0.022 (0.002)	0.012 (0.002)	0.012 (0.002)
Foreign-born *Schooling	13.8			0.005 (0.007)		-0.007 (0.008)
Literacy score/100	288.5				0.186 (0.015)	0.178 (0.016)
Foreign-born *Lit score/100	269.0					0.114 (0.062)
Constant		0.938 (0.010)	0.884 (0.011)	0.885 (0.011)	0.807 (0.012)	0.811 (0.012)

\*For variables interacted with foreign-born (including low and high-income country intercepts), sample means give the conditional mean for the immigrant sample.

NOTE: Regressions control for gender, age above 44, their interactions with foreign-born status, and more than 12 years since migration. See also notes to Tables 2 and 3.

The employment regressions presented in Table 4 investigate whether immigrant employment outcomes and their higher returns to literacy skills simply can be explained by our failure to consider source country factors. As column (1) shows, employment rates of residents born in low-income countries are significantly lower than those of natives and immigrants from high-income countries. When we account for differences in educational attainment, this employment disadvantage becomes

slightly smaller and the favorable employment differential of immigrants from developed countries is largely explained by their higher education levels; see column (2). These patterns persist when we allow for separate returns to education by immigrant status (and evaluate immigrant differentials at 11 years of schooling; see col. 3).

When we control for literacy scores, as in column (4), immigrants from low-income source countries have the same employment rate as natives. While differences in formal schooling fail to explain the employment gap for low-income country immigrants, the employment divergence across immigrant groups from low and high-income source countries and natives can be fully attributed to differences in skills measured by actual competence tests (i.e., their literacy score). Finally, the results in column (5) show that the strong association between literacy and employment for immigrants remains even when we account for source country factors. In other words, the Norwegian anomaly of higher immigrant returns to literacy skill is not a reflection of origin mix. Nor is the pattern uncovered for Canada and the US with lower relative returns to literacy skills for immigrants likely to reflect origin mix, as the explanation would imply either lower employment among immigrants from high-income countries or a negative correlation between source country income level and literacy skills in the North American data.

Next we use the Norwegian data to consider the role of source-country versus host-country education. Table 5, column (1), shows that employment of immigrants from low-income countries without any Norwegian education falls short of that of other groups, while employment among those with Norwegian education or from high-income countries is slightly higher than for natives. These patterns persist when we account for differences in educational attainment (column 2) and when we allow for group-specific coefficients of the education variable (and evaluate group differences at 11 years of schooling; see column 3). There are no signs of statistical differences in the coefficient of education across immigrant groups, although there is weak indication that schooling is particularly important for low-income source country immigrants without Norwegian education. However, as column (5) reveals, the finding is merely a reflection of differences in returns to literacy skill. When the specification allows for flexible returns to education and literacy scores across the various immigrant categories and natives, results in column (5) show that literacy is more important in shaping group differences in employment than is formal years of schooling. In particular, the table demonstrates that the finding of higher returns to immigrant literacy stems from the especially strong role of literacy skill for immigrants from low-income source countries who do not acquire any host-country schooling. For this group of immigrants, who are characterized by low employment rates as column (1) showed, success in the Norwegian labor market is foremost linked to demonstrated literacy skills, and not to years of formal schooling.

**Table 5. Employment regressions accounting for birth region and host-country education, Norway**

	Sample Mean*	(1)	(2)	(3)	(4)	(5)
Low-income centry *Foreign educ	0.414	-0.175 (0.046)	-0.143 (0.045)	-0.161 (0.047)	-0.039 (0.045)	-0.025 (0.050)
Low-income centry *Norw educ	0.187	0.038 (0.069)	0.006 (0.067)	0.009 (0.088)	0.056 (0.067)	0.036 (0.088)
High-income source country	0.399	0.089 (0.059)	0.039 (0.058)	0.082 (0.075)	0.021 (0.057)	0.043 (0.085)
Schooling	13.8		0.022 (0.002)	0.022 (0.002)	0.011 (0.002)	0.012 (0.002)
Low inc foreign educ *Schooling	12.1			0.012 (0.010)		-0.003 (0.012)
Low inc Norw educ *Schooling	14.4			-0.003 (0.016)		-0.003 (0.017)
High inc centry *Schooling	15.4			-0.012 (0.011)		-0.015 (0.013)
Literacy score/100	288.5				0.184 (0.015)	0.178 (0.016)
Low inc foreign educ *Literacy score/100	230.0					0.152 (0.084)
Low inc Norw educ *Literacy score/100	270.7					0.027 (0.147)
High inc centry *Literacy score/100	308.8					0.033 (0.114)
Constant		0.938 (0.010)	0.885 (0.011)	0.885 (0.011)	0.808 (0.012)	0.811 (0.012)

\*For schooling and literacy variables interacted with foreign-born categories, sample means give the conditional mean for the relevant immigrant category.

NOTE: Regressions control for gender, age above 44, their interactions with foreign-born status, and more than 12 years since migration. See also notes to Tables 2 and 3.

The analyses of the Norwegian data show that the high immigrant returns to literacy skill can be linked to immigrants from developing countries who do not acquire host-country education (but cannot be explained by failure to account for immigrant origin or education). This raises the question whether a similar relation exists among immigrants in Canada and the US, and that the group is too small to influence the estimated immigrant returns to literacy. But, again, the possibility appears

highly unlikely as the proportion of immigrants in the US from low-income countries is much larger than that in Norway.<sup>8</sup> Further, prior research shows that the fraction of developing-country immigrants who acquire US schooling is even lower than the proportion with host-country education observed in our Norwegian data (Bratsberg and Ragan, 2002).

## 4.2 The role of health

Results thus far fail to provide any evidence that the Norwegian-North American divergence in immigrant literacy returns can be explained by immigrant sorting. But the question remains whether the immigrant populations of Europe and North America differ along other, non-observed dimensions of skill. For example, immigrants can sort themselves across countries on the basis of attitudes, preferences, or non-cognitive skills, and uneven emphasis on refugee policy might be expected to create cross-country differences in the labor market preparedness of immigrants. Reliable measures on these characteristics are hard to obtain but the ALL data offer an opportunity to address the role of health. Typically, individuals with health problems are less likely to be employed. Based on a five-level scale, we observe individuals who consider their general health to be poor. First, Table 1 reveals that immigrants do not in general perceive their health to be particularly poor. Although the fraction with poor health differs by country, there is no significant immigrant-native difference in reported health within countries. Employment differentials by health status are, on the other hand, substantial in all three countries. Table 6 shows that poor health is associated with reduced employment of 19 to 24 percentage points, less in the United States than in Canada and Norway. The poor-health employment penalty is smaller for immigrants than natives in the US and Norway. But more important from our perspective is that the larger effect of literacy skills for immigrants in Norway remains and does not reflect that low-skilled immigrants in Norway have particularly poor (self-reported) health.

The failure to uncover evidence that the discrepancy in immigrant skill returns reflects systematic differences across the immigrant populations of the three host countries leave us with explanations tied to institutions and labor market flexibility. Compared to the North American economies, the Norwegian labor market is characterized by stricter employment protection (Venn, 2009), higher effective minimum wages due to centralized bargaining (OECD, 2004), and a much smaller low-wage service sector. Such institutional features might be expected to make it more difficult for low-skilled immigrants to gain employment in Norway. Indeed, if variation in host-country labor market flexibility does explain why employment of low-skilled immigrants differs across countries, we would

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<sup>8</sup> Using Europe, North America, and Oceania as proxies for high-income source countries, in 2003 the fraction of the immigrant population originating in these regions was 17.3 percent in the US compared to 49.5 percent in Norway (US

also expect that education and literacy are equally more important in Norway compared to Canada and the United States for other groups characterized by low productivity. The much lower employment rates of those with poor health documented in Table 6 suggest that many natives with health problems are at the margin of labor market participation. The results presented in Table 7, columns (1)-(3), provide further indication of this, showing that schooling is more important for employment of native-born individuals with poor health than those with good health in all three countries. The coefficient of the interaction term is, however, significantly larger in Norway; schooling is particularly important for employment of Norwegians with poor health. This finding is consistent with the hypothesis that compressed wage structures and employment protection limit employment opportunities of low-skilled workers. At the same time, the table shows that the larger effect of literacy skills for immigrants in Norway remains—their higher marginal returns to skills are not caused by more frequent health problems in this group.

**Table 6. Accounting for health status**

	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.039 (0.016)	0.090 (0.045)	-0.037 (0.042)	-0.037 (0.016)	0.071 (0.045)	-0.054 (0.042)
Schooling	0.008 (0.001)	0.011 (0.004)	0.009 (0.002)	0.008 (0.001)	0.011 (0.004)	0.009 (0.002)
Foreign-born *Schooling	-0.000 (0.002)	-0.008 (0.006)	-0.004 (0.008)	-0.000 (0.002)	-0.008 (0.006)	-0.003 (0.008)
Literacy score /100	0.146 (0.010)	0.164 (0.022)	0.146 (0.016)	0.146 (0.010)	0.160 (0.022)	0.145 (0.016)
Foreign-born *Lit score/100	-0.078 (0.016)	-0.065 (0.049)	0.100 (0.052)	-0.079 (0.016)	-0.059 (0.049)	0.119 (0.052)
Poor health	-0.243 (0.010)	-0.186 (0.021)	-0.238 (0.015)	-0.240 (0.011)	-0.203 (0.023)	-0.247 (0.015)
Foreign-born *Poor health				-0.015 (0.023)	0.125 (0.061)	0.161 (0.063)
Constant	0.839 (0.007)	0.802 (0.017)	0.856 (0.012)	0.838 (0.007)	0.807 (0.017)	0.858 (0.012)

NOTE: Regressions control for gender, age above 44, their interactions with foreign-born status, and more than 12 years since migration. See also notes to Tables 2 and 3.

**Table 7. Interactions between health status and skills**

	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.038 (0.016)	0.068 (0.046)	-0.048 (0.043)	-0.043 (0.016)	0.068 (0.046)	-0.057 (0.043)
Schooling	0.007 (0.001)	0.010 (0.004)	0.006 (0.002)	0.009 (0.001)	0.012 (0.004)	0.008 (0.002)
Foreign-born *Schooling	0.000 (0.003)	-0.007 (0.007)	-0.005 (0.009)	-0.001 (0.003)	-0.010 (0.007)	-0.007 (0.009)
Literacy score /100	0.145 (0.010)	0.160 (0.022)	0.145 (0.016)	0.121 (0.010)	0.131 (0.025)	0.114 (0.017)
Foreign-born *Lit score/100	-0.078 (0.016)	-0.060 (0.049)	0.120 (0.052)	-0.063 (0.017)	-0.027 (0.053)	0.154 (0.058)
Poor health	-0.249 (0.012)	-0.212 (0.026)	-0.262 (0.016)	-0.252 (0.012)	-0.193 (0.027)	-0.299 (0.018)
Foreign-born *Poor health	-0.011 (0.023)	0.130 (0.062)	0.138 (0.069)	0.016 (0.027)	0.101 (0.076)	0.173 (0.074)
Poor health *Schooling	0.008 (0.003)	0.005 (0.007)	0.019 (0.005)	-0.009 (0.004)	-0.007 (0.009)	0.007 (0.006)
Foreign-born *Health*School	-0.004 (0.005)	-0.001 (0.013)	-0.001 (0.015)	0.008 (0.007)	0.014 (0.018)	0.013 (0.019)
Poor health *Literacy/100				0.179 (0.028)	0.135 (0.053)	0.190 (0.041)
Foreign-born *Health*Lit/100				-0.103 (0.048)	-0.166 (0.141)	-0.202 (0.132)
Constant	0.841 (0.007)	0.809 (0.018)	0.862 (0.012)	0.846 (0.007)	0.811 (0.018)	0.872 (0.012)

NOTE: Regressions control for gender, age above 44, their interactions with foreign-born status, and more than 12 years since migration. See also notes to Tables 2 and 3.

In Table 7, columns (4)-(6), we also include interaction terms between health status and literacy score. Although results show that the importance of literacy skills for natives with poor health is only marginally larger in Norway than in Canada and the United States, the coefficient of the interaction term between education and poor health takes the opposite sign in Norway compared to Canada and the United States. In fact, when we examine the combined effect of skills measured by one-standard deviation increases in *both* literacy score and schooling (54 points and 3.6 years of schooling among those with poor health), predicted employment is 6.4 percent higher for those with poor health than

those with good health in Canada, 4.9 percent higher in the United States, and 12.6 percent higher in Norway. Pairwise tests of equal employment effects for those with poor health across countries reject the hypothesis of equality between Norway and each of the other two countries at the five percent level, but fail to reject the null hypothesis of equal coefficients in the comparison between Canada and the United States.

The stronger association between skills and employment uncovered for Norwegians with health impairments is highly relevant for the interpretation of our results. A persuasive pattern to emerge from our analyses is that employment prospects for low-productivity workers are worse in Norway than in Canada and the United States. Because wage returns to skills are lower in Norway than in the United States, these relations are unlikely to reflect labor supply responses. The empirical patterns are, on the other hand, consistent with the hypothesis that a compressed wage structure, employment protection, and social insurance with high replacement ratios create adverse employment effects for low-productivity workers. The finding that the strong association between literacy skills and employment among immigrants in Norway is driven by the significant interaction effect for immigrants from low-income source countries without host-country schooling and generally low labor force participation rates, further strengthens the interpretation that differences in immigrant employment is explained by cross-country variation in the influences of demand and institutional factors.

A final plausible explanation of our findings is that variation in xenophobic attitudes and employer discrimination generates differences across host countries in labor demand facing immigrants. Mayda (2006), for example, drawing on survey data from a wide range of developed and developing countries, shows that there is considerable variation in attitudes toward immigrants across host nations. Her data reveal, however, that native attitudes towards immigration in general and the variation in views on immigration policy by educational attainment in particular are very similar in Canada, the United States, and Norway. Differences in native attitudes towards immigration thus appear to be an unlikely explanation of the observed discrepancies in immigrant employment outcomes across the Norwegian and North American labor markets.

## **5. Conclusion**

We study how individual skills in terms of years of schooling and literacy proficiency relate to employment of immigrants and natives in three host countries: Canada, the United States, and Norway. For the native-born populations, the associations between skills and employment are

remarkably similar across the three countries, regardless of whether skills are measured by educational attainment or literacy scores. Literacy correlates strongly with employment in all three countries, even within groups with similar educational attainment.

For immigrants, the employment penalty associated with low levels of literacy is particularly large in Norway, while the literacy skill gradient in employment is low for immigrants in the North American labor markets.

We investigate various sources of this discrepancy and fail to uncover evidence that the finding reflects differential immigrant sorting across host countries. This leaves us with explanations tied to institutions and labor market flexibility. Compared to the North American economies, the Norwegian labor market is characterized by stricter employment protection and higher effective minimum wages due to centralized bargaining. Such institutional features might be expected to make it particularly difficult for low-skilled immigrants to gain employment. This interpretation is supported by our finding that education and literacy are equally important to other groups characterized by low productivity such as those reporting poor health in Norway compared to Canada and the United States. We find that the high returns to immigrant literacy in Norway stem from the especially strong role of literacy skills for immigrants from low-income source countries who do not acquire any host-country schooling. These immigrants have generally low employment rates and their success in the Norwegian labor market is foremost linked to demonstrated literacy skills, and not to years of formal schooling.

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## Appendix

**Table A1. Results from probit regressions**

	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.028 (0.018)	0.109 (0.040)	0.004 (0.045)	-0.043 (0.019)	0.127 (0.042)	0.005 (0.045)
Female	-0.088 (0.007)	-0.100 (0.018)	-0.093 (0.011)	-0.091 (0.008)	-0.101 (0.018)	-0.093 (0.011)
Foreign-born *Female	-0.075 (0.017)	-0.128 (0.059)	-0.002 (0.048)	-0.072 (0.017)	-0.132 (0.060)	-0.001 (0.049)
Age>44	-0.125 (0.008)	-0.084 (0.018)	-0.047 (0.012)	-0.124 (0.008)	-0.084 (0.018)	-0.044 (0.012)
Foreign-born *Age>44	0.021 (0.015)	0.071 (0.042)	0.006 (0.051)	0.020 (0.015)	0.070 (0.043)	0.002 (0.052)
YSM>12	0.085 (0.012)	0.047 (0.042)	0.030 (0.041)	0.085 (0.012)	0.047 (0.042)	0.031 (0.042)
Schooling	0.010 (0.001)	0.014 (0.004)	0.012 (0.002)	0.013 (0.002)	0.018 (0.004)	0.016 (0.003)
Foreign-born *Schooling	-0.002 (0.002)	-0.011 (0.007)	-0.007 (0.008)	-0.005 (0.003)	-0.019 (0.008)	-0.011 (0.008)
Literacy score	0.166 (0.010)	0.191 (0.022)	0.160 (0.015)	0.182 (0.010)	0.220 (0.025)	0.173 (0.016)
Foreign-born *Literacy score	-0.089 (0.017)	-0.072 (0.054)	0.093 (0.055)	-0.111 (0.012)	-0.074 (0.060)	0.085 (0.059)
Educ/Literacy Interaction				-0.014 (0.002)	-0.016 (0.006)	-0.012 (0.004)
Foreign-born *Interaction				0.016 (0.003)	0.006 (0.011)	0.010 (0.011)
Table reference	3(4)	3(5)	3(6)	A1(4)	A1(5)	A1(6)

NOTE: Listed coefficients are marginal effects.

**Table A2. Education-literacy interaction effects**

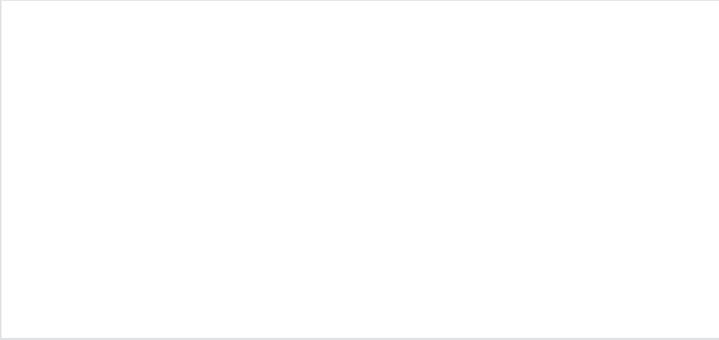
	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	0.003 (0.017)	0.161 (0.046)	0.004 (0.043)	-0.028 (0.017)	0.136 (0.050)	-0.001 (0.043)
Female	-0.082 (0.007)	-0.094 (0.017)	-0.093 (0.011)	-0.084 (0.007)	-0.095 (0.017)	-0.093 (0.011)
Foreign-born *Female	-0.091 (0.015)	-0.109 (0.044)	0.009 (0.046)	-0.086 (0.015)	-0.106 (0.044)	0.001 (0.047)
Age>44	-0.115 (0.007)	-0.080 (0.017)	-0.041 (0.012)	-0.114 (0.007)	-0.080 (0.017)	-0.040 (0.012)
Foreign-born *Age>44	0.007 (0.016)	0.072 (0.049)	0.000 (0.051)	0.008 (0.016)	0.071 (0.049)	0.001 (0.051)
YSM>12	0.107 (0.014)	0.050 (0.044)	0.038 (0.047)	0.102 (0.014)	0.053 (0.044)	0.035 (0.047)
Schooling	0.014 (0.001)	0.018 (0.004)	0.023 (0.003)	0.017 (0.002)	0.020 (0.004)	0.024 (0.003)
Foreign-born *Schooling	-0.008 (0.003)	-0.022 (0.007)	-0.015 (0.008)	-0.008 (0.003)	-0.020 (0.007)	-0.017 (0.008)
Literacy score	0.191 (0.010)	0.239 (0.023)	0.212 (0.017)	0.203 (0.010)	0.247 (0.024)	0.215 (0.017)
Foreign-born *Literacy score	-0.072 (0.017)	-0.080 (0.050)	0.115 (0.053)	-0.118 (0.018)	-0.111 (0.055)	0.093 (0.057)
Educ/Literacy Interaction	-0.015 (0.002)	-0.020 (0.004)	-0.025 (0.004)	-0.023 (0.002)	-0.024 (0.005)	-0.027 (0.004)
Foreign-born *Interaction				0.022 (0.003)	0.012 (0.009)	0.011 (0.010)
Constant	0.809 (0.007)	0.765 (0.017)	0.807 (0.012)	0.812 (0.007)	0.766 (0.017)	0.806 (0.012)

NOTE: The coefficients of schooling and literacy score are evaluated at a literacy score of 250 and 11 years of schooling, respectively.

**Table A3. Numeracy vs. document literacy and employment**

	<u>Numeracy</u>			<u>Document literacy</u>		
	Canada (1)	USA (2)	Norway (3)	Canada (4)	USA (5)	Norway (6)
Foreign-born	-0.030 (0.016)	0.092 (0.044)	-0.036 (0.043)	-0.020 (0.016)	0.112 (0.045)	-0.013 (0.043)
Female	-0.063 (0.007)	-0.072 (0.017)	-0.082 (0.011)	-0.090 (0.007)	-0.103 (0.017)	-0.101 (0.011)
Foreign-born *Female	-0.099 (0.015)	-0.117 (0.045)	-0.004 (0.047)	-0.084 (0.015)	-0.097 (0.044)	-0.014 (0.046)
Age>44	-0.118 (0.007)	-0.083 (0.017)	-0.062 (0.012)	-0.118 (0.007)	-0.084 (0.017)	-0.045 (0.012)
Foreign-born *Age>44	0.012 (0.016)	0.072 (0.049)	0.021 (0.052)	0.012 (0.016)	0.075 (0.049)	0.008 (0.051)
YSM>12	0.105 (0.014)	0.056 (0.044)	0.029 (0.047)	0.102 (0.014)	0.057 (0.044)	0.031 (0.047)
Schooling	0.010 (0.001)	0.012 (0.004)	0.014 (0.002)	0.011 (0.001)	0.016 (0.004)	0.012 (0.002)
Foreign-born *Schooling	-0.001 (0.002)	-0.007 (0.007)	-0.009 (0.008)	-0.001 (0.002)	-0.012 (0.007)	-0.004 (0.008)
Literacy score	0.158 (0.009)	0.198 (0.020)	0.137 (0.015)	0.159 (0.009)	0.185 (0.022)	0.178 (0.015)
Foreign-born *Literacy score	-0.075 (0.016)	-0.116 (0.046)	0.144 (0.055)	-0.082 (0.016)	-0.081 (0.050)	0.070 (0.050)
Constant	0.807 (0.007)	0.767 (0.017)	0.831 (0.012)	0.803 (0.007)	0.757 (0.017)	0.809 (0.012)





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