In model 2 the mean plausible value for the dimension numeracy is included in the model. The results show that including the respondents' score in numeracy adds further variance to the model (0.335 in comparison to 0.277) and that higher individual numeracy skills have a positive income effect (0.249).

To operationalize the individuals' migration status different variables can be used and were considered. Within the respective presented models the country of birth as well as the region, where the highest qualification has been acquired, have been used. Besides this also the parent's status of migration or the migration program under which the individual came to Canada could potentially be used. Calculating a model using the parents' migration status showed that this variable explains the smallest additional variance in comparison to the country of birth and the region, where the highest qualification has been acquired. Regarding the migration programs it is problematic, that the data set contains respective information only for a very limited amount of respondents.

Considering all this in model 3 first the country of birth was included. This variable adds only little variance to model 2 (0.335 in comparison to 0.337). Furthermore the negative effect of being born in another country than Canada (-0.051) is statistically significant in this model. The other effects stay comparatively constant. In model 4 instead of the country of birth the region where the respondents attained their highest qualification is included. This variable adds comparatively more variance than the respondents' country of birth does (0.337 in comparison to 0.343). The results show that the acquirement of the highest qualification outside of Canada has a negative income effect for all regions except North America and Western Europe. However, among the other regions there is variance – the following regions have slightly sloping negative income effects: Asia and the Pacific (-0.110), Central and Eastern Europe (-0.130), Arab States and Sub-Saharan Africa (-0.166), Latin America and the Caribbean (-0.208). Different from these regions there is no income penalty for people who have acquired their highest qualification in North America or Europe. Actually, the positive coefficient calculated is not statistically significant. Furthermore, in model 4, when including the regions where the highest qualification has been acquired the country of birth outside Canada is no longer statistically significant.

Finally in model 5 interaction effects between the migration status (being born abroad) and the variables years of education, years of work experience as well as numeracy skills are taken into account. The results show that there is a negative interaction effect between the country of birth (outside Canada) and the individual years of education. The two other interaction effects are not statistically significant, whereas the one between country of birth and numeracy skills is positive.

In a next step the effects of the industry, in which the individuals work, is considered as a relevant aspect influencing their income. In order to prove this using the ISIC-classification the following industry specific income data are calculated (see Table 3).

Table 3. Income data sorted by industries (gross hourly wage in CAD)

Industry	Obs.	Mean	Std. Dev.
Agriculture, forestry and fishing	208	16.84	7.34
Mining and quarrying	285	35.12	11.12
Manufacturing	1,417	24.72	10.45
Electricity, gas, steam and air conditioning supply	135	39.10	9.19
Water supply; sewerage, waste management and remediation act	87	25.51	10.00
Construction	875	25.51	9.74
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,661	20.20	10.26
Transportation and storage	601	23.34	9.17
Accommodation and food service activities	561	14.47	5.75
Information and communication	455	30.42	11.58
Financial and insurance activities	599	29.62	10.66
Real estate activities	126	22.24	10.28
Professional, scientific and technical activities	547	27.84	11.79
Administrative and support service activities	407	19.24	8.79
Public administration and defence; compulsory social security	1,458	32.68	9.67
Education	1,127	29.77	10.39
Human health and social work activities	1,644	25.81	10.53
Arts, entertainment and recreation	191	23.69	10.75
Other service activities	231	22.09	11.84
Activities of house-holds as employers; undifferentiated good	32	14.63	6.33
n=12,937; weighted; data source: PIAAC 2012.			

The results show that there is a big variance between means of each industry. One can see that there is a difference in mean wages of 24.63 CAD between the highest paying industry “Electricity, gas, steam and air conditioning supply” (39.10 CAD) and the lowest paying industry “Accommodation and food service activities” (14.47 CAD). The respective t-test proves the significance of this result (t-value: 4.500; significance: $p < 0.001$). The occurring differences regarding the income result from individual characteristics as well as from industry specific characteristics. Within all the above regression models only variables representing individual characteristics have been included. In the following model the industry in which the respondents work is regarded as one more individual characteristic. The following Table 4 shows the results of the respective model.

Table 4. Wage effects of education, work experience, skills, migration status and industry

Independent Variable	Coeff.	Rob. St. Er.	Sig.
Gender	-.117	.011	.000
Years of education	.036	.002	.000
Years of work experience	.027	.002	.000
Years of work experience²*100	-.042	.004	.000
Numeracy (mean of plausible values) *100	.180	.015	.000
Born abroad	.035	.018	.059
Highest qual. acqu. in Canada (ref. category)			
Arab States and Sub-Saharan Africa	-.151	.054	.006
Latin America and the Caribbean	-.182	.033	.000
Asia and the Pacific	-.092	.026	.000
Central and Eastern Europe	-.136	.041	.001
North America and Western Europe	.003	.028	.921
Years of education*born abroad	-.015	.003	.000
Years of work exp.*born abroad	-.000	.001	.709
Numeracy skills*born abroad	.025	.026	.336
Agriculture, forestry and fishing	.084	.041	.041
Mining and quarrying	.635	.040	.000
Manufacturing	.305	.026	.000
Electricity, gas, steam and air conditioning supply	.656	.042	.000
Water supply; sewerage, waste management and remediation act	.265	.084	.000
Construction	.388	.032	.000
Wholesale and retail trade; repair of motor vehicles and motorcycles	.152	.027	.000
Transportation and storage	.286	.032	.000
Accommodation and food service activities			
Information and communication	.432	.035	.000
Financial and insurance activities	.458	.029	.000
Real estate activities	.170	.065	.000
Professional, scientific and technical activities	.364	.033	.000
Administrative and support service activities	.141	.038	.000
Public administration and defence; compulsory social security	.523	.028	.000
Education	.405	.029	.000
Human health and social work activities	.398	.027	.000
Arts, entertainment and recreation	.212	.042	.000
Other service activities	.132	.053	.013
Activities of house-holds as employers; undifferentiated good	.054	.096	.576
Constant	2.770	.024	.000
R-squared	**.441**		
n=12,647; weighted data; data source: PIAAC 2012			

Including industry as an independent variable in the model adds a significant share of variance in comparison to the above models. For example, in comparison to model 5, which explains 35% variance, the model including the industries explains 44% variance of the individual income. In the model the lowest paying industry, which is "Accommodation and food service activities", was used as reference category. As expected the effects for all other industries are positive. According to the descriptive data the coefficient of the best paying industry "Electricity, gas, steam and air conditioning supply" has the highest value (0.621). Except for the industries "Agriculture, forestry and fishing", "Mining and quarrying" as well as "Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use" all effects are statistically significant.

As an alternative to the OLS-regression model including the industries as independent variables the influences of the industry on income can also be analysed by calculating multilevel models instead. In this case industry is not regarded as an individual characteristic but as a group variable. Another advantage of this model is that it allows an exact calculation of the variance explained on each level. Here the multilevel models are mainly used to illustrate the effects of the three not migration-related and metric variables explaining individual income: years of education, years of work experience as well as numeracy skills. The results illustrate the part of the variance of income, which can be explained on an individual level (level 1), and the part of the variance of income, which can be explained on an industry level (level 2) for each of these three variables.

To check if there is variance in the individual income, which can be explained by the industries first a null model is calculated. In this model the variance of the constant explained on the industry level is 0.069 and the respective ICC-value (Intra-Class-Correlation) is 0.307. The ICC tells us that 30.7 percent of the overall variance are explained by level 2 (the industry). This result shows that the calculation of further models considering the industry as a second level makes sense. In a further step random intercept models for the above three variables were calculated to see how the variance of income is related to the individual level and the industry level. The following Table 5 gives an overview of the results.

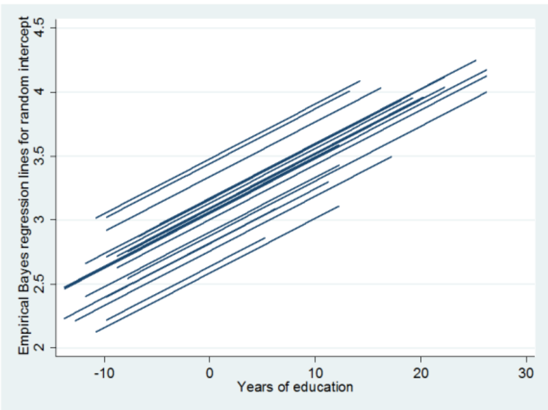
The results show that for all three level 1 variables there is a significant part of variance which can be explained on level 2 (industry level). The multi level model shows that 5.2% of the variance of the constant is explained on level 2, which means by the industry, for the level 1 variable years of education. For years of work experience the respective value is 6.5% and for numeracy skills 4.8% can be explained on level 2. The ICC values for all models also indicate that a significant part of the variance of individual income can be explained by the industry, which legitimates the calculation of the above multi level models.

Table 5. Results of the random intercept models for one variable each

Independent Variable	Years of education	Years of work exp.	Numeracy skills
Coefficient	.040	.007	.275
Constant	3.069	3.071	3.067
Variance of constant on level 2	.052	.065	.048
Variance of residual on level 2	.141	.149	.140
Log-Likelihood	5617.7	5967.6	5541.7
Wald-Chi2	1376.5	621.2	1546.4
P(Wald-Chi2)	.000	.000	.000
ICC value	.270	.302	.257
n=12,647; groups: 20; weighted data; data source: PIAAC 2012			

To visualise the effects of the three analysed level 1 variables on the industry level (level 2) the calculated random intercept models are transformed into graphs. The following figure 3 shows the respective results. Each graph shows the regression lines for a model with the income as dependent variable and the years of education, the years of work experience and the numeracy skills as the independent variable. Due to the multi level approach the graphs show one regression line for each industry, which illustrates the effect of industry on level 2 well visible.

When comparing the three graphs there are some striking results and differences. Overall it becomes apparent that all three variables have a positive effect on the individual income.



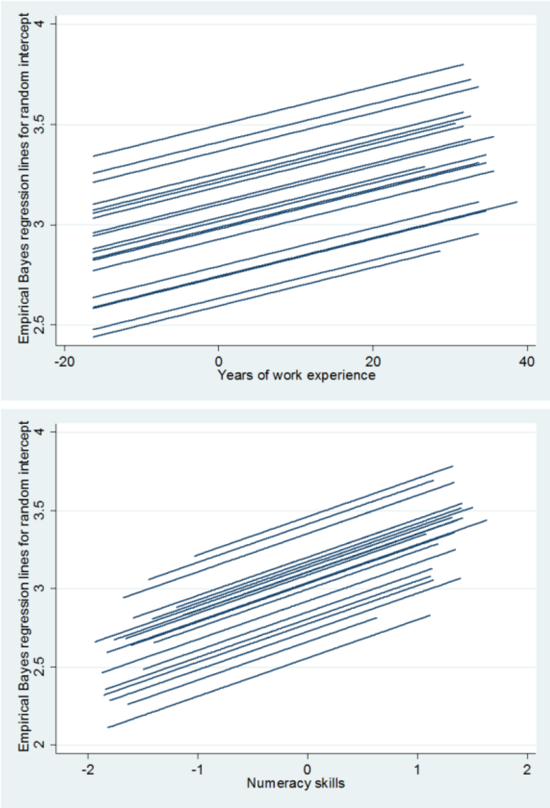


Figure 3. Random intercepts on industry level for years of education, years of work experience and numeracy skills
n=12,647; data source: PIAAC 2012

This proves the results of all the above regression models. The graphs furthermore visualise that the years of education as well as the numeracy skills explain a bigger part of variance of income on an individual level than the years of work experience do. When calculating univariate regression models with only the years of education as independent variable the variance explained is 15.6%, while with numeracy skills as independent variable the variance explained is even 16.9%. The years of work experience explain a smaller part of variance of income on an individual level, which is visible when comparing the above graphs. The respective univariate regression model for years of work experience explains 4.8% of the variance of individual income. These results confirm the results of the multivariate regression models. The additional information gained by calculating the multi level models is to get insights on how the industry affects the income and how the level of income differs among industries.

Regarding the industry level the calculated models as well as the graphs show that for all three variables there is variance. The calculated values of the models prove that the biggest share of variance on level 2 occurs regarding the variable years of work experience. This can also be seen very well when comparing the three above graphs, because for this variable the calculated regression lines for all 20 industries show the strongest variation.

Finally a random intercept model with all three variables included has been calculated. This leads to the following results (see table 6). It shows that even when including all variables at once on level 1 there is still 23.4 percent of variance explained on level 2.

Table 6. Results of the random intercept model for three variables

Fixed effects			
	Coeff.	**Std. Error**	**Sign.**
Years of education	.030	.001	.000
Years of work exp.	.009	.000	.000
Numeracy skills	.203	.007	.000
Constant	3.036	.044	.000
Components of variance			
	Coeff.	**Std. Error**	
Variance of constant on level 2	.038	.012	
Variance of residual on level 2	.123	.002	
Log-Likelihood	-4761.7		
Wald-Chi2	3410.8		
P(Wald-Chi2)	.000		
ICC value	.234		
n=12,647; data source: PIAAC 2012			

5. Conclusion and forecast

The Mincer regression model and its assumptions could be fully replicated in the above calculations. Accordingly, years of education as well as work experience represent two very important variables influencing individuals' income. Furthermore, the PIAAC data set allows to estimate the influence of individual skills, which shows that numeracy skills (which were chosen here in the models) explain additional variance of wages. Besides these important aspects determining the income the focus of this paper was to analyze to which extent the individuals' migration status affects their income.

Overall the findings confirm the discrimination of immigrants on the Canadian labour market regarding their income due to the foreign acquirement of their qualifications. But the data only prove the devaluation of qualifications acquired abroad. In concrete the results suggest that the region where the highest qualification was acquired determines the migrants' income more than the fact that they were born in another country than Canada. Furthermore, the identified interaction effect between years of education and migration status (being born abroad) also indicates that education is devaluated on the Canadian labour market if individuals have a migration background.

Besides all the above individual characteristics one further aspect is considered in a second step of the analyses: the influence of the industry on the individual income. Here all results prove the strong role industries play in determining the individual income. The respective results are consistent no matter if the industry is regarded as an individual characteristic or as a group variable on a second level. Regarding this second level it would be interesting to include further variables in the model characterising the industry like unemployment quota, value added, share of gross domestic product etc. These data are not available in the PIAAC data set, because it only contains individual data which was collected from the respondents. In a further step respective data could be merged from other data sets.

Finally, the results indicate the explanatory power of the above theories towards the entrance to the labour market and the meaning of educational credentials and work experience for immigrants. In concrete the results suggest that the acquisition of the highest qualification outside of Canada is a stronger disadvantage on the Canadian labour market than being born outside of Canada, judging by the achieved hourly wage. Furthermore, the results prove a wage penalty for foreign qualifications, while they do not prove this for foreign work experience. Here the differentiated approach from Bourdieu seems more useful than human capital theory, because the results prove that there are differences of international transferability between different kinds of cultural capital in the terms of Bourdieu.

The analysis has some limitations, which have to be considered when interpreting the results. The operationalisation of the migration status as described above is possible by using various variables. But the calculated models already show that when including more than one of these variables the effects may get smaller or even lose their significance. Finally, the actuality of data set has to be considered.

The conducted analyses could prove the discrimination of immigrants in the Canadian labour market already discovered within former research. But the results only document the actual status quo and do not provide explanations why this situation occurs. In order to find answers to this question the project will focus on investigating the reasons for the discrimination of migrants by conducting case studies in Canadian enterprises as a next step. Using a maximum variation sampling the health and ICT sectors will be analysed. While the health sector is characterised by a high level of standardization and regulation, in which qualifications and credentials play a big role, this is less the case for the ICT sector. The case studies furthermore serve to identify approaches and methods that employers and other stakeholders use to make decisions regarding foreign qualification recognition.

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