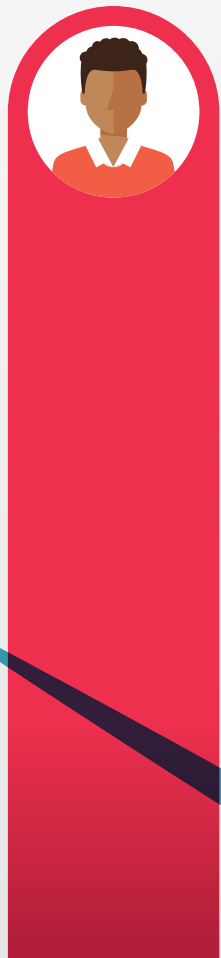


CIMI  
METHODOLOGY  
OVERVIEW  
MAY 2017



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## INTRODUCTION: OUR APPROACH

The Canadian Index for Measuring Integration (CIMI) is an evidence-based assessment tool used to evaluate the state of immigrant integration in Canada. The CIMI identifies factors that contribute to successful immigrant integration, assesses changes and trends over time, enables detailed examination of key dimensions of integration and provides rankings based on empirical evidence for Canadian geographies.

The CIMI compares immigrant to non-immigrant integration in two ways:

1. By examining various integration-related outcomes while adjusting for socio-demographic differences between the immigrant and Canadian-born population, allowing for equal comparisons across geographies and time.
2. Through the use of descriptive data to demonstrate differences or “gaps” between immigrants and non-immigrants per indicator (without controlling for socio-demographic influences), which offers snapshots of integration trends for Canadian geographies at a specific point in time.

The CIMI is constructed using multivariate analyses, including both Ordinary Least Squares (OLS) regression for scalar (or scalar-like) dependent variables and Maximum Likelihood Estimation (MLE) regression for non-scalar dependent variables.

Multivariate analyses allow for us to quantify the unique effects of an independent variable on dependent outcomes. In the current context, this has been conducted by tracking incremental changes of the main independent variables (immigration status and year of immigration) across the models, and in combination with descriptive analyses detailing means/proportional differences of the main independent variable on all controls and indicator variables of the regression models. These methods are used to estimate/model indicators for each of our four dimensions of integration (economic, social, civic and democratic participation and health), which are described in more detail below.

The primary advantage of using multivariate regression analysis for the current study is that it allows us estimate the main effects of independent/predictor variables on key outcomes related to immigrant integration across Canadian geographies (provinces, CMAs/cities) while holding constant a number of related socio-demographic factors. For instance, the models allow us to measure the likelihood of voting in the last provincial or federal election, across geographies and over time, while taking into consideration (or holding constant) a number of socio-demographic characteristics of the sample.” As another example, we can predict average wages for individuals within a given geography and immigration status (i.e., Canadian born or immigrant) and/or their likelihood of living with low-income while controlling/taking into consideration their socio-demographic characteristics.

Furthermore, multivariate regression, as well as its statistical descriptive analyses, allow for estimation and reduction of error/inaccuracies through the various confidence interval estimation and hypothesis testing procedures.

## CIMI GEOGRAPHIES

The CIMI examines 10 Canadian provinces and 33 Canadian cities across five time periods (1991-1995, 1996-2000, 2001-2005, 2006-2011, 2011-) that are sampled consistently by Statistics Canada in numerous surveys. If a territory or city is not represented, it is because it either had a low immigrant sample population or did not meet the minimum population criteria to be considered a Census Metropolitan Area (CMA) or Census Agglomeration (CA) by Statistics Canada. Please see list below.

| PROVINCES            | CITIES (CMAS)   |
|----------------------|---|
| Newfoundland         | St. John's  |
| Prince Edward Island | —   |
| Nova Scotia          | Halifax   |
| New Brunswick        | Moncton, Saint John   |
| Québec               | Montréal, Québec, Saguenay, Sherbrooke, Trois-Rivières  |
| Ontario              | Barrie, Brantford, Guelph, Hamilton, Kingston, Kitchener, London, Oshawa, Ottawa-Gatineau, Peterborough, St. Catharines-Niagara, Sudbury, Thunder Bay, Toronto, Windsor |
| Manitoba             | Winnipeg  |
| Saskatchewan         | Regina, Saskatoon   |
| Alberta              | Edmonton, Calgary   |
| British Columbia     | Abbotsford, Kelowna, Vancouver, Victoria  |

## CIMI DATA SOURCES

Our analyses of the economic, health, social and civic and democratic participation dimensions of immigrant integration (for both ranks and scores as well as descriptive statistics) are based on various data sets that include the Canadian Census, the Canadian Community Health Survey (CCHS), and numerous cycles of the General Social Survey (GSS) and Ethnic Diversity Survey (EDS).

Each dimension relies on the following data sets:

- **Economic:** Census cycles 1991, 1996, 2001, 2006 and 2011 National Household Survey (NHS); Public use Micro Data File (PUMF) data; and additional Statistics Canada customized tabulations.<sup>1</sup>
- **Social:** General Social Survey (GSS) cycles 2003, 2008 and 2013; the Ethnic Diversity Survey (2002-03); PUMF data; and relevant Master data files.<sup>2</sup>
- **Health:** Canadian Community Health Survey (CCHS) cycles 2000-01, 2005, 2011-12 and 2014; PUMF data; and relevant Master data files.<sup>3</sup>
- **Civic and Democratic Participation:** General Social Survey (GSS) cycles 2003, 2008 and 2013; Ethnic Diversity Survey (2002-03); PUMF data; and relevant Master data files.<sup>4</sup>

## INDEPENDENT VARIABLE(S)

Immigration status and year of immigration are the main independent variables and principal predictors for CIMI multi-variate and descriptive analyses. An immigrant \* year of immigration interaction term has been computed to serve this purpose and allow for comparisons among immigrant integration outcomes.

## CIMI INDICATORS

The following are the CIMI economic, social, civic and democratic participation and health indicators. These indicators were selected based on conceptual and methodological considerations with continuous input from our Expert Advisory Committee (EAC).

## Economic Indicators

- *Wages*: Refers to earned gross wages and salaries before deductions of full-time workers (scalar variable, available for the five censal data cycles).
- *Low-Income Measures*: Refers to the proportion of individuals who have lived under Statistics Canada's low-income cut-offs, such as LICO (dichotomous variable, available for the five censal data cycles), LIM and LIM-MI measures (dichotomous variables, available for NHS only), as well as Human Resources and Skills Development Canada's MBM measures (dichotomous variable, available for NHS only).
- *Labour Force Participation*: Refers to the percentage of individuals who are active in the labour force, either employed or unemployed but looking for work (dichotomous variable, available for the five censal data cycles).
- *Employment Status*: Refers to the percentage of individuals who are employed and active in the labour force (dichotomous variable, available for the five censal data cycles).
- *Unemployment Status*: Refers to the percentage of individuals who are unemployed and inactive in the labour force (dichotomous variable, available for the five censal data cycles).
- *Full-time Employment Status*: Refers to the percentage of individuals using a non-official language most often at work (dichotomous variable, available for the five censal data cycles).
- *Non-official Language at Work*: Refers to the percentage of individuals who are using non-official languages most often at work (dichotomous variable, available for NHS 2001 and 2006 only).
- *Subsidized Housing*: Refers to individual renters who live in subsidized housing (i.e., rent geared to income, social housing, public housing, government-assisted housing, or non-profit housing) (dichotomous variable, available for NHS only).

## Social Indicators

- *Number of Close Friends*: Refers to an individual's average number of close friends (scalar variable, available for all three GSS cycles).
- *Number of Close Friends Living in the Same Community/City*: Refers to the average number of close friends individuals have in the same city or local community (scalar variable, available for the 2008 and 2013 GSS data cycles only).
- *Sense of Belonging to Local Community*: Refers to the extent to which individuals report a strong or very strong sense of belonging to their local community (Likert-scale variable, available for all three GSS cycles).
- *Sense of Belonging to Province*: Refers to the extent to which individuals report a strong or very strong sense of belonging to their province of residence. (Likert-scale variable, available for all three GSS cycles and EDS).
- *Sense of Belonging to Canada*: Refers to the extent to which individuals report a strong or very strong sense of belonging to Canada (Likert-scale variable, available for all three GSS cycles and EDS).
- *Victim of Discrimination in the Past 5 Years*: Refers to the extent to which an individual has said they experienced discrimination over the past 5 years (dichotomous variable, available for GSS 2013 only and EDS).

## Civic & Democratic Participation Indicators

- *Unpaid Volunteer Work in the Past 12 Months*: Refers to the percentage of individuals who have done unpaid volunteer work in the past 12 months (dichotomous variable, available for all three GSS cycles and EDS).
- *Involvement in Organizations in the Past 1-5 Years*: Refers to the percentage of individuals who reported membership, participation or involvement in groups or organizations in the past 1-5 years (Likert-scale variable, available for all three GSS cycles and a dichotomous variable available for EDS).
- *Voted in the Last Provincial Election*: Refers to the proportion of individuals who voted in the last provincial election (dichotomous variable, available for all three GSS cycles and EDS).
- *Voted in the Last Federal Election*: Refers to the proportion of individuals who voted in the last federal election (dichotomous variable, available for the three GSS cycles and EDS).

## Health Indicators

- *Have a Medical Doctor*: Refers to the proportion of individuals who have a regular medical doctor (dichotomous variable, available for all four CCHS data cycles).
- *Self-perceived Unmet Health Care Needs*: Refers to the proportion of individuals who perceive that their health care needs are not being met (dichotomous variable, available for CCHS 2014 data cycle only).
- *Cost as a Barrier to Health Care Access*: Refers to the proportion of individuals who have reported that cost is a barrier to accessing health care (dichotomous variable, available for CCHS 2014 data cycle only).
- *Self-perceived Life Stress*: Refers to the proportion of individuals who report being quite a bit or extremely stressed (Likert-scale, available for all four CCHS data cycles).
- *Satisfaction with Life*: Refers to the proportion of individuals who say they are very satisfied with their lives (dichotomous variable, available CCHS 2005, 2011-12 and 2014 data cycles only).

## CIMI CONTROLS

The use of a consistent set of socio-economic and demographic control variables relevant to Canadian immigrant integration allows for proportional comparisons to be made for the integration outcomes of Canadian immigrants relative to non-immigrants across all geographies (10 provinces and 33 CMAs/cities) and various time periods (1991-1995, 1996-2000 ... 2011-). These controls include gender, visible minority status, knowledge of official languages, education level, occupation, geographic mobility, etc. Other dimension-specific/thematic controls were deployed as needed. Please see **Appendix A** for a list and definitions of each control variable used in the analysis.

The following lists represent the control variables used in the analysis for each CIMI domain (economic, social, civic and democratic participation and health). The consistent use of these control variables across all CIMI models ensures an “apples to apples” comparison of immigrant outcomes across geographies. Selection of these controls was based on conceptual and methodological considerations with input from our Expert Advisory Committee (EAC).

### **Economic Control Variables**

- Immigrant status/year of immigration interaction term
- Gender (dichotomous variable, available for all censal data cycles)
- Age (scalar variable, available for all censal data cycles)
- Visible minority status (dichotomous variable, available for all censal data cycles)
- Knowledge of official languages (polytomous variable, available for all censal data cycles)
- Education (polytomous variable, available for all censal data cycles)
- Occupation (polytomous variable, available for all censal data cycles)
- Mobility (1 year and 5 year) (polytomous variables, available for all censal data cycles)
- Provinces (available for all censal data cycles)
- Census Metropolitan Areas (available for all censal data cycles; content varies over years)

### **Social Control Variables**

- Immigrant status/year of immigration interaction term
- Gender (dichotomous variable, available for all three GSS cycles and EDS)
- Age (scalar variable, available for all three GSS cycles and EDS)
- Visible minority status (dichotomous variable, available for GSS 2008 and 2013 only and EDS)
- Official languages (polytomous variable, available for all three GSS and EDS)
- Education (polytomous variable, available for all three GSS and EDS)
- Occupation (polytomous variable, available for GSS 2003 and 2008 only and EDS)
- Income (scalar variable, available for all three GSS cycles and EDS)
- Provinces (available for all three GSS cycles and EDS, with the availability of provinces varying between GSS 2003 or EDS 2003)
- Census Metropolitan Areas (available for all three GSS cycles and EDS, with the availability of cities varying between GSS 2003 or EDS 2003)

### **Civic & Democratic Participation Control Variables**

- Immigrant status/year of immigration interaction term
- Gender (dichotomous variable, available for all three GSS cycles and EDS)
- Age (scalar variable, available for all three GSS cycles and EDS)
- Visible minority status (dichotomous variable, available for GSS 2008 and 2013 only and EDS)
- Official languages (polytomous variable, available for all three GSS and EDS)
- Education (polytomous variable, available for all three GSS and EDS)
- Occupation (polytomous variable, available for GSS 2003 and 2008 only and EDS)
- Income (scalar variable, available for all three GSS cycles and EDS)



- Provinces (available for all three GSS cycles and EDS, with the availability of provinces varying between GSS 2003 or EDS 2003)
- Census Metropolitan Areas (available for all three GSS cycles and EDS, with the availability of cities varying between GSS 2003 or EDS 2003)

### **Health Control Variables**

- Immigrant status/year of immigration interaction term
- Gender (dichotomous variable, available for all four CCHS cycles)
- Age (scalar variable, available for all four CCHS cycles)
- Visible minority status (dichotomous variable, available for all four CCHS cycles)
- Official languages (polytomous variable, available for all four CCHS cycles)
- Education (polytomous variable, available for all four CCHS cycles)
- Occupation (polytomous variable, available for CCHS 2000-01, 2011-12 and 2014 cycles only)
- Income (scalar variable, available for all four CCHS cycles)
- Full-time work status (dichotomous variable, available for all four CCHS cycles)
- Self-perceived (physical) health (Likert-scale variable, available for all four CCHS data cycles)
- Self-perceived mental health (Likert-scale variable, available for 2005, 2011-12 and 2014 CCHS data cycles only)

### **Provinces (available for the four CCHS cycles)**

- Census Metropolitan Areas (available for all four CCHS cycles with variations in geographies boundaries depending on year)

## CIMI SAMPLE

The CIMI sample is comprised of the adult population of immigrants compared to non-immigrants living within Canada. Non-permanent residents and northern Canadian sub-populations were excluded from analysis due to sampling reasons.

Each CIMI indicator is analyzed using a uniquely pre-defined sub-population/sample that is filtered by various socio-demographic control variables or specific categories within these controls/indicators (please see below for a detailed list of the variable filters used).

### Economic Filters

| INDICATOR                                 | FILTER   |
|---|--|
| Wages                                     | Age: 18 to 65; population of interest is limited to currently employed, full-time, wage earners earning between \$18,000.00 and \$200,000.00 |
| Low Income Cut-Off (Lico)                 | No Filters   |
| Low Income Measure (Lim)                  | No Filters   |
| Low Income Measure Market Income (Lim-Mi) | No Filters   |
| Market Basket Measure (Mbm)               | No Filters   |
| Labour Force Participation                | Age: 18 to 65  |
| Employment Status                         | Age: 18 to 65  |
| Unemployment Status                       | Age: 18 to 65  |
| Full-Time Employment Status               | Age: 18 to 65  |
| Non-Official Language At Work             | Age: 18 to 65  |
| Subsidized Housing                        | No Filters   |

### Social Filters

| INDICATOR   | FILTER  |
|---|---|
| Number of Close Friends                                   | Age: 18 to 65, Income between \$1 and \$200,000.00 and Number of close friends between 1 and 30.                  |
| Number of Close Friends Living in the Same City/Community | Age: 18 to 65, Income between \$1 and \$200,000.00 and Number of close friends in the same city between 1 and 30. |
| Sense of Belonging to Local Community                     | Age: 18 to 65, Income between \$1 and \$200,000.00.   |
| Sense of Belonging to Province                            | Age: 18 to 65, Income between \$1 and \$200,000.00  |
| Sense of Belonging to Canada                              | Age: 18 to 65, Income between \$1 and \$200,000.00.   |
| Victim of Discrimination in the Past 5 Years              | Age: 18 to 65, Income between \$1 and \$200,000.00.   |

**Civic & Democratic Participation Filters**

| INDICATOR  | FILTER  |
|--|---|
| Unpaid Volunteer Work in the Past 12 Months        | Age: 18 to 65, Income between \$1 and \$200,000.00. |
| Involvement in Organizations in the Past 1-5 Years | Age: 18 to 65, Income between \$1 and \$200,000.00. |
| Voted in Last Provincial Election                  | Age: 18 to 65, Income between \$1 and \$200,000.00. |
| Voted in Last Federal Election                     | Age: 18 to 65, Income between \$1 and \$200,000.00. |

**Health Filters**

| INDICATOR                              | FILTER   |
|--|--|
| Have a Medical Doctor                  | Age: 18 to 65, Income between \$1 and \$200,000.00 |
| Self-Perceived Life Stress             | Age: 18 to 65, Income between \$1 and \$200,000.00 |
| Cost asa Barrier to Health Care Access | Age: 18 to 65, Income between \$1 and \$200,000.00 |
| Self-Perceived Unmet Health Care Needs | Age: 18 to 65, Income between \$1 and \$200,000.00 |
| Satisfaction with Life                 | Age: 18 to 65, Income between \$1 and \$200,000.00 |

**DATA QUALITY TESTS**

In consultation with the EAC, several multivariate regression sensitivity tests have been conducted in order to ensure data accuracy and quality. One battery of tests indicated comparable multivariate immigrant outcomes for the various corresponding sub-periods of immigration (immigrant X year of immigration main independent variable interaction term) when isolated (dummied) versus when are not. Other tests were conducted to evaluate immigrant integration outcomes using current “global/across-all-geographies” immigration interaction term versus corresponding “per-geography” immigration interaction term.

**DATA TRANSFORMATIONS AND WEIGHTING**

Various transformations and recoding of the data for indicators and control variables have been conducted. Diagnostic tests and procedures (including normality, linearity, heteroscedasticity, multicollinearity and curve estimation procedures) as well as multiple tests of correlational and statistical significance have been deployed in order to ensure that the data and models have produced results of trusted quality. Population and bootstraps weights provided by Statistics Canada and calculated normalized weights were applied as needed.

## STATISTICAL ANALYSIS

CIMI scores and ranks are based on the calculated corresponding model's standardized coefficients beta weights (OLS models) and odd ratios (MLE models) statistics for each indicator (See **Appendix B** for examples). These CIMI standardized scores and rankings have been constructed for each geography (10 provinces and 33 cities) per time period. Each geography has been ranked on its relative integration performance to other similar geographies. The rankings have then been averaged across the years to reflect composite geographic outcomes or rather the "CIMI overall ranking." This is provided for each of the four dimensions, based on assigned weights.

It is important to note that CIMI rankings should be interpreted with caution when establishing their overall significance. Differences in rankings are not equal and can be minimal in some cases. The statistical significance of the results have been denoted (at  $p < 0.05$  or  $p < 0.1$ ) in the exportable spreadsheets along with special cautionary notes (use with caution if corresponding coefficient of variation (CV) of the statistic is between 16.6 and 33.3, or not reliable to release if CV is  $> 33.3$ ).

Additional descriptive data analyses have been conducted detailing means and proportion for bivariate of within-immigrant status by categories of indicators and controls, along with relevant statistical significance and importance (see **Appendix C** for examples). The descriptive data aims to:

- 1) complement the multivariate inferential techniques;
- 2) provide the ability to examine both snapshots and patterns/trends of economic immigrant integration outcomes over time;
- 3) and assist in further situating and interpreting various economic immigrant ranking outcomes (see descriptive analyses examples below).

## APPENDIX A: CONTROL VARIABLE DEFINITIONS

| INDICATOR                        | FILTER  |
|----------------------------------|---|
| Gender                           | Refers to whether the person is male or female.   |
| Age                              | Refers to the age (in years) at last birthday before the reference date.  |
| Visible Minority Status          | Includes persons who are non-Caucasian in race or non-white in colour and who do not report being Aboriginal.   |
| Knowledge of Official Languages  | Refers to the ability to conduct a conversation in English only, in French only, in both English and French, or in neither English or French.                     |
| Education                        | Information indicating the person's most advanced certificate, diploma or degree.   |
| Occupation                       | Refers to the kind of work performed by employed persons based on the National Occupational Classification System.  |
| Income                           | Refers to best estimated total personal income from all sources, before taxes and deductions, from all sources in the past 12 months.                             |
| Full-time Employment Status      | Refers to the percentage of individuals who are working full-time.  |
| Mobility (1-year & 5-year)       | Refers to the person's usual province or city of residence one year or five years prior to the reference day.   |
| Self-perceived Health (physical) | Refers to the perception of a person's health in general. Health means not only the absence of disease or injury but also physical, mental and social well-being. |
| Self-perceived Health (mental)   |   |
| Provinces                        | Province of Canada where the person lived on the reference day.   |
| Cities/CMAs                      | City or Census Metropolitan Area where the person lived on the reference day.   |

## APPENDIX B: EXAMPLES OF ANALYSIS FOR THE ECONOMIC DIMENSION

All CIMI indicator models (across all dimensions), constructed allow for the simulation of immigrants integration outcomes compared to non-immigrates when taking into considerations (controlling for) their socio-economic/demographic characteristics as well as their geography (provinces and CMAs), over time.

The following examples illustrate the multivariate Ordinary Least Squares (OLS) Regression method as well as the Maximum Likelihood Estimation (MLE) Regression method that have been deployed in order to estimate/model the economic indicator variables. The exact same methodology/interpretations hold true for the remaining unillustrated dimensions.

### Ordinary Least Squares (OLS) Regression Example:

To Illustrate, the following is an OLS multivariate regression model estimating earned wages, using NHS PUMF 2011, constructed in the following mathematical denotation:

$$DV^* = a + b[IV_{1---j}] + [CV_{1---j}]$$

Wages<sup>†</sup> = - 28060.936 - 1561.63 (pyrim<sup>‡</sup>) + 12245.235 (Male) + 3125.962 (Age) - 30.704 (Age<sup>2</sup>) - 4243.997 (Minority) - 3300.193(French) + 1683.725 (Bilingual) -3911.097 (Neither) + 3912.243 (Secondary) + 9784.452 (Nonuniv) + 21239.637 (Bachler) + 27697.397 (Advanced) + 14152.188 (Management) -2276.381 (Business) + 7625.487 (Natural) + 4805.404 (Health) + 1839.922 (Educlaw) - 6246.221 (Artcultural) - 9233.673 (Services) - 2198.754 (Construction) - 2582.793 (Manufact) - 1833.651 (NonMigrants1) - 940.410(ProvMig1) - 2358.005 (InterProvMig1) - 962.024 (ExternMig1) - 995.598 (NonMigrants5) - 131.746 (ProvMig5) - 556.602 (InterProvMig5) - 4940.562 (ExternMig5) + 1184.617 (BC)

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\* DV Is the Dependent Variable, IV, CV are the Independent Variable and Control variables, respectively.

† Per/Controlling for rest of Canadian geographic locations (i.e., Provinces, CMAs), with the following model comparison groups: non-immigrants; female; not a visible minority; English speakers; no formal education; supervisors and technicians in fields such as natural resources and agriculture; non-movers; Ontario; and Ottawa-Gatineau. Models are also filtered by class, duration of work, extreme wage values and 18- 65 years of age.

‡ Pyrim is an interaction term (combining immigrant status and year/period of immigration variables) that can take any of the following numerical values: 1 = 'Before 1965'; 2 = '1965 to 1979'; 3 = '1980 to 1984'; 4 = '1985 to 1992'; 5 = '1993 to 2000'; 6 = '2001 to 2007'; 7 = '2008 to 2010'.

Based on the above model, an established immigrant (arrived before 1965) living in British Columbia (BC) would still earn \$1,562 less, on average, than his/her non-immigrant counterpart with the same characteristics (i.e. when controlling for gender, age, visible minority status, language spoken, education, occupation, geographic mobility and geography of residence (Provinces and CMAs)). A recent immigrant (arrived between the year 2008-2010) would earn 7 times less, on average.

Moreover, immigrants living in BC would earn them an average of \$1185 more compared to living in Ontario (chosen comparative group), when controlling for all above-mentioned socio-demographic factors/characteristics on the right side of the multivariate regression formula above (i.e. independent and control variables). Results are statistically significant at  $p < .001$ . This corresponds to an equivalent calculated standardized Beta coefficient weight of 0.013 [a Beta weight, or the standardized partial slope ( $b^*$ ), is calculated using this formula:  $b^*1 = b1(S1/Sy)$ , rendering BC a comparative 3<sup>rd</sup> rank after Alberta and Saskatchewan for this particular economic indicator. Similar comprehensive scores/ranking analysis for BC and for all other provinces/CMAs geographies, for this indicator and for all censal years in question, have been conducted and compiled.

This model demonstrates data findings of trusted quality based on its “Best Linear Unbiased estimates”, or BLUE results for the model with conformity to normality, linearity and homoscedasticity). The model is also showing a non-multicollinearity conformity based on tolerance and VIF statistics analysis and has an overall healthy indicator explanatory/predictive power R<sup>2</sup> value of about 28%.

### Maximum Likelihood Estimation (MLE) Regression Example:

To further illustrate, the following is an MLE probability logistic multivariate regression model estimating the dependent dichotomous variable Non-Official Language (NOL) used most often at work – based on NHS PUMF 2011 – constructed in the following mathematical denotation:

Probability of use of NOL at work=

$$e^{a + b_1 x_1 + b_2 x_2 + \dots + b_n x_n} / 1 + e^{a + b_1 x_1 + b_2 x_2 + \dots + b_n x_n}$$

Where b<sub>1</sub>, b<sub>2</sub>, b<sub>n</sub>...bn are the logistic (probability) model's coefficients that correspond to independent variables (predictors/controls) X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>...X<sub>n</sub>.

Similar to the OLS regression illustration, this logistic probability model predicts immigrants living in New Brunswick (NB) decrease their likelihood of speaking an NOL at work most often by 63% compared to living in Ontario (again chosen reference group), when controlling for same above-mentioned socio-economic controls/ predictors. Therefore, NB has a no. 1 ranking for this particular economic indicator. Results are statically significant at p < .001.

Similarly, this model demonstrates data findings of trusted quality based on its linear conformity, as per the statistically significant results of the Hosmer and Lemeshow test. The model is also showing a non-multicollinearity conformity based on tolerance and VIF statistics and has an overall healthy indicator explanatory/predictive power Nagelkerke R<sup>2</sup> value of about 35%.

## APPENDIX C: DESCRIPTIVE ANALYSIS EXAMPLES

The following is a summary descriptive analysis of key indicators by dimension for the 2011- time period. In general, the Canadian-born perform better on measures of integration than do immigrants, but there are exceptions to this rule. Please note results are based on the same corresponding CIMI filters outlined above, but without deployment of socio-demographic controls.

**Economic:** In 2011-, the non-immigrant population of Canada earned \$1,670 more (on average) than immigrants in Canada; immigrants also had lower rates of low income (-6.8%), higher rates of labour force participation (+3.6%) and employment (+4.0%). However, they were more likely to work full-time (+1.6%) than the Canadian-born population. Results are statistically significant at  $p < .05$ .

**Social:** The Canadian-born population had more close friends (in general) and friends living in the same city or community than immigrants; non-immigrants demonstrated a stronger sense of belonging to their local community (80.6% v. 79.4%), but immigrants showed a stronger sense of belonging to Canada (95.5% v. 91.4%). Results are statistically significant at  $p < .05$ .

**Civic & Democratic Participation:** Non-immigrants had higher rates of volunteerism than immigrants (36.0% v. 33.1%), but immigrants showed increased involvement in organizations over the past one to five years (23.6% v. 22.2%). The Canadian-born population was much more likely to vote in the last provincial and federal elections (75.8% and 76.9%) than the immigrant population (51.1% and 53.4%, respectively). Results are statistically significant at  $p < .05$ .

**Health:** 83% of the Canadian-born population had a medical doctor compared to 80.1% of immigrants. Cost was a barrier to healthcare access for 15.2% of immigrants, but only 10.7% of non-immigrants. 11.5% of immigrants reported having unmet healthcare needs compared to 13.4% of non-immigrants; and immigrants reported lower levels of life stress (23.7% v. 26.6%). Results are statistically significant at  $p < .05$ .



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