Projecting literacy skills using microsimulation models: tools to better inform social and immigration policies

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A new demographic regime

Main research question

How future education and immigration levels will impact the size and the skills of the future workforce?

- Immigration has reached historical level
- Immigration has become increasingly culturally diverse
- Older workers are replaced by more educated young cohorts

➢Numerous policy consequences

- Long-term sustainability of social security programs (healthcare, pension plans)
- Political outcomes, immigration and integration policies …

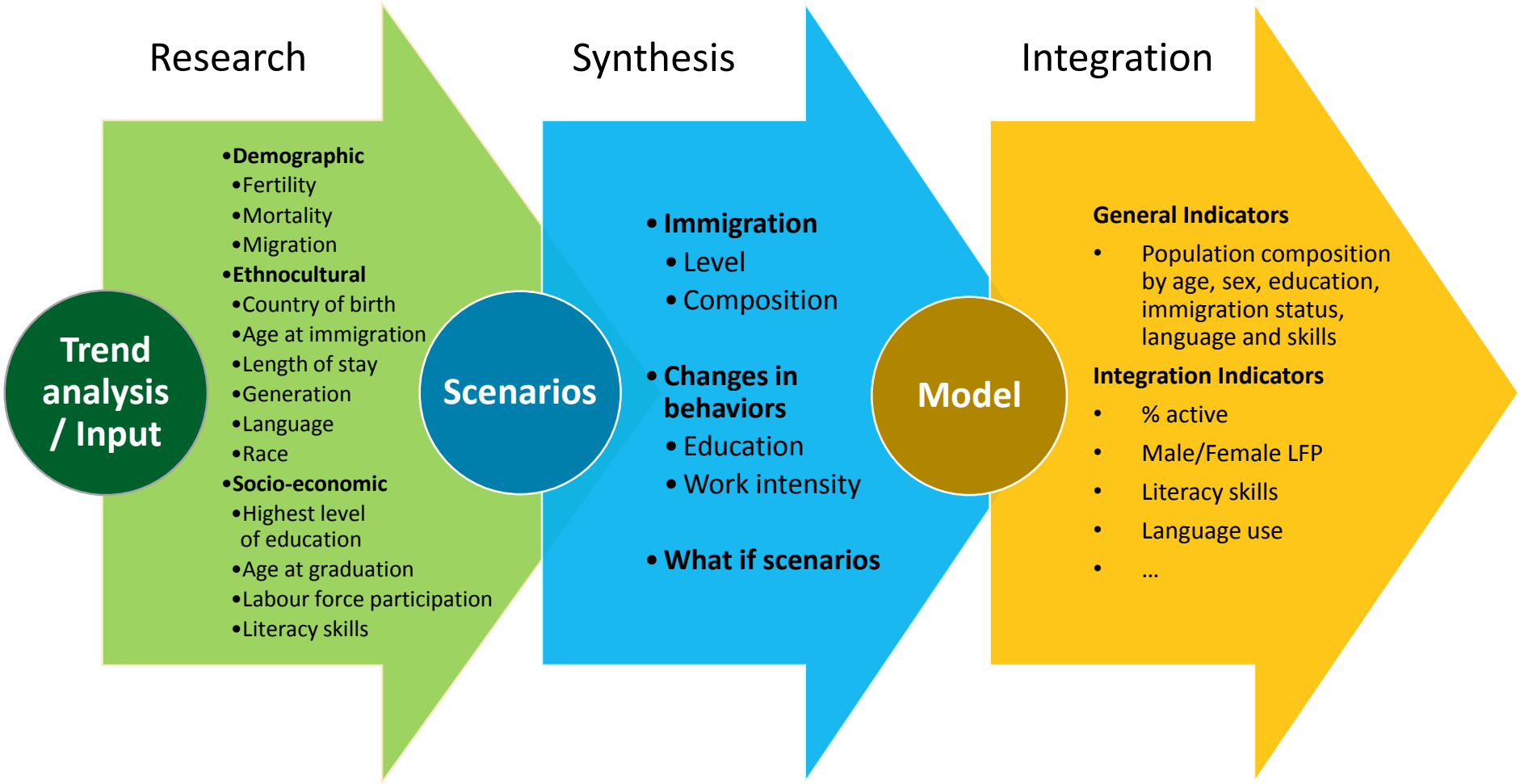
A new demographic regime

- New policy tools are needed
  - Social cohesion
  - Labour maket needs and changes
  - Poverty and inqualities
  - Education and language skill formation
- Microsimulation models
- Human capital and Knowledge-based economies
  - PIAAC - Survey on Adult Skills

Microsimulation

- What is it?
  - Departure from deterministic macro models
  - The individual, not the aggregate, is the unit being simulated
  - A population is therefore simulated one unit at a time
  - State transitions are determined stochastically
- Why the buzz?
  - A very significant technical improvement over multistate methodology
  - Extremely flexible in its implementation
  - Though, dependent on available data

Microsimulation



Source: Bélanger *et al.*, (2017) A Framework for the Prospective Analysis of Super-Diversity.

Focus

- Two developed countries: Austria and Canada
  - Different immigration contexts
  - Different education contexts
- Workforce: 25 to 64 years old
- Microsimulation models
  - *PÖB* (Austria)
  - *LSD-C* (Canada)
- Projections 2011 – 2061
- Open to migration

Descriptive statistics

Total population aged 25 to 64 years old, 2012

		Austria	Canada
Proportion of university graduates	Native-born	19 %	22 %
	Foreign-born	**24 %**	**35 %**
Proficiency in literacy skills (Mean score)	Native-born	275	276
	Foreign-born	**245**	**249**
Proportion economically active	Native-born	80 %	82 %
	Foreign-born	**74 %**	**78 %**
Population (N)	Native-born	3,749,100	14,205,500
	Foreign-born	914,900	4,658,600

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
REFERENCE	**Official immigration volume projected by National Statistical agencies**	**Austria: Characteristics of immigrants arrived in 2011-2016** **Canada: Characteristics of immigrants arrived between 2006-2010**	**Recent trends reflecting the observed rise of educational attainment of cohorts**	Recent trends

Immigration rate

Canada: 0.75% (Among the world's highest rate)

Austria: Refugee Crisis, back to 0.25% by 2026.

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
COMPARABLE	**Immigration rate set at 0.35%**	Characteristics of immigrants arrived between 2006-2010	Educational attainment set at observed rate in 2011	Recent trends
ZERO	**No immigration**	Characteristics of immigrants arrived between 2006-2010	Educational attainment set at observed rate in 2011	Recent trends

Immigration rate

0.35% is equal to the US level.

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
EDUCATION	Immigration rate set at 0.35%	Characteristics of immigrants arrived between 2006-2010	**Recent trends reflecting the observed rise of educational attainment of cohorts**	Recent trends

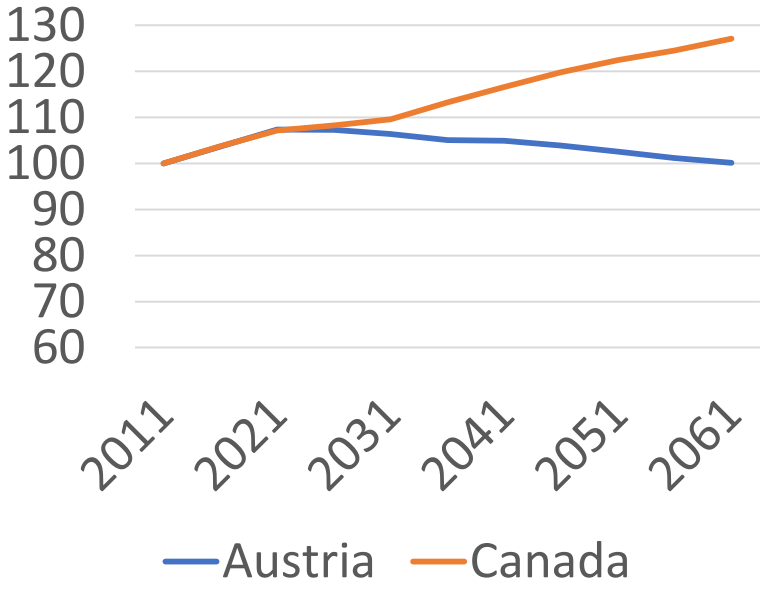
Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
CHARACT	Official immigration volume projected by National Statistical agencies	**<u>Austria</u>: Characteristics of immigrants arrived in 2015-2016** **<u>Canada</u>: Immigrants come in with more "literacy-oriented" characteristics in terms of age, education, language skills and country of highest diploma**	Educational attainment set at observed rate in 2011	Recent trends

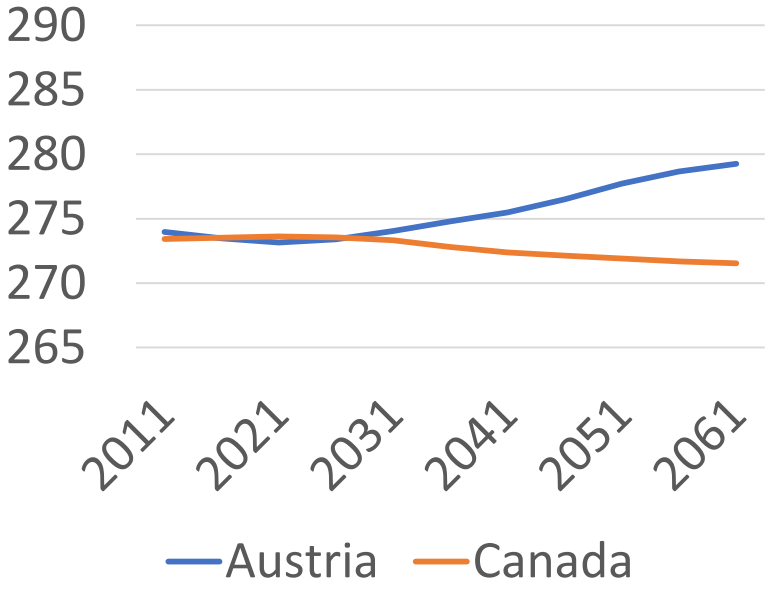
REFERENCE Scenario

Size of the workforce

(base 100 in 2011)



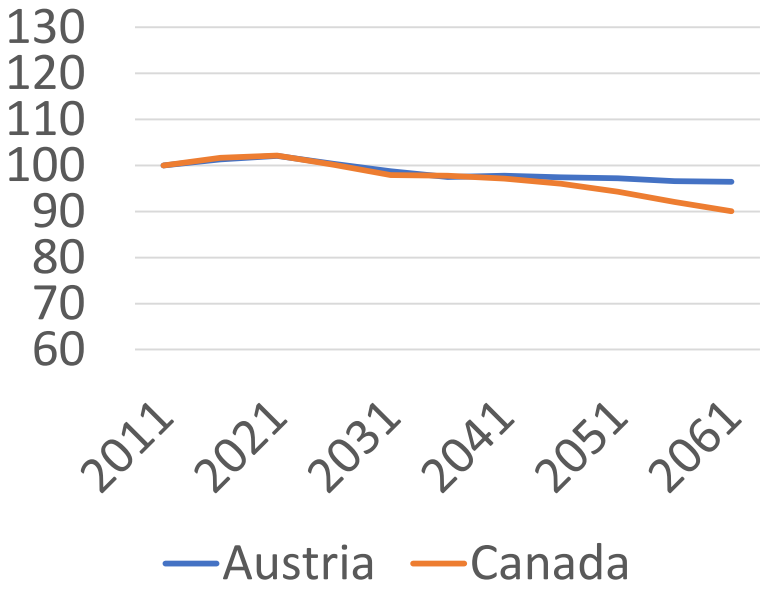
Average literacy score of the workforce



COMPARABLE Scenario

Size of the workforce

(base 100 in 2011)



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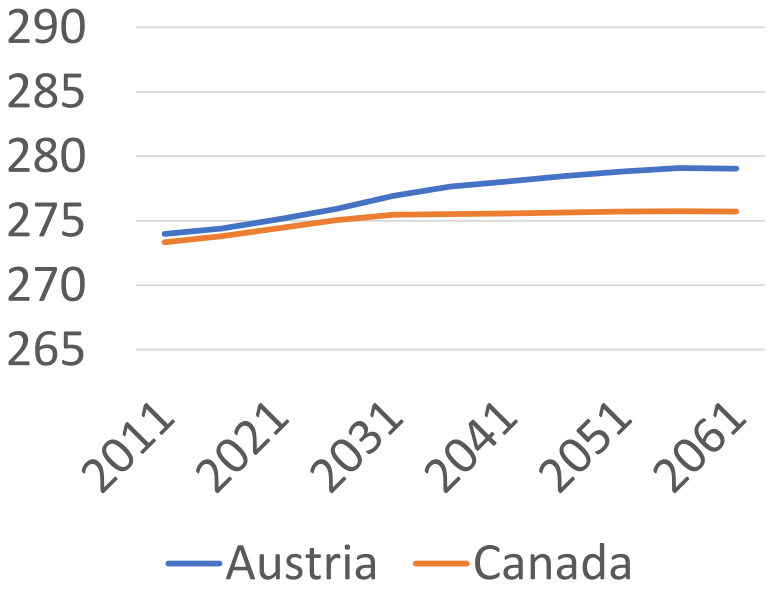
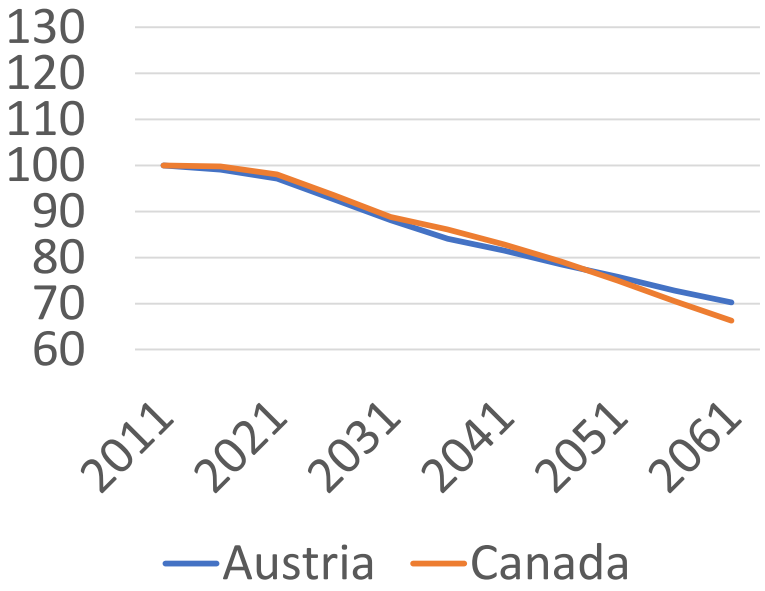


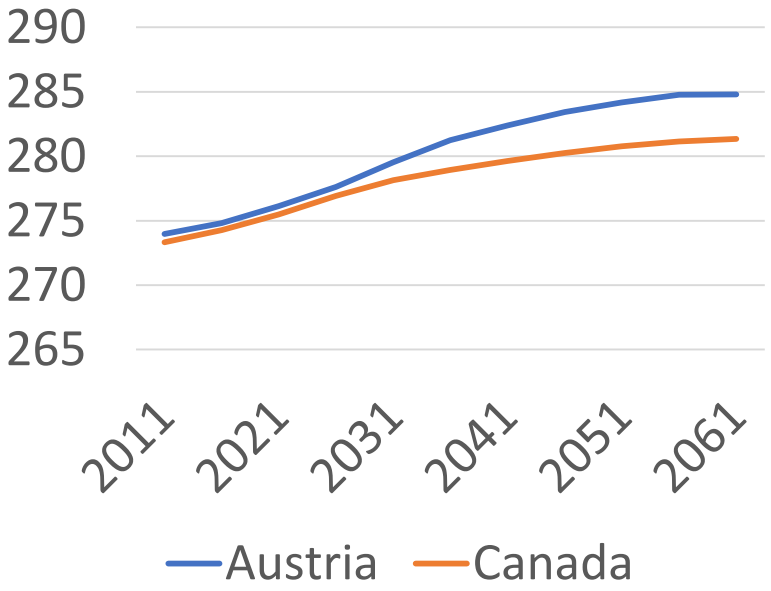
ZERO Scenario

Size of the workforce

(base 100 in 2011)



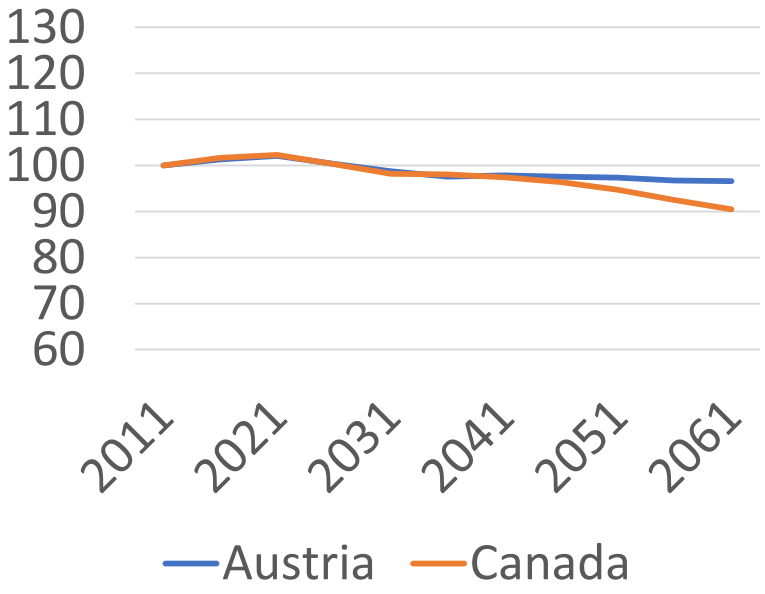
Average literacy score of the workforce



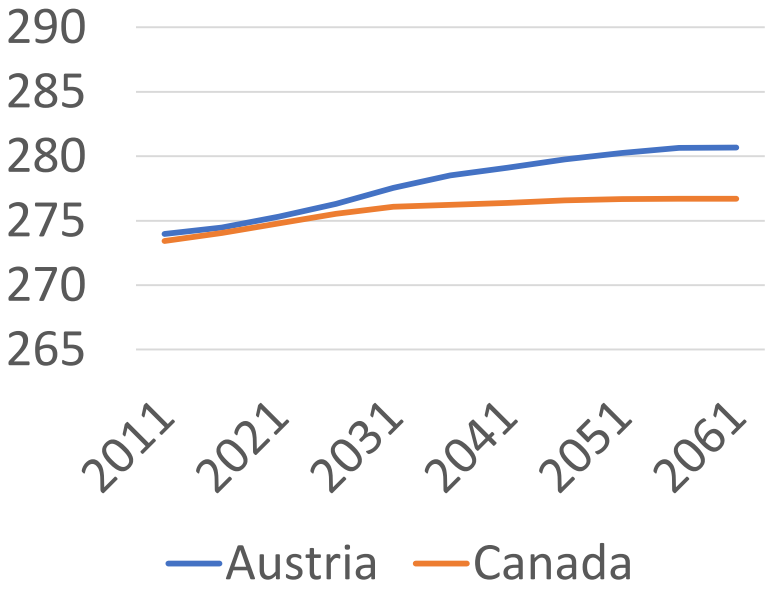
EDUCATION Scenario

Size of the workforce

(base 100 in 2011)



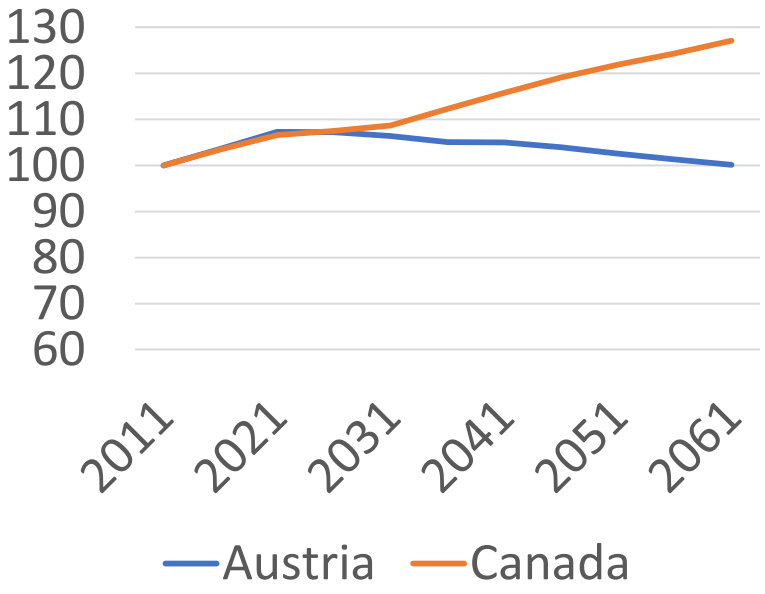
Average literacy score of the workforce



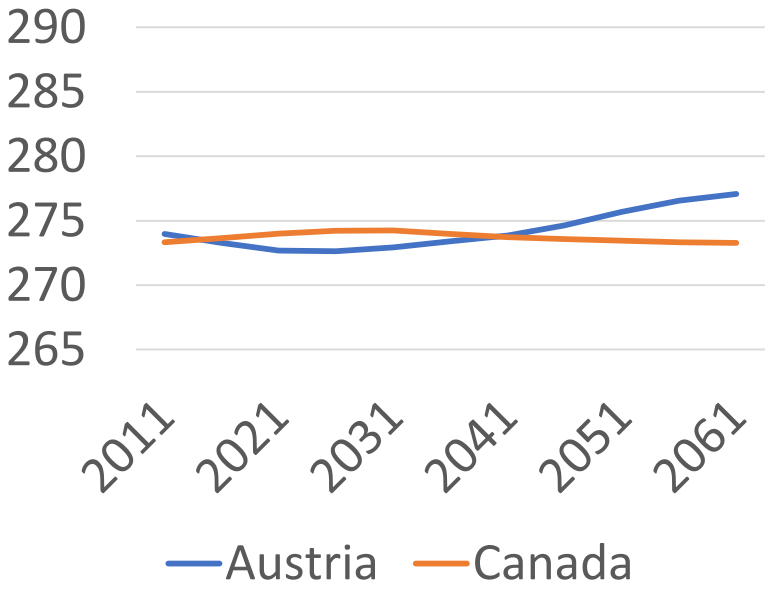
CHARACT Scenario

Size of the workforce

(base 100 in 2011)



Average literacy score of the workforce



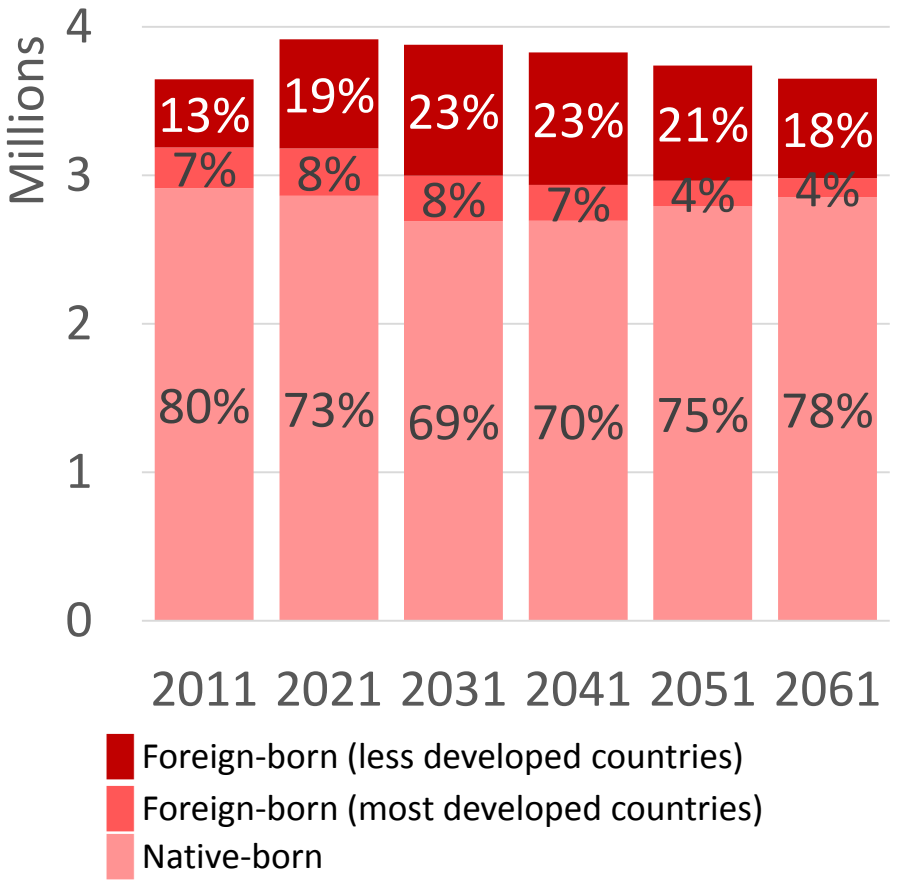
In a nutshell

- The demographic dynamic, the natural growth rate of the workforce is similar in both Austria and Canada
- Future positive growth of the workforce relies heavily on immigration intakes
- Immigration also impacts on average skills
- Education have no significant impact on the size of the future workforce
- Education impacts on average skills
- Divergent strategies in terms of future development of the workforce

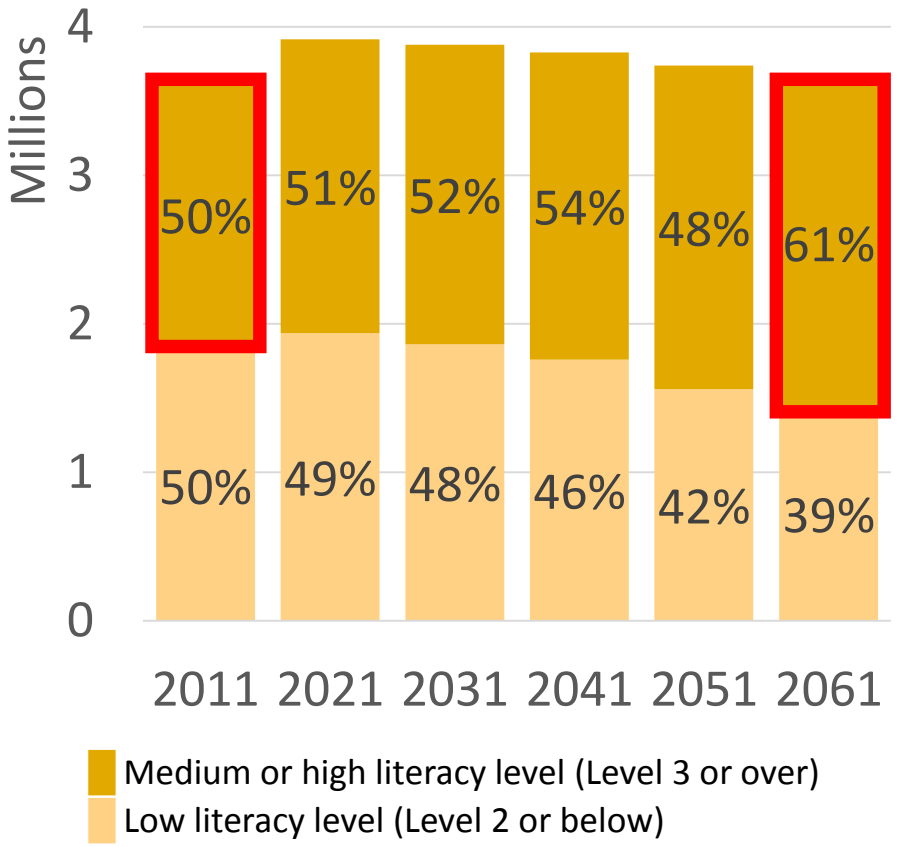
Implications - Austria

Workforce aged 25 to 64 years old, 2011-2061, REFERENCE Scenario

By immigration status and country of birth



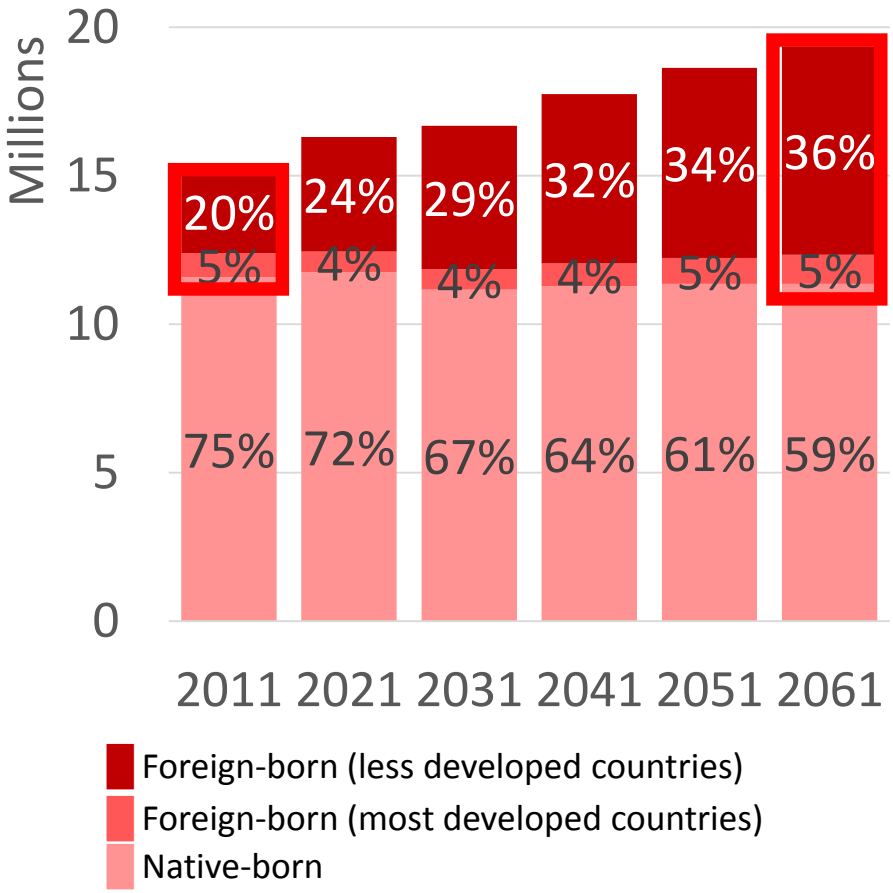
By literacy level



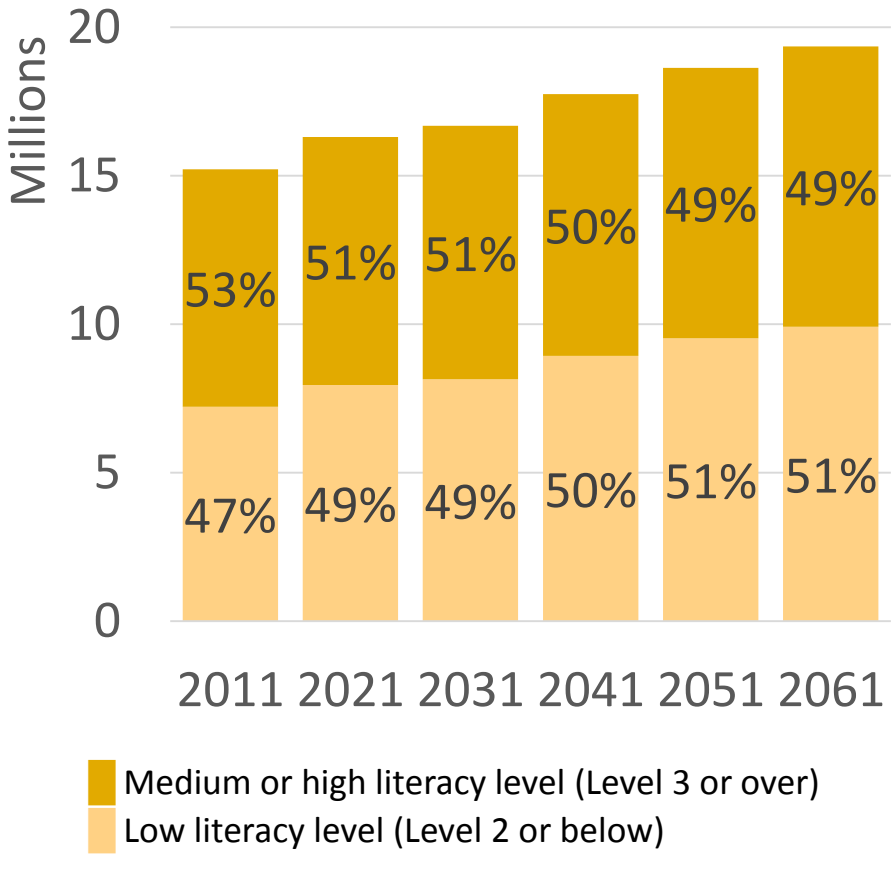
Implications - Canada

Workforce aged 25 to 64 years old, 2011-2061, REFERENCE Scenario

By immigration status and country of birth



By literacy level



Implications for policy

How to close the skill gap between foreign-born and native-born ?

1. Integration policies
   - Lifelong training
   - Language skills

2. Immigration policies
   - Selection based on skills

Thank you !

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Modelling Education

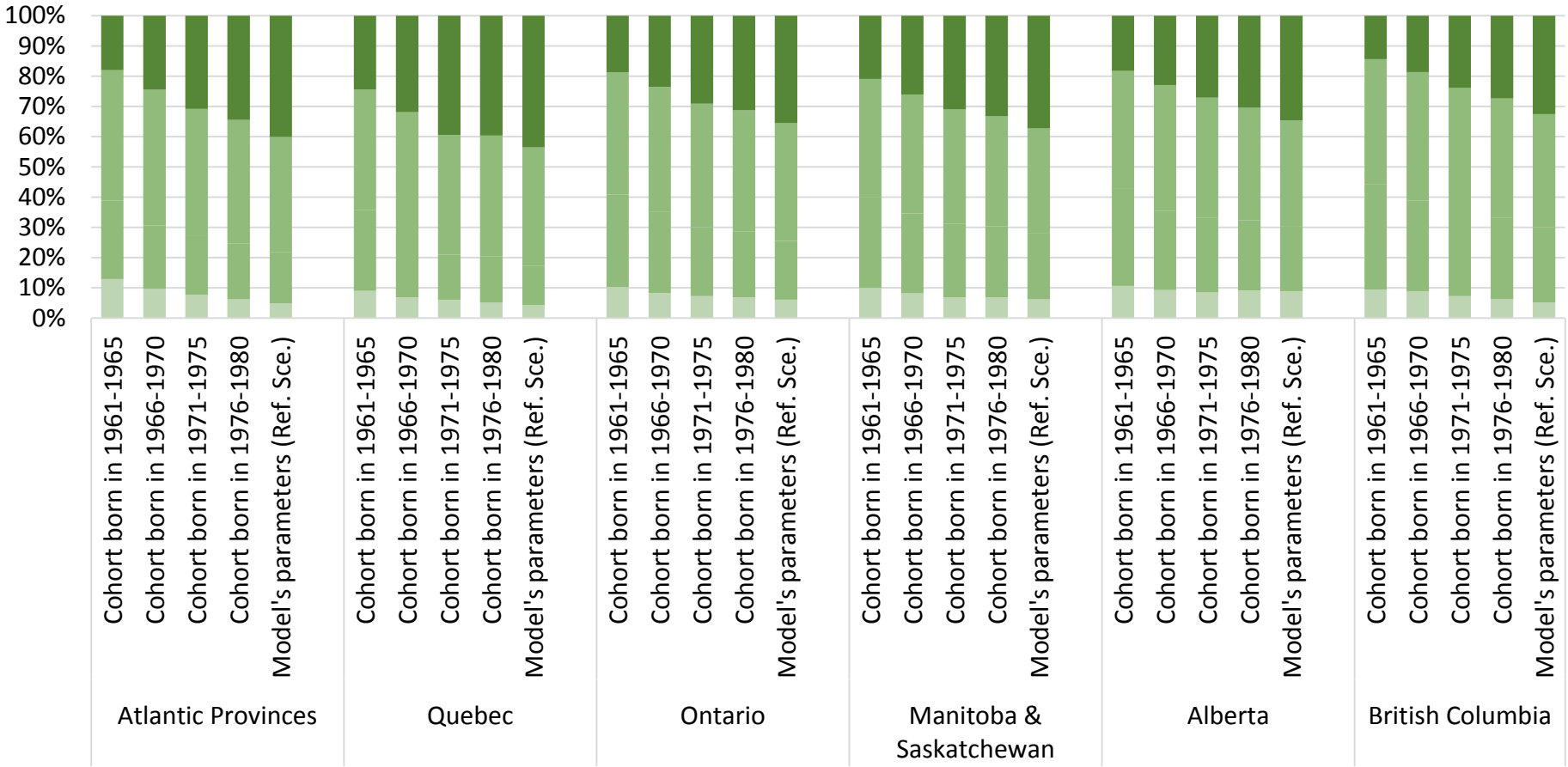
- Three education levels:
  - Low – Less than a high school diploma
  - Med. – High school diploma and other post-secondary
  - High – University diploma (Bachelor's degree or higher)

- Three-step modelling

Applied to individuals with incomplete education paths: newborns, immigrants arrived during childhood and individuals from base population under 30 years old

  - Setting up an education level
  - Schedule of education
  - Simulation of life course

Education module - Reference scenario parameter



Modelling Labour Force

- Binary variable: Active vs. Inactive
- Value derived from characteristics
- Parameters extrapolate observed trends:
  - Increasing female participation
  - Increasing 55+ participation
  - Native-born vs. Foreign-born participation gap

Modelling Literacy skills

- Literacy Score (Between 0 and 500)
- Value derived from characteristics

Native-born	Foreign-born
Sex	Sex
Age*	Age*
Region of residence	Region of residence
Education*	Education*
Language*	Language*
Labour force status*	Labour force status*
	Age at immigration
	Length of stay in host country
	Country of birth*
	Country of highest diploma*

Light grey variables: In the Canadian model only.

PIAAC data analysis

- Regression analyses – the results
  - **Education** is the main driver.
  - **Language** is important too
  - Literacy declines with **age**
  - **Mother's education** level is a significant predictor of one's literacy skill level
  - **Life-wide factors** are important and significant
  - **Some immigrants**' characteristics are significant, such as the country of highest diploma
  - No significant link between literacy and sex or region of residence (province, urban/rural)

PIAAC data analysis

- Complete regression models

Native-born	Foreign-born
Sex	Sex
Age	Age
Region of residence	Region of residence
Education	Education
Language	Language
Mother's level of education	Mother's level of education
Literacy skills' use	Literacy skills' use
Labour force status	Labour force status
	Age at immigration
	Length of stay in host country
	Immigration category
	Country of birth
	Country of highest diploma

- R^2

Complete models		Simplified models	
Native-born	Foreign-born	Native-born	Foreign-born
0.339	0.385	0.291	0.345