Automation and Occupations in Ireland
An Exploration of the Potential Impact of Automation on Occupations

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Dr. Eric Doyle
Lena Jacobs
Department of the Taoiseach

IGEES

Irish Government Economic & Evaluation Service

This paper has been prepared by Economic Policy Unit in the Department of An Taoiseach as an input into the Departments policy-making process.
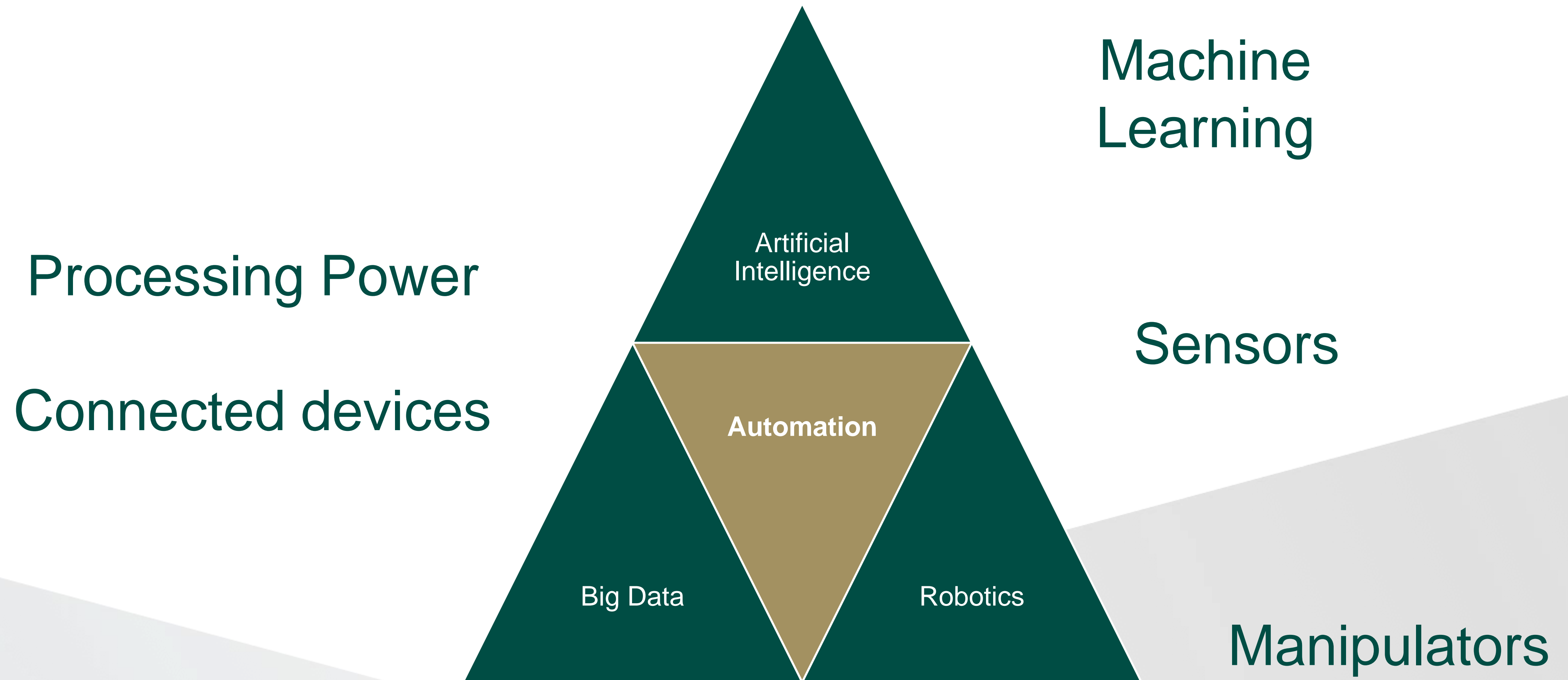
The views presented in this paper are those of the author(s) alone and do not represent the official views of the Taoiseach or the Department of An Taoiseach.

Overview

1. Literature
2. Method
3. Results for Ireland
4. Supplementary Analysis
5. Policy Response
6. Discussion

Developments in Automation

Machine Learning

Processing Power

Sensors

Connected devices

Artificial Intelligence

Automation

Big Data

Robotics

Manipulators

Recent Studies

- Frey & Osbourne (2013): 47% of employed in US in 2016 at high risk of automation (i.e. faced risk of automation of 70% or more).

- Arntz, Gregory & Zierhan (2016): An average of 9% of jobs at high risk of automation in OECD countries.

- Nedelkoska & Quintini (2018): An average of 14% of jobs at high risk of automation in OECD countries.

- PWC (2018): an average of 31% of jobs in the OECD are likely to be automated by 2037.

Method

- Risk probabilities based on how exposed the task profile of each occupation was to existing 'engineering bottlenecks'.

- Bottlenecks included:
    - Perception and manipulation
    - Creative intelligence
    - Social intelligence

Method

Frey & Osbourne (F&O) model mapped US SOC 2010 occupation data to O*NET task data

Nedelkoska & Quintini (N&Q) model ISCO occupation data for OECD countries to PIAAC task data

Mapped Probability Score to Census data

- High Risk: a probability score of 70% or over;

- Significant Risk: a probability score of 50% or over, but less than 70%; and

- Low Risk: probability scores of less than 50%.

Method – Comparing Advantages

Nedelkoska and Quintini

- Task-based estimation

- Specific to Ireland

Frey and Osbourne

- More detailed occupation estimation

- Better estimation of caring/assistance jobs
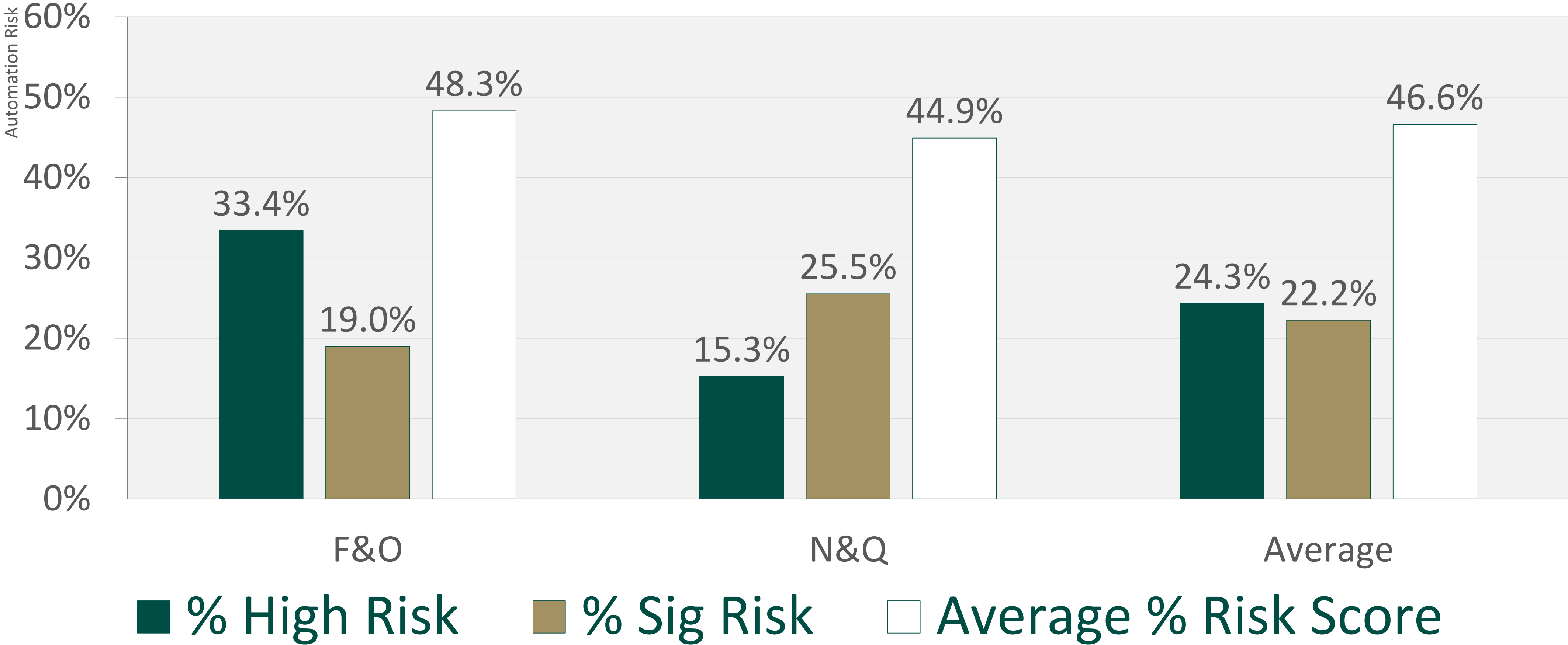
Method – Health Warnings

Overestimates negative impact (only estimates destructive power)

Based on expert opinion of technical capability – does not consider

- Substitution costs;
- Firm capacity to absorb technologies;
- Behavioural responses to automation

Results for Ireland

Results for Ireland: Occupations
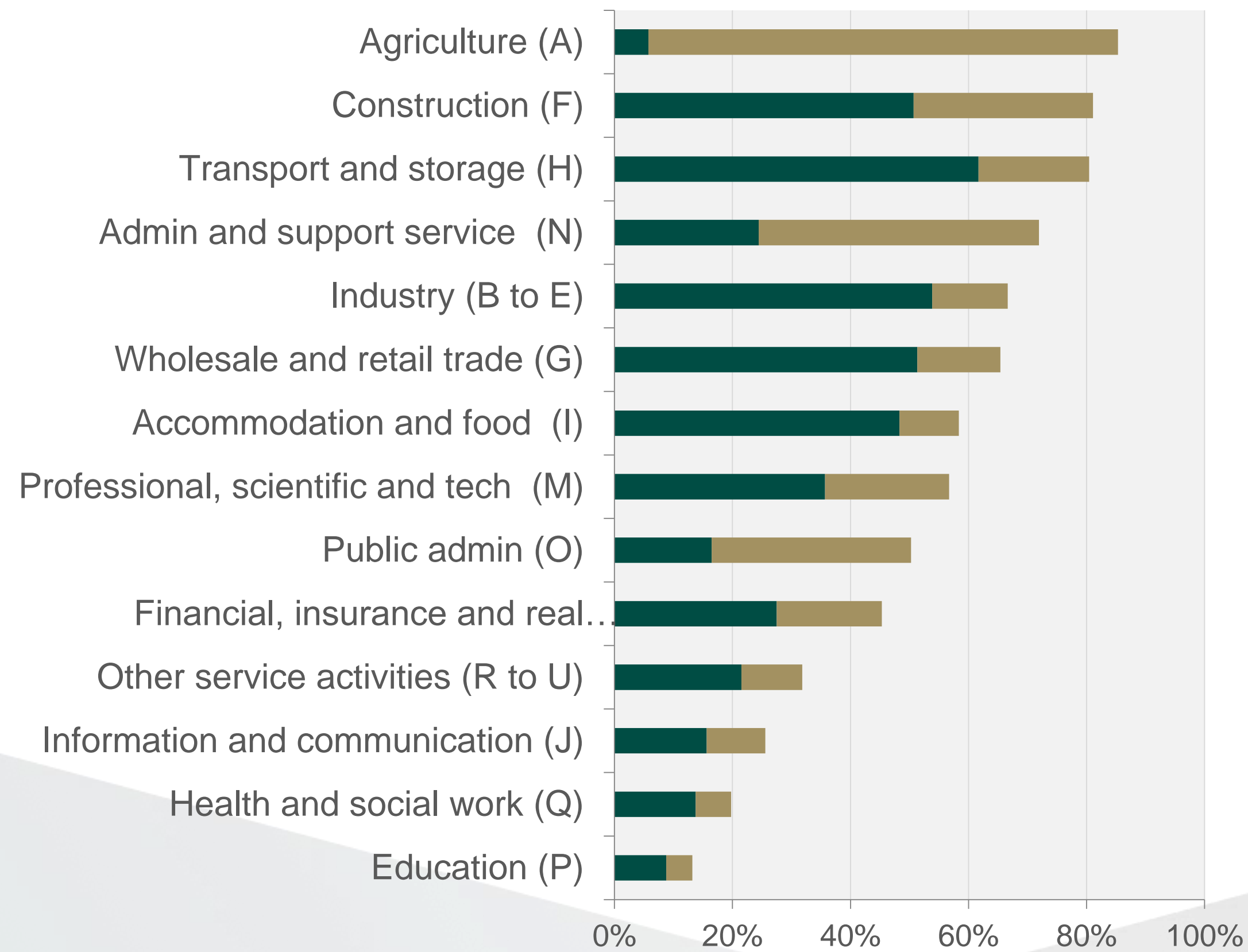
Automation Risk by Occupation Group, F&O Model

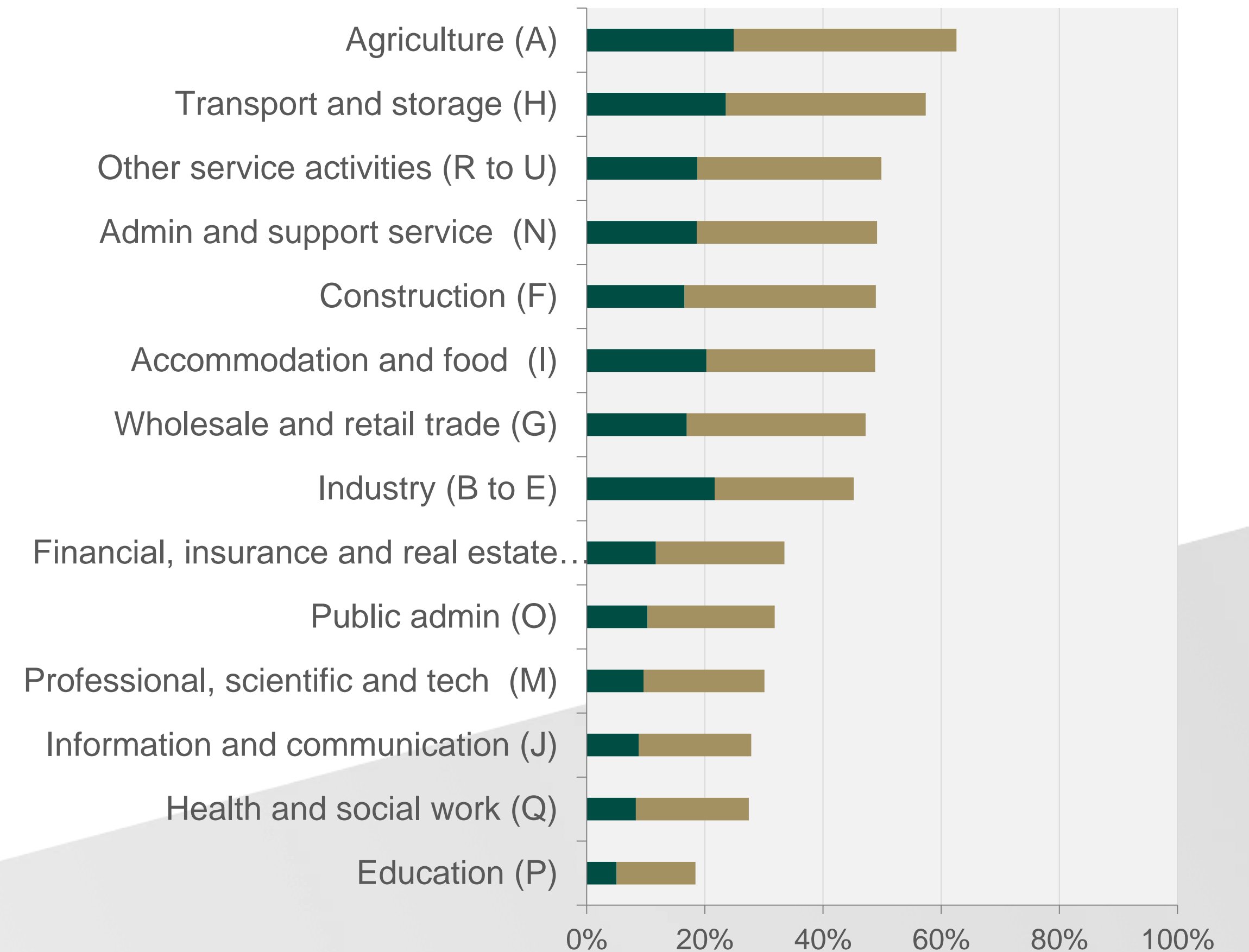| Occupation	
Process, Plant and Machine Operatives	
Elementary	
Sales and Customer Service	
Administrative and Secretarial	
Skilled Trades	
Associate Professional and Technical	
Professional	
Managers, Directors and Senior Officials	
Caring, Leisure and Other Service	

■ % High Risk   ■ % Sig Risk

Automation Risk by Occupation Group, N&Q Model

Occupation	
Plant and Machine Operators and Assemblers	
Elementary Occupations	
Skilled Agricultural, Forestry and Fishery Workers	
Clerical Support Workers	
Craft and Related Trades Workers	
Armed Forces Occupations	
Services and Sales Workers	
Technicians and Associate Professionals	
Professionals	
Managers	

■ % High Risk   ■ % Sig Risk

Supplementary Analysis: Sectors

Automation Risk by Sector, N&Q Model

Automation Risk by Sector, N&Q Model

Supplementary Analysis: Sectors
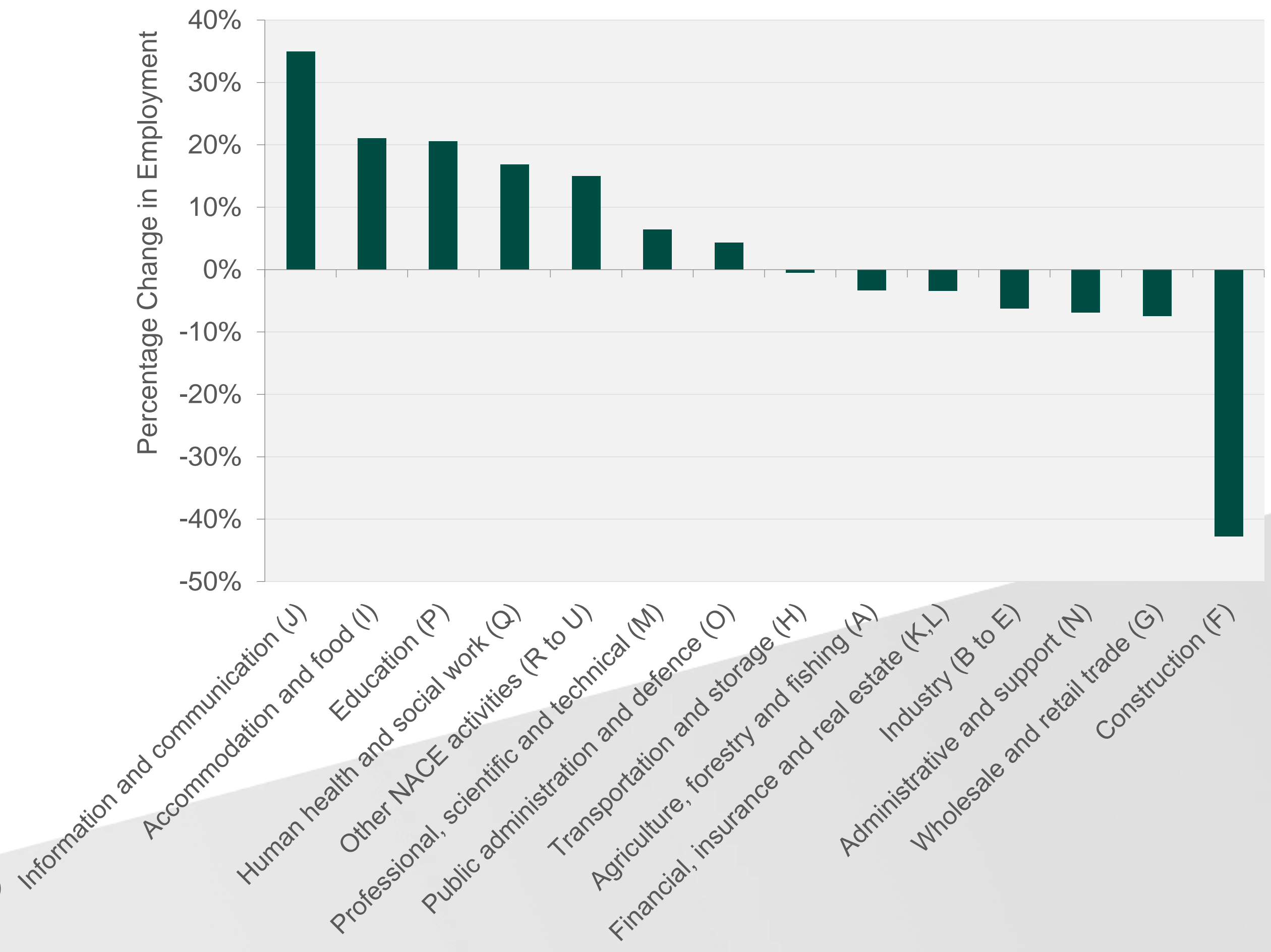
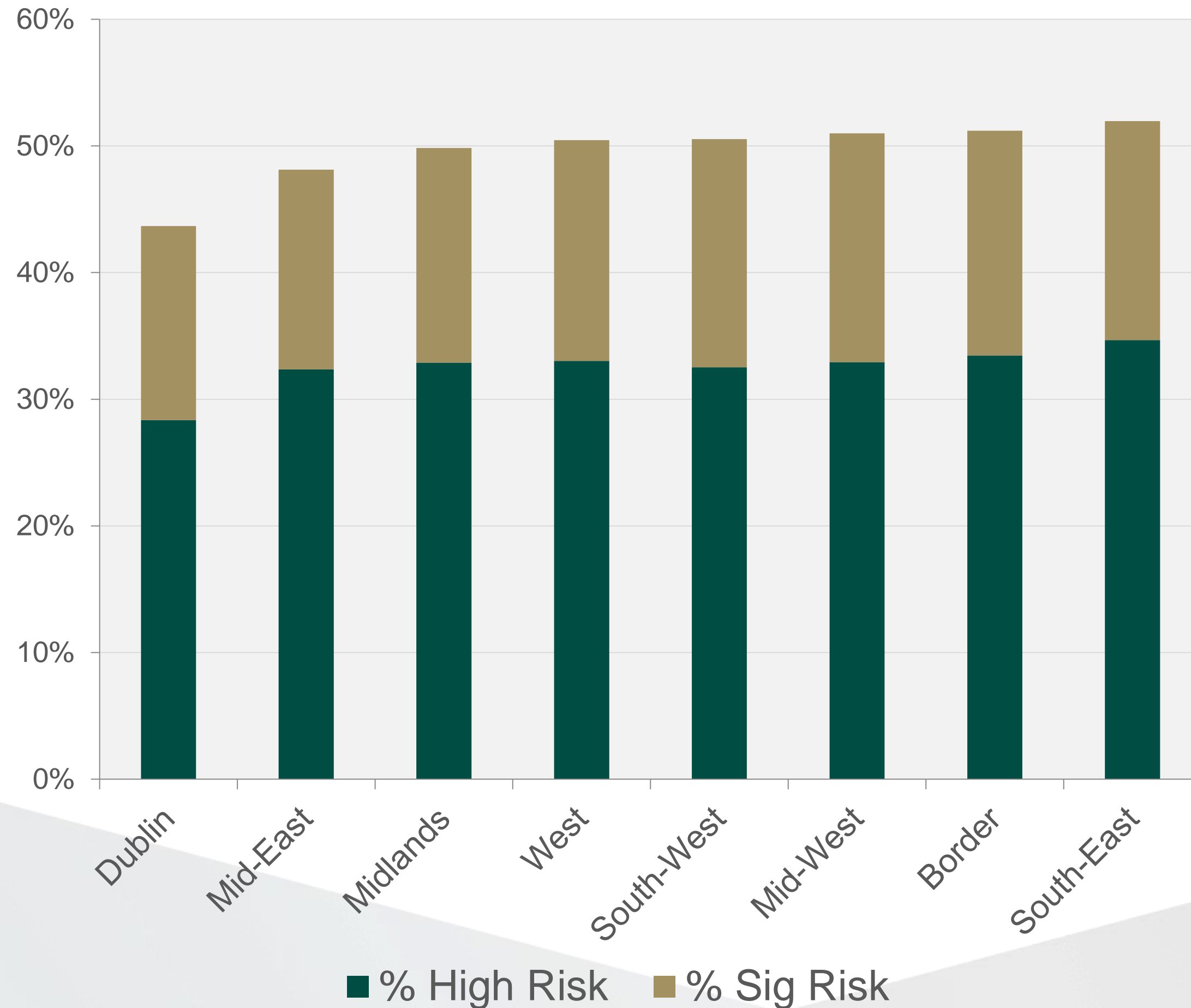## Employment by Sector, Q4 2017
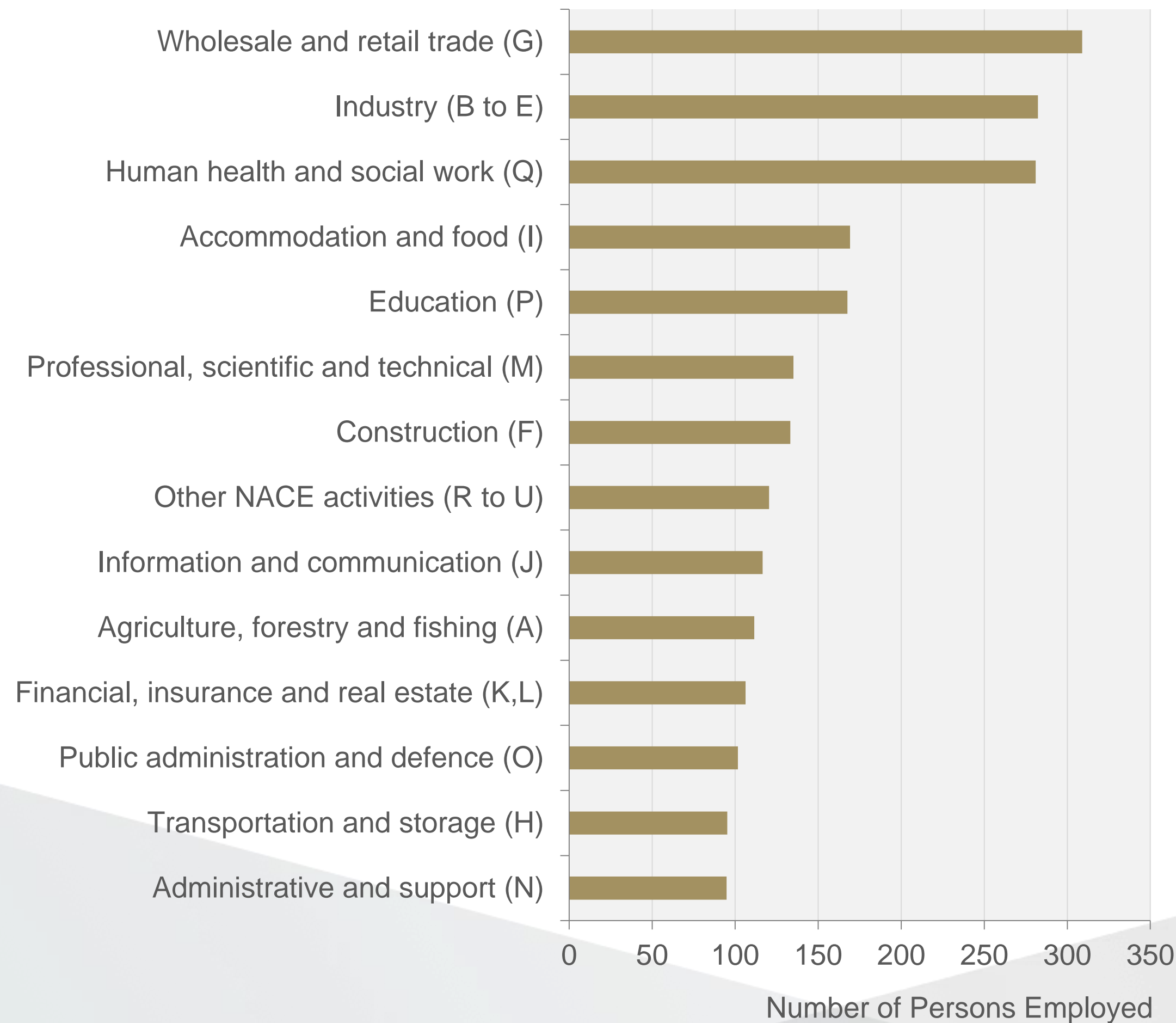
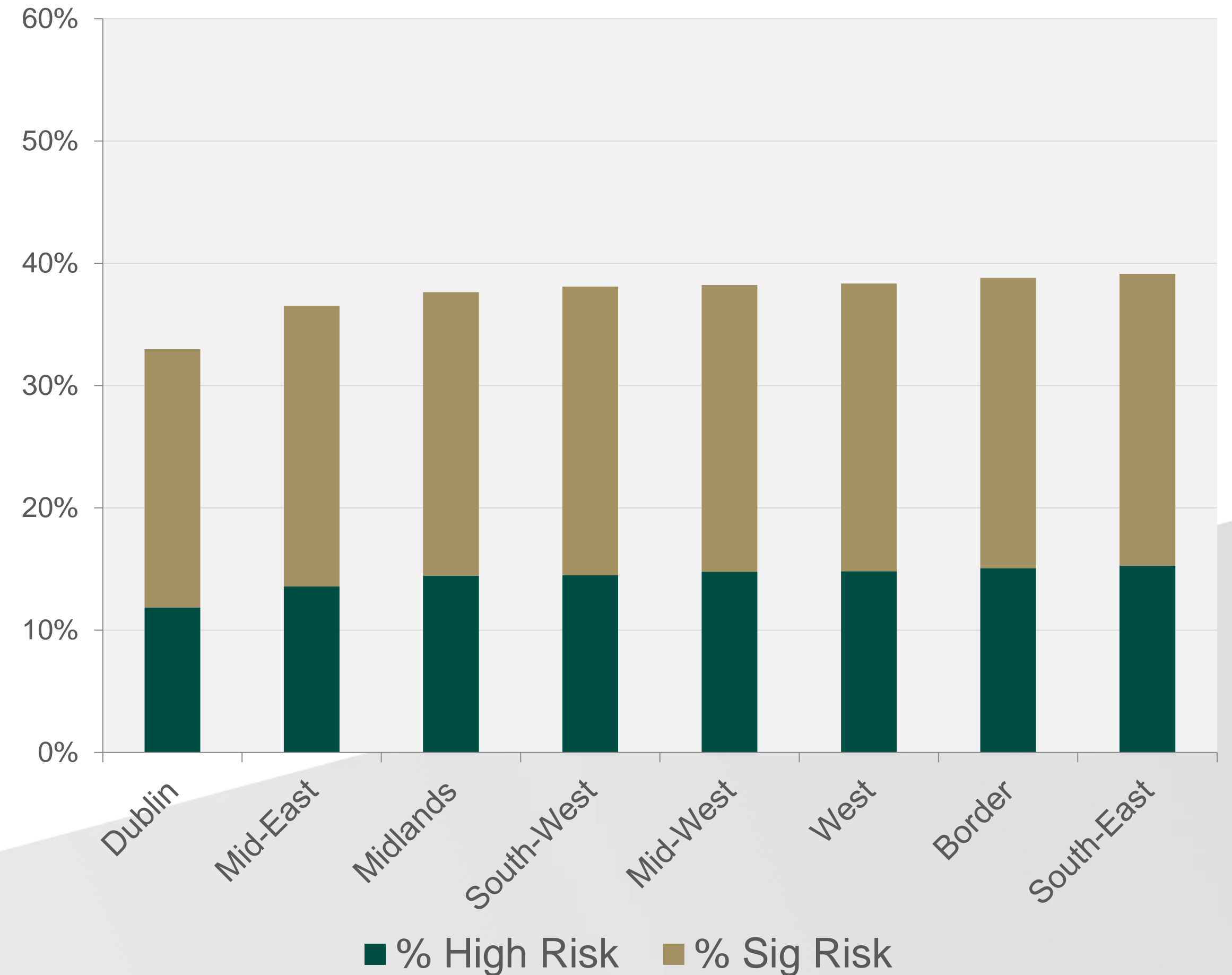## Change in Employment by Sector, Q4 2007 to Q4 2017

Supplementary Analysis: Regions

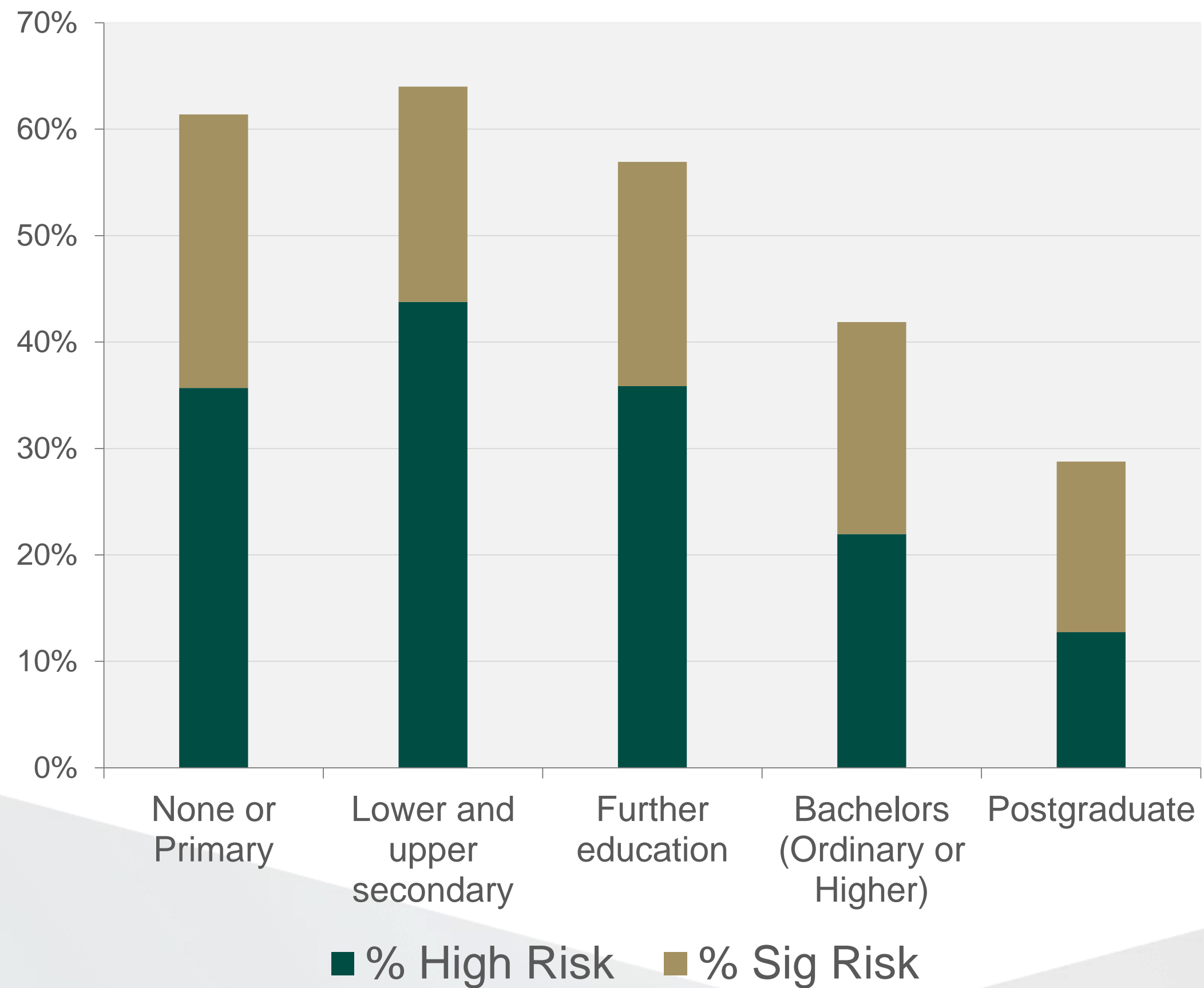## Automation Risk by Region, F&O Model
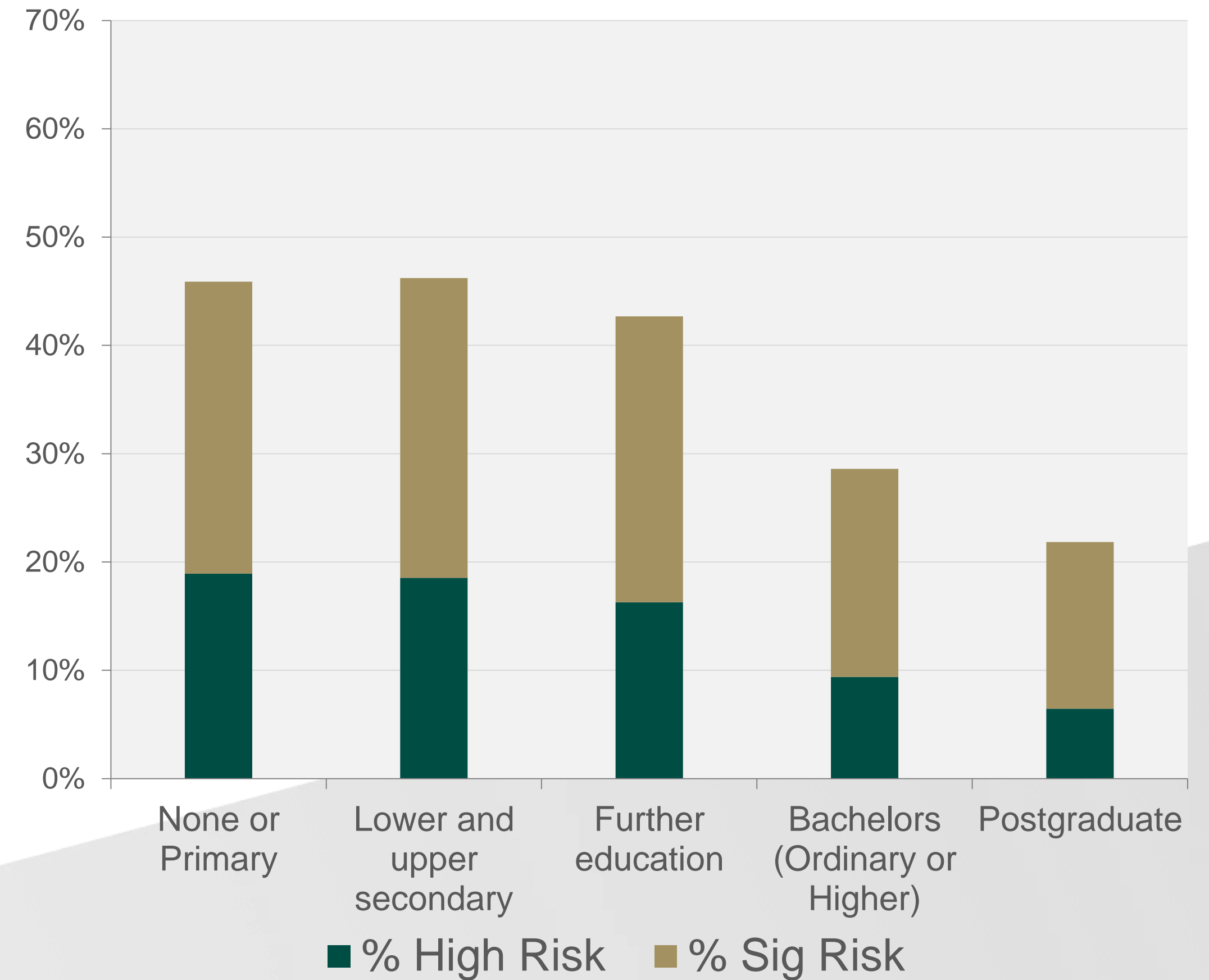

Automation Risk by Region, N&Q Model

Supplementary Analysis: Education

Automation Risk by Education, F&O Model
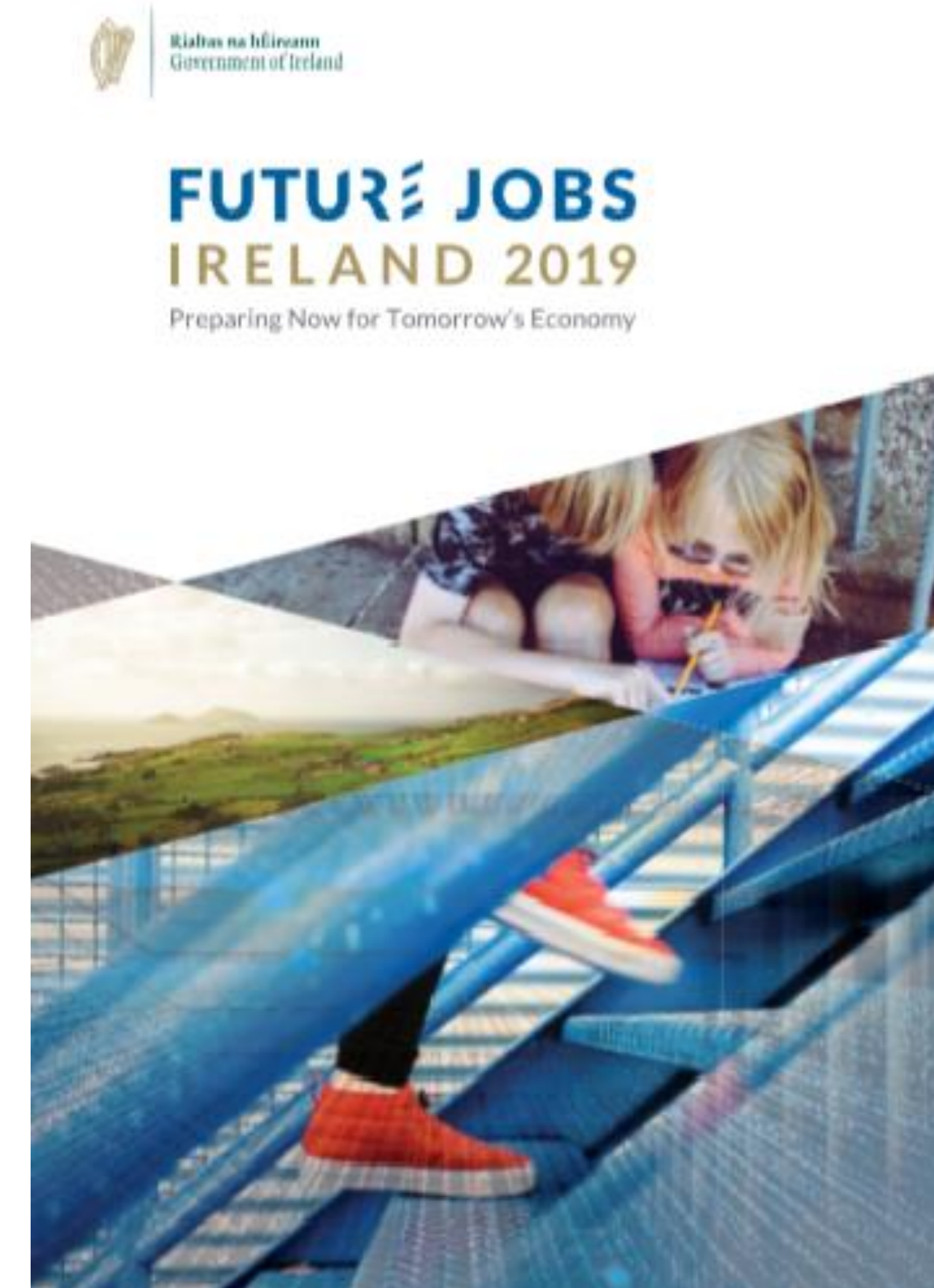
Automation Risk by Region, N&Q Model

Policy Response – Future Jobs Ireland

Five pillars:

- Embracing Technological Change and Innovation

- Improving SME Productivity

- Enhancing Skills and Developing and Attracting Talent

- Increasing Labour Force Participation
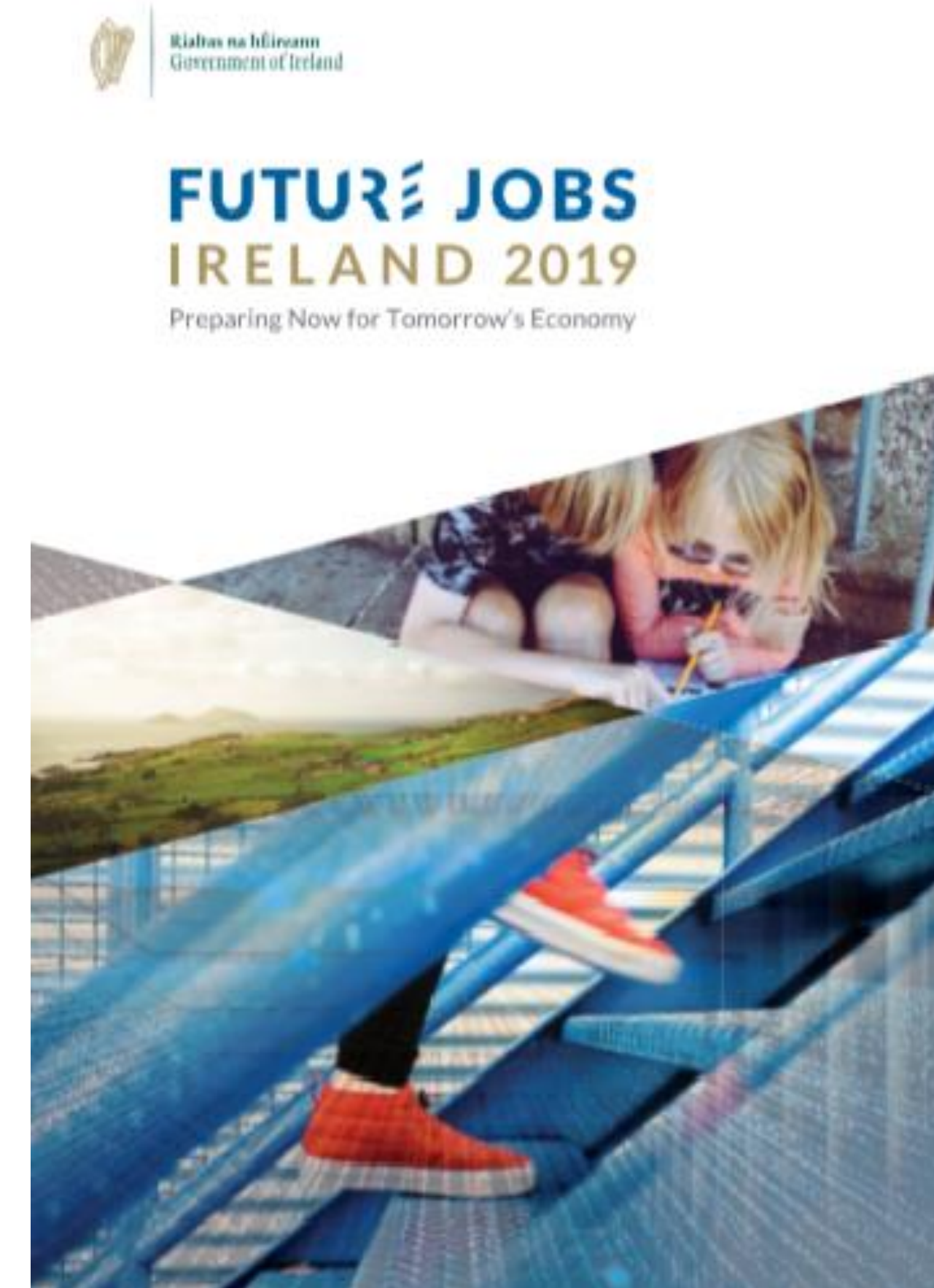
- Transitioning to a Low Carbon Economy

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Policy Response – Future Jobs Ireland

Embracing Technological Change and Innovation

Develop Transition Teams (1.7)

NESC will develop policy recommendations for Transition Teams to manage the impact of economic transition on vulnerable workers and sectors

Enhancing Skills and Developing and Attracting Talent

Double the lifelong learning rate from 8.9% to 18%

Explore

Skills to Advance

igees.gov.ie

gov.ie/futurejobsireland