

Brief reflections on

The Future of Automation and Implications for Education Systems

by

Daniel Münich

IDEA CERGE
EI 

PwC 2018: Will robots really steal our jobs? An international analysis of the potential long term impact of automation

https://www.pwc.com/hu/hu/kiadvanyok/assets/pdf/impact_of_automation_on_jobs.pdf

1. **Algorithm wave:** focused on automation of simple computational tasks and analysis of structured data in areas like finance, information and communications – this is already well underway.
2. **Augmentation wave:** focused on automation of repeatable tasks such as filling in forms, communicating and exchanging information through dynamic technological support, and statistical analysis of unstructured data in semi-controlled environments such as aerial drones and robots in warehouses – this is also underway, but is likely to come to full maturity in the 2020s.
3. **Autonomy wave:** focused on automation of physical labour and manual dexterity, and problem solving in dynamic real-world situations that require responsive actions, such as in manufacturing and transport (e.g. driverless vehicles) – these technologies are under development already, but may only come to full maturity on an economy-wide scale in the 2030s.



Figure 3.7 – Task automation across the three waves

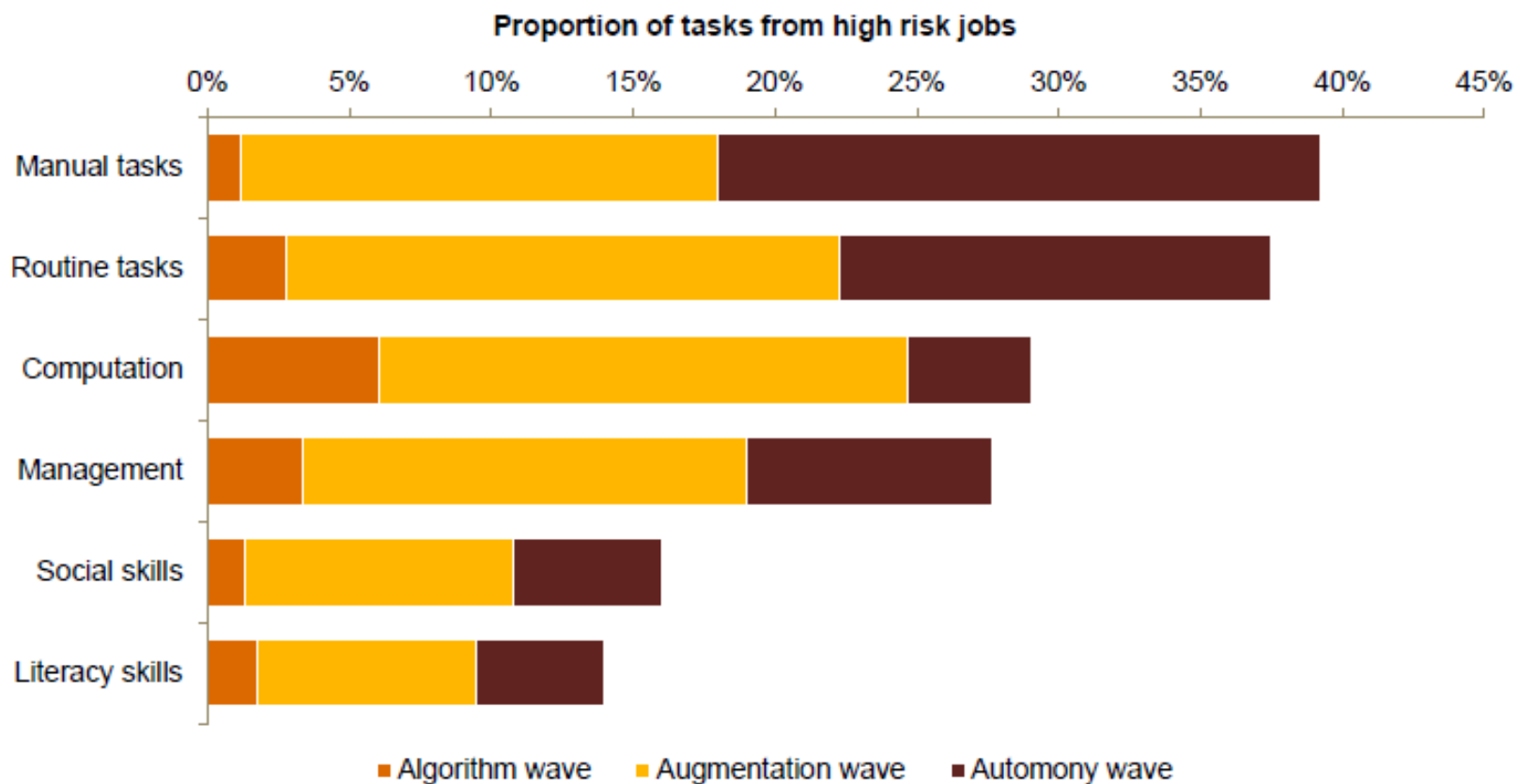
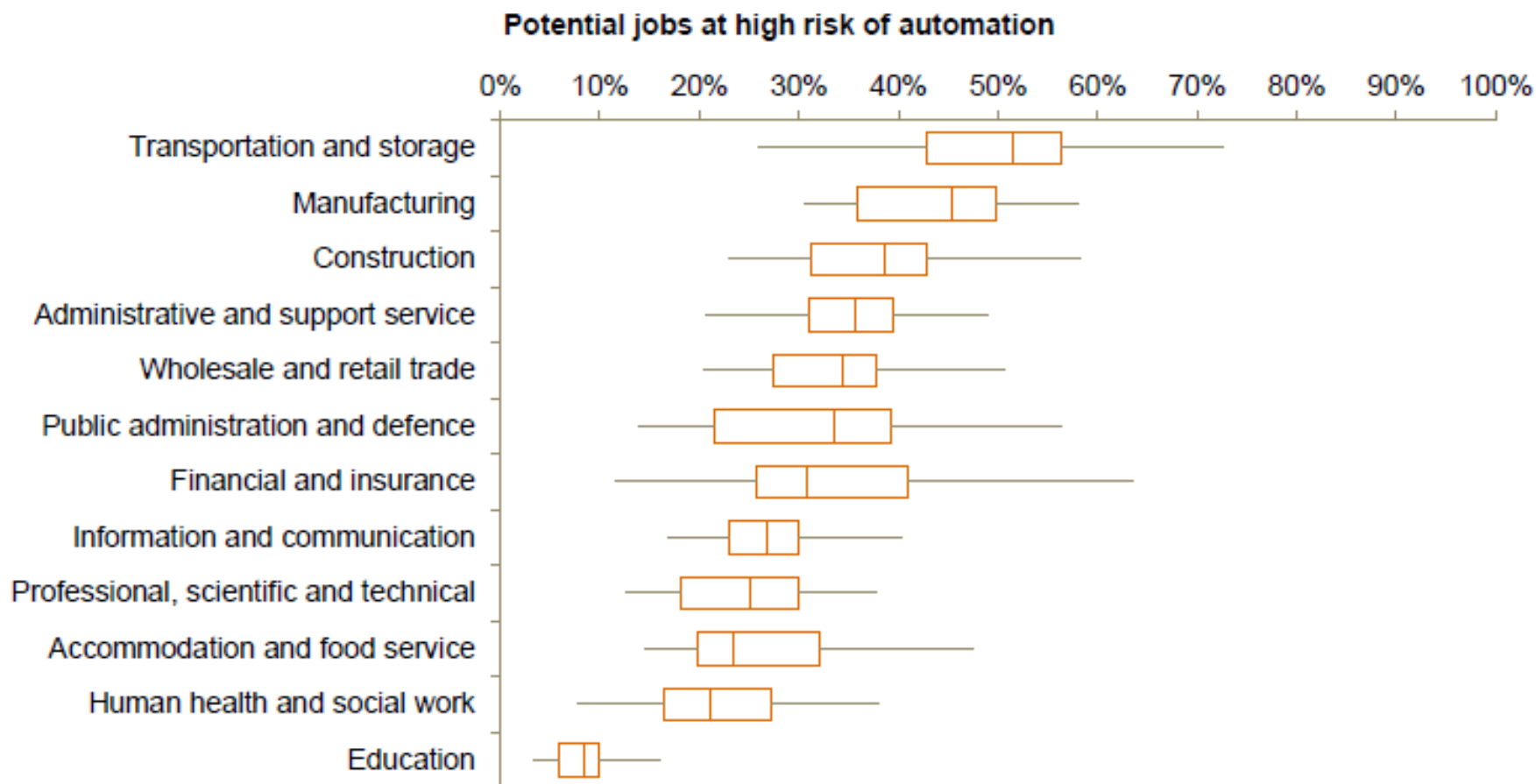


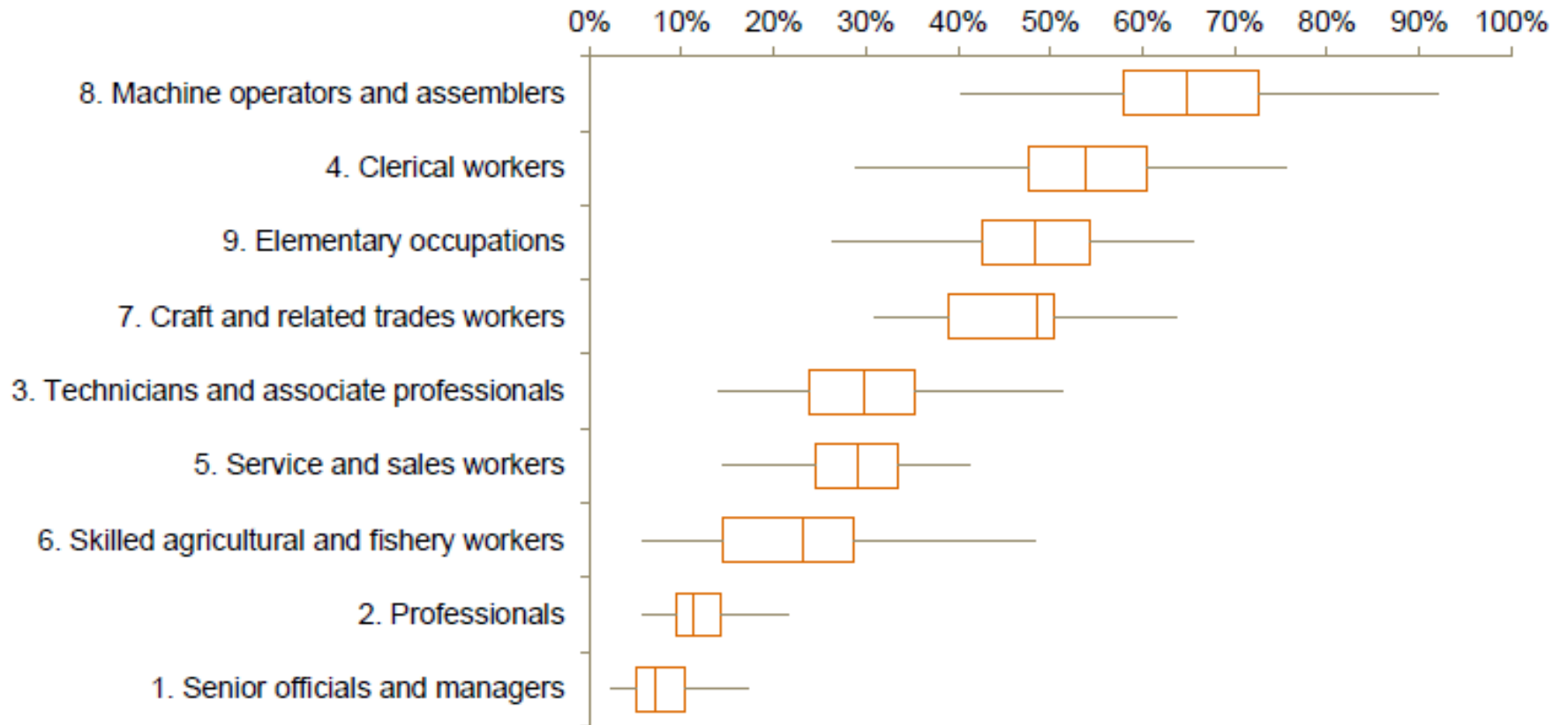
Figure 4.1 –Share of jobs with potential high automation rates by industry



Source: PIAAC data, PwC analysis

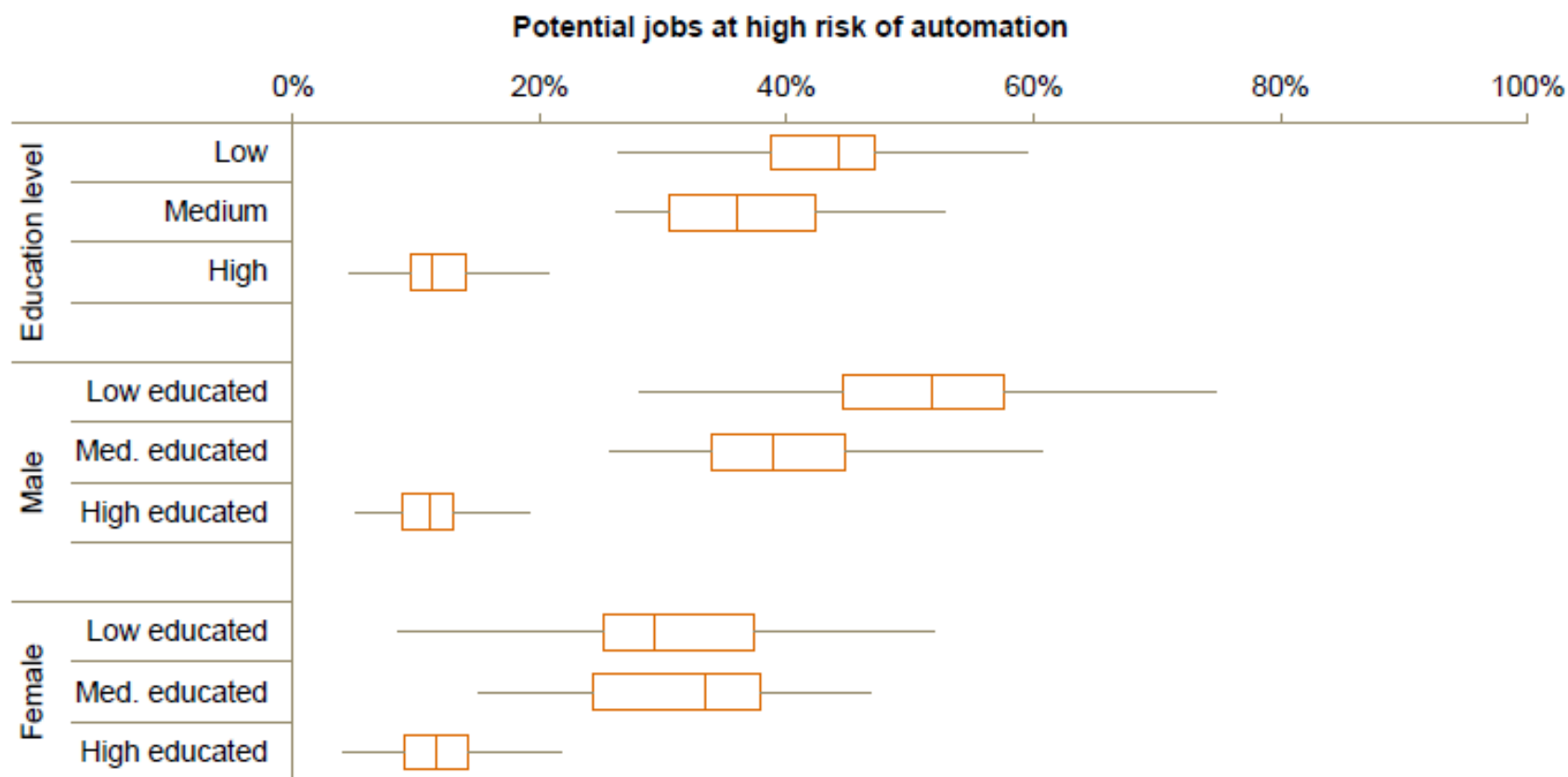
Figure 5.1 – Share of jobs with potential high rates of automation by industry

Potential jobs at high risk of automation



Source: PIAAC data, PwC analysis

Figure 6.5 – Share of jobs with potential high rates of automation by gender and education level



Source: PIAAC data, PwC analysis

Vzdělanostní struktura zaměstnaných osob

2014, země EU28

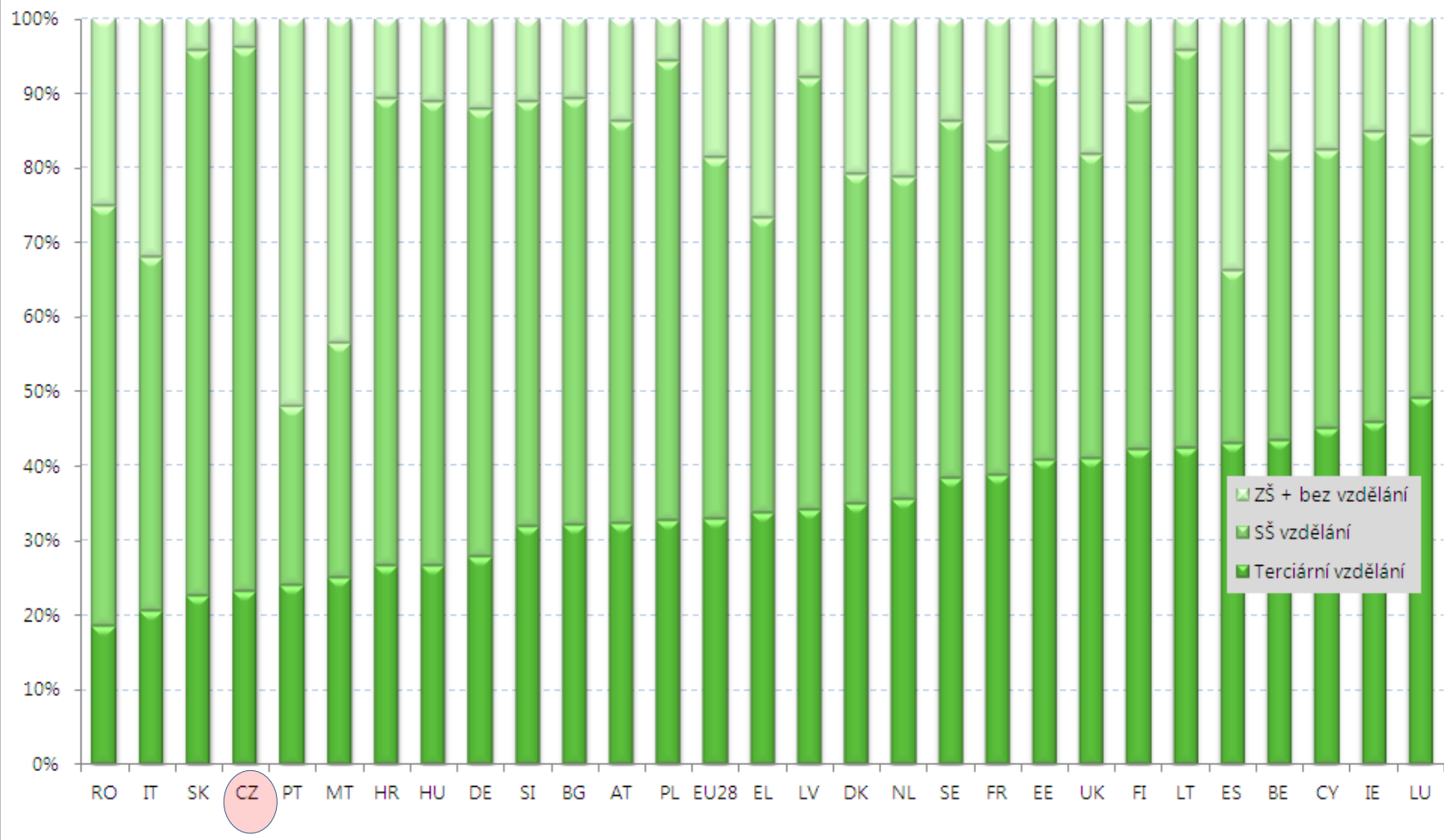
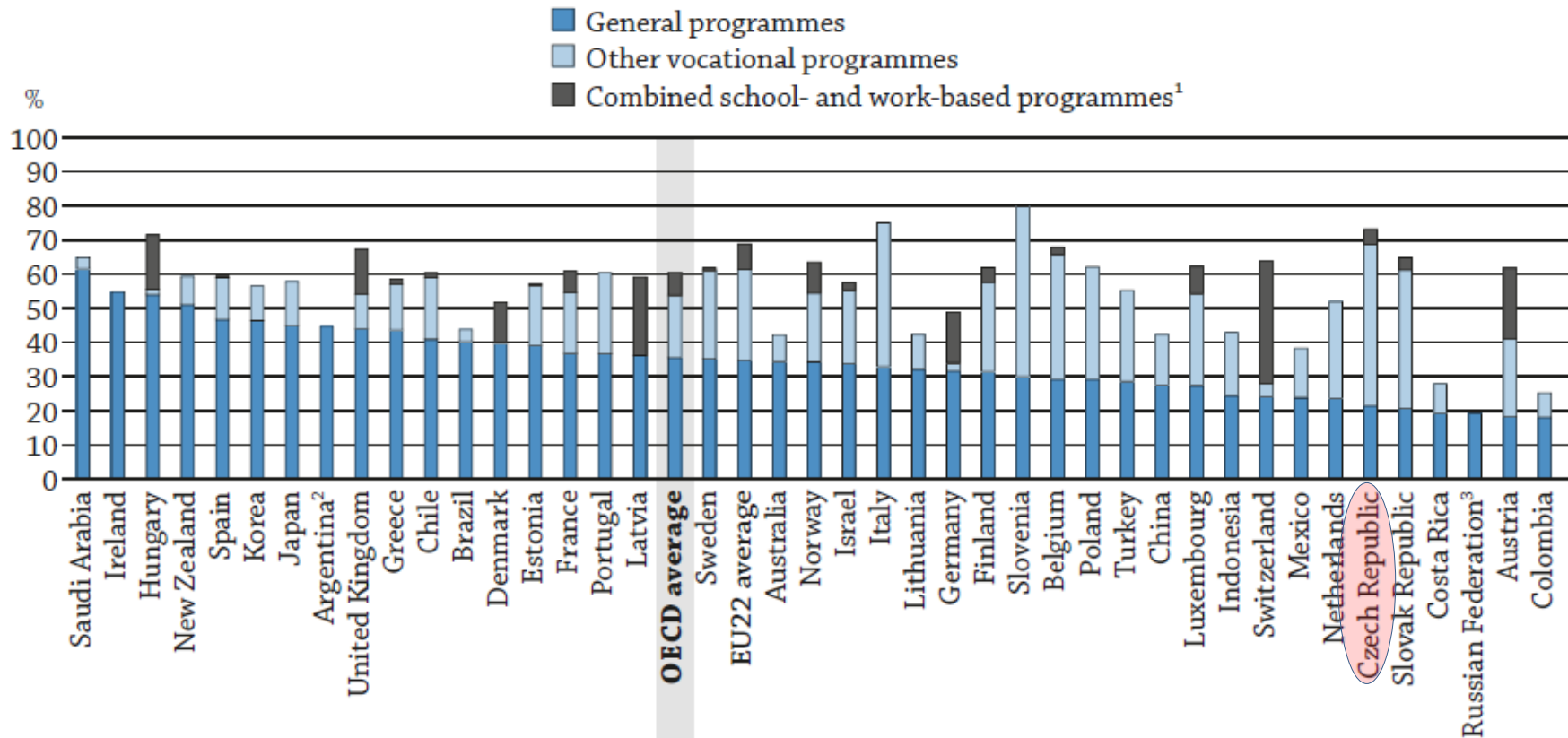


Figure C1.1. Upper secondary enrolment rates of 15-19 year-olds, by programme orientation (2014)



1. Estimate based on the enrolment rate to vocational programmes and the share of students in school- and work-based programmes over the total vocational enrolment for all ages. The enrolment rate of 15-19 year-olds to combined school- and work based programmes is likely to be over-estimated, as these programmes often target older students.

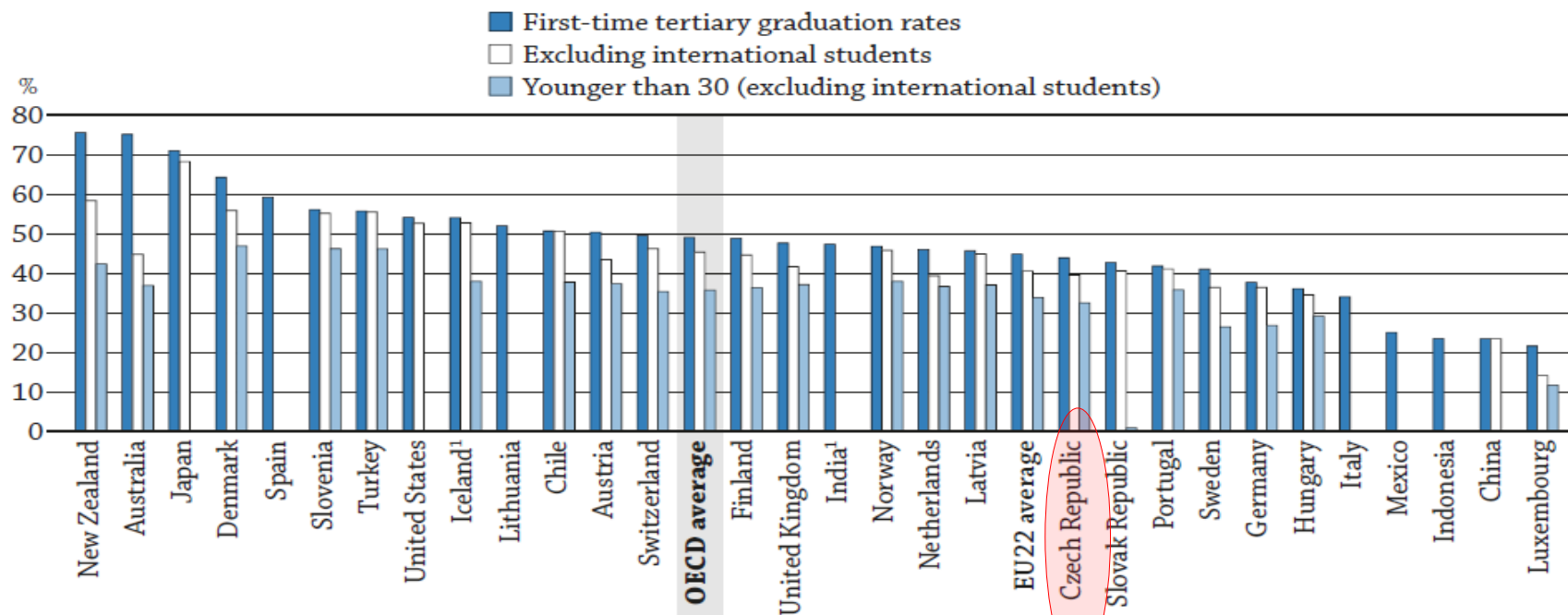
2. Year of reference 2013.

3. Enrolments in upper secondary vocational programmes (ISCED 3-Vocational) are partially included in indicators for post-secondary non-tertiary and tertiary education.

Countries are ranked in descending order of the share of students enrolled in general programmes.

Source: OECD. Table C1.3a. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).

Figure A3.1. First-time tertiary graduation rates (2014)



Note: Mismatches between the coverage of the population data and first-time graduates data mean that the graduation rates for those countries that are net exporters of students may be underestimated and those that are net importers may be overestimated. The first-time tertiary graduation rate excluding international students accounts for this.

1. Year of reference 2013.

Countries are ranked in descending order of the first-time tertiary graduation rates.

Source: OECD. Table A3.1. See Annex 3 for notes (www.oecd.org/education/education-at-a-glance-19991487.htm).


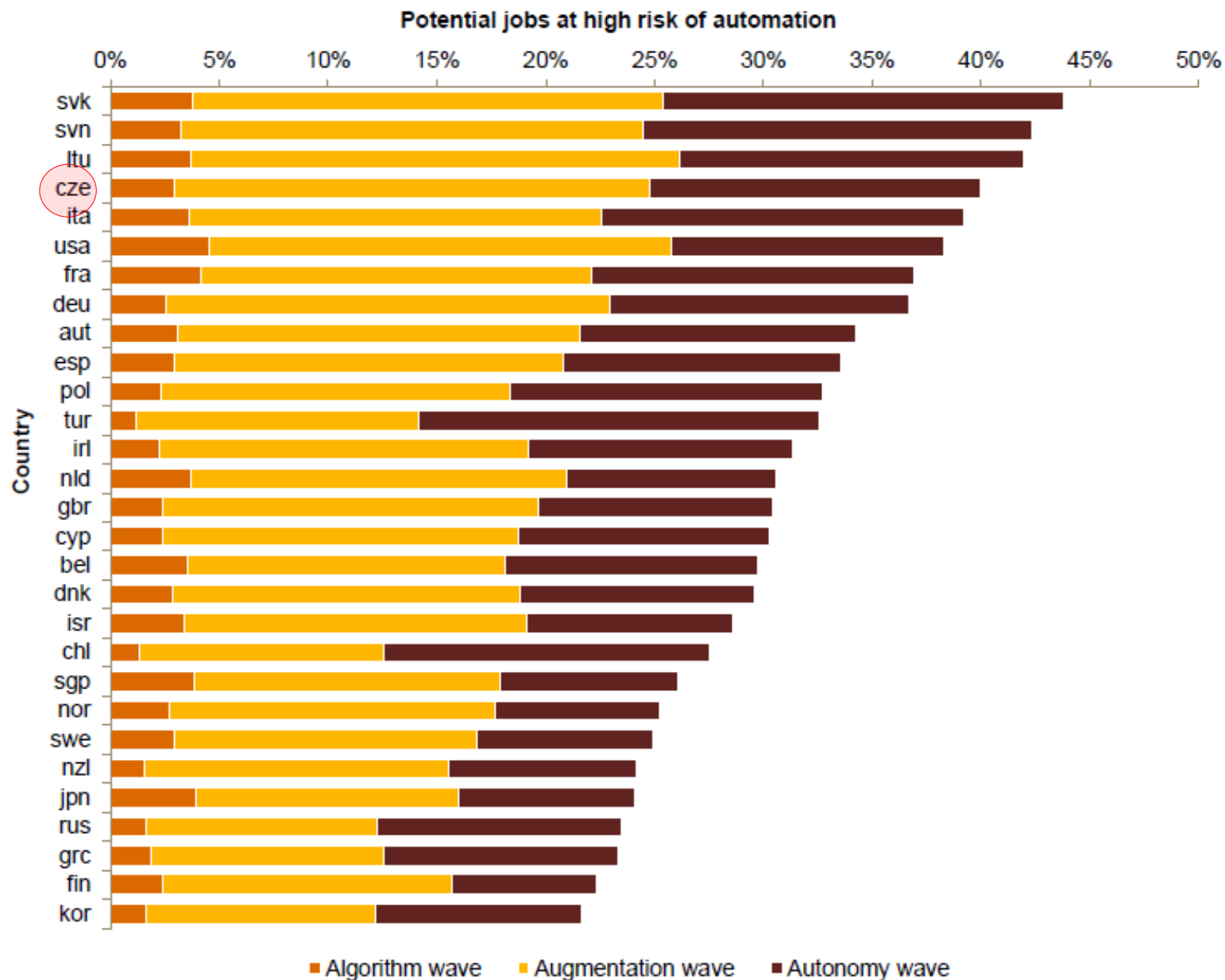
StatLink  <http://dx.doi.org/10.1787/888933396803>

Figure 1.1 – Potential job automation rates by country across waves



Source: PIAAC data, PwC analysis

Figure 3.2 – Potential impact across countries by employment shares and automatability of jobs

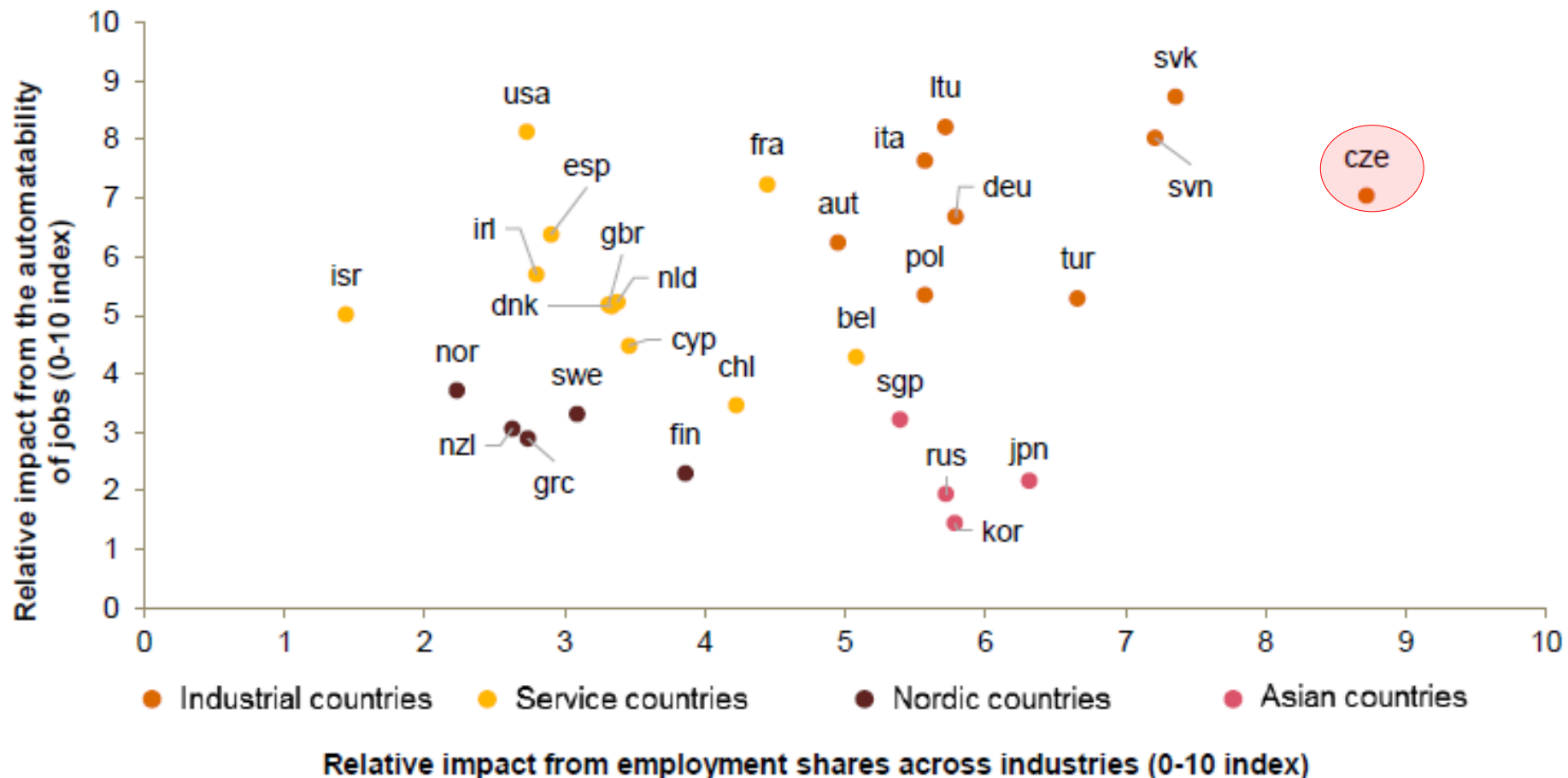
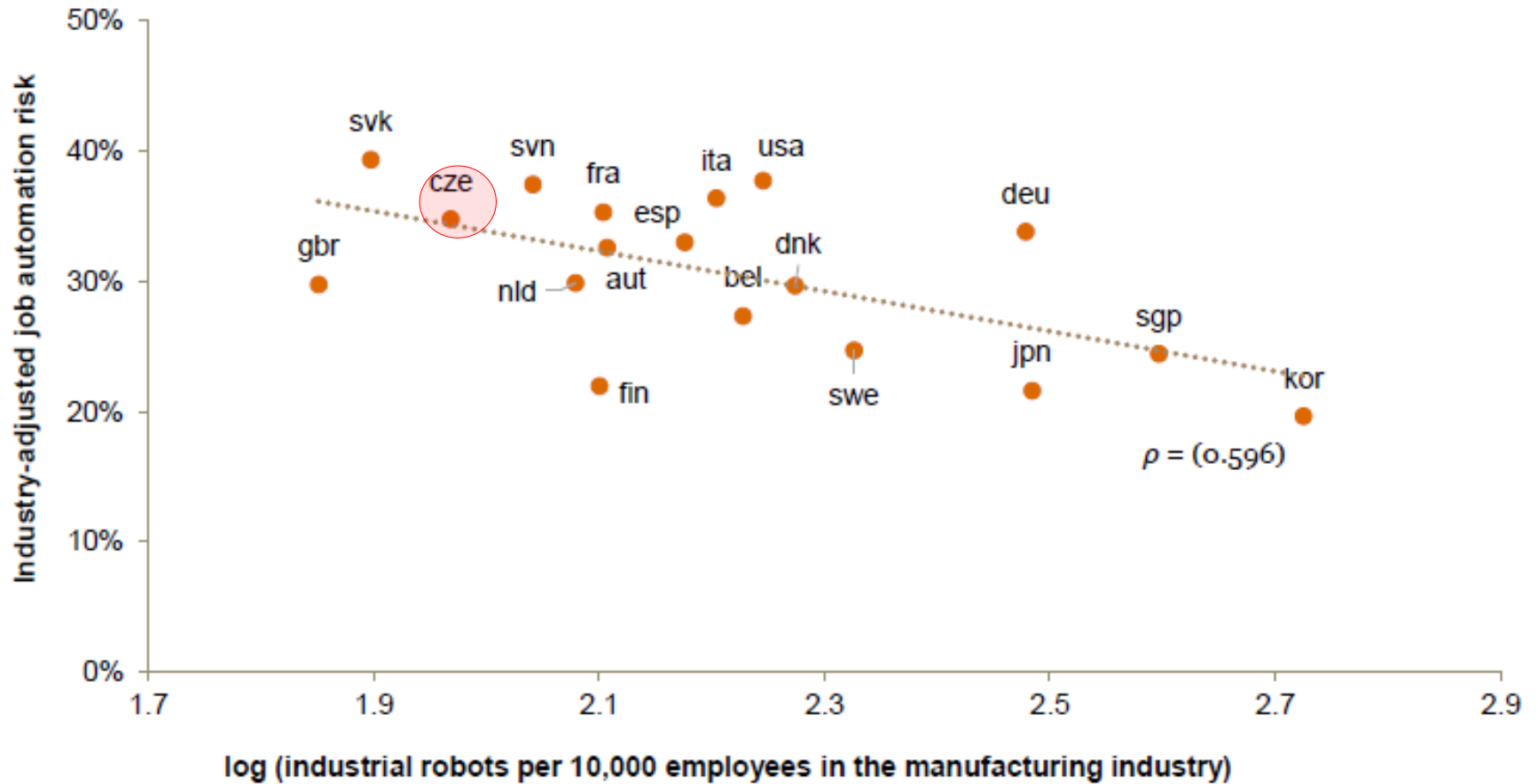


Figure 3.5 – Relationship between density of industrial robots and industry-adjusted job automation rates



Source: International Federation of Robots, PwC analysis

Table 3.1 – Estimated share of jobs at potential high risk of automation across countries for each of the three waves: Algorithm wave, Augmentation wave and Autonomy wave

Country	Algorithm wave (%)	Augmentation wave (%)	Autonomy wave (%)
Slovakia	4	25	44
Slovenia	3	24	42
Lithuania	4	26	42
Czech Republic	3	25	40
Italy	4	23	39
USA	5	26	38
France	4	22	37
Germany	3	23	37
Austria	3	22	34
Spain	3	21	34
Poland	2	18	33
Turkey	1	14	33
Ireland	2	19	31
Netherlands	4	21	31
UK	2	20	30
Cyprus	2	19	30
Belgium	4	18	30
Denmark	3	19	30

