



ESCoE Conference on Economic Measurement 2019  
King's College London, London 8 – 10 May 2019

---

# OCCUPATIONAL TRANSITIONS: THE COST OF MOVING TO “SAFE HAVEN” OCCUPATIONS

---

**Mariagrazia Squicciarini**

OECD Directorate for Science, Technology and Innovation

# NEED TO **RETHINK EDUCATION** AND **LIFELONG LEARNING POLICIES**

**Labour-saving technologies** always **impacted** the **level and composition of the workforce**, requiring workers to learn new skills either to remain in their job or, seek opportunities elsewhere.

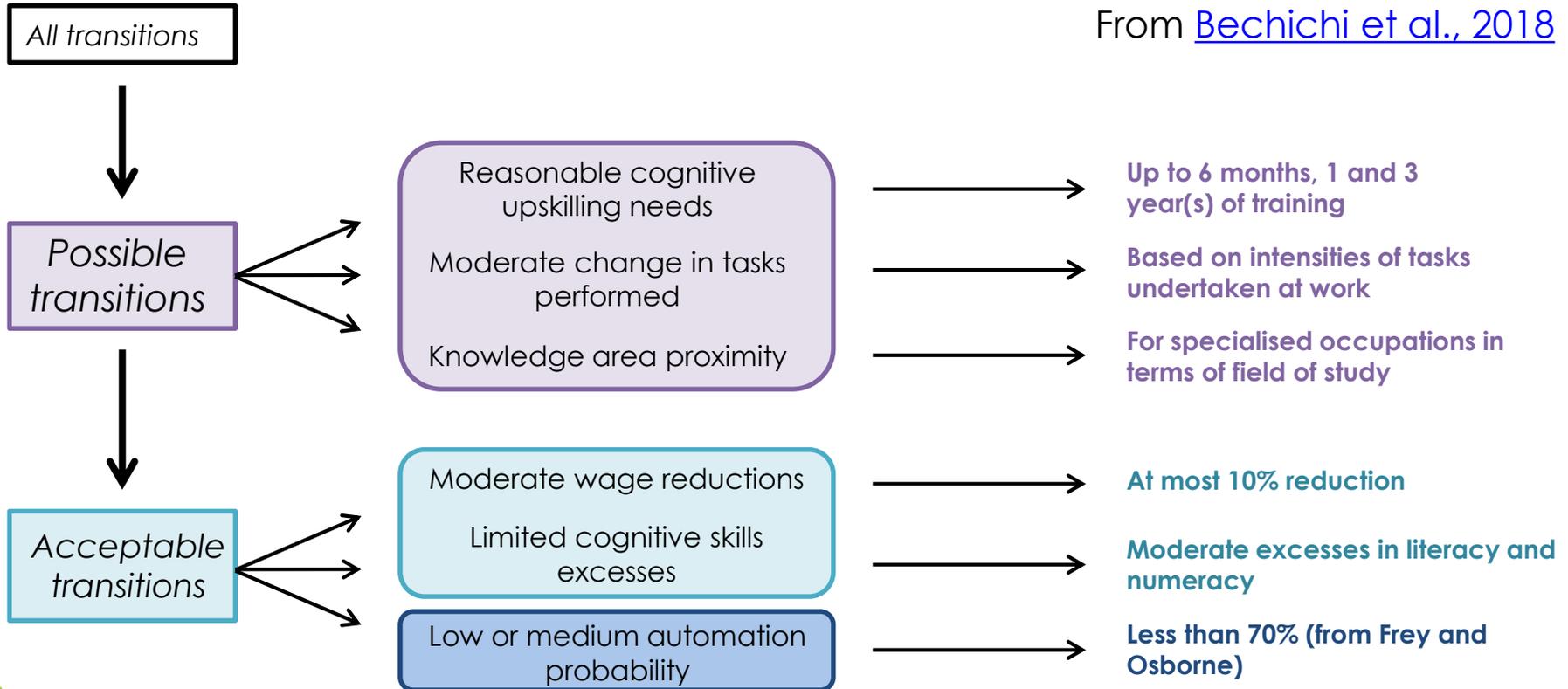
Digital technologies and **automation** are **making some workers redundant**, particularly those whose tasks can be automated.

These people will need to find different occupations and, many will have to acquire new skills. Important questions to be answered are:

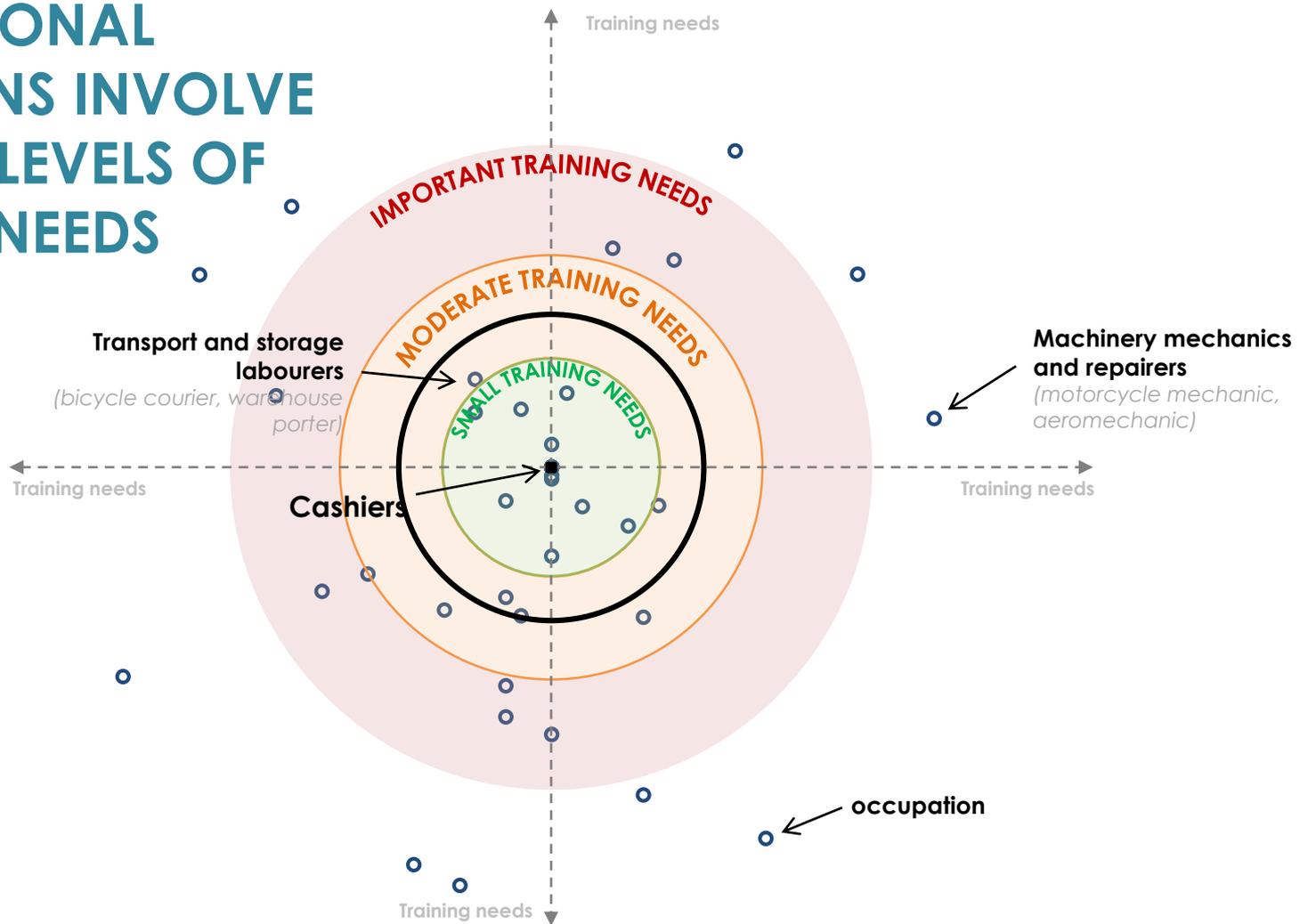
- 1) **How much** is this “mass” reskilling going to **cost**?
- 2) For **how long** will people need **to train**?
- 3) Do jobs in **manufacturing** and **services differ** in these respect?
- 4) Do acceptable **transitions differ** between **young and old workers**?

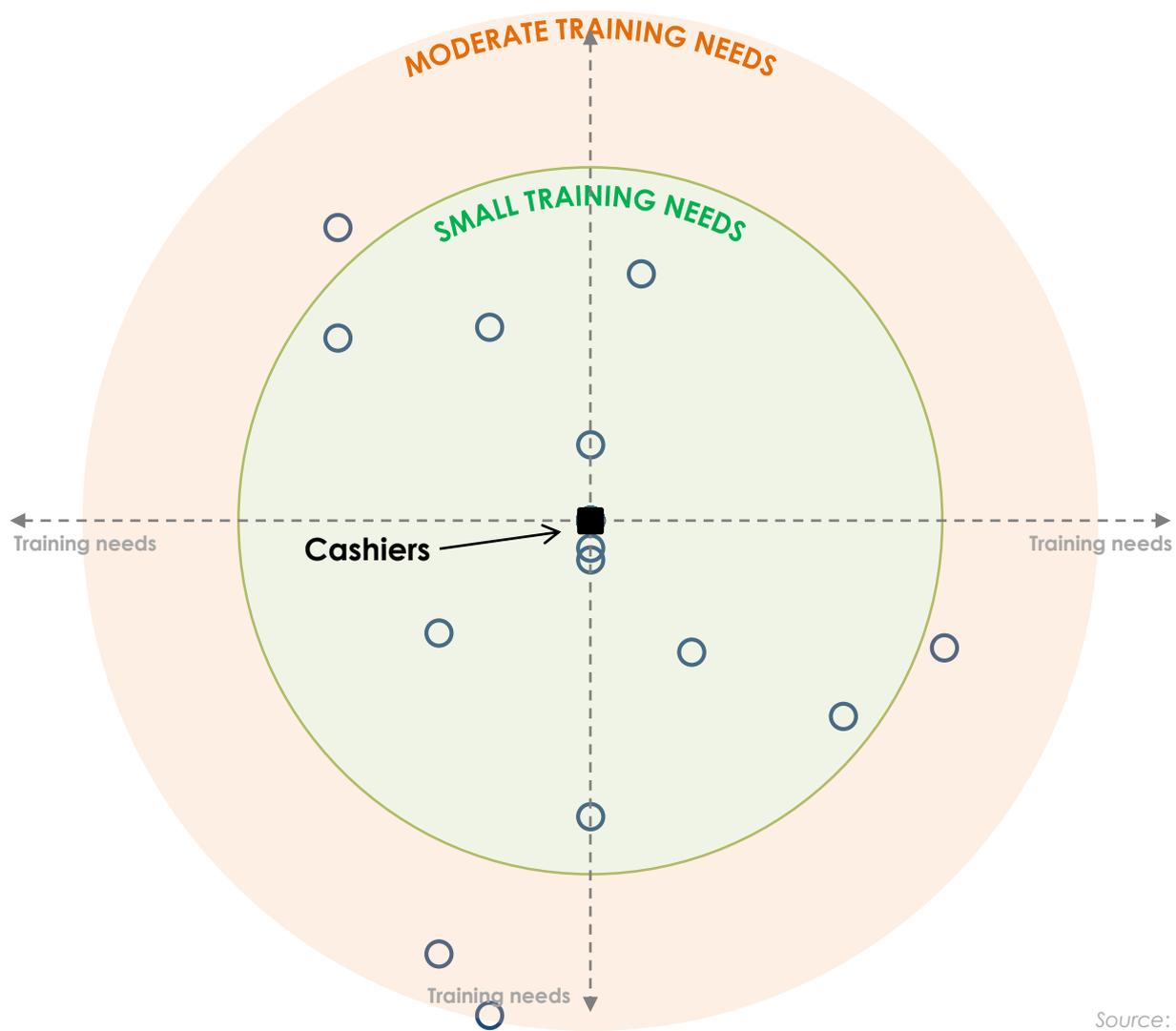
# TYPOLGY OF TRANSITIONS

From [Bechichi et al., 2018](#)

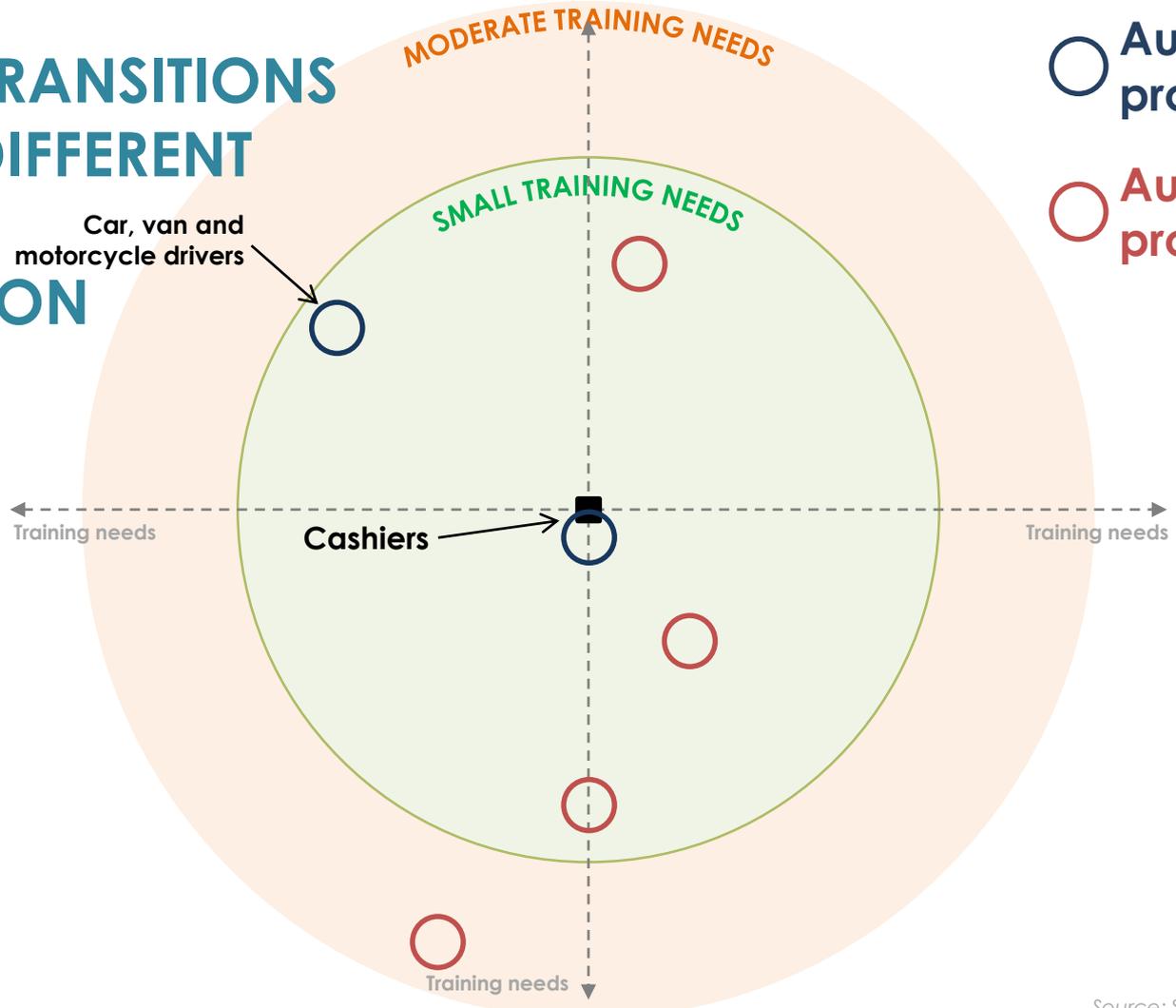


# OCCUPATIONAL TRANSITIONS INVOLVE DIFFERENT LEVELS OF TRAINING NEEDS





# POSSIBLE TRANSITIONS INVOLVE DIFFERENT RISKS OF AUTOMATION

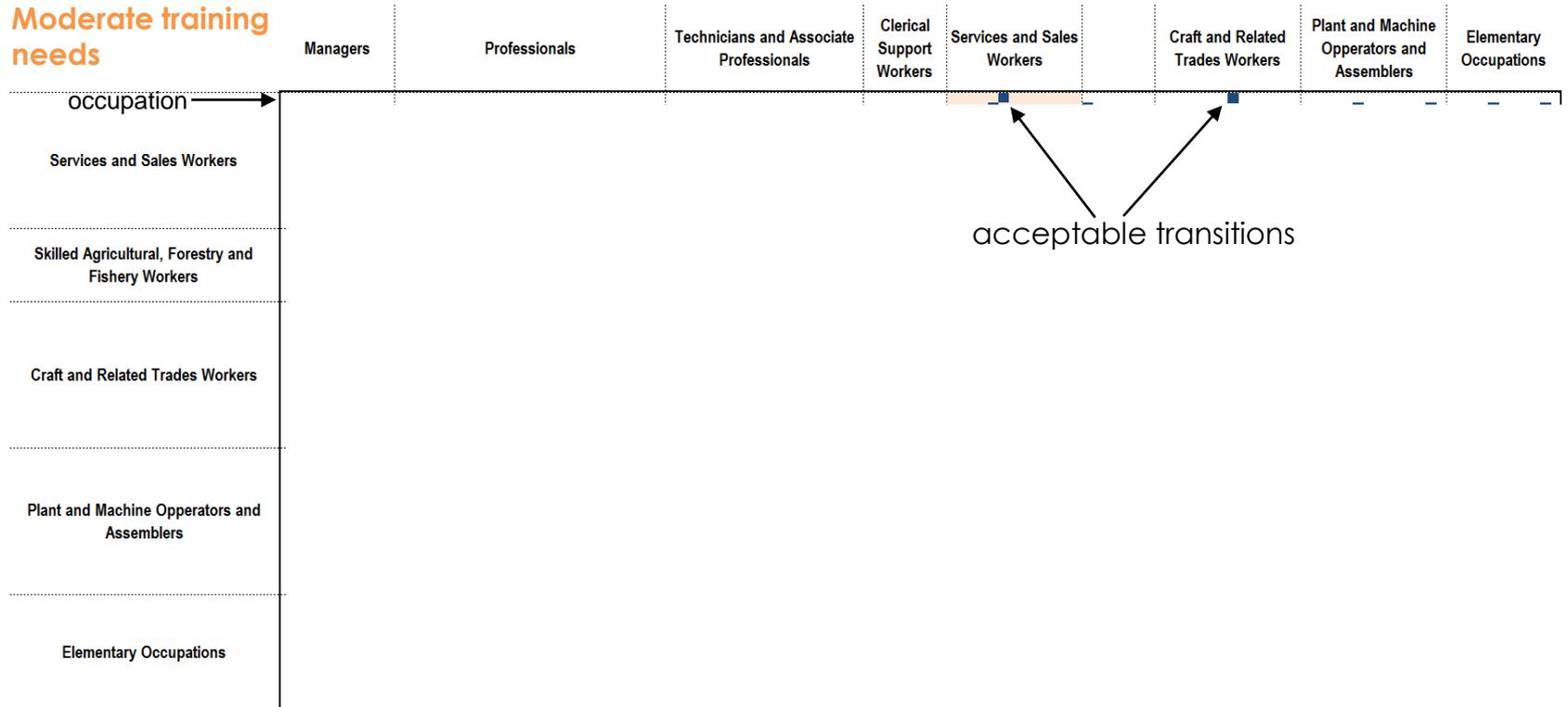


○ Automation probability <70%

○ Automation probability >70%

# WHERE ARE OCCUPATIONS' ACCEPTABLE TRANSITIONS?

Moderate training needs





---

# The COST of retraining

---

([Andrieu et al., 2019](#))

# The cost of transitions

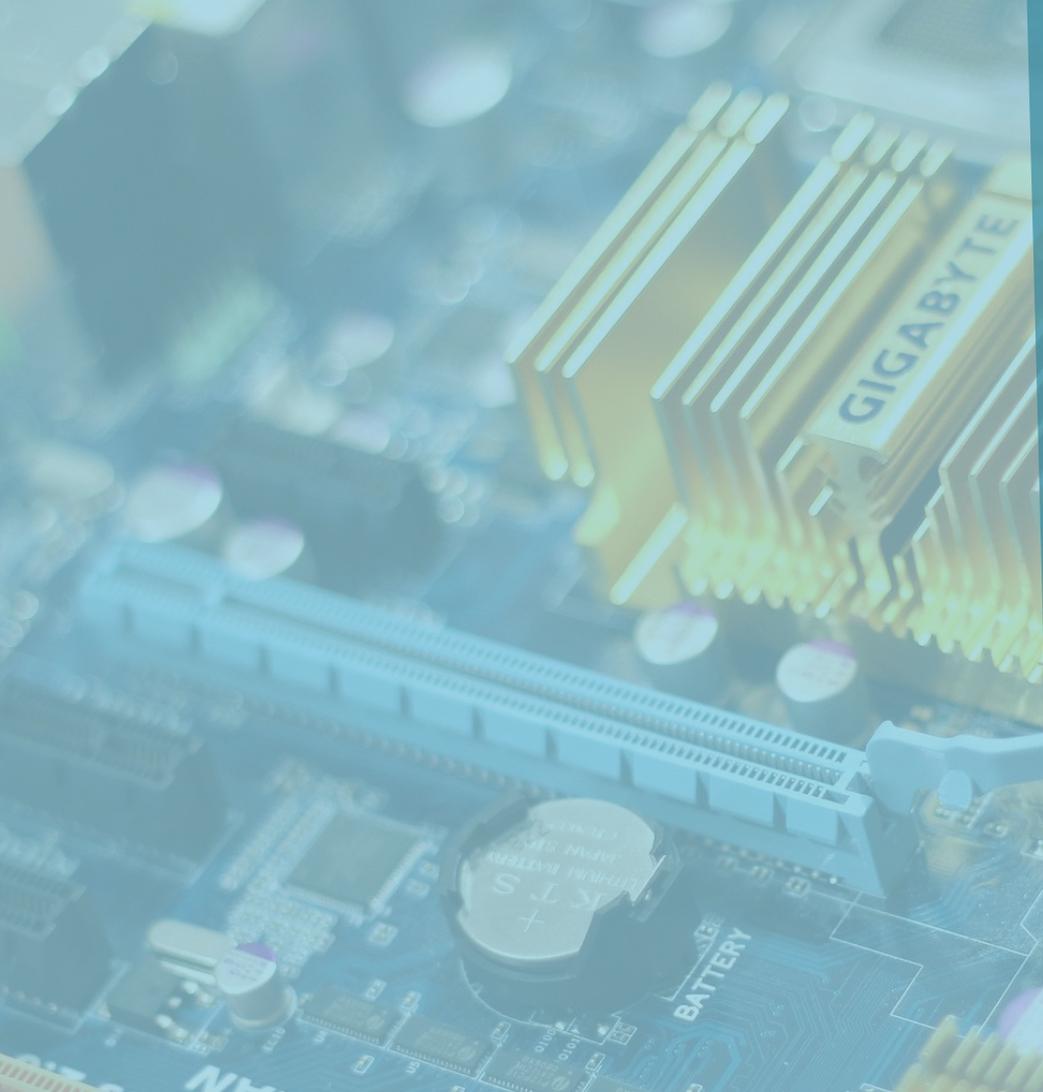


- Cost of retraining or upskilling in cognitive skills, for **acceptable transitions**
  - Direct: Per student, *country specific* cost. Education at a Glance (2018).
  - Indirect: *cluster-specific average* worker's wage from PIAAC.
- One estimate per 123 ISCO-08 occupations, 31 countries and 3 scenarios.
- Estimates presented for :
  - **Overall** sample, pooling over countries.
  - Restricted sample: occupations of origin at **High Risk Of Automation**.

# Making the problem tractable

- Transitions are successful: individuals *can* learn; they all learn as the average individual; do not drop out from training.
- The per-person cost of adult learning courses mimics that of education (secondary or tertiary).
- Adult learning systems have similar effectiveness across countries.
- Only retraining in cognitive skills is accounted for.
- No working and learning at the same time.
- Job to job transition after the (re)training spell.

➡ **Ball-park figures.**



---

**Moving to a  
“Safe haven”**

---

# The cost to safe haven



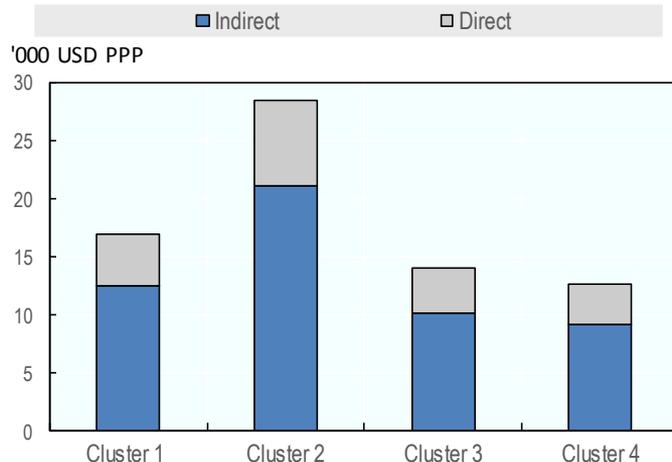
- **Minimum cost** of moving to a safe haven:
  - Focus on occupations of destinations at low/medium Risk of Automation (not a statement about the « quality » or « security » of the job).
  - Average cost of moving to the nearest scenario
- Estimates of the costs at the country-level:
  - (Average cost per occupation)\*(# employees in the occupation), then sum over all occupations in the country.
  - **Upper bound**: all individuals employed in the occupation are at high ROA.
  - **Lower bound**: only a share\* of employed workers are at high ROA.

# Minimum cost per worker



Minimum total cost for a worker in High-ROA towards  
“safe-haven” occupations

Average over occupations and countries in the cluster



Cluster 1: CHL, GRC, ITA, LTU, RUS, SVK, TUR

Cluster 2: AUS, CAN, GBR, IRL, NZL, USA

Cluster 3: AUT, BEL, CZE, DNK, FIN, DEU, JPN, NLD, NOR, SWE

Cluster 4: EST, ESP, FRA, ISR, KOR, POL, SGP, SVN

Average per-person minimum cost:

- Cluster 1: ~\$17,000
- Cluster 2: ~\$27,000
- Cluster 3: ~\$14,000
- Cluster 4: ~\$13,000

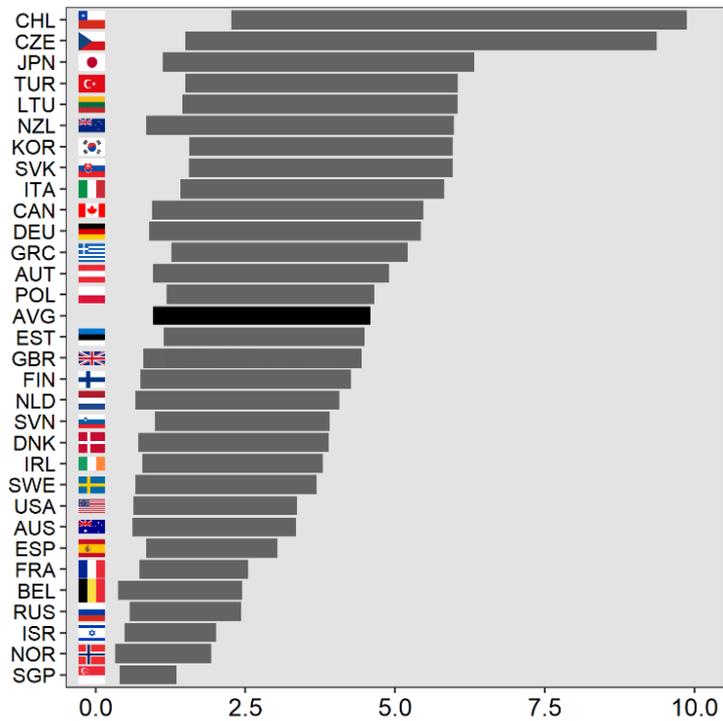
Direct cost: 27% of total cost

Cost higher for low/medium-ROA than on average across all occupations (high-ROA and low/medium-ROA).

# The COST TO SAFE HAVEN



Country-level **total** cost to nearest available destinations (% 1-year GDP, Lower and Upper bounds)



■ range, upper bound and lower bound estimates

- Approximate magnitude:
  - Lower bound average: 1%
  - Upper bound average: 5%
- Heterogeneity between countries: multiple channels at play.

**BUT not to be sustained in one year!**

Source: Authors' calculations based on Survey of Adult Skills (2012, 2015), Education at a Glance (2018) and OECD STAN

# Addressing some open questions



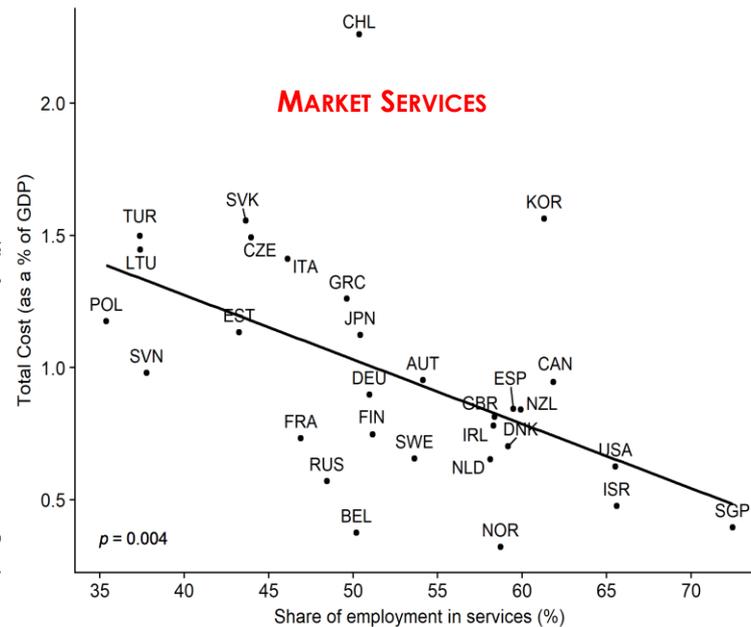
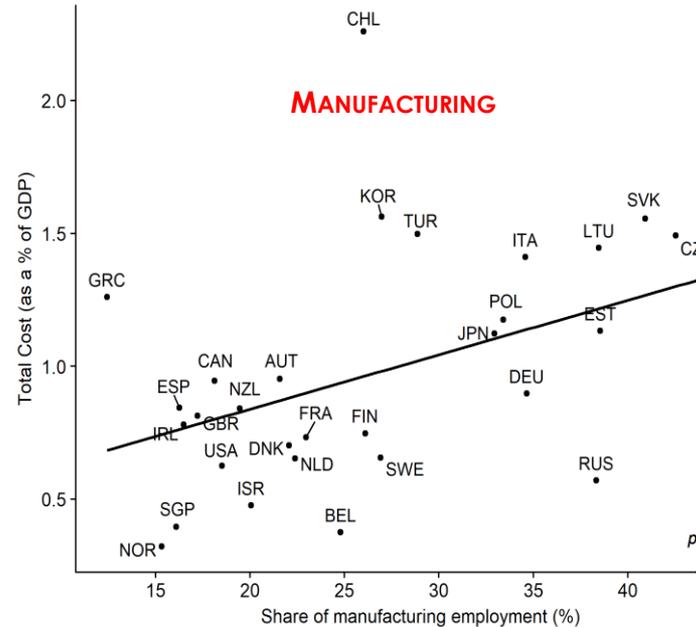
- **Cost of training task-based skills:** on-the-job (no indirect cost), using CVTS data for 2015.
  - For all high-ROA workers in a country => + 0.06% to 0.3% of GDP
- **Failure to complete training:** no consistent data across countries.
  - Use completion rates for secondary/tertiary education: ~75%
  - => + 25% in cost may be needed

# INDUSTRY MATTERS

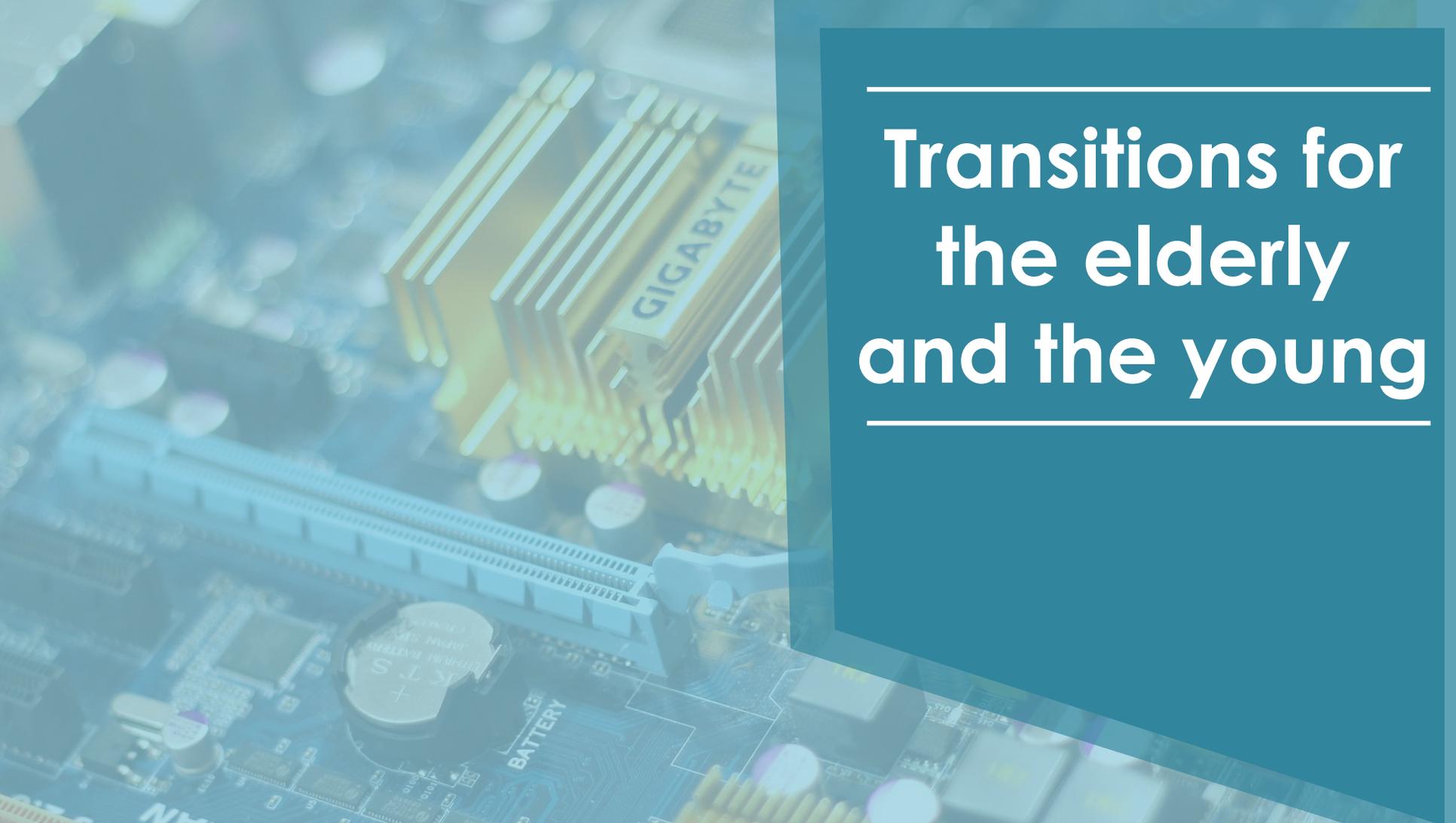
## for the cost of transition



Country-level minimum cost to safe haven and the share of high-ROA employment by industry



The **higher** the **share** of employment in **manufacturing**, the **higher** the country's **aggregate cost of training** all workers currently employed in high-ROA jobs.



---

# Transitions for the elderly and the young

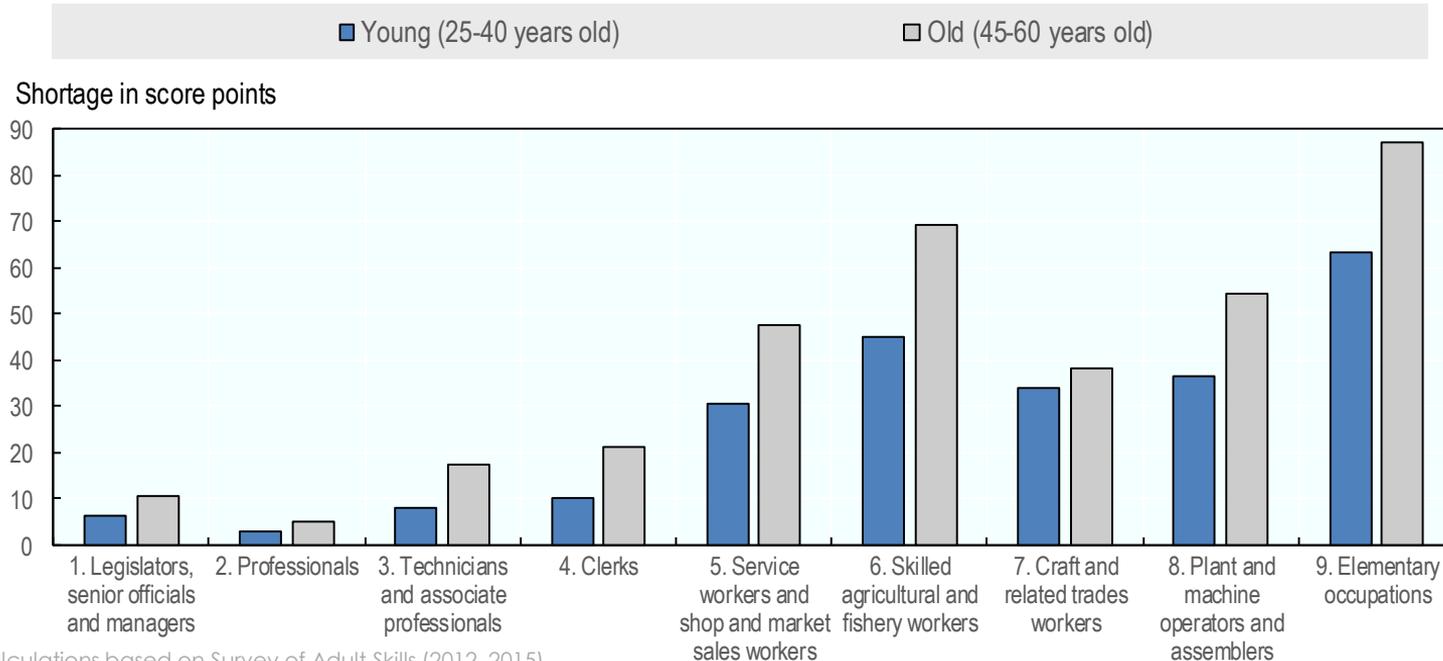
---

# Transitions differ between YOUNGER AND OLDER WORKERS?



Distinguish the **older** (45-60 years old) from **younger** (25-40 years old) workers.

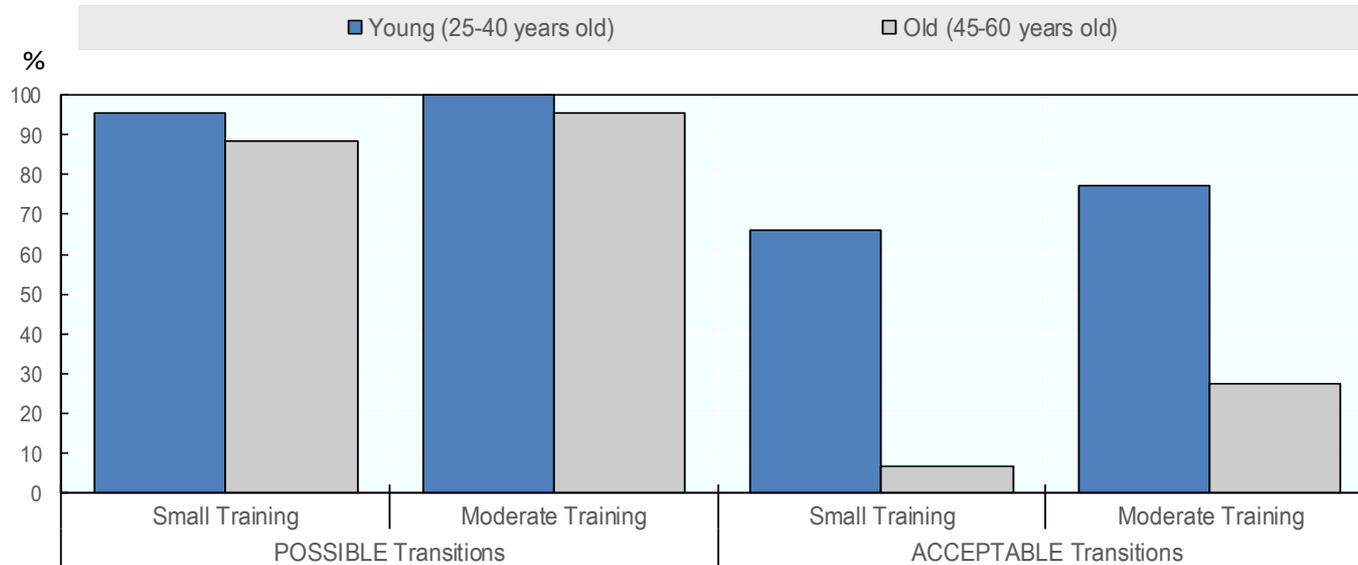
- Older workers have lower cognitive skills, and even lower if high-ROA.
- *Average shortage in cognitive skills for possible transitions:*



# Acceptable transitions for older workers are **HARDER TO FIND**



## PROPORTION OF POSSIBLE AND ACCEPTABLE TRANSITIONS, HIGH-ROA OCCUPATIONS by age category

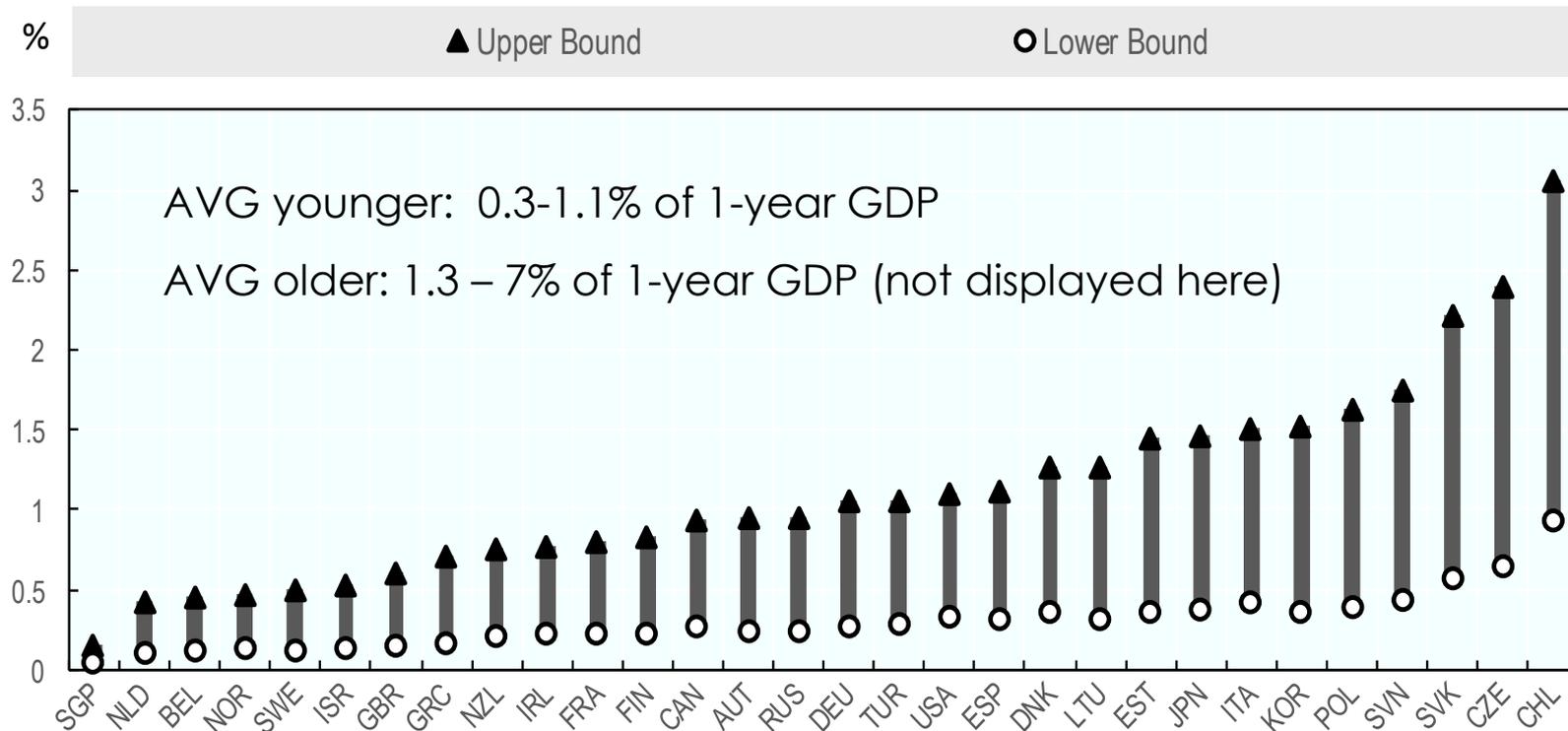


Older workers have lower average shares of possible and acceptable transitions (number of occupations which can be reached with retraining)

# The aggregate **COST** to “safe haven” is **HIGHER** for the **OLDER WORKERS**



Younger workers have lower per-person cost of mobility, no matter the length of the training spell considered.



# Conclusions



- Estimates of occupation & country specific cost of retraining, exploiting the occupational transitions identified in Bechichi et al. (2018)
- Resources for High-ROA workers only: **1-5% of 1-year GDP**. BUT:
  - Not all workers may need to transit at the same time.
  - Modelling assumptions impose caveats.
- Costs are increasing in the share of manufacturing employment.
- Harder to find *acceptable* transitions for the older workers, both high-ROA and not.
- Cost of mobility is higher for the older workers, both in per-person terms and country-wide.

# Policy discussion



- Are currently available resources sufficient? Are **education and training** systems ready or suitable for lifelong learning?
  - **Efficiency & effectiveness** of training systems: how to factor this in?
- Who should bear the **cost** of transition? **How to best split it?**
  - In-school, in vocational training, on the job, all?
- **Trade-off** between cost of training and unemployment benefits?  
Especially for older workers.
- Design for the older workers (1): group learning, targeted financial incentives. **Incentives to learn** (motivation, stigma).
- Design for older workers (2): distances and training for **task-based skills**.

# THANK YOU!

**Elodie Andrieu, Stéphanie Jamet, Luca Marcolin and Mariagrazia Squicciarini (2019)**

[“Occupational transitions: The cost of moving to a safe haven”](#)

**Nagui Bechichi, Stéphanie Jamet, Gustave Kenedi, Robert Grundke and Mariagrazia Squicciarini (2019)**

[“Occupational mobility, skills and training needs”](#)

[mariagrazia.squicciarini@oecd.org](mailto:mariagrazia.squicciarini@oecd.org)

<http://www.oecd.org/going-digital/>