



# AUTOMATION OF JOB TASKS AND POLARIZATION

Analysis of changes in the occupational structure of the Dutch labour market



Understanding the relation between technological innovations and social inequality

# AGENDA

- **Part 1:** Collection of automation risk indicators  
(Technequality – Work Package 1)
- **Part 2:** Application of automation risk indicators to the Dutch context
  - RQ: How are changes in the occupational composition of the Dutch labour related to the automation risk of occupational tasks?



# PART 1: COLLECTION OF AUTOMATION RISK INDICATORS

Technequality-Work Package 1

# MOTIVATION – TECHNEQUALITY AUTOMATION RISK INDICATORS

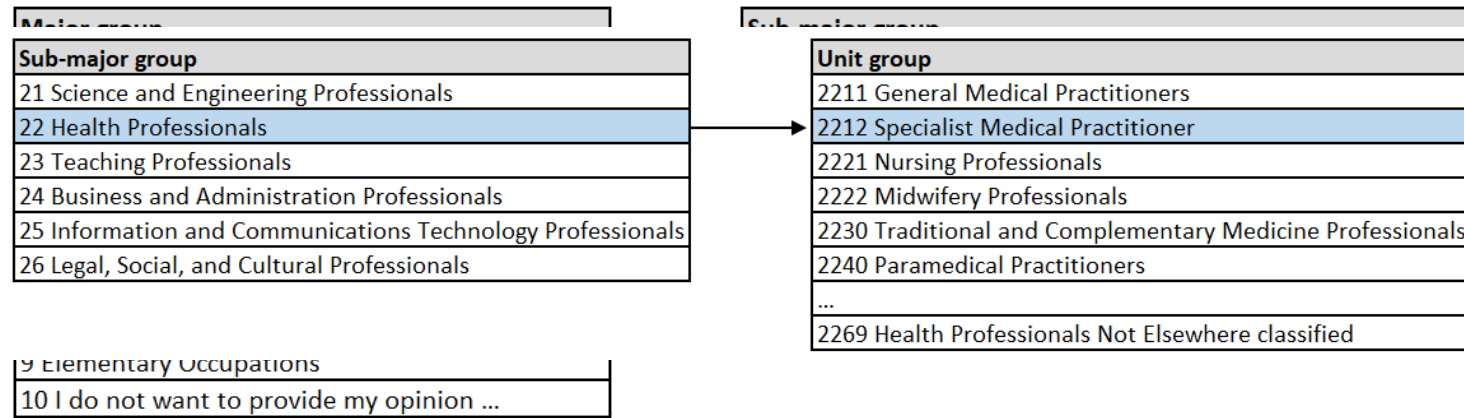
- Goal is to contribute to prior automation risk assessments:
  - Frey & Osborne (2017)
  - Nedelkoska & Quintini (2018)
- Prior estimates rely on experts' assessment of tasks that are (still) difficult to automate, i.e. engineering bottlenecks
- Our contribution:
  - Account for factors affecting the actual adoption of technologies (e.g. price and access to technology, legislation, availability of training data, managerial practices and culture)
  - Account for the fact that technology potential might have improved

# DATA COLLECTION PROCEDURE – TECHNEQUALITY AUTOMATION RISK INDICATORS

- **What:** gather country-specific automation risk assessments for 2-digit ISCO occupations via an expert questionnaire
- **Experts:** company directors (33.6%), managers (28.3%), HR professionals (5.1%)
- **8 countries:** CZ, DE, GB, ES, FR, NO, EE, NL
- **Survey dissemination:** Kantar Public → via local business panels
- **Data collection:** via the Internet, approach of respondents differed across local panels
- **Number of respondent:** 894 experts (964 started the questionnaire) provided 2,328 assessments

# QUESTIONNAIRE DESIGN – TECHNEQUALITY AUTOMATION RISK INDICATORS

- Respondents selected one or more (4-digit ISCO) occupations for which they felt able to assess how automation will affect the task content
- A stepwise approach guided respondents in their selection
  1. Select major group (9 groups)
  2. Select sub-major group (40 groups)
  3. Select unit groups (433 groups)



# QUESTIONNAIRE DESIGN – TECHNEQUALITY AUTOMATION RISK INDICATORS

*“Based on the most recent technological developments (e.g. in the fields of robotics, computerization, machine learning), could you indicate how much time (**workers will: not perform this task any longer, spend less time on this task, the same amount of time on this task, spend more time on this task, I don’t know**) workers will spend on the following tasks for the occupation of [selection occupation] in the next five years?*

*Please take into account factors that influence the actual adoption of technologies when providing your answer (i.e. the price of technologies; the design of the organisation, production processes and supply chains; legal constraints; and cultural expectations.”*

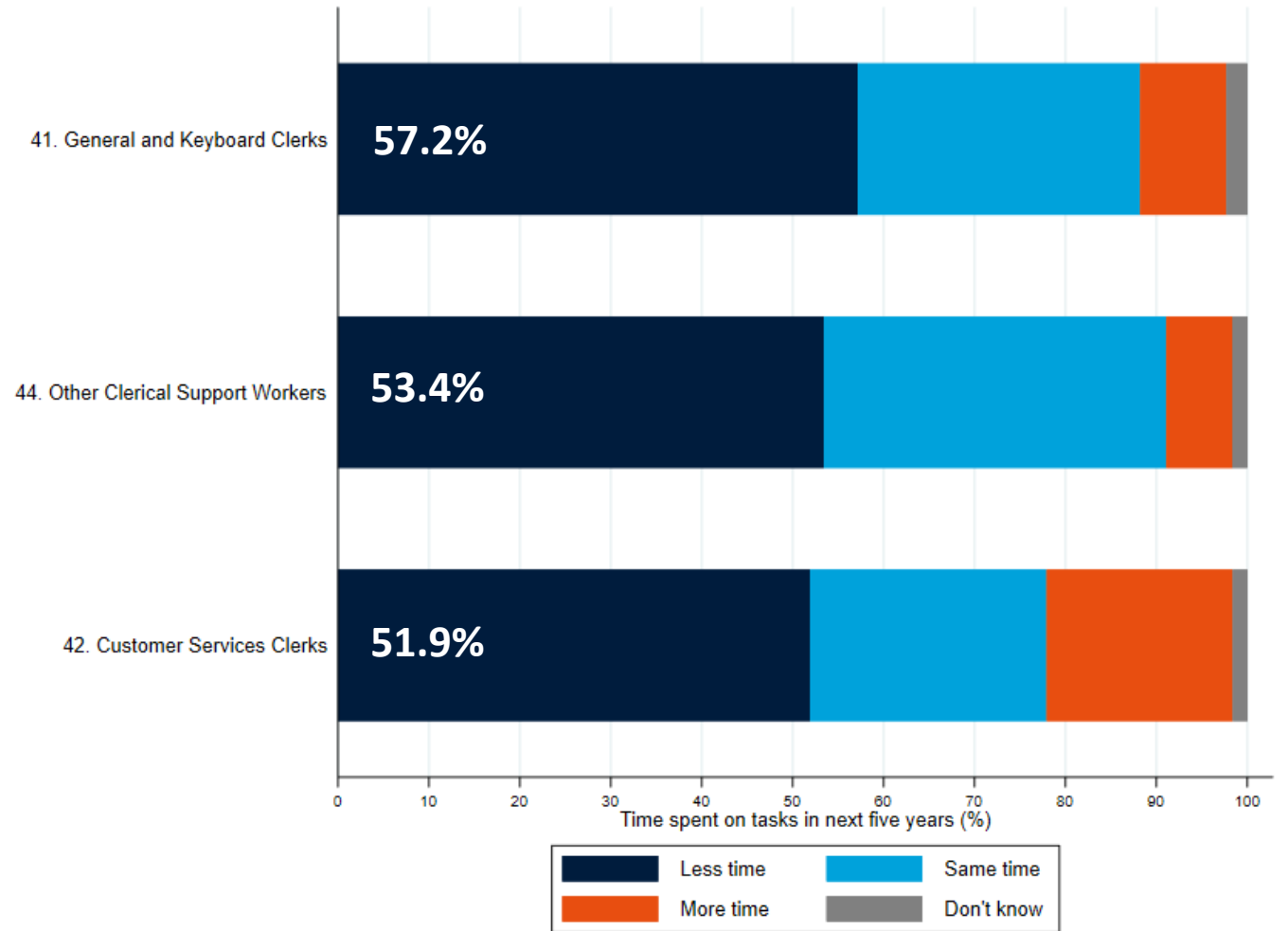
Examples of tasks associates with specialist medical practitioner:

- a) conducting physical examinations of patients and interviewing them and their families to determine their health status;
- b) considering medical information provided by a referring doctor or other health provider



# DESCRIPTIVE FINDINGS – TECHNEQUALITY AUTOMATION RISK INDICATORS

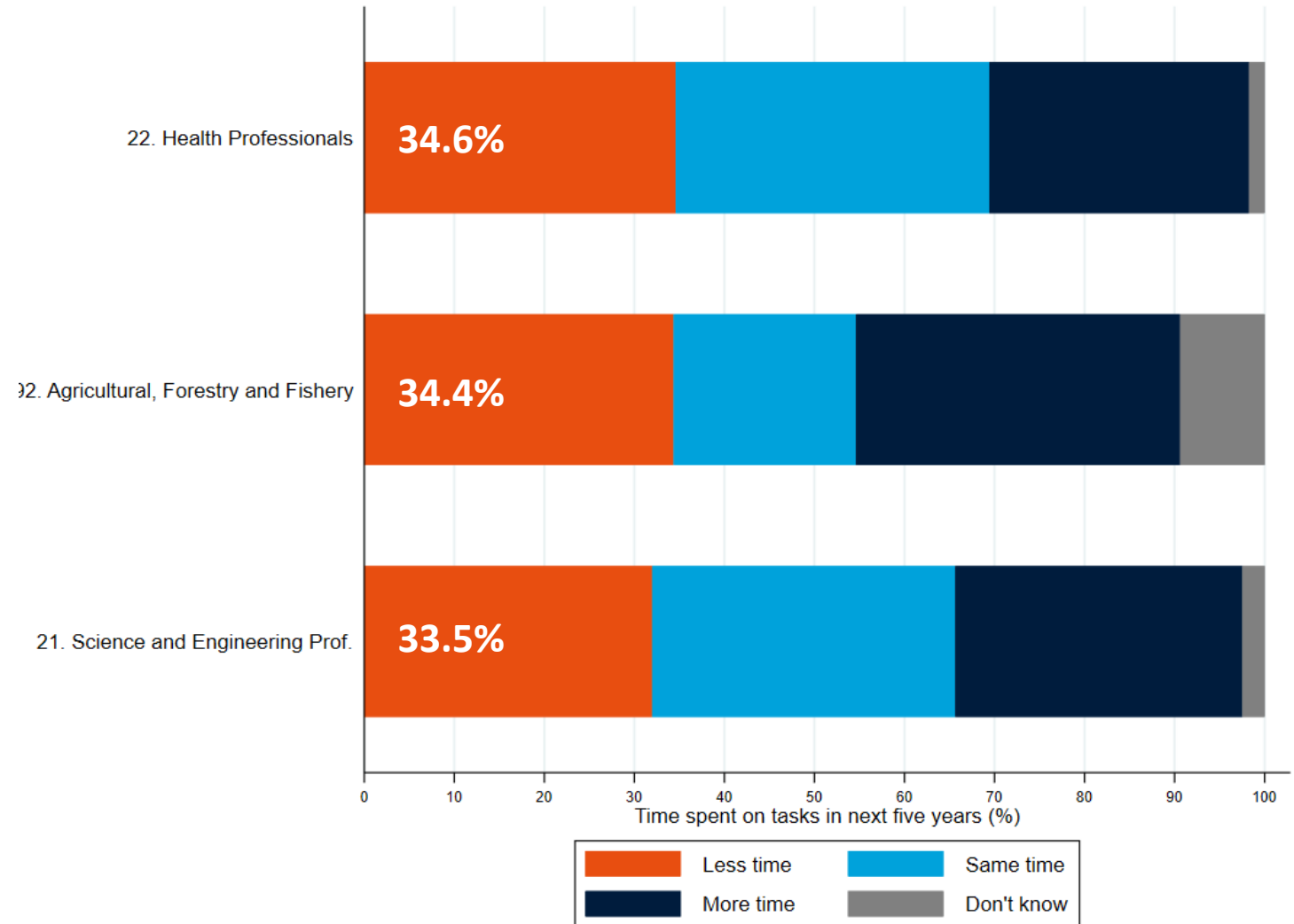
Top 3 occupations in which workers will spend less time on tasks





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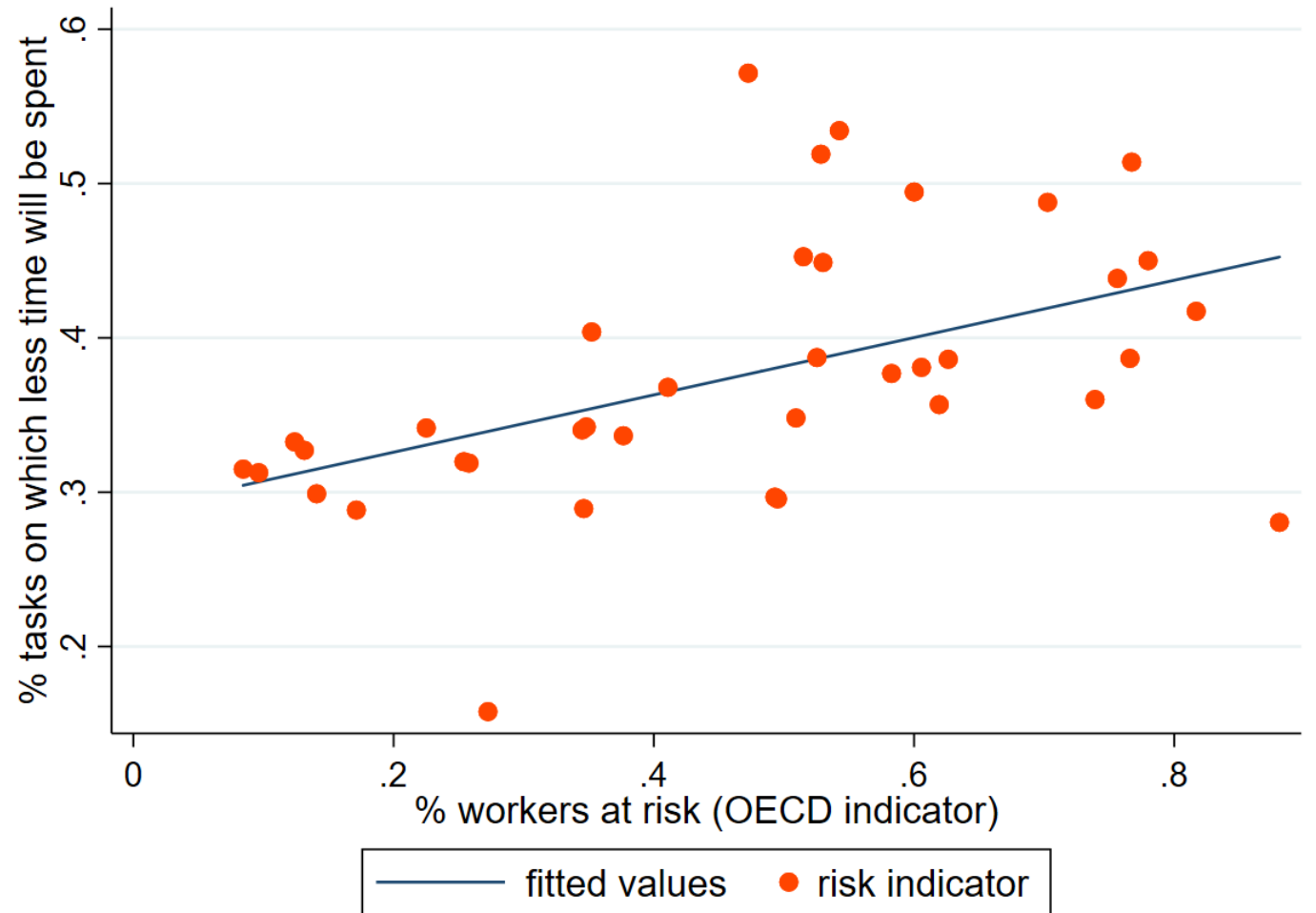
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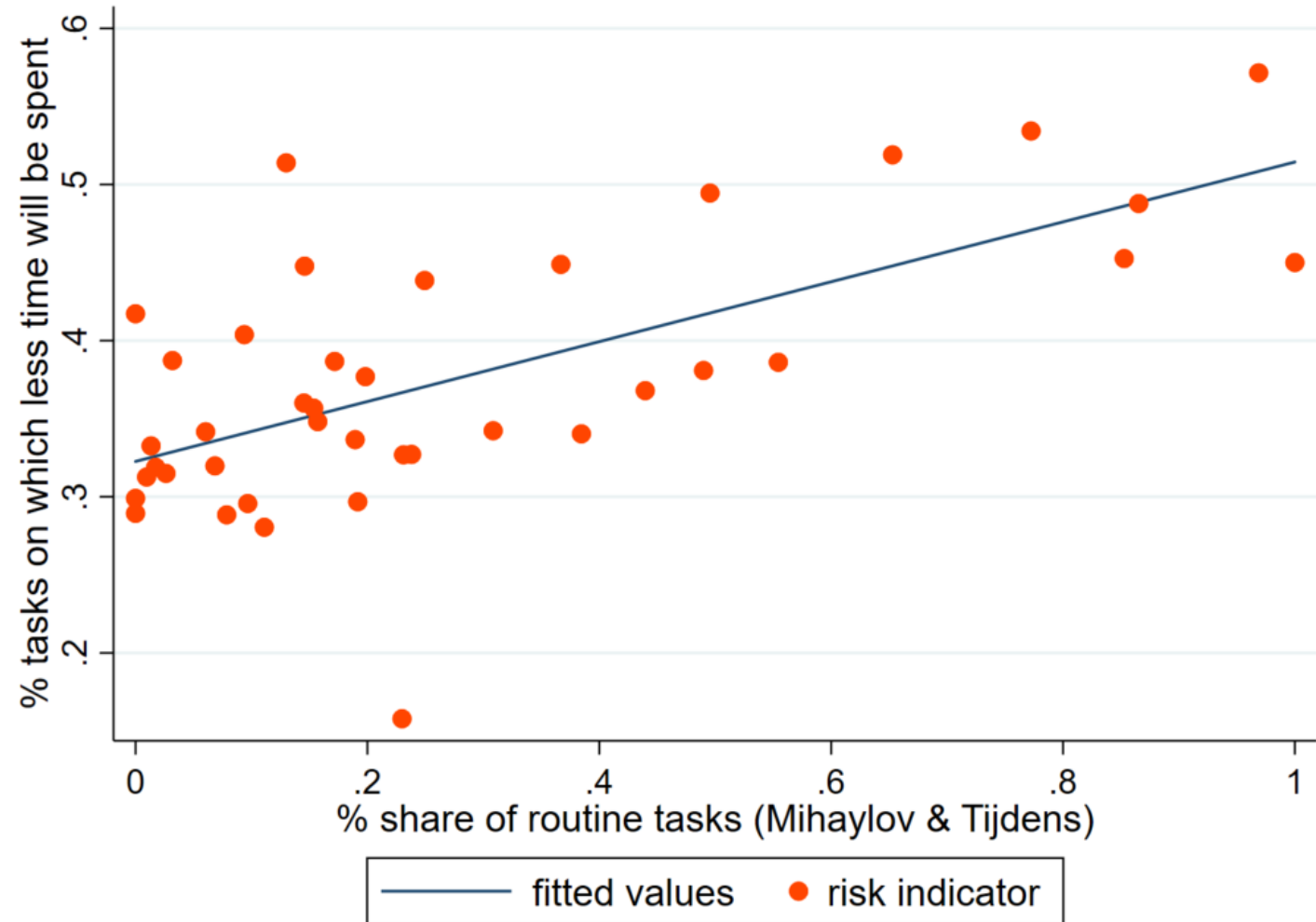
# DATA QUALITY CHECKS – TECHNEQUALITY AUTOMATION RISK INDICATORS

- Respondents were asked to what extent they agree with the following statements (totally agree, tend to agree, tend to disagree, totally disagree, don't know)  
→ the answers are correlated with the share of tasks on which workers will spend less time
- *“Due to the use of robots and artificial intelligence, more jobs will disappear than new jobs will be created”* ( $\rho=-0.004$ ;  $p=0.503$ )
- *“Robots are necessary as they can do jobs that are too hard or too dangerous for people”* ( $\rho=0.013$ ;  $p=0.550$ )

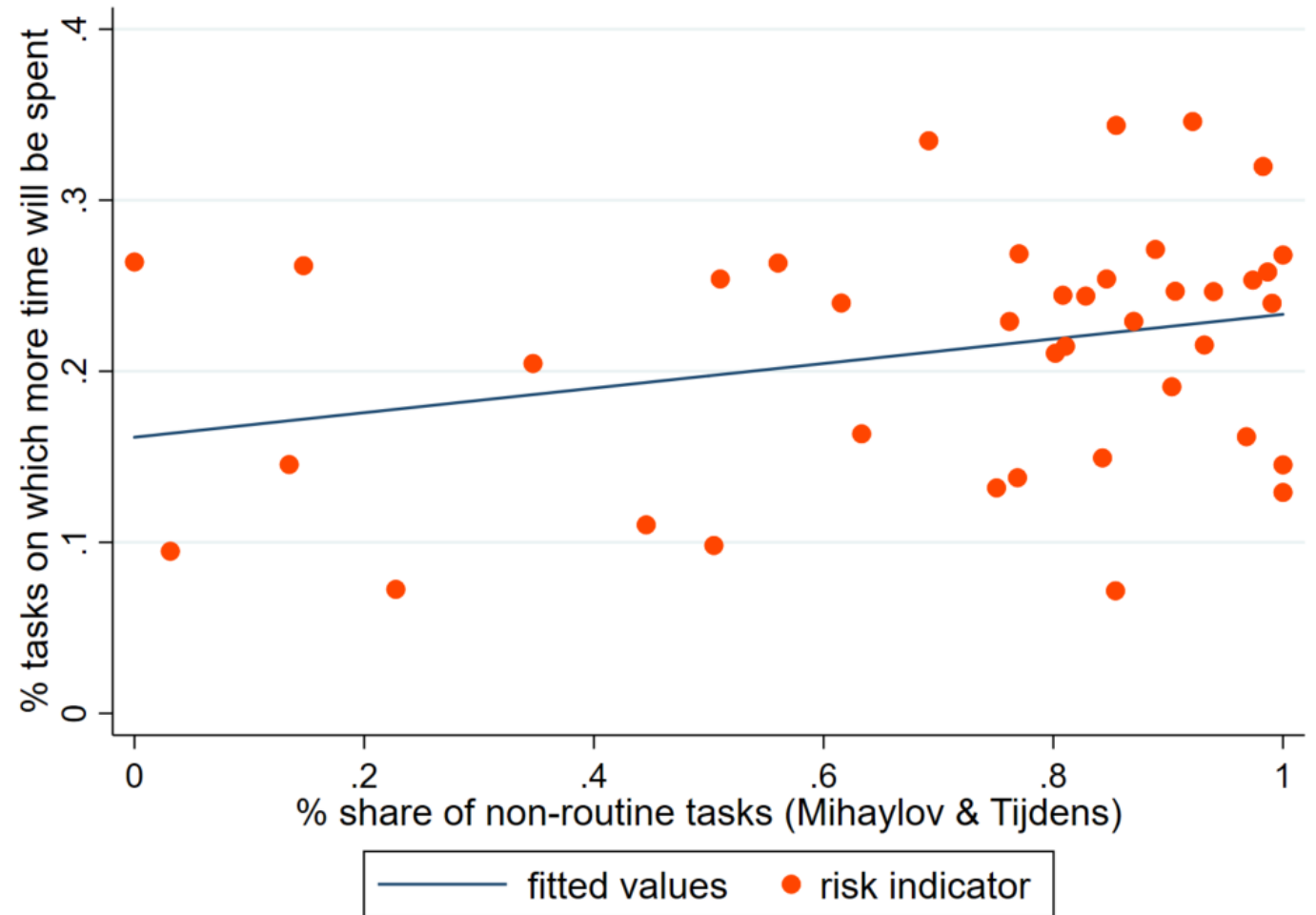
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DATA QUALITY  
CHECKS—  
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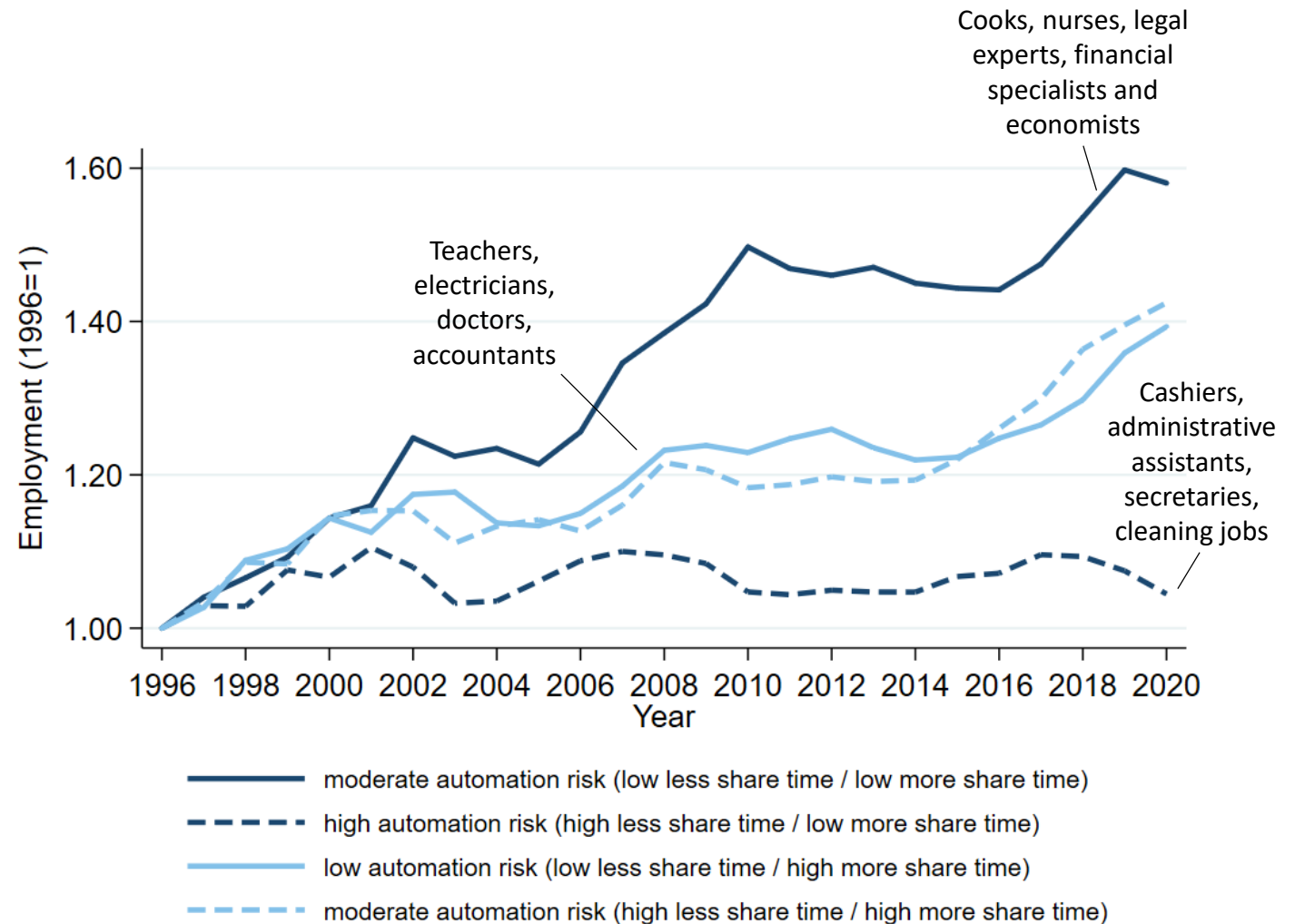


# PART 2: APPLICATION OF AUTOMATION RISK INDICATORS TO THE DUTCH CONTEXT

Automation risk and changes in the occupational composition

# APPLICATION OF AUTOMATION RISK INDICATORS

The development of employment by  
automation risk of occupations

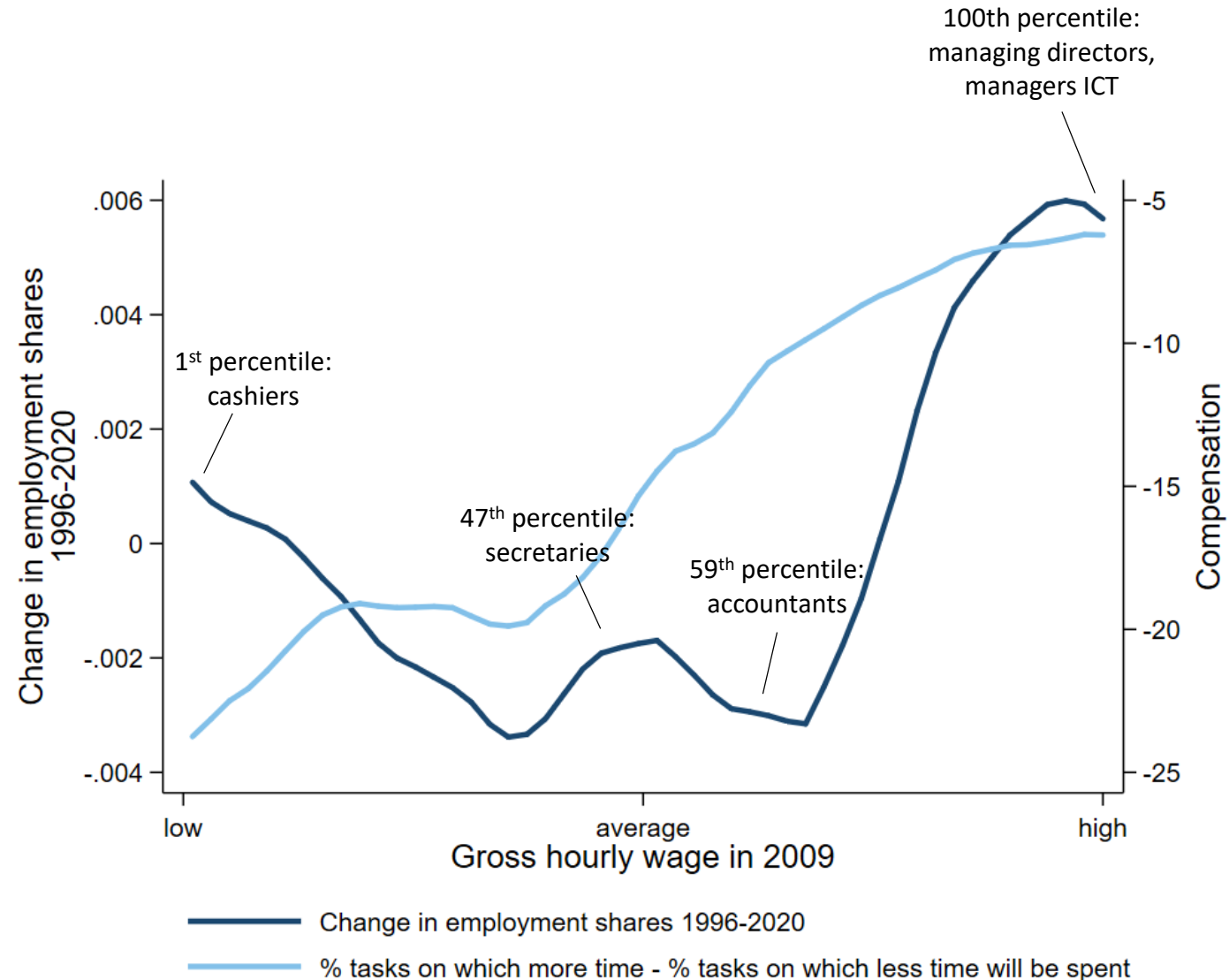


Source: EU-LFS, TECHNEQUALITY



# APPLICATION OF AUTOMATION RISK INDICATORS

Change in employment shares of occupations between the years 1996 and 2020, and routine task intensity of occupations, by their corresponding wage level in 2009



Source: EBB, SSB, TECHNEQUALITY



# THANK YOU



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