

# How Scary is the Risk of Automation? Evidence from a Large Scale Survey Experiment

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## Motivation

- Pre-Generative AI digital transformation: (Katz & Murphy, 1992; Autor et al., 2003)
  - Substitution of low-skilled and routine workers
  - Complementarity with high-skilled and non-routine cognitive workers

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  - Substitution of low-skilled and routine workers
  - Complementarity with high-skilled and non-routine cognitive workers
- Generative AI: Negative effects on high-skilled cognitive workers (e.g., Eloundou et al., 2023; Felten et al., 2023; Hui et al., 2023)
- Workers can respond to labor demand shifts by
  - retraining & upskilling (Di Giacomo & Lerch, 2023; Golin & Rauh, 2022; Hess et al., 2023; Lergeltporer et al., 2023)
  - adjusting their occupational choice (Goller et al., 2023)

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## Summary

**Research Question:** What are individuals willing to pay – in terms of lower wages – to reduce their exposure to this automation risk?

**Empirical Strategy & Data:** Discrete-choice experiment as part of a large-scale survey among 5,952 Swiss residents between 25 and 60

### Findings:

- On average, individuals are willing to accept a 17% lower annual gross wage to work in a job with a 10 ppt. lower automation risk
- The WTP is even higher for female, old and risk-averse individuals and those with a secondary level of education or below

## Discrete Choice Experiment

Survey respondents

- 1 are asked to imagine they now had a 40-year-old child
  - ◆ Random assignment of a daughter or son



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### Survey respondents

- 1 are asked to imagine they now had a 40-year-old child
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- 2 are presented with a choice set of two *career paths*
  - Career paths vary in 4 *attributes*: highest education, hierarchical position, annual gross wage, and job automation risk

## Discrete Choice Experiment

### Survey respondents

- 1 are asked to imagine they now had a 40-year-old child
  - Random assignment of a daughter or son
- 2 are presented with a choice set of two *career paths*
  - Career paths vary in 4 *attributes*: highest education, hierarchical position, annual gross wage, and job automation risk
- 3 need to choose the preferred career path for their child

## Discrete Choice Experiment

Example choice set:

*Imagine you had a 40-year-old daughter today.*

*Which of the two career paths would you prefer for her, career path A or career path B?*

	<b>Career path A</b>	<b>Career path B</b>
Highest educational attainment	University of applied sciences degree	Apprenticeship certificate
Hierarchical position	Low (without management position)	Low (without management position)
Annual gross wage (CHF)	100,000	130,000
Job automation risk	30%	45%

Attributes & Levels

## Discrete Choice Experiment

Why ask about their hypothetical 40-year-old child?

- 1 Hypothetical: Comparability
- 2 40-year-old: Close to career peak
- 3 Their child: Parental concern

## Discrete Choice Experiment

- ➡ Every respondent completes 7 varying choice sets
- ➡ Applying a mixed logit model, respondent choices are used to approximate their preferences for career path attributes

## Results

### Mixed logit estimates and willingness to pay (WTP) for career path attributes

	Coefficients	WTP
Lower automation risk (10 ppt.)	0.787*** (0.0243)	15333.1*** (366.8)
University degree	-0.560*** (0.0417)	-10910.1*** (912.3)
UAS degree	-0.0301 (0.0325)	-586.6 (638.6)
Top management position	0.0670** (0.0253)	1305.9** (485.2)
Annual gross wage (10,000 CHF)	0.513*** (0.0128)	
N	83,328	83,328

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Interactions

## Results: Non-linearity

### WTP for lower automation risk (10 ppt.)

	(1)	(2)
Overall	15333.1*** (366.8)	
Between 30% and 45%		11474.4*** (401.4)
Between 45% and 60%		18420.9*** (788.3)
N	83,328	83,328

# Results: Respondent characteristics

## Individual determinants of WTP for a *lower* automation risk

	Full Sample
Male	-686.4* (333.7)
Age: 35 - 49	717.8 (427.7)
Age: 50+	2102.0*** (482.1)
Below Secondary Degree	2367.7** (814.0)
Secondary Degree	1953.6*** (353.3)
Parent	-433.6 (358.1)
Trait: Risk-seeking	-989.5** (339.6)
Constant	15943.8*** (527.1)
N	5948

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001



## Results: Interactions

### WTP for lower automation risk with interactions

	(1)	(2)
Lower automation risk (10 ppt.)	15305.5*** (371.7)	13879.6*** (659.5)
Lower automation risk × University Degree		2439.8*** (550.5)
Lower automation risk × UAS Degree		71.91 (467.1)
Lower automation risk × Top Management Position		776.9* (302.6)
N	83,328	83,328

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

## Results: Summary

- On average, individuals are willing to accept a CHF 15'000 lower annual gross wage for a 10 ppt. lower risk of job automation
- Preference for reducing one's exposure rises with automation risk
- Males, risk-tolerant, younger and tertiary educated individuals show relatively less concern about automation threats
- Simultaneous university degree or top position increases value of job security against automation
- No differences in preferences depending on the gender of the hypothetical child

## Conclusions

- Job loss due to automation technology is considered a substantial threat
  - Typically implies diminished opportunities to secure similar positions
- Possible manifestations of individuals' identified WTP:
  - Switching to more secure occupations with lower pay
  - Investing time and money to train for a more secure occupation
  - Saving more to allow for early retirement, thus reducing the risk of future job automation
  - Preferences for policies and regulations to protect against job automation, even if economically disadvantageous

# Thank you!

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## DCE: Attribute-level universe [Back](#)

	<b>Attribute</b>	<b>Levels</b>
$wage_a$	Annual gross wage (CHF)	75'000, 100'000, 115'000, 130'000
$edu_a$	Highest educational attainment	<ul style="list-style-type: none"> <li>- University degree;</li> <li>- university of applied sciences degree;</li> <li>- apprenticeship certificate</li> </ul>
$pos_a$	Hierarchical position	<ul style="list-style-type: none"> <li>- Low (without management position);</li> <li>- high (top management)</li> </ul>
$arisk_a$	Job automation risk	30%, 45%, 60%
-	Job satisfaction	Satisfied
-	Weekly working time	42 hours

## Individual determinants of WTP for a *lower* automation risk

	Full sample	Daughter subsample	Son subsample
Male	-686.4* (333.7)	-457.7 (468.1)	-873.9 (475.5)
35–49	717.8 (427.7)	1131.3 (610.7)	291.9 (599.7)
50+	2102.0*** (482.1)	2621.3*** (690.3)	1641.3* (673.6)
Below secondary degree	2367.7** (814.0)	1813.3 (1114.0)	2860.3* (1188.5)
Secondary degree	1953.6*** (353.3)	1858.4*** (492.3)	2011.5*** (507.8)
Swiss citizen	1244.4** (384.3)	370.9 (560.0)	2102.4*** (530.9)
Parent	-433.6 (358.1)	-497.9 (512.9)	-435.9 (501.4)
Trait: risk-seeking	-989.5** (339.6)	-832.5 (481.4)	-1178.9* (480.6)
Constant	15943.8*** (527.1)	15783.0*** (746.7)	16160.1*** (747.5)
N	5948	2975	2973

## Individual determinants of WTP for a *lower* automation risk

