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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  - 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; Lergetporer 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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   ↦ 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?

	Career path A	**Career path 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***	15333.1***
	(0.0243)	(366.8)
University degree	-0.560***	-10910.1***
	(0.0417)	(912.3)
UAS degree	-0.0301	-586.6
	(0.0325)	(638.6)
Top management position	0.0670**	1305.9**
	(0.0253)	(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

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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

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Subsamples: Child gender | Distribution

Results: Interactions

WTP for lower automation risk with interactions

	(1)	(2)
Lower automation risk (10 ppt.)	15305.5***	13879.6***
	(371.7)	(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

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Reults: 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
  - $\rightarrow$ 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

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Thank you!

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DCE: Attribute-level universe

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	Attribute	**Levels**
$wage_a$	Annual gross wage (CHF)	75'000, 100'000, 115'000, 130'000
edu_a	Highest educational attainment	- University degree; - university of applied sciences degree; - apprenticeship certificate
pos_a	Hierarchical position	- Low (without management position); - high (top management)
$arisk_a$	Job automation risk	30%, 45%, 60%
-	Job satisfaction	Satisfied
-	Weekly working time	42 hours

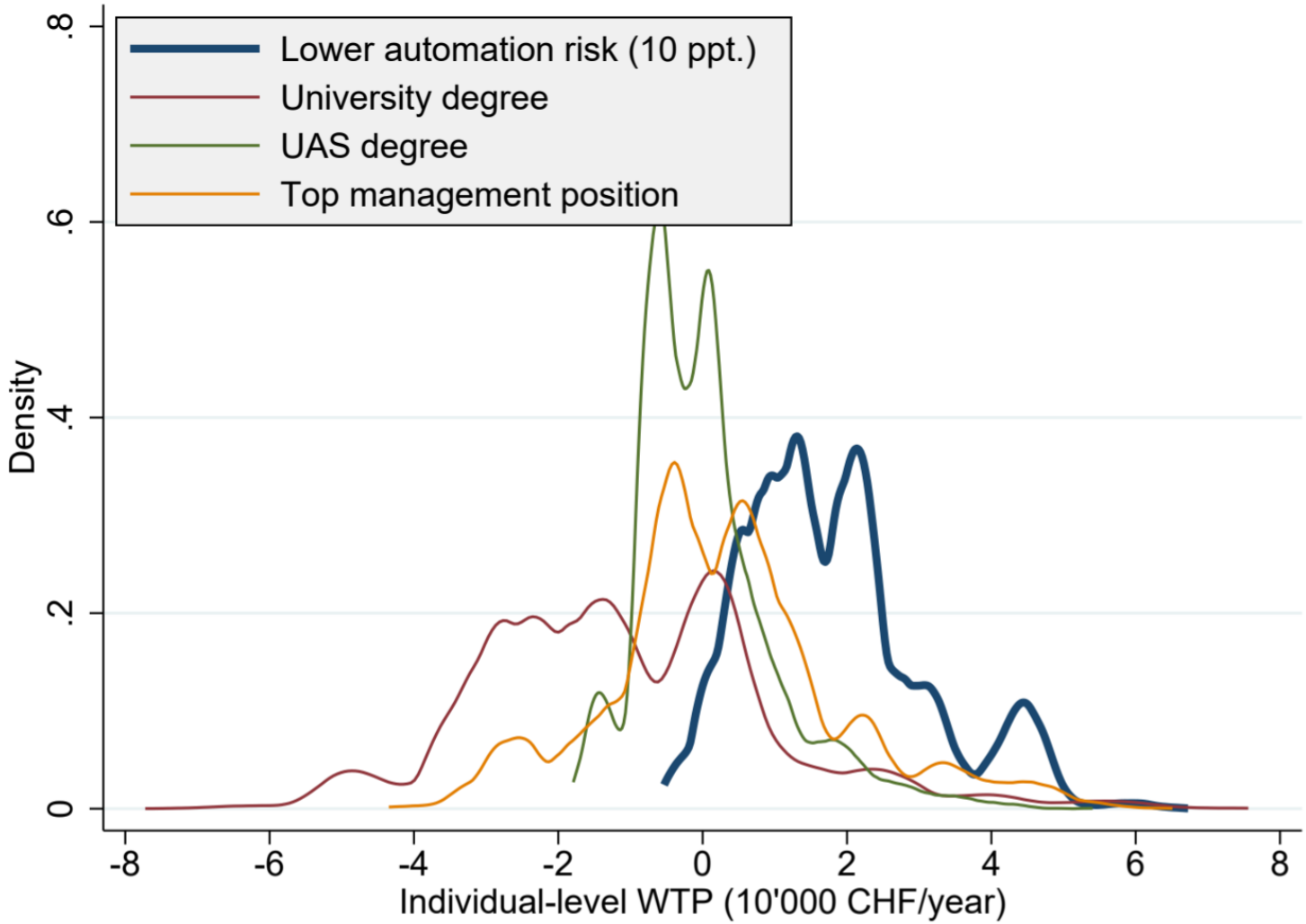
Results

Individual determinants of WTP for a *lower* automation risk

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

Results

Individual determinants of WTP for a *lower* automation risk



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