

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

Maria Cattaneo¹ **Christian Gschwendt**² Stefan C. Wolter³

¹SKBF Aarau

²University of Bern

³University of Bern, SKBF, CESifo, IZA

EEA Conference 2024

August 29, 2024

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
 - 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 & Rau, 2022; Hess et al., 2023; Lergetporer et al., 2023)
 - adjusting their occupational choice (Goller et al., 2023)
- What is the willingness to pay of individuals to reduce their exposure to automation risk?

Summary

Research Question: What is the willingness to pay (WTP) of individuals to reduce their exposure to 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
- 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?

	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

👉 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 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

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: 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

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!

Contact: christian.gschwendt@unibe.ch

Literature

- Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly journal of economics*, 118(4), 1279-1333.
- Di Giacomo, G., & Lerch, B. (2023). Automation and Human Capital Adjustment: The Effect of Robots on College Enrollment. *Journal of Human Resources*.
- Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). Gpts are gpts: An early look at the labor market impact potential of large language models. arXiv preprint arXiv:2303.10130.
- Felten, E. W., Raj, M., & Seamans, R. (2023). Occupational heterogeneity in exposure to generative ai. Available at SSRN 4414065.
- Golin, M., & Rauh, C. (2022). The Impact of Fear of Automation.
- Goller, D., Gschwendt C., & Wolter S., 2023. "This Time It's Different" – Generative Artificial Intelligence and Occupational Choice. *Discussion Paper* No. 16638. Institute of Labor Economics (IZA).
- Hess, P., Janssen, S., & Leber, U. (2023). The effect of automation technology on workers' training participation. *Economics of Education Review*, 96, 102438.
- Hui, X., Reshef, O., & Zhou, L. (2023). The Short-Term Effects of Generative Artificial Intelligence on Employment: Evidence from an Online Labor Market. Available at SSRN 4527336.
- Katz, L. F., & Murphy, K. M. (1992). Changes in relative wages, 1963-1987: supply and demand factors. *The quarterly journal of economics*, 107(1), 35-78.

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

	Attribute	Levels
$wage_a$	Annual gross wage (CHF)	75'000, 100'000, 115'000, 130'000
edu_a	Highest educational attainment	<ul style="list-style-type: none"> - University degree; - university of applied sciences degree; - apprenticeship certificate
pos_a	Hierarchical position	<ul style="list-style-type: none"> - Low (without management position); - high (top management)
$arisk_a$	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

