

BEYOND THE PROMISE OF AI, PRODUCTIVITY, AND THE FUTURE OF WORK

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APPENDIX A: ECONOMETRIC ANALYSIS OF THE IMPACT OF AI ON WORKERS

AI Data and variable construction

This section describes the data and construction of the main variables used in the empirical analysis. We first introduce the Danish Culture Habits Survey and explain how reported work-related AI use is measured. We then describe the linkage of survey responses to administrative register data, the construction of the labour-market outcomes and control variables, and the restrictions used to obtain the final analytical sample. Finally, we present descriptive statistics for the resulting sample, including baseline characteristics and patterns of reported work-related AI use.

A1.1 Survey data

The analysis uses data from the Danish Culture Habits Survey (Kulturvaneundersøgelsen), administered by Statistics Denmark. The survey is a quarterly, sample-based interview survey covering individuals aged 16 and above who reside in Denmark. The current version of the survey has been conducted since the first quarter of 2024.¹

Each quarter, Statistics Denmark draws a simple random sample of approximately 15,100 individuals from the Danish population register. Around 4,800 completed interviews are collected per quarter. Respondents are initially invited to complete the survey online through a computer-assisted web interview. Those who do not respond online may subsequently be contacted for a computer-assisted telephone interview. In 2025, no data was collected in the first quarter; instead, a double-sized sample was drawn in the second quarter.²

The questionnaire consists of a common module answered by all respondents and four submodules. Web respondents are assigned to one of the four submodules with equal probability, whereas telephone respondents answer only the common module.³ The questions used to measure AI use are included in one of these submodules.⁴ Consequently, the analytical sample is substantially smaller than the total number of respondents to the survey.

The survey also provides population weights intended to partly compensate for systematic non-response among individuals selected for the sample. Separate weights are constructed for the common

module and each of the four submodules. For the submodules, the weights are based on register information on gender, age, education and family income, and are designed to make respondents more closely resemble the Danish population along these observable dimensions.⁵

A1.2 Measurement of work-related AI use

Work-related AI use is measured using questions included in one of the four submodules. Respondents are first asked how frequently they have used AI as a tool during the preceding 12 months. Respondents reporting AI use are subsequently asked in which situations they typically use these tools, with multiple responses permitted. The available response categories include use in connection with work and use for writing job applications and CVs. The wording of the questions is unchanged across the 2024 and 2025 questionnaires, and the response categories used to identify work-related AI use are the same in both years.⁶

We construct an indicator of work-related AI use that equals one if an individual selects either “in connection with work” (I forbindelse med arbejde) or “for writing job applications and CVs” (Til at skrive jobansøgninger og CV). All other respondents who completed the relevant submodule are coded as zero. The zero category therefore includes respondents who report no AI use, respondents who report using AI only in other contexts, and respondents whose relevant responses are “don’t know” or “prefer not to answer”.

Because the questions refer to use during the 12 months preceding the survey, the measure does not identify the exact date at which an individual first began using AI for work-related purposes or whether such use was continuous throughout the period. The measurement of work-related AI use should therefore be interpreted as a measure of reported work-related AI use rather than of the timing of AI adoption. Throughout the policy study, we refer to respondents for whom the indicator equals one as AI users and all remaining respondents as other respondents.

A1.3 Register data and outcome variables

We link the survey responses to several administrative registers maintained by Statistics Denmark using deidentified personal identification numbers. The resulting monthly register panel covers November 2018 to November 2025, and all respondents in the analytical sample can be linked to the relevant registers.

Monthly labour-market outcomes are constructed using the Employment Statistics for Employees register (BFL).⁷ We consider two primary outcomes: earnings and employment. Earnings are measured as total monthly broad earnings across all jobs held by an individual. Our primary earnings outcome is the logarithm of monthly earnings and is therefore defined only for months with positive earnings. Employment is an indicator equal to one if the individual has positive recorded paid hours during the month and zero otherwise.

BFL also provides information on occupation.⁸ For individuals holding multiple jobs, monthly occupation is assigned based on the job accounting for the largest number of recorded paid hours. Occupation is classified according to the Danish version of ISCO-08.⁹

Demographic information is obtained from the Population Register (BEF), including date of birth and gender.¹⁰ Labour-market experience is obtained from the personal component of the Integrated Database for Labor Market Research (IDAP).¹¹

Further details on the underlying register variables and the construction of the analysis variables are provided in Appendix B.

A1.4 Sample construction

The sample is constructed from all seven rounds of the Culture Habits Survey from 2024 to 2025. Across these rounds, 37,594 completed interviews were collected.

The questions on AI are included in submodule 2.¹² A total of 7,309 respondents completed submodule 2. Some individuals completed the survey more than once during the sample period. For these individuals, we retain only their latest response, resulting in 7,301 unique respondents to submodule 2.

We further require individuals to be employed in October 2022, the calendar month preceding the release of ChatGPT in November 2022. Employment is defined as having positive recorded paid hours in that month. This leaves 4,321 individuals.

Finally, we restrict the sample to respondents aged 25-60 as of October 2022. This restriction yields a final analytical sample of 3,113 individuals.

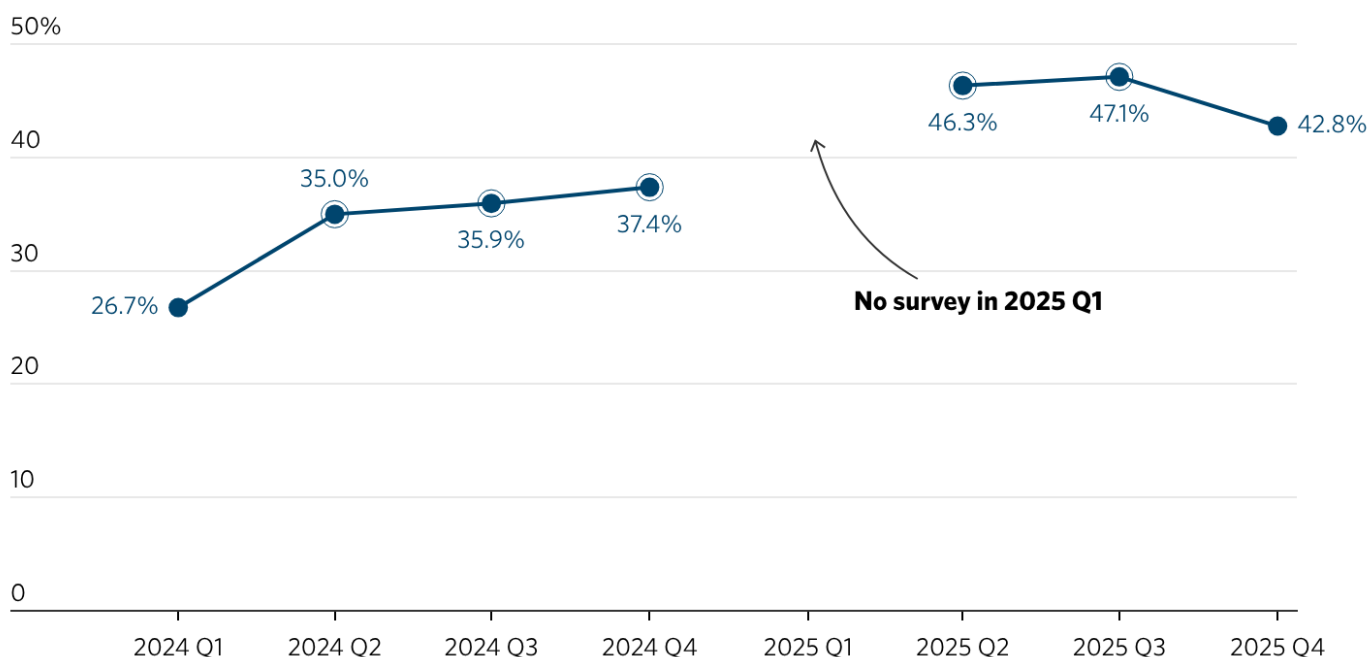
A1.5 Descriptive evidence

Figure A1 shows the weighted share of respondents classified as AI users in each survey round. The share increases from 26.7% in the first quarter of 2024 to between 35 and 37% during the remaining 2024 rounds. It rises further in 2025, reaching 46.3% in the second quarter and 47.1% in the third quarter, before declining to 42.8% in the fourth quarter. No survey was conducted in the first quarter of 2025.

Figure A1

Share of Respondents Reporting Work-Related AI Use

Weighted share of respondents reporting work-related AI use by survey round.



Anm.: The figure reports the weighted share of respondents classified as AI users in each survey round. AI users are respondents reporting AI use either in connection with work or for writing job applications and CVs. Estimates are weighted using the official survey weights.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Table A1

Weighted Descriptive Statistics by Reported Work-Related AI Use

Variable	Full sample	Other respondents	AI users	Difference
Average earnings, 1,000 DKK (Nov. 2021 - Oct. 2022)	38.3 (20.3)	34.4 (16.2)	44.3 (24.4)	9.9
Average log earnings (Nov. 2021 - Oct. 2022)	10.4 (0.6)	10.3 (0.6)	10.5 (0.6)	0.2
Average employment rate (%) (Nov. 2021 - Oct. 2022)	96.1	96.4	95.6	-0.8
Age, years (Oct. 2022)	43.9 (10.1)	45.2 (9.9)	41.7 (10.1)	-3.5
Total Labor Market Experience, years (Dec. 2021)	17.1 (11.6)	18.3 (11.7)	15.2 (11.2)	-3.1
Female (%)	48.4	52.1	42.5	-9.5
Occupation shares (%)				
Managers	4.2	2.5	7.0	4.5
Science and Engineering Professionals	3.3	2.2	5.2	3.0
Health Professionals	5.7	5.9	5.3	-0.6
Teaching Professionals	10.8	9.5	12.8	3.3
Business and Administration Professionals	4.0	2.2	6.6	4.4
Information and Communications Technology Professionals	3.3	1.3	6.3	5.0
Legal, Social and Cultural Professionals	4.6	3.4	6.4	3.0
Other Professionals	0.4	0.1	1.0	0.9
Technicians and Associate Professionals	11.4	10.0	13.6	3.5
Clerical Support Workers	9.0	8.0	10.6	2.5
Service and Sales Workers	13.0	16.2	8.1	-8.1
Manual, Production, and Elementary Occupations	17.6	24.6	6.6	-18.0
Occupation Not Classified	12.7	14.1	10.5	-3.6
Number of individuals	3,113	1,880	1,233	

Anm.: All statistics except the number of individuals are weighted using the official survey weights. Continuous variables are reported as weighted means with weighted standard deviations in parentheses. Employment rates, the female share, and occupation shares are reported in percent. The difference column reports AI users minus other respondents. Differences for variables reported in percent are expressed in percentage points. Occupational groups are based on DISCO-08. Major group 2 is disaggregated at the two-digit level, while major groups 6-9 are combined. Individuals without a classified DISCO-08 occupation are included under "Occupation Not Classified." Sample counts are unweighted.

Table: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Table A1 presents weighted descriptive statistics for the full analytical sample and separately for AI users and other respondents. The two groups differ along several pre-release characteristics. AI users have higher average earnings during the period from November 2021 to October 2022: average monthly earnings are 44,300 Danish kroner among AI users compared with 34,400 Danish kroner among other respondents, while average log earnings are 10.5 and 10.3, respectively. In contrast, average employment rates over the same period are similar across the two groups, at 95.6% among AI users and 96.4% among other respondents.

AI users are also younger and have less accumulated labour-market experience. Their average age in October 2022 is 41.7 years, compared with 45.2 years among other respondents, while average labour-market experience is 15.2 and 18.3 years, respectively. Women account for 42.5% of AI users and 52.1% of other respondents.

The occupational composition of the two groups also differs considerably. AI users are more strongly represented among managers and several professional occupations, particularly information and communications technology professionals, business and administration professionals, and science and engineering professionals. Conversely, service and sales workers and manual, production, and elementary occupations account for substantially smaller shares of AI users than of other respondents.

Appendix C provides additional descriptive evidence on the contexts and frequency of AI use, occupational differences in reported work-related AI use, and raw earnings and employment paths.

AI.6 Summary of data and variable construction

Taken together, the analytical sample consists of 3,113 respondents from the Danish Culture Habits Survey linked to monthly administrative register data from November 2018 to November 2025. Reported work-related AI use is measured

from subsequent survey responses and, therefore, identifies groups according to later reported use rather than the timing of individual adoption. AI users differ from other respondents along several pre-release characteristics, including earnings, age, gender, labour-market experience and occupational composition. At the same time, average pre-release employment rates are very similar across the two groups.

A2 Empirical strategy

Following Humlum and Vestergaard,¹³ we use the release of ChatGPT in November 2022 as a common event date. While this event occurred at the same time for all individuals, work-related AI use is measured subsequently through survey responses collected between March 2024 and December 2025. The survey identifies whether an individual reports work-related AI use during the 12 months preceding the survey but does not reveal the timing of initial adoption or whether use was continuous throughout this period.

The design therefore does not exploit variation in observed individual adoption dates and should not be interpreted as a conventional staggered-adoption design. Instead, it compares the evolution of labour-market outcomes around the release of ChatGPT between individuals classified according to subsequently reported work-related AI use. In particular, the comparison is between AI users and other respondents.

The event-study coefficients capture how the conditional difference in outcomes between these groups in each calendar month differs from the corresponding difference in November 2022, which serves as the omitted reference month. Post-release coefficients therefore indicate whether outcomes developed differently for individuals who subsequently report work-related AI use relative to other respondents following the release of ChatGPT. Pre-release coefficients describe differential outcome developments before November 2022 and provide information about whether the two groups followed similar trends prior to the release.

Because work-related AI use is measured after the event and individual adoption dates are unobserved, the coefficients do not directly identify the effect of beginning to use AI at a particular point in time. Rather, they capture differential labour-market developments around the release of ChatGPT between groups defined by subsequently reported work-related AI use.

A2.1 Regression specification

We estimate the following dynamic difference-in-differences specification:

$$Y_{it} = \alpha_i + \delta_t + \sum_{m \in M} \lambda'_m X_i \mathbf{1}\{t = m\} + \sum_{\substack{m \in M \\ m \neq 2022m11}} \beta_m A_i \mathbf{1}\{t = m\} + \epsilon_{it}.$$

Here, Y_{it} denotes the outcome of individual i in calendar month t . The model is estimated separately for log monthly earnings and employment. The earnings specification is estimated for person-months with positive earnings, while the employment specification includes all person-months. M denotes the set of calendar months in the estimation period, spanning November 2018 to November 2025. The term α_i denotes individual fixed effects, and the term δ_t denotes calendar-month fixed effects. ϵ_{it} is an error term.

A_i is a time-invariant indicator of reported work-related AI use. It equals one for individuals who report using AI either in connection with work or for writing job applications and CVs, and zero for all other respondents who completed the submodule. We refer to respondents with $A_i = 1$ as AI users and respondents with $A_i = 0$ as other respondents.

The vector X_i contains baseline characteristics measured prior to the release of ChatGPT. Thus, we allow for differential outcome developments associated with these observed characteristics to vary over time. Specifically, the relationship between outcomes and predetermined age and labour-market experience may vary flexibly across calendar months through month-specific linear interactions. The specification further includes gender-by-

calendar-month and occupation-by-calendar-month fixed effects, with occupation measured in October 2022.

The coefficients of interest are β_m . They measure the conditional difference in outcome developments between individuals reporting work-related AI use and other respondents in calendar month m , relative to the corresponding difference in November 2022. November 2022 is omitted and normalised to zero. All models are estimated by ordinary least squares, and standard errors are clustered at the individual level.

A2.2 Time aggregation and inference

To reduce month-to-month noise and facilitate interpretation, we aggregate the estimated monthly event-study coefficients into non-overlapping three- and six-month windows. Following the aggregation principle discussed by Baker et al.,¹⁴ these summary estimates are constructed directly from the underlying monthly event-study coefficients.

For an aggregation window g of length $h \in \{3, 6\}$, the aggregated coefficient is defined as

$$\hat{\beta}_g^{(h)} = \frac{1}{h} \sum_{m \in M_g^{(h)}} \hat{\beta}_m,$$

where $M_g^{(h)}$ denotes the set of h calendar months included in window g . Each aggregated coefficient is therefore an equally weighted average of either three- or six-monthly event-study coefficients from the underlying regression. The aggregation windows are constructed separately before and after the omitted reference month. Consequently, November 2022 is not included in any three- or six-month window.

The standard errors of the aggregated estimates are calculated using the full estimated variance-covariance matrix of the monthly coefficients and, therefore, account for covariance between coefficient estimates within each window. In addition to conventional pointwise 95% confidence intervals, we report simultaneous 95% confidence

bands to account for the fact that multiple event-study coefficients are examined jointly. Pointwise intervals are constructed to cover each coefficient separately with 95% confidence, whereas the simultaneous bands are constructed to cover the entire set of coefficients jointly with 95% confidence. We construct the simultaneous bands using the sup-t procedure of Montiel Olea and Plagborg-Møller;¹⁵ the resulting bands are typically wider than the corresponding pointwise confidence intervals.

A2.3 Weighting

Our main results are estimated using the official survey weights for submodule 2 of the Culture Habits Survey. These weights are designed to partly compensate for systematic non-response among individuals selected for the sample and are constructed using register information on gender, age, education and family income.¹⁶ Each respondent is assigned the weight corresponding to the survey round in which the retained response was collected. We apply the original weights as probability weights without further normalisation or recalibration to the analytical sample.

A2.4 Identification assumptions and limitations

A causal interpretation of the estimated coefficients requires that absent differential post-release effects associated with work-related AI use, labour-market outcomes for AI users and other respondents would have followed similar trajectories after November 2022, conditional on the included fixed effects and controls. This assumption may fail if the two groups are exposed to different post-event shocks or would otherwise have experienced different labour-market developments.

The pre-release coefficients provide evidence on differential outcome developments before November 2022. Estimated coefficients close to zero suggest similar pre-release trends for both groups. Systematic patterns would instead suggest that individuals who later report work-related AI use were already on different outcome paths before the

release of ChatGPT. However, pre-release estimates do not directly test the post-release parallel-trends assumption. Nor does a lack of statistically significant pre-release coefficients establish it, especially when estimates are imprecise.¹⁷

A central limitation is that work-related AI use is measured after the release of ChatGPT. Individuals are classified according to survey responses collected between March 2024 and December 2025. Each response refers to AI use during the preceding 12 months. Reported AI use may therefore depend on labour-market developments after November 2022. For example, changing occupation or employer may affect access to AI, while leaving employment may reduce opportunities to use AI at work. The AI use classification may therefore be endogenous to the outcomes, creating scope for selection and reverse causality.

Individual adoption dates are also unobserved. November 2022 provides a common event date, but respondents likely began using AI at different points in time. The event-study therefore relates outcomes around the release of ChatGPT to subsequently reported work-related AI use, rather than to individual adoption dates. Some post-event coefficients may therefore cover periods before particular respondents began using AI at work.

Finally, the log-earnings outcome is defined only for person-months with positive earnings. The earnings estimates therefore capture changes in earnings conditional on positive earnings. They may also reflect changes in the composition of individuals with positive earnings. We analyse employment separately to assess whether differential movements into or out of employment accompany the earnings results.

Taken together, the estimates should be interpreted as differential labour-market developments between individuals who subsequently report work-related AI use and other respondents, relative to November 2022.

A2.5 Summary of empirical strategy

In summary, the empirical design compares labour-market developments around the release of ChatGPT between AI users and other respondents, relative to the corresponding difference in November 2022 and conditional on the included fixed effects and baseline characteristics. The main results are reported as three- and six-month averages of the underlying monthly event-study coefficients, with both pointwise confidence intervals and simultaneous confidence bands. The pre-release coefficients provide evidence on whether the groups were already following different outcome paths before the event, while the post-release coefficients describe subsequent differential developments. Because work-related AI use is measured after November 2022 and individual adoption dates are unobserved, however, the estimates should not be interpreted as the causal effects of beginning to use AI. Instead, they describe differential labour-market developments between groups defined by subsequently reported work-related AI use.

A3 Results

This section presents the main empirical results. We begin with raw weighted earnings trends for AI users and other respondents to illustrate the underlying differences between the groups. We then turn to the event-study estimates for log earnings and employment, reported as six- and three-month averages of the underlying monthly coefficients.

A3.1 Weighted mean log earnings by reported work-related AI use

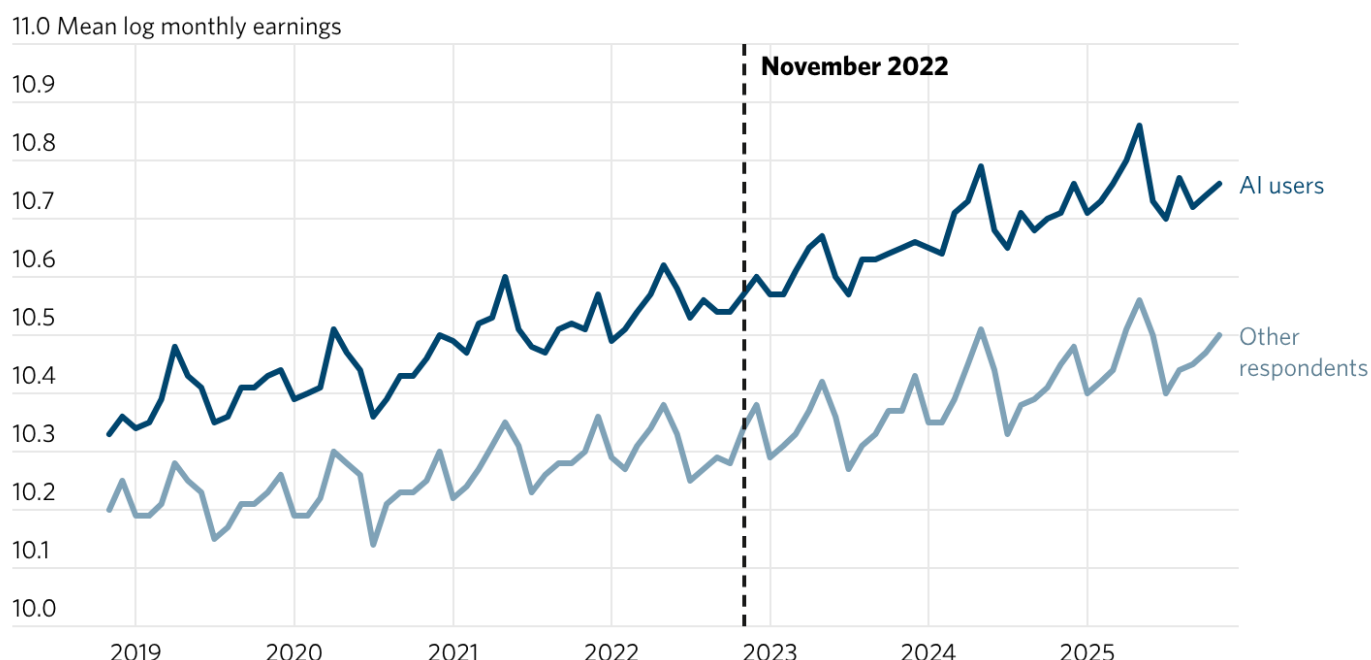
Figure A2 presents raw weighted mean log earnings for AI users and other respondents from November 2018 to November 2025. AI users have higher mean log earnings throughout the entire period, indicating that substantial earnings differences between the two groups predate the release of ChatGPT. In the 12 months immediately preceding November 2022, mean log earnings average approximately 10.5 among AI users and 10.3 among other respondents.

Mean log earnings increase over time for both groups. Following November 2022, the raw earnings gap appears somewhat larger than in the period immediately preceding the release, although there is considerable month-to-month variation and differences between the groups are already present before the event. Because the series are unadjusted for differences in observable characteristics and group classification is based on subsequent survey responses, the figure is descriptive. The event-study estimates below examine whether earnings developments differed between AI users and other respondents after accounting for the controls described in the Section A2.

Figure A2

Weighted Mean Log Earnings by Reported Work-Related AI Use

Monthly weighted averages, Nov. 2018 - Nov. 2025.



Anm.: The figure reports raw monthly weighted mean log earnings for AI users and other respondents in the analytical sample. Group classification is based on survey responses collected in 2024–2025 and therefore does not represent contemporaneous AI-use status in each month. Log earnings are defined only for months with positive earnings. Estimates are weighted using the official survey weights and are not regression-adjusted.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

A3.2 Event-study estimates of log earnings by reported work-related AI use

Figures A3 and A4 present the weighted event-study estimates for log earnings. Figure A3 reports six-month averages of the underlying monthly coefficients, while Figure A4 reports corresponding three-month averages. The six-month estimates provide a smoother representation of the overall development, whereas the three-month estimates allow the timing of the post-release pattern to be examined in greater detail. Appendix D reports the underlying monthly estimates.

The pre-release estimates provide little evidence of a systematic difference in log-earnings trends between AI users and other respondents. In the six-

month specification, all eight pre-release estimates are close to zero and both the pointwise confidence intervals and simultaneous confidence bands include zero. The three-month estimates tell a similar story: the coefficients fluctuate around zero throughout the pre-period, and none of the pointwise or simultaneous confidence intervals exclude zero.

After November 2022, the estimates are positive and for the most part increasing in magnitude. In the six-month specification, the first post-release estimate is 0.013 log points. The estimates subsequently rise to 0.033, 0.035 and 0.040 log points in the next three six-month windows. The latter corresponds to an approximately 4% increase in earnings difference between AI users and other respondents relative to the difference in November 2022. The estimate reaches 0.056 log points in months 25-30 after

the event, corresponding to an approximately 5.6% increase in earnings difference between AI users and other respondents relative to the difference in November 2022. This is the only six-month estimate for which both the pointwise confidence interval and the simultaneous confidence band exclude zero. The final six-month window remains positive at 0.031 log points, but both the pointwise confidence interval and the simultaneous confidence band include zero.

The three-month estimates show that the positive change in earnings difference between AI users and other respondents develops gradually rather than appearing immediately after November 2022. The first two post-release windows are estimated at 0.007 and 0.018 log points and are not statistically distinguishable from zero. The estimate then rises to 0.043 log points in months 7-9, with a pointwise confidence interval excluding zero. Positive

estimates persist through much of the remaining post-period, reaching 0.051 log points in months 16-18, 0.051 in months 25-27 and 0.061 in months 28-30. The latter corresponds to an approximately 6.1% increase in earnings difference between AI users and other respondents relative to the difference in November 2022. Several of these later estimates are statistically different from zero when assessing the pointwise confidence intervals, while the simultaneous confidence bands generally include zero.

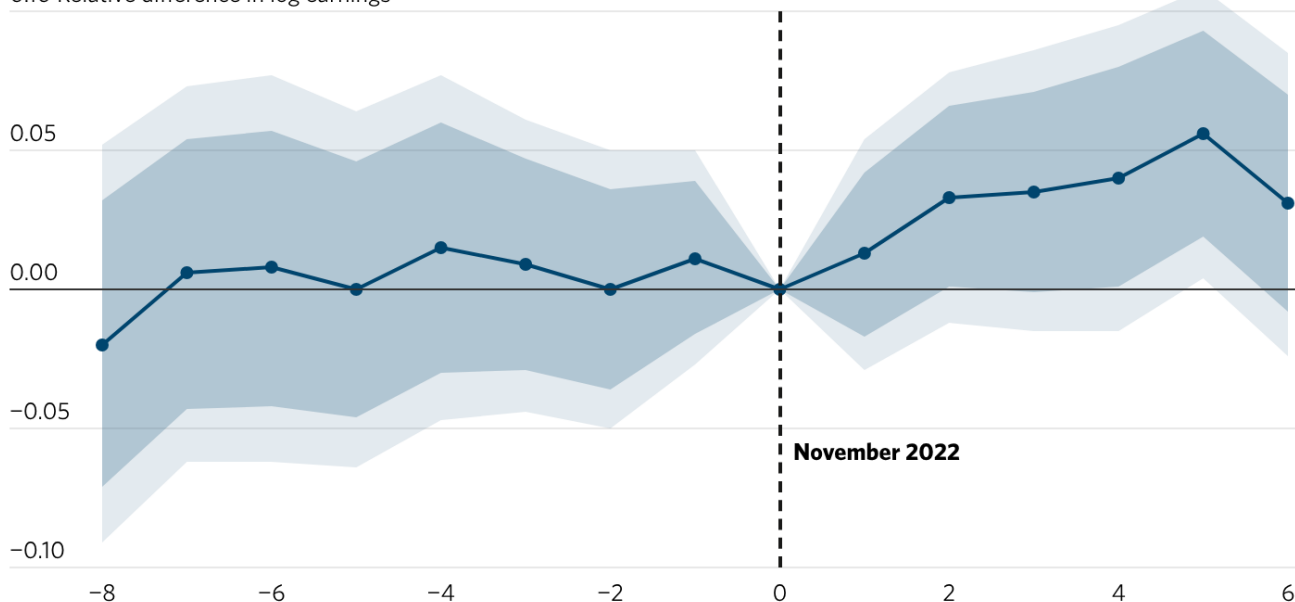
Taken together, the earnings estimates indicate an increasingly positive change in the log-earnings difference between AI users and other respondents after the release of ChatGPT, particularly later in the post-release period. The pre-release estimates do not display a comparable systematic pattern.

Figure A3

Difference in Log Earnings by Reported Work-Related AI Use

Weighted six-month averages of monthly event-study estimates, relative to November 2022.

0.10 Relative difference in log earnings



Anm.: Six-month averages of monthly event-study coefficients from the specification described in the section Empirical Strategy. The x-axis denotes six-month periods relative to November 2022, the omitted reference month. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

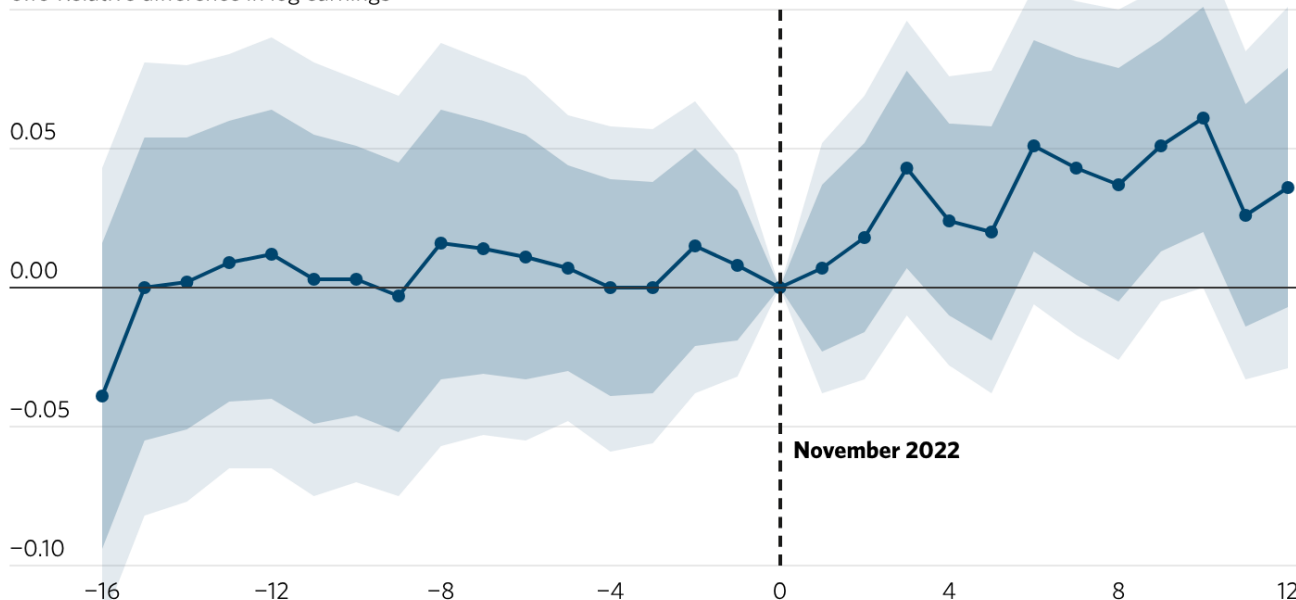
Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure A4

Difference in Log Earnings by Reported Work-Related AI Use

Weighted three-month averages of monthly event-study estimates, relative to November 2022.

0.10 Relative difference in log earnings



Anm.: Three-month averages of monthly event-study coefficients from the specification described in the section Empirical Strategy. The x-axis denotes six-month periods relative to November 2022, the omitted reference month. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

A3.3 Event-study estimates of employment rate by reported work-related AI use

Figures A5 and A6 present the weighted event-study estimates for the employment rate. Figure A5 reports six-month averages of the underlying monthly coefficients, while Figure A6 reports corresponding three-month averages. The coefficients measure changes in the employment rate difference between AI users and other respondents relative to the difference in November 2022.

The pre-release estimates are consistently negative, although none are statistically distinguishable from zero using either the pointwise confidence intervals or the simultaneous confidence bands. In the six-month specification, the estimates range from -0.006 to -0.023 . This implies that the employment rate difference between AI users and other

respondents is approximately 0.6 to 2.3 percentage points lower than in November 2022. The most negative estimates occur around two years before November 2022. The estimates then move gradually toward zero as the event approaches. The three-month estimates reveal a similar pattern.

Following November 2022, the employment estimates initially remain close to zero. In the six-month specification, the estimates are -0.003 , 0.001 and -0.002 during the first 18 post-release months. They subsequently become positive, rising to 0.014 in months 19–24 and 0.023 in months 25–30. The latter corresponds to a 2.3 percentage point increase in the employment rate difference between AI users and other respondents, relative to November 2022, and the pointwise 95% confidence interval excludes zero. Its simultaneous confidence band, however, includes zero. The estimate remains

positive at 0.021 during months 31-36, although the pointwise confidence interval again includes zero.

The three-month estimates also clearly show that the positive change in the employment rate difference is concentrated in the later post-release period. Estimates remain close to zero through approximately the first year and a half after November 2022 before becoming positive and generally increasing in magnitude. The largest estimate is 0.031 in months 28-30, corresponding to a 3.1 percentage point increase in the employment rate difference between AI users and other respondents, relative to November 2022. Its pointwise confidence interval excludes zero, whereas the simultaneous band does not. The final two three-month estimates

remain positive, at 0.022 and 0.021, but are not statistically distinguishable from zero.

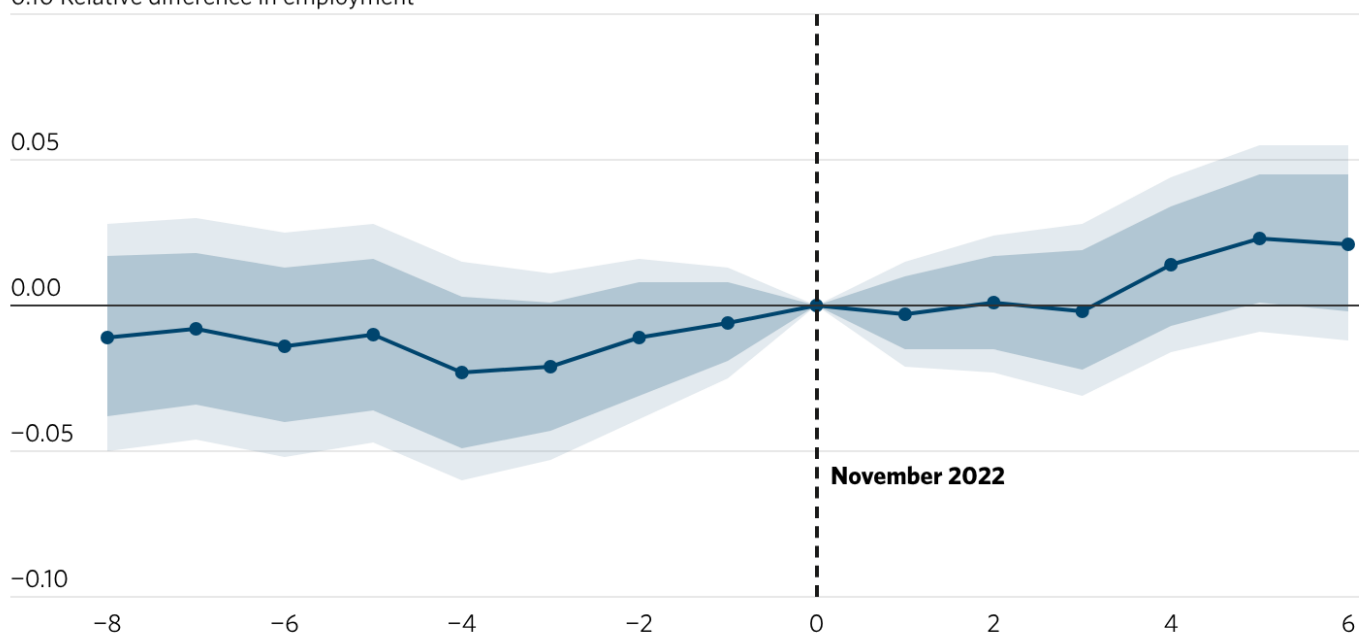
Taken together, the employment estimates indicate that the employment rate difference between AI users and other respondents becomes more positive in the later post-release period, beginning roughly two years after the release of ChatGPT. However, the employment results warrant caution because the pre-release coefficients display a visible negative pattern, even though none of the pre-release estimates are statistically different from zero. Moreover, none of the post-release employment estimates are statistically different from zero when evaluated using the simultaneous confidence bands.

Figure A5

Difference in Employment Rate by Reported Work-Related AI Use

Weighted six-month averages of monthly event-study estimates, relative to November 2022.

0.10 Relative difference in employment



Anm.: Six-month averages of monthly event-study coefficients from the specification described in the Empirical Strategy section. The x-axis denotes months relative to November 2022, the omitted reference month. A coefficient of 0.01 corresponds to a 1 percentage-point difference in the employment rate. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

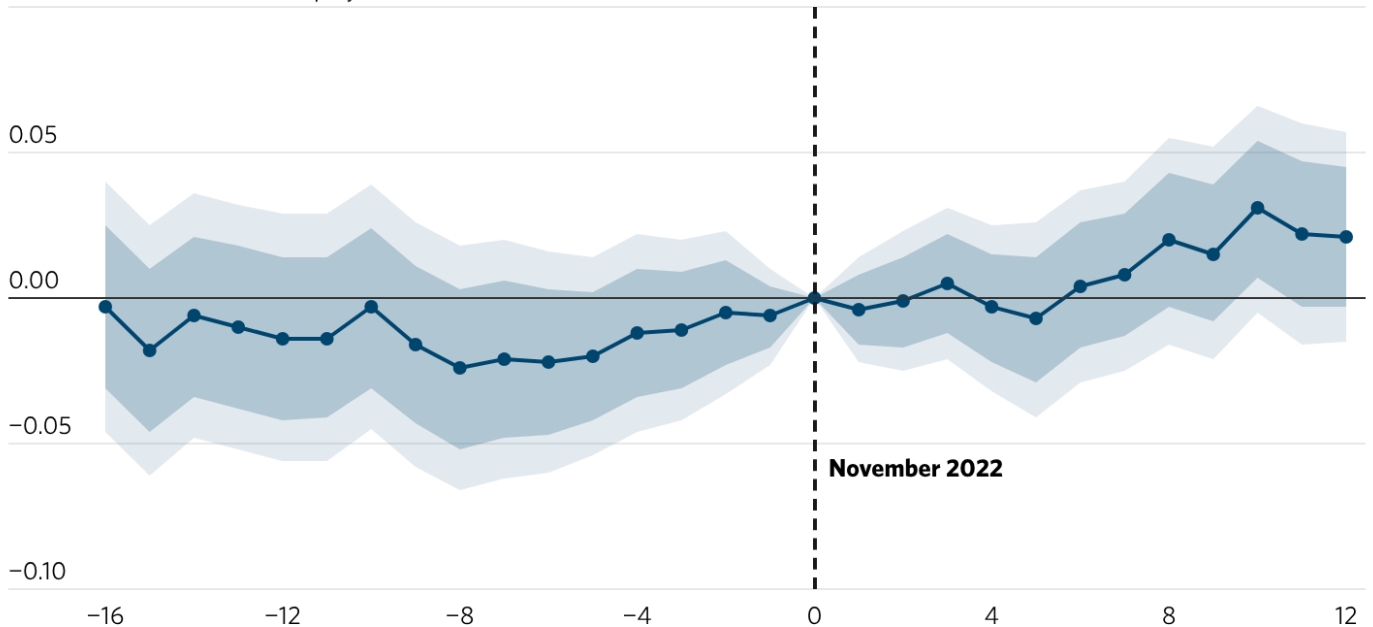
Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure A6

Difference in Employment Rate by Reported Work-Related AI Use

Weighted three-month averages of monthly event-study estimates, relative to November 2022.

0.10 Relative difference in employment



Anm.: Three-month averages of monthly event-study coefficients from the specification described in the Empirical Strategy section. The x-axis denotes months relative to November 2022, the omitted reference month. A coefficient of 0.01 corresponds to a 1 percentage-point difference in the employment rate. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

A3.4 Summary of results

Taken together, the results point to positive labour-market developments for AI users relative to other respondents in the post-release period, with the clearest evidence appearing in log earnings. The earnings estimates are close to zero throughout the pre-release period and become positive and increasing in magnitude after November 2022. The largest estimates occur roughly 2-2.5 years after the event. Employment shows a similar late positive pattern, but the evidence is weaker: the pre-release coefficients are consistently negative, and none of the post-release estimates exclude zero under the simultaneous confidence bands. The results, therefore, provide stronger evidence of a post-release change in earnings difference between AI

users and other respondents than in the employment rate difference. Given the subsequent measurement of work-related AI use and the absence of individual adoption dates, these patterns should be interpreted as changes in the differences between the two groups rather than as causal effects of AI adoption.

APPENDIX B: MATERIAL

B1 Documentation for the Danish culture habits survey

The questions used to construct reported work-related AI use are included in submodule 2 of the Danish Culture Habits Survey. The questionnaire consists of a common module answered by all respondents and four submodules, each administered to a randomly selected quarter of respondents completing the survey by web interview. The AI section begins with the introductory text: The next questions concern your use of artificial intelligence.

Respondents are first asked about their frequency of AI use during the preceding 12 months. The questionnaire explicitly asks respondents to think of generative AI tools and language models, such as ChatGPT, Bard, Bing, Descript, Midjourney, Grammarly and MyAI, and states that they should consider use in any context. The variable is M2_some_AI_freq.

Respondents who report some AI use in the first question, namely, response categories 1-6, are subsequently asked about the situations in which they typically use AI. This is a multiple-response question, recorded in M2_some_ai_brug. The questionnaire randomises context responses 1-5, while “other situations”, “don’t know” and “prefer not to answer” remain fixed. Table B1 reproduces the two questions and their response categories.

We define an individual as an AI user if the respondent selects either response 2, “for writing job applications and CVs” (Til at skrive jobansøgninger og CV), or response 3, “in connection with work” (I forbindelse med arbejde), in M2_some_ai_brug. Respondents who select neither category are classified as other respondents. Respondents reporting no AI use in the preceding 12 months, having never used AI, or answering “don’t know” or “prefer not to answer” to the frequency question are not asked the context question and are likewise classified as other respondents. The other-respondent category, therefore, also includes respondents who report AI use only in contexts other than work or job applications/CV.

Table B1

Survey Questions Used to Construct Reported Work-Related AI Use

Danish Culture Habits Survey, 2025.

Variable	Question	Response categories
M2_some_AI_freq	How often have you used artificial intelligence as a tool during the past 12 months? Clarification: Think of generative AI tools and language models, e.g. ChatGPT, Bard, Bing, Descript, Midjourney, Grammarly, MyAI. Regardless of the context in which you may use them.	1. One or more times a day 2. 4-6 times a week 3. 1-3 times a week 4. 1-3 times a month 5. 2-5 times every six months 6. 1-3 times during the past 12 months 7. I have not done this during the past 12 months 8. I have never done this 99. Don't know 88. Prefer not to answer
M2_some_ai_brug	In which situations do you typically use artificial intelligence, generative AI tools, or language models as a tool? Instruction: Multiple responses permitted.	1. For private purposes or private tasks 2. For writing job applications and CVs 3. In connection with work 4. In connection with school or education 5. As a hobby or interest 6. In other situations 9. Don't know 8. Prefer not to answer

Anm.: The table reproduces the questions used to construct reported work-related AI use in the 2025 Danish Culture Habits Survey. English translations are provided by the authors. The AI-frequency question refers to use during the preceding 12 months and across all contexts. The context question is asked only of respondents reporting AI use in frequency categories 1-6 and permits multiple responses.

Table: Arbejderbevægelsens Erhvervsråd (AE) • Source: Statistics Denmark (2025a), Questionnaire for the Danish Culture Habits Survey 2025.

B2 Documentation for registers and variables

This appendix provides additional documentation on the administrative registers and variable construction used in the analysis. It describes the underlying register sources, the construction of the main labour-market outcomes, and the coding of occupational and demographic characteristics. Table B2 provides a summary of all variables included in the analysis.

Table B2

Register Sources and Construction of Analysis Variables

Analysis variable	Register/source	Construction
Monthly earnings	BFL	Broad earnings (AJO_BREDT_LOENBELOEB) summed across all jobs within each individual-month. Measured in nominal DKK.
Log monthly earnings	BFL	Natural logarithm of total monthly broad earnings. Defined only for individual-months with positive earnings.
Employment	BFL	Indicator equal to one if total recorded paid hours across all jobs are positive in a given month and zero otherwise.
Paid hours	BFL	Total recorded paid hours summed across all jobs within each individual-month.
Monthly occupation	BFL / DISCO-08	For individuals with multiple jobs, occupation is assigned based on the job accounting for the largest number of recorded paid hours in the month.
Baseline occupation	BFL / DISCO-08	Occupation measured in October 2022 and used as a time-invariant control in the regressions.
Age	BEF	Calculated from date of birth and measured in October 2022.
Gender	BEF	Register-recorded gender.
Labor market experience	IDAP	Cumulative labor-market experience measured in December 2021 and expressed in years.

Tabel: Arbejderbevægelsens Erhvervsråd (AE)

B2.1 Earnings and employment

Monthly earnings and employment information are obtained from the BFL register.¹⁸ The earnings measure is based on broad earnings (AJO_BREDET_LOENBELOEB), which includes A- and B-income, labour-market contributions, ATP contributions, and the taxable value of employee benefits.¹⁹ Earnings are summed across all jobs held by an individual within each calendar month and are measured in nominal Danish kroner. The earnings outcome used in the analysis is the natural logarithm of monthly broad earnings and is therefore observed only in months in which earnings are positive.

Employment is constructed from recorded paid hours. An individual is classified as employed in a given month if the sum of paid hours across all jobs is positive and as non-employed otherwise. The paid-hours outcome is constructed by summing recorded hours across all jobs within each individual month.

B2.2 Occupational classification

Occupational information is obtained from BFL and classified according to the Danish version of ISCO-08.²⁰ For individuals holding multiple jobs within a month, occupation is assigned based on the job accounting for the largest number of recorded paid hours. The regressions use occupation measured in October 2022 as a time-invariant characteristic.

The occupational classification is based on DISCO-08 major groups and selected subgroups. Managers, technicians and associate professionals; clerical support workers; and service and sales workers enter as separate categories. Major group 2 (Professionals) is disaggregated into the six two-digit groups 21-26, while remaining occupations within major group 2 are grouped as "Other Professionals." Major groups 6-9 are combined into a single category labelled "Manual, Production, and Elementary Occupations". Individuals without a classified DISCO-08 occupation are retained in a separate category.

B2.3 Demographic characteristics and labour-market experience

Demographic information is obtained from BEF, which provides date of birth and gender.²¹ Age is calculated at the individual level and measured in October 2022.

Labour-market experience is obtained from the personal component of IDAP²² and measured in December 2021. The measure combines estimated labour-market experience accumulated from 1980 onward (ERHVER) with labour-market experience accumulated before 1980 (ERHVER79) and is expressed in years.²³ It is therefore intended to capture cumulative labour-market experience prior to the event period.

APPENDIX C: ADDITIONAL DESCRIPTIVE EVIDENCE

This appendix provides supplementary descriptive evidence on reported work-related AI use and labour-market outcomes. It presents the contexts and frequency of AI use among AI users, differences in reported work-related AI use across occupations, and raw weighted earnings and employment paths for AI users and other respondents. These figures complement the descriptive evidence presented in the main text.

Figure C1

Contexts of AI Use Among AI Users

Weighted share of respondents classified as AI users.



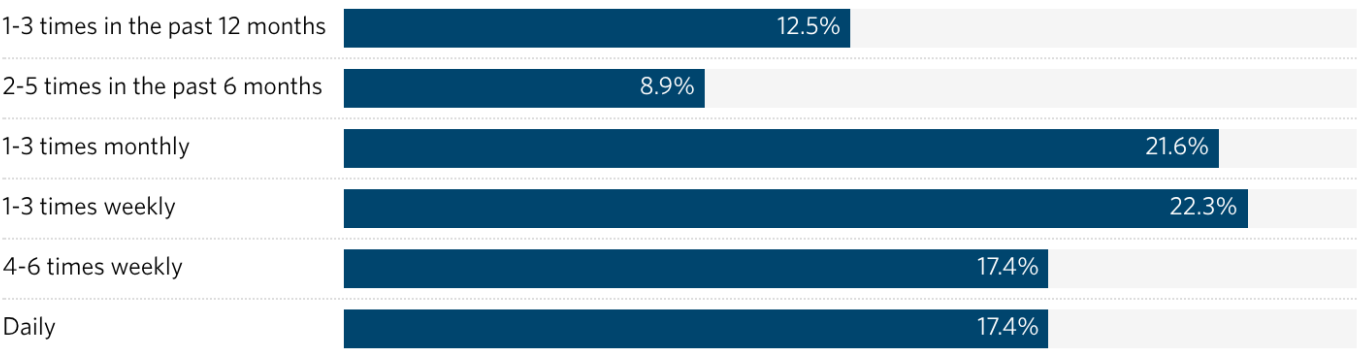
Anm.: The figure reports the weighted distribution of AI-use contexts among respondents classified as AI users. "Work only" denotes respondents reporting AI use in connection with work but not for writing job applications and CVs. "Job applications/CVs only" denotes respondents reporting the latter but not work-related use. "Both" denotes respondents reporting both. Estimates are weighted using the official survey weights.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure C2

Overall Frequency of AI Use Among AI Users

Weighted share of respondents classified as AI users.



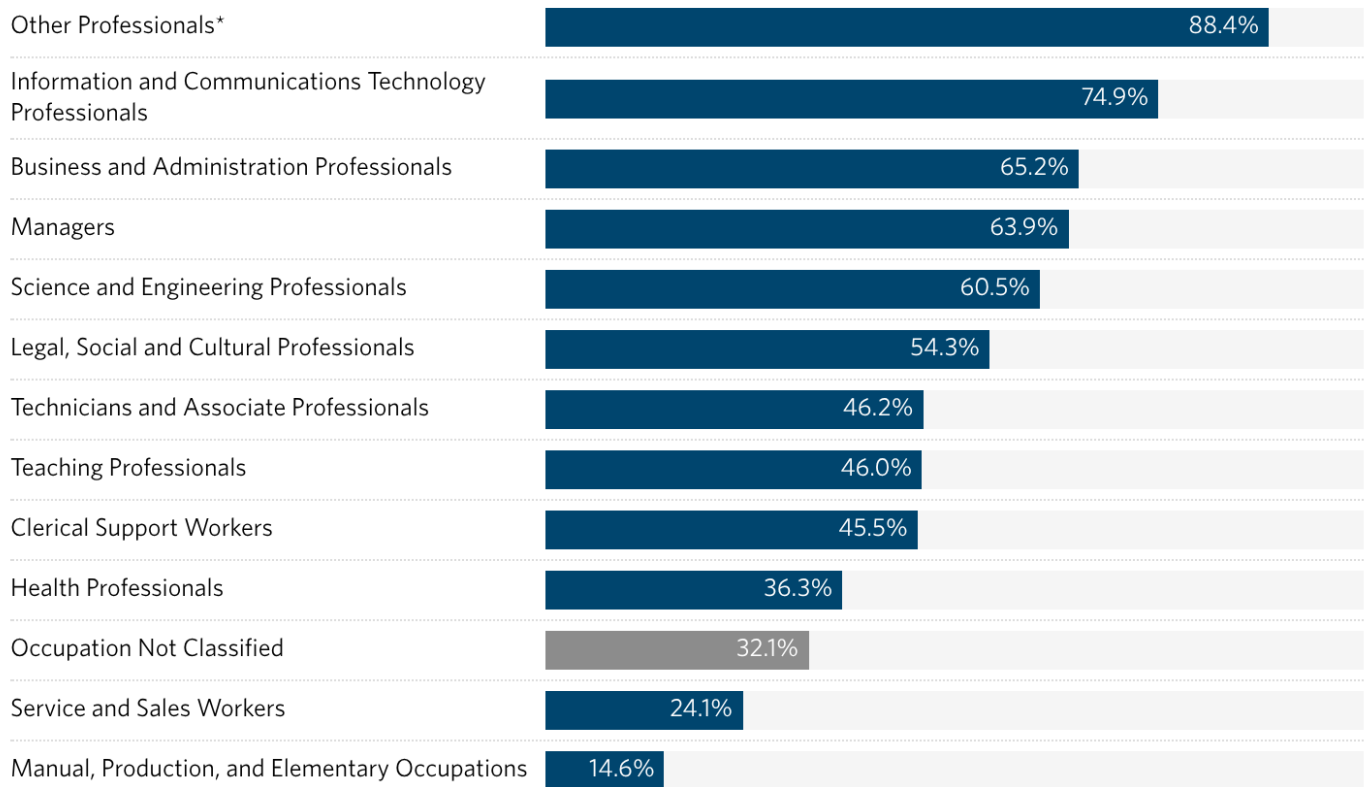
Anm.: The figure reports the weighted distribution of overall AI-use frequency among respondents classified as AI users. The frequency measure refers to AI use across all contexts and is not restricted to work-related use. Estimates are weighted using the official survey weights. Shares may not sum to 100 due to rounding.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure C3

Share of Respondents Reporting Work-Related AI Use by Occupation

Weighted share within each occupation.



Anm.: The figure reports the weighted share of respondents classified as AI users within each occupation. Occupation is measured in October 2022. Occupational groups are based on DISCO-08. Major group 2 is disaggregated at the two-digit level, while major groups 6–9 are combined. Individuals without a classified DISCO-08 occupation are included under "Occupation Not Classified." Estimates are weighted using the official survey weights. The "Other Professionals" category contains only 11 (unweighted) individuals.

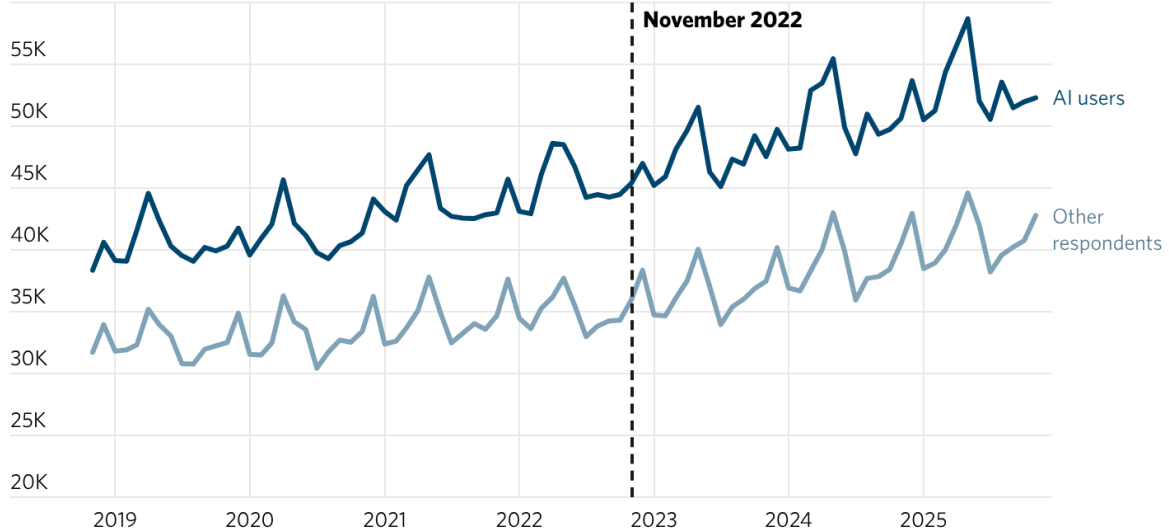
Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure C4

Weighted Mean Earnings by Reported Work-Related AI Use

Monthly weighted averages, Nov. 2018 - Nov. 2025.

60K Mean monthly earnings (DKK)



Anm.: The figure reports raw monthly weighted mean earnings for AI users and other respondents in the analytical sample. Group classification is based on survey responses collected in 2024–2025 and therefore does not represent contemporaneous AI-use status in each month. Estimates are weighted using the official survey weights and are not regression-adjusted.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure C5

Weighted Employment Rate by Reported Work-Related AI Use

Monthly weighted averages, Nov. 2018 - Nov. 2025.



Anm.: The figure reports raw monthly weighted mean employment rates for AI users and other respondents in the analytical sample. The analytical sample is restricted to individuals employed in October 2022. Employment rates therefore equal 100 percent in that month by construction. Group classification is based on survey responses collected in 2024–2025 and therefore does not represent contemporaneous AI-use status in each month. Estimates are weighted using the official survey weights and are not regression-adjusted.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

APPENDIX D: ADDITIONAL EVENT-STUDY RESULTS

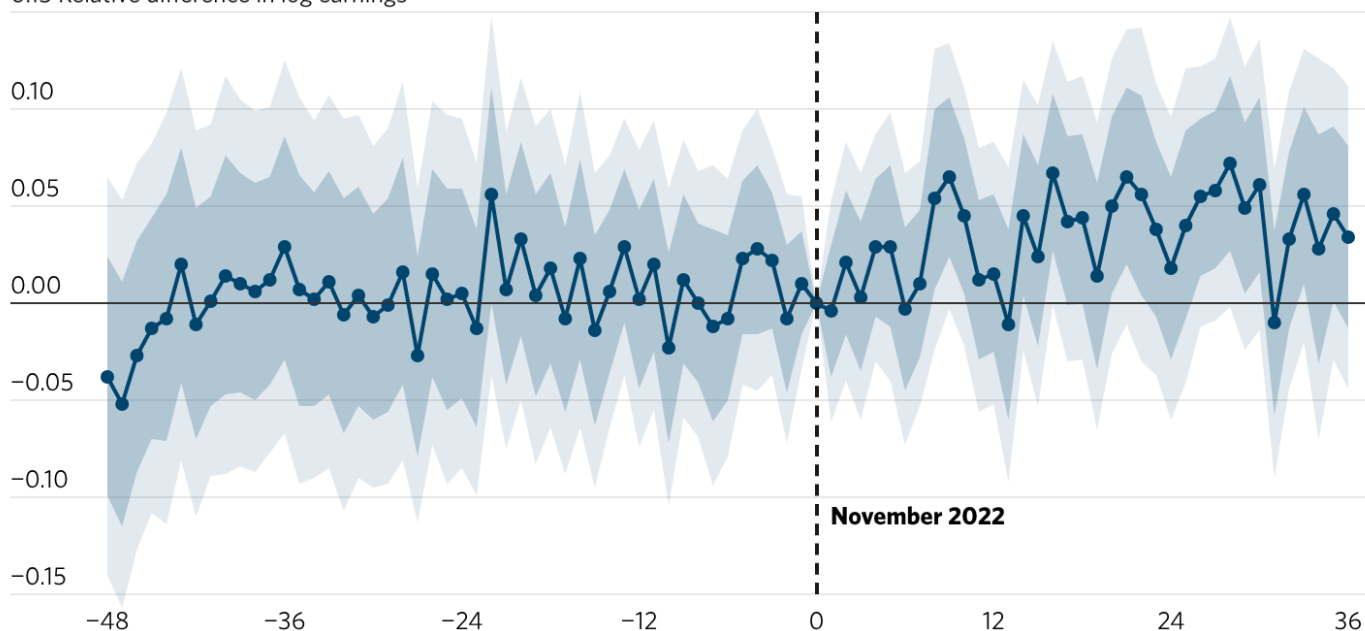
This appendix reports the underlying monthly event-study estimates for log earnings and employment. These monthly coefficients form the basis for the three- and six-month averages presented in the main text and provide a more detailed view of the month-to-month variation in the estimated differential developments between AI users and other respondents.

Figure D1

Difference in Log Earnings by Reported Work-Related AI Use

Weighted monthly event-study estimates, relative to November 2022.

0.15 Relative difference in log earnings



Anm.: Monthly event-study coefficients from the specification described in the section Empirical Strategy. The x-axis denotes months relative to November 2022, the omitted reference month. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

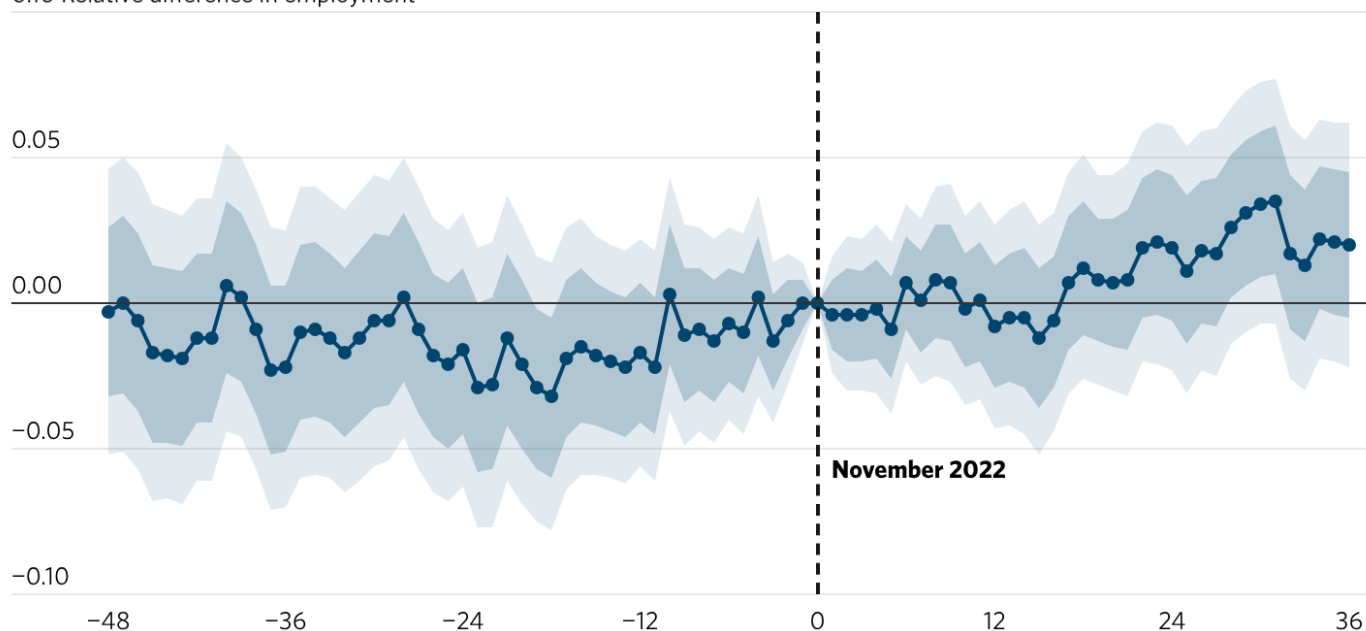
Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Figure D2

Difference in Employment by Reported Work-Related AI Use

Weighted monthly event-study estimates, relative to November 2022.

0.10 Relative difference in employment



Anm.: Monthly event-study coefficients from the specification described in the section Empirical Strategy. The x-axis denotes months relative to November 2022, the omitted reference month. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

Chart: Arbejderbevægelsens Erhvervsråd (AE) • Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

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- 1 "Statistikdokumentation for Kulturvaneundersøgelsen 2025 [Statistical Documentation for the Culture Habits Survey 2025]". Statistics Denmark, 2025.
- 2 Ibid.
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- 13 Humlum, A. and E. Vestergaard (2025) "Still waters, rapid currents: Early labor market transformation under generative AI".
- 14 Baker, A., B. Callaway, S. Cunningham et al. (2026) "Difference-in-differences designs: A practitioner's guide". Journal of Economic Literature, 2(64): 498-557. DOI: 10.1257/jel.20251650
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AI, technology and labour markets

Humlum, A. and E. Vestergaard (2025) "Still waters, rapid currents: Early labor market transformation under generative AI". Working paper no. 33777. National Bureau of Economic Research. DOI: 10.3386/w33777

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ACTIVITY BACKGROUND



This Policy Study is published as part of the FEPS-Nordic Digital Programme.

It reflects the opinions of the authors, not those of the European Parliament, FEPS, nor the participating member foundations and supporting unions of the FEPS-Nordic Digital Programme Consortium. The responsibility of FEPS is limited to the publication.

AI DISCLOSURE STATEMENT

This publication was written in accordance with FEPS guidelines on the responsible use of AI in research and writing activities. AI tools were used to assist with coding and data processing, including support for code written in Stata and SAS. All AI-assisted code and outputs were reviewed, verified and modified by the authors, who retain full responsibility for the analysis and results.

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