The Adoption of ChatGPT*

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Abstract

We study the adoption of ChatGPT, the icon of Generative AI, using a large-scale survey experiment linked to comprehensive register data in Denmark. Surveying 100,000 workers from 11 exposed occupations, we document ChatGPT is pervasive: half of workers have used it, with younger, less experienced, higher-achieving, and especially male workers leading the curve. Why have some workers adopted ChatGPT, and others not? Workers see a substantial productivity potential in ChatGPT, understand it substitutes for human expertise, and expect little cross-task substitution. Adoption is hindered by practical hurdles, including employer restrictions and required training, rather than existential fears of job redundancy or technology dependency. Informing workers about expert assessments of ChatGPT shifts workers' beliefs and intentions but has limited impacts on their adoption of the technology.

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The arrival of ChatGPT marks the era of Generative Artificial Intelligence (AI), in which intelligent algorithms may disrupt several high-skilled occupations (Eloundou et al., 2023). This paper provides descriptive and experimental evidence on the adoption of ChatGPT, examining who has adopted the technology, how workers anticipate it will affect their jobs, and why some workers use it and others do not.

In collaboration with Statistics Denmark, we surveyed 100,000 workers from 11 exposed occupations[1] between November 2023 and January 2024, achieving a 29% response rate and a representative sample.[2] Our survey includes an experiment, informing workers about expert assessments of ChatGPT in their job tasks, and a follow-up to see whether treatment effects persist. We link the survey responses to register data on individual labor market histories, earnings, wealth, education, and demographics to characterize heterogeneity in the adoption of ChatGPT.

We first document ChatGPT is widespread in the exposed occupations: half of workers have used the technology, with adoption rates ranging from 79% for software developers to 34% for financial advisors, and almost everyone is aware of it. Workers differ in their intensity of ChatGPT usage, with 32% currently using it and 6% having a Plus subscription. The widespread adoption of ChatGPT, only a year after its first launch, solidifies it as a landmark event in technology history.

Second, we look within the exposed occupations and ask what characterizes workers who use ChatGPT. Existing evidence highlights workers with less prior expertise have the most to gain from ChatGPT and other Generative AI (Brynjolfsson, Li and Raymond, 2023; Noy and Zhang, 2023), suggesting the technology could help alleviate existing inequalities between workers (Autor, 2024). Consistent with this view, we find younger

[1] Our list of occupations includes accountants, customer support specialists, financial advisors, HR professionals, IT support specialists, journalists, legal professionals, marketing professionals, office clerks, software developers, and teachers.

[2] As we show, our results are robust to reweighing the sample to exactly match the population on observables, and to using randomized participation incentives to control for selection into the survey based on worker unobservables, following Dutz et al. (2022).

and less experienced workers are more likely to use ChatGPT. In particular, every year of age and experience is associated with a 1.0 and 0.7 percentage point lower likelihood of using ChatGPT. However, despite the lower tenure, workers who use ChatGPT earned slightly more already before its arrival, reflecting higher-achieving individuals within cohorts (in particular, individuals with more education and higher grades) are more likely to use ChatGPT. These adoption patterns suggest less able workers may need further assistance to reap the benefits of Generative AI. As a final piece of descriptive evidence, we document a staggering gender gap in the adoption of ChatGPT: women are 20 percentage points less likely to use ChatGPT than men in the same occupation. The gender gap persists when we compare coworkers within the same workplace and control for workers' detailed task mixes.

Next, we examine how workers anticipate ChatGPT will impact their work activities. Workers in the exposed occupations see a substantial productivity potential in ChatGPT, confirming expert predictions (Eloundou et al., 2023): the average worker estimates ChatGPT can halve working times in about a third of his job tasks. Workers are twice as likely to state ChatGPT provides smaller rather than larger time savings for workers with greater expertise, consistent with existing evidence that the technology substitutes for human expertise (Noy and Zhang, 2023). Workers expect little substitution between tasks in response to ChatGPT, with 38% reporting they will not perform more of the tasks ChatGPT saves time completing. The limited cross-task substitution suggests that in the short run, before firms have reorganized their work to the new technology, ChatGPT may cause limited reallocation between job tasks. Finally, workers hold widely varying views on the time savings from ChatGPT, and these perceptions correlate with their actual use of the technology, suggesting a potential role for individual beliefs in determining who uses ChatGPT.

In the experimental part of the study, we investigate whether informing workers about

ChatGPT's capabilities can shift their perceptions and, if so, whether the changed beliefs translate into actual adoption. To evaluate these questions, we embed an experiment in our survey, exposing a random set of participants to expert assessments of the time savings from ChatGPT in their job tasks. The expert assessments are based on Eloundou et al. (2023), which we adapt to the Danish context and validate with industry experts. The information treatment is successful in shifting workers' beliefs: the gap to the expert assessments shrinks by 15%, with effects that persist in the follow-up survey two weeks later. Yet, despite the altered beliefs, the treatment has a limited impact on workers' adoption of ChatGPT. Workers who receive positive news about the productivity of ChatGPT are initially slightly more likely to intend to use ChatGPT. However, in the follow-up survey two weeks after the treatment, workers are not more likely to have actually used ChatGPT.

Finally, we examine what prevents workers from converting the potential productivity gains from ChatGPT into actual adoption. Workers report restrictions on use and needing training as the primary barriers to adoption, highlighting the role of firm policies (e.g., providing guidelines for use or facilitating employee training) in steering the further adoption of ChatGPT. By contrast, few workers report "existential fears," such as becoming dependent on technology or redundant in their jobs, as reasons for not using ChatGPT.

1 Data

The data infrastructure in Denmark offers an ideal setting to study the adoption of ChatGPT. In particular, every Dane has a digital mailbox that Statistics Denmark can use to send survey invitations. We link the survey to the administrative registers at Statistics Denmark, which offers two advantages to this study. First, we observe detailed occupational codes for all workers, allowing us to target the survey to individuals in exposed occupations, such as software developers, school teachers, and paralegals.

Second, the registers contain a wealth of information about individuals, allowing us to study heterogeneity by workers' labor market histories, earnings, wealth, education, and demographics. We preregistered our survey and experiment at AEA-RCT-R-0012527.

1.1 Expert Assessments

The starting point of our study is an expert assessment of the time savings from ChatGPT in detailed job tasks. We use the expert assessments (*i*) to identify occupations that are exposed to ChatGPT and (*ii*) as the information treatment in our experiment. We provide an overview of our expert assessments in this section and relegate details to Appendix B.1.

1.1.1 Productivity Metric

Our expert assessments are based on the "Direct Exposure (E0)" metric of Eloundou et al. (2023), which asks whether access to ChatGPT can halve the time an average worker takes to complete a task at equal quality. Box A provides the rubric of the metric, which we call "productivity" in this paper.

1.1.2 GPT Ratings

Eloundou et al. (2023) use a combination of human assessments and GPT prompts to classify the productivity of ChatGPT in the Detailed Work Activities (DWAs) in the O*NET database. We start by replicating the GPT ratings of Eloundou et al. (2023), applying minor adjustments to classify the most detailed Job Duties in the O*NET register.[3,4] We validate the GPT ratings match our independent assessments of a random selection of 100 tasks.

[3]We thank Pamela Mishkin and Daniel Rock for sharing their GPT prompt and exposure scores.

[4]Eloundou et al. (2023) classify the DWAs in O*NET, as these are comparable across occupations. We use the Job Duties because they are more relevant to specific occupations. In total, we have around 30,000 Job Duties that aggregate up to approximately 1,600 DWAs.

1.1.3 Selecting Occupations

We use the GPT ratings to identify the occupations to include in our study. In particular, we include all occupations that (*i*) have at least one job task that is exposed to ChatGPT, (*ii*) are captured by a well-defined set of ISCO codes, and (*iii*) contain enough workers for statistical analysis. The resulting list of occupations is accountants, customer support specialists, financial advisors, HR professionals, IT support specialists, journalists, legal professionals, marketing professionals, office clerks, software developers, and teachers. Appendix B.1.1 describes how we identify these occupations in the register data.

1.1.4 Selecting Job Tasks

We include six representative job tasks for each occupation in our survey. Appendix B.1.2 details our selection algorithm, which picks the combination of six job tasks that best matches the productivity scores of the entire set of tasks in the respective occupation.

1.1.5 Human Ratings

We independently rate each of the six job tasks in the 11 occupations. The GPT and human ratings agreed on all of the 66 job tasks. We furthermore validated the assessments with industry specialists and technology experts in Denmark.

1.1.6 Explanations

Our information treatment includes a short (1-2 sentence) explanation for each expert assessment. We use GPT to generate draft explanations for its assessed productivity ratings, which we manually review for validity and clarity. Our final set of expert assessments and explanations are available (in Danish) at `www.andershumlum.com/s/expert.xlsx`.

1.2 Survey Outline

1.2.1 Main Survey

Our main survey is organized into five blocks summarized below. The full questionnaire is in Appendix E.

Block 1: Adoption. After selecting their occupation, workers are asked about their experiences with ChatGPT. Workers also report the importance of the surveyed tasks in their jobs and their own expertise in each job task.

Block 2: Prior Beliefs. Workers assess the time savings from ChatGPT for an average worker in their occupation, thus completing the productivity rubric of Section 1.1.[5] Workers also assess whether the time savings are smaller, similar, or larger for workers with greater expertise in the task. Finally, workers report how time savings from ChatGPT will affect their task outputs and time allocations.

Block 3: Treatment. The treatment group is exposed to the expert assessments from Section 1.1, seeing a comparison of their assessments and the expert assessments, together with a brief explanation of each expert assessment. The control group sees a summary of their assessments. Figure C.1 displays the treatment and control pages.

Block 4: Intended Adoption and Posterior Beliefs. Workers report their intended use of ChatGPT in the coming two weeks. They also assess their own time savings from ChatGPT, thus completing the productivity rubric for themselves (instead of the average worker), which we call "individual productivity". Workers also assess the cross-task substitution from ChatGPT.

[5]Incentivized belief elicitation is not possible because Statistics Denmark does not allow payments that depend on respondents' answers.

Block 5: Frictions. If applicable, workers are asked why their assessed time savings from ChatGPT differ for an average worker versus themselves. If applicable, workers are asked why they do not intend to use ChatGPT despite stating it could save them time. Workers may also sign up for the information sheet with use cases of ChatGPT in their job tasks.

1.2.2 Follow-Up Survey

We distribute a follow-up survey two weeks after workers' responses to the main survey. The follow-up survey follows the structure of the main survey with two exceptions: in Block 1, we ask about adoption and task importance in the past two weeks. We ask this question to be consistent with the time window of intended adoption in Block 4 of the main survey. Second, we exclude Block 3 (Treatment) from the follow-up survey.

1.3 Survey Sample

We surveyed 100,000 workers from the 11 exposed occupations between November 2023 and January 2024, distributing a follow-up two weeks after workers' initial responses. We sent three reminders per survey round, two by e-mail and one by text. The invitation letter is in Appendix D. The main survey achieved a response rate of 29.2%, among which 86.4% were still employed in an exposed occupation.[6] Among these eligible participants, the main survey had a completion rate of 72.1%. Of the workers who completed the main survey, 41.0% responded to our follow-up survey, with a completion rate of 81.2%. Attrition rates in our sample are balanced across our treatment arms and similar to previous surveys in the Danish setting (Hvidberg, Kreiner and Stantcheva, 2023). Although we focus our main analysis on the completed responses, all our findings are robust to adding in the partial responses.

[6]The remaining 13.6% reflect workers who had left their jobs between June 2023 (the latest month of register data) and November 2023 (the launch of the survey) or whose occupational codes were outdated in the registers.

1.3.1 Representativeness

We conduct several checks to ensure our survey data paint a representative picture.

First, Table B.2 ensures our sample represents the population on observables, including age, gender, schooling, experience, income, and wealth, and Table B.1 (Column (2)) shows our findings are robust to controlling for selection into the survey based on these observables.

Second, following Dutz et al. (2022), we use randomized participation incentives to examine selection into our survey based on worker unobservables. Table B.3 shows workers who randomly receive a higher participation prize are more likely to participate in the survey but do not differ in their responses. Table B.1 (Column (3)) uses this variation to show our findings are robust to controlling for workers' latent willingness to participate in the survey.

1.3.2 Response Quality

We conduct several checks on the quality of our survey responses.

As an external validation, we cross-check variables that are also recorded in the administrative registers. First, our survey and administrative registers agree on the occupation of 87% of our respondents.[7] Second, validating the quality of respondents' subjective assessments, Figure B.1 shows workers' self-reported task expertise is strongly correlated with their experience in the relevant occupation recorded in the registers.

As an internal validation, we examine the correlation between repeat measurements in the main survey and the follow-up survey. In particular, Tables B.6 and B.7 show workers' reported task importance and task expertise scores are strongly correlated between the main survey and follow-up. Further validating workers' assessments, Table B.5 shows

[7]The disagreements likely reflect measurement error in the registers because firms generally do not update occupational switches of existing employees (Groes, Kircher and Manovskii, 2015). Table B.4 shows the disagreements occur in cells that reflect likely switches, such as (IT Support, Software Developer). By contrast, the survey and register data agree on the occupation of 100% of our school teachers.

workers' reported expertise in a task is highly related to how important the task is in their jobs. Finally, we confirm workers' beliefs about ChatGPT correlate with the expert assessments.[8]

2 Descriptive Evidence

2.1 Adoption of ChatGPT

2.1.1 Adoption across Occupations

Figure 1 shows the adoption of ChatGPT across our 11 occupations, reporting extensive margins in Panel (a) and intensity of usage in Panel (b). ChatGPT is widespread in exposed occupations. Half of workers have used it, with 72% having used it at work. Almost all workers are aware of ChatGPT. Workers differ in their intensity of ChatGPT usage, with 32% currently using it and 6% having a Plus subscription.[9]

Adoption rates differ across occupations, with IT-prone and high-skilled occupations, such as software developers and marketing specialists, leading the curve with rates of adoption around 78%. Occupations with lower educational requirements and where employers may restrict usage, such as office clerks and financial advisors, have the lowest adoption rates, around 36%. Sections 2.1.2 and 2.3 examine the roles of worker skills and employer restrictions in the adoption of ChatGPT.

[8]Workers and experts agree on the exposure rankings of 78% of the job tasks. For example, according to workers, the least exposed job task is "Establish and enforce rules for behavior and procedures for maintaining order among students" of teachers, and the most exposed task is "Analyze financial information obtained from clients to determine strategies for meeting clients' financial objectives" of financial advisors.

[9]The adoption rates for ChatGPT are high relative to existing AI technologies. McElheran et al. (2024) document 5.8% of US firms used any AI technology as of 2017, with adoption rates in leading industries around 11%-24%. Humlum and Meyer (2022) report 4.5% of Danish firms used AI tools in 2017. Acemoglu et al. (2022) show AI jobs represent a growing but small share of online vacancies in the US, constituting about 0.8% in 2018.

2.1.2 Adoption within Occupations

Table 1 dives within the exposed occupations and asks what characterizes workers who use ChatGPT.

Existing research highlights workers with less prior expertise have the most to gain from ChatGPT and other Generative AI (Brynjolfsson, Li and Raymond, 2023; Noy and Zhang, 2023). Consistent with this view, we find younger and less experienced workers are more likely to use ChatGPT. In particular, every year of age and experience is associated with a 1.0 and 0.7 percentage point lower likelihood of using ChatGPT. However, despite the lower tenure, workers who use ChatGPT earned slightly more before its arrival, reflecting that more able workers are more likely to use ChatGPT. Educational achievements explain a part of the ability bias in adoption: an additional year of schooling increases adoption rates by 0.1 percentage points, and a standard deviation higher GPA from high school is associated with a 2.1 percentage point higher rate of adoption (Table A.1).[10] Workers who use ChatGPT are less wealthy, reflecting they are younger.

The last row of Table 1 documents a staggering gender gap in the adoption of ChatGPT: Women are about 20 percentage points less likely to use ChatGPT than men in the same occupation. Figure 1 shows the gender gap is pervasive across occupations.

What explains the large gender differences in the use of ChatGPT? In Table A.2, we assess whether women specialize in jobs that are less exposed to ChatGPT. In particular, comparing workers within the same workplace and controlling for workers' detailed task mixes shrinks the gender gap from 20 to 17 percentage points, leaving a substantial gender gap unexplained by job specializations. In Section 2.4, we examine the roles of worker beliefs and adoption barriers in driving the gender disparities in the use of ChatGPT.

[10] Otis et al. (2024) show high-performing entrepreneurs in Kenya accrue larger gains from access to a GPT-powered AI assistant, consistent with our finding that higher-achieving workers may be better positioned to use ChatGPT.

2.2 Beliefs about ChatGPT

Table 2 examines how workers anticipate ChatGPT will impact their job tasks. Column (1) shows workers see a large productivity potential of ChatGPT in their occupations, estimating it can halve working times in 37% of the job tasks for the typical worker.

Table 2, Columns (2)-(4) report workers' beliefs about whether ChatGPT provides smaller, similar, or larger time savings for workers with more expertise in the task. Workers are twice as likely (39% vs. 20%) to state the time savings from ChatGPT are smaller rather than larger for workers with greater task expertise. These patterns align with existing research on the productivity effects of ChatGPT (Dell'Acqua et al., 2023; Noy and Zhang, 2023) and suggest workers understand the technology substitutes for human expertise.

Table 2, Column (5) shows how workers perceive their *own* time savings from ChatGPT. Workers are slightly more skeptical about their own productivity gain from ChatGPT (compared with the typical worker in Column (1)), estimating it can halve their working times in 32% of their job tasks. Figure 2.(a) shows workers give their expertise levels and worries about correctness (i.e., "hallucinations") as the main reasons they gain less from ChatGPT than the average worker.

Table 2, Columns (6)-(8) show how workers expect ChatGPT will impact their task outputs and time allocations. Strikingly, 38% of workers report they will not perform more of a task if ChatGPT can save time completing it. By contrast, 24% of workers report they will devote a larger share of their working time to tasks ChatGPT can save time completing.[11] The limited cross-task substitution suggests that in the short run, before industries have reorganized work around the new technology, ChatGPT may cause

[11]The cross-task substitution is particularly limited among teachers, among whom 61% state a cross-task substitution of zero, whose job tasks arguably are more fixed by the school system.

limited reallocation between job tasks.[12,13]

Finally, Table 2 reveals beliefs about ChatGPT vary vastly within occupations: the standard deviation of workers' estimated productivity shares (Column (1)) is 31 percentage points. Furthermore, as Appendix Figure A.1 shows, most workers are (very) uncertain in their assessments of the time savings from ChatGPT. In Section 3, we examine the causal role of worker beliefs in driving the adoption of ChatGPT.

2.3 Frictions from Beliefs to Adoption

Section 2.2 showed many workers see a large potential of ChatGPT to save time in their job tasks. Do these perceived productivity gains manifest in workers' actual use of the technology? In this section, we examine the transmission from worker beliefs to adoption behaviors.

Figure 2.(b) reveals a striking fact: among workers who believe ChatGPT can halve their time to do a job task, about 50%–60% do *not* intend to use it. These "adoption frictions" suggest large unrealized productivity gains from ChatGPT. What prevents workers from converting potential gains into actual adoption? The most important frictions relate to firm policies: 43% of workers report they need training to use ChatGPT, and 35% report employers actively restrict their usage. "Existential fears" of becoming redundant in the job or dependent on technology are the least important adoption frictions, with less than 10% of workers reporting these fears as reasons for not using ChatGPT.

Frictions to adoption also help explain the systematic differences between occupations in the use of ChatGPT (Figure 1). In particular, Table A.3 shows occupations with lower rates of adoption are more likely to face barriers to adoption. For example, while 82% of financial advisors face an adoption friction, 37% of software developers report the same.

[12]Eisfeldt et al. (2024) show firms exposed to ChatGPT saw a rise in their stock prices following its release, reflecting anticipations that the technology will help reduce their labor costs.

[13]Agrawal, Gans and Goldfarb (2023) provide a model of organization-wide adoption of AI across job tasks.

The relevant frictions also differ by occupations. Employer restrictions are more likely to bind in occupations that handle sensitive information, such as financial advisors and legal professionals. Less IT-prone occupations, such as teachers, report they need training to use ChatGPT, whereas this is less of a concern for software developers. Customer service representatives avoid ChatGPT due to fears of being replaced or becoming dependent on technology. Finally, in occupations where writing is a core competency, such as journalism and teaching, workers resist ChatGPT because it diminishes their enjoyment of their job.

2.4 Gender Gaps

Section 2.1.2 revealed a large gender gap in the adoption of ChatGPT, showing women are 20 percentage points less likely to use ChatGPT than men in the same occupation. Why have so few women adopted ChatGPT? Figure 2 provides some insights.

The gender gap in adoption does *not* reflect differences in beliefs, as women are about as optimistic as men about the productivity of ChatGPT (Panel (a)). Instead, women are more likely to face an adoption barrier (Panel (b)). In particular, women report they need training to use ChatGPT.[14] By contrast, men's use of ChatGPT is more limited by employer restrictions and data confidentiality.[15]

3 Experimental Evidence

Why have some workers adopted ChatGPT, and others have not? The descriptive evidence in Section 2 suggests a potential role of individual beliefs in driving who uses ChatGPT. In particular, workers hold widely varying views on the productivity of ChatGPT but are also highly uncertain about these assessments. The scope for diverging beliefs is particularly

[14]Consistent with this finding, women are also more likely to state they "do not know how" to use ChatGPT as a reason their benefits from it are lower (Panel (a)).

[15]Carvajal, Franco and Isaksson (2024) identify a comparable gender gap in a survey experiment among 514 university students in Norway. In particular, they document female students use ChatGPT much less, are less proficient at writing ChatGPT prompts, and are more sensitive to bans on using ChatGPT.

pertinent for ChatGPT, which falls into the class of General Purpose Technologies, whose use cases are vast and uncertain (Bresnahan and Trajtenberg, 1995; Eloundou et al., 2023).

This section studies the causal role of worker beliefs in driving the adoption of ChatGPT. In particular, we expose a random set of workers to the expert assessment of ChatGPT described in Section 1.1. Using this experiment, we study whether information shifts workers' perception of ChatGPT and, if so, whether the changed beliefs affect their adoption decisions. We preregistered our experiment at AEA-RCT-R-0012527, with the analysis in this section focusing on the productivity treatment.

3.1 Identification Strategy

Our identification strategy combines the information treatment with workers' pre-treatment deviations from the expert assessments. Following Jäger et al. (2024), the idea is that workers who are initially far off from the expert assessments receive a larger information treatment from exposure to the information.

Our outcomes of interest Y_i^{Post} are workers' posterior beliefs and adoption behaviors. The reduced-form estimation equation reads

$$Y_i^{\text{Post}} = \beta_0 + \beta_1 \text{EstError}_i^{\text{Pre}} + \beta_2 \text{Treated}_i + \beta_3 \text{Treated}_i \times \text{EstError}_i^{\text{Pre}} + \epsilon_i, \qquad (1)$$

where $\text{EstError}_i^{\text{Pre}}$ is worker i's pre-treatment estimation error (i.e., deviation from the expert assessments), Treated_i indicates the information treatment, and our coefficient of interest β_3 is the effect of the treatment by workers' initial estimation errors. To estimate effects at the worker level, we use workers' average estimation errors across their six surveyed job tasks.

3.2 Results

Table 3, Panel A shows the impact of the information treatment on workers' posterior beliefs and adoption behaviors. Column (1) reports the impact on workers' beliefs about their own time savings from ChatGPT. The information treatment is successful in shifting workers' beliefs, with the deviations from the expert assessments shrinking by 14.9%.[16]

Columns (2)-(5) study workers' adoption behaviors in the main survey, reporting effects on workers' intended use and interest in information about use cases of ChatGPT. Overall, the information treatment has muted effects on adoption, with magnitudes that are about 10%-20% of the effect on beliefs and not statistically significant.

Columns (6)-(8) report impacts in the follow-up survey. Workers' beliefs remain shifted two weeks after the treatment, with about 55%-85% of the original effect persisting. However, workers are not more likely to have actually used ChatGPT in the two weeks that followed the treatment.

3.2.1 Adoption Frictions

The muted effects of information on actual adoption are consistent with the substantial frictions to adoption documented in Section 2.3. In particular, Table 3 shows the correlation β_1 between workers' prior beliefs ("Pre Error") and adoption behaviors ("Intent to Use") is also muted and around $\beta_1 \approx 20\%$. In fact, our reduced-form estimates on intended use are somewhat smaller than but within the confidence bands of those predicted by the correlations.[17] Furthermore, Table A.4 shows workers' responses to the information treatment are hindered by the same barriers as those reported in the general population in Figure 2(b), namely "needing training" and "employer restrictions."

[16]The treatment also has a direct negative impact on worker beliefs β_2, suggesting the salience of the information treatment makes workers more skeptical about ChatGPT. The salience effect reflects workers whose negative priors are confirmed by the expert assessments rarely revise their beliefs upward.

[17]The effects predicted by the correlation is given by $\beta_1^{\text{Adoption}} \times \beta_3^{\text{Ind.Prod.}}$ (i.e., the correlation between adoption and beliefs, scaled by the reduced-form impacts on beliefs).

3.2.2 Gender Gaps

In Panels B and C of Table 3, we split our experiment by gender. Women's beliefs are more than twice as responsive to the treatment on impact, as their deviations from the expert assessments shrink by 22% in the main survey, compared with 9% for men. Women are also more likely to intend to use ChatGPT following the treatment, whereas men's adoption behaviors are unaltered by the information. Women's larger initial belief response dissipates entirely after two weeks, however, as the treatment effects on workers' beliefs shrink to 8%. The point estimates for women's intended adoption persist in their actual use two weeks after, although the estimates are noisy and not statistically significant.

Why are women more responsive to the information treatment? Figure A.1 shows women are less confident in their priors about ChatGPT, which could explain why they are also more swayed by the expert assessments. To explore this hypothesis, Table A.5 splits the information experiment by workers' prior uncertainty. While men with uncertain priors are more responsive to the information (10.9% vs. 8.5%), it explains a minor part of the difference to women. In particular, women are 9.8 pp. and 13.6 pp. more responsive to the information than men with similar levels of prior confidence.

In summary, these findings show the gender gap in adoption does *not* reflect women are less responsive to information about the technology. On the contrary, women respond more to the information but face barriers that prevent their further adoption. In particular, Table A.4 (Panels B and C) confirms the "need for training" is actively hindering more women from taking advantage of ChatGPT.

4 Conclusion

The arrival of ChatGPT is a landmark event in technology history. A year after its launch, ChatGPT is widespread in the exposed occupations, with adoption rates ranging from 79% for software developers to 34% for financial advisors. Thus far, the rapid take-up has been driven by the individual decisions of workers to start using it, with many employers playing a passive or regressive role.

Looking ahead, firms could play a critical role in facilitating the further adoption of Generative AI such as ChatGPT. Indeed, many workers who currently do not use ChatGPT report employers are restricting their use or that they need training to use it. Hence, by providing guidelines for productive use or facilitating employee training, employers could help more workers unlock the productivity potential of Generative AI.

A proactive approach by firms or governments to aid the further adoption of Generative AI could also help alleviate three concerning patterns in the current adoption of ChatGPT. First, despite the potential of Generative AI to alleviate existing inequalities, workers who currently use ChatGPT earned slightly more before its arrival. Hence, workers with less expertise may need further assistance to reap the benefits of Generative AI.

Second, our analysis revealed a staggering gender gap in adoption, with women being much less likely to use ChatGPT. A planned effort to train workers could help resolve this gender gap, as many women report they need training to use ChatGPT.

Finally, many workers report they will not expand their output in tasks where ChatGPT boosts their productivity. However, as firms reorganize their workflows around Generative AI such as ChatGPT, the productivity gains may also deliver greater expansion in output, ultimately contributing to economic growth.

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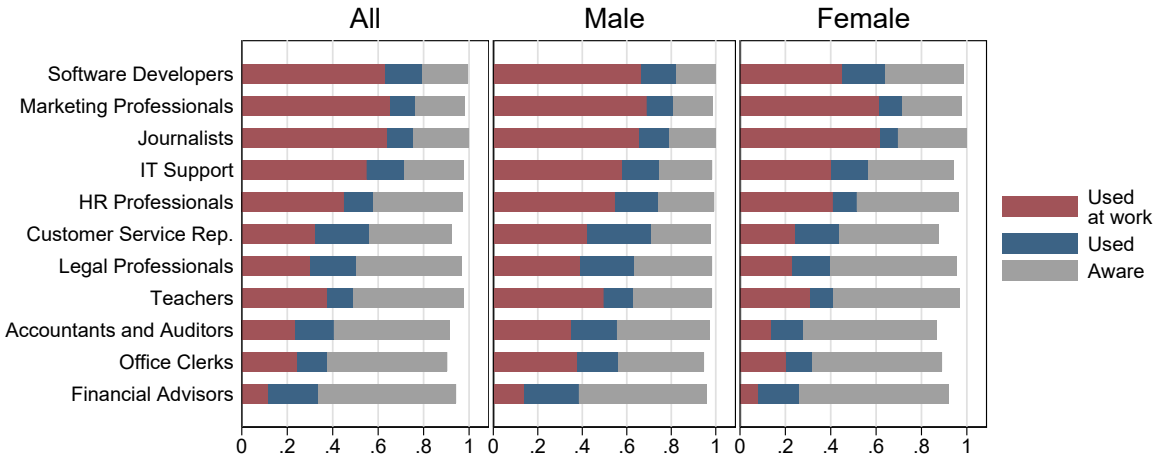
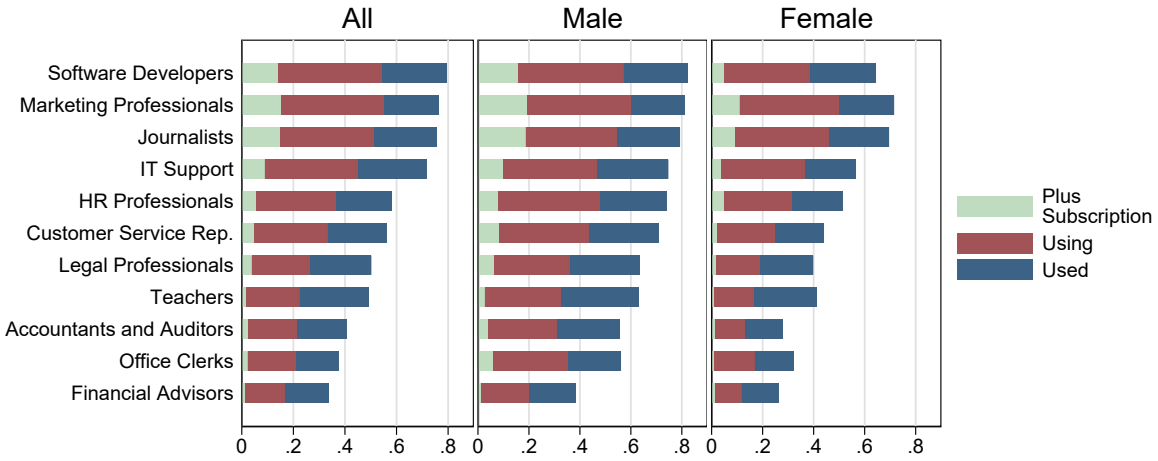
Figures and Tables

Figure 1: Adoption of ChatGPT across Occupations

(a) Extensive Margins



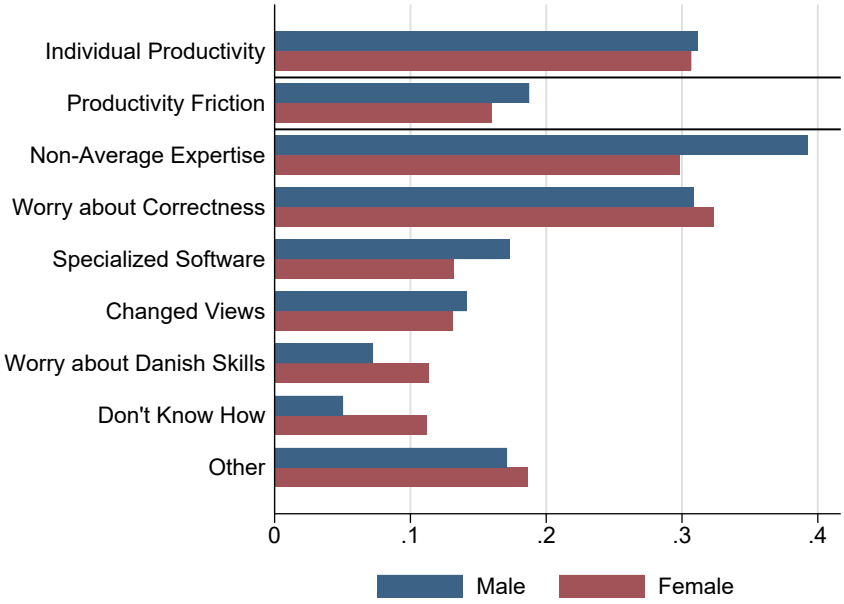
(b) Intensity of Use



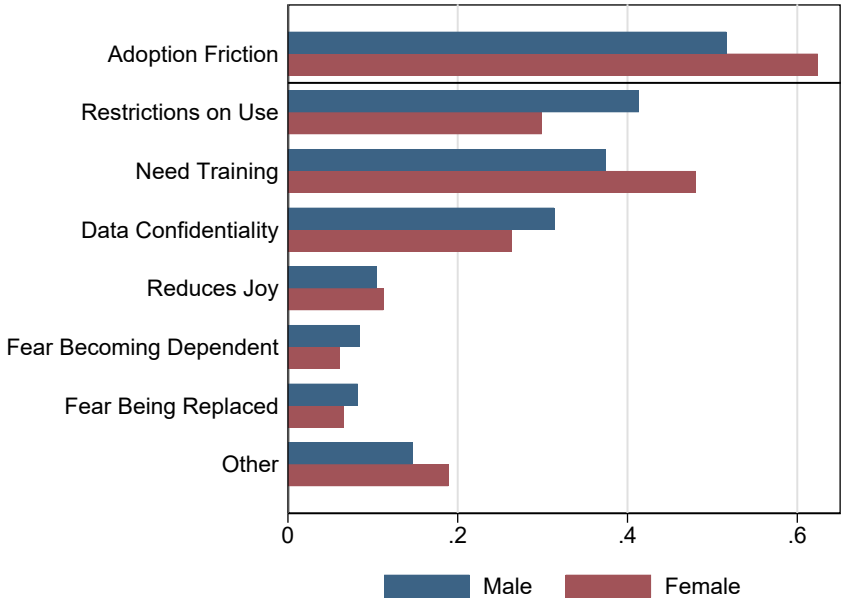
Notes: This figure shows the adoption of ChatGPT among workers in different occupations. Panel (a) plots the shares of workers who are aware of ChatGPT but have not used it, have used ChatGPT but not at work, and have used ChatGPT at work. Panel (b) shows the shares of workers who have an active Plus subscription to ChatGPT, have used ChatGPT in the past two weeks (but without a Plus account), and have used ChatGPT (but not in the past two weeks).

Figure 2: Frictions from Beliefs to Adoption

(a) Beliefs about the Productivity of ChatGPT



(b) Frictions from Productivity to Adoption



Notes: This figure studies transmission from workers' beliefs about ChatGPT to their adoption of the technology. The figure focuses on the control group and splits by gender. The gender-specific statistics are reweighed to match the average composition across occupations. Panel (a) shows workers' beliefs about the capabilities of ChatGPT. The top set of bars shows the share of job tasks in which workers state ChatGPT can halve their working times. The next set of bars focuses on the tasks in which workers state ChatGPT can halve working times for an average worker but not for themselves (a "productivity friction"). The remaining bars report workers' reasons for these productivity frictions. Panel (b) explores what prevents workers from adopting ChatGPT despite believing in its productivity potential. The upper bars show the share of tasks where workers do not intend to use ChatGPT despite its ability to save time (an "adoption friction"). The bars below show workers' reasons for these adoption frictions.

Table 1: Who Has Adopted ChatGPT? (Comparison within Occupations)

	Univariate					Multivariate
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.010					-0.010
	(0.000)					(0.000)
Experience		-0.018				-0.007
		(0.001)				(0.001)
log(Earnings)			0.003			0.083
			(0.007)			(0.009)
Net Wealth / Earnings				-0.027		0.001
				(0.001)		(0.002)
Female					-0.206	-0.182
					(0.008)	(0.008)
Observations	17907	17907	17907	17907	17907	17907

Notes: This table compares workers within occupations and asks what characterizes those who have used ChatGPT. All characteristics are based on register variables. *Experience* is the years of employment in the occupation (`DISCO_KODE`). *Earnings* are total labor income (`LOENMV_13`). *Net Wealth* is the sum of real assets, financial assets, pension savings, minus the sum of priority debt, other private debt, and public debt (`FGNF_2020`), winzorized at the 5th and 95th percentiles. Columns (1)-(5) represent univariate regressions, controlling for occupation fixed effects. Column (6) reports estimates from a multivariate regression, estimating the partial effect of each variable, controlling for occupation fixed effects. Standard errors in parentheses.

Table 2: Worker Beliefs about ChatGPT

		Expertise Complementarity			Individual	Cross-Task Substitution		
	Productivity	Negative	Neutral	Positive	Productivity	Zero	Inelastic	Elastic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Software Dev.	0.363	0.430	0.366	0.205	0.275	0.332	0.495	0.173
	(0.313)	(0.383)	(0.332)	(0.312)	(0.319)	(0.471)	(0.500)	(0.378)
Marketing	0.452	0.304	0.432	0.264	0.407	0.340	0.398	0.262
	(0.323)	(0.348)	(0.347)	(0.340)	(0.348)	(0.474)	(0.490)	(0.440)
Journalists	0.233	0.468	0.356	0.177	0.205	0.385	0.462	0.154
	(0.236)	(0.385)	(0.338)	(0.302)	(0.235)	(0.487)	(0.499)	(0.361)
IT Support	0.419	0.413	0.380	0.207	0.348	0.365	0.421	0.213
	(0.300)	(0.348)	(0.318)	(0.287)	(0.309)	(0.482)	(0.494)	(0.410)
HR Prof.	0.393	0.397	0.419	0.184	0.321	0.434	0.346	0.220
	(0.283)	(0.354)	(0.330)	(0.266)	(0.284)	(0.496)	(0.476)	(0.414)
Customer Service	0.380	0.377	0.411	0.212	0.349	0.351	0.313	0.337
	(0.330)	(0.361)	(0.338)	(0.280)	(0.344)	(0.477)	(0.464)	(0.473)
Legal Prof.	0.352	0.421	0.405	0.174	0.298	0.377	0.436	0.188
	(0.287)	(0.368)	(0.344)	(0.278)	(0.289)	(0.485)	(0.496)	(0.390)
Teachers	0.210	0.358	0.495	0.147	0.191	0.613	0.249	0.139
	(0.232)	(0.371)	(0.363)	(0.255)	(0.244)	(0.487)	(0.432)	(0.345)
Accountants	0.382	0.390	0.410	0.200	0.297	0.326	0.388	0.286
	(0.331)	(0.387)	(0.362)	(0.305)	(0.333)	(0.469)	(0.487)	(0.452)
Office Clerks	0.417	0.333	0.437	0.230	0.361	0.393	0.368	0.239
	(0.315)	(0.347)	(0.343)	(0.291)	(0.321)	(0.488)	(0.482)	(0.427)
Financial Adv.	0.466	0.369	0.468	0.164	0.433	0.240	0.400	0.361
	(0.342)	(0.370)	(0.358)	(0.271)	(0.371)	(0.427)	(0.490)	(0.480)
All Workers	0.370	0.387	0.416	0.197	0.317	0.377	0.388	0.235
	(0.311)	(0.369)	(0.345)	(0.292)	(0.320)	(0.485)	(0.487)	(0.424)

Notes: This table shows workers' mean beliefs about ChatGPT with standard deviations in parentheses. Column (1) reports the share of job tasks where access to ChatGPT can halve working times for an average worker. Columns (2)-(4) show the share of job tasks in which ChatGPT delivers respectively smaller, similar, and larger time savings for workers with greater task expertise. Column (5) shows the share of job tasks where access to ChatGPT can halve workers' *own* working times. Column (6) shows the share of workers who will not complete more of a task if ChatGPT can save time in it. Column (7) is the share of workers who will complete more of a task if ChatGPT but will not dedicate a larger share of their work time to the task. Column (8) is the share of workers who will dedicate a larger share of their time to a task if ChatGPT can save time completing it. *All workers* are averages with equal weights to each occupation.

Table 3: Effects of the Information Treatment on Beliefs and Adoption Behaviors

	Main Survey						Follow Up		
	Ind. Productivity (1)	Ind. Productivity Follow Up Sample (2)	Intent to Use in Job Tasks (3)	Intent to Use (4)	Interest in Material (5)	Clicks on Material (6)	Individual Productivity (7)	Use in Job Tasks (8)	Use (9)
Panel A: All									
Pre Error × Treated	-0.149	-0.156	-0.014	-0.028	-0.019	-0.006	-0.087	0.015	0.010
	(0.012)	(0.020)	(0.013)	(0.023)	(0.025)	(0.019)	(0.024)	(0.019)	(0.037)
Pre Error	0.735	0.761	0.181	0.246	0.212	0.039	0.544	0.104	0.140
	(0.009)	(0.015)	(0.010)	(0.018)	(0.019)	(0.015)	(0.019)	(0.015)	(0.028)
Treated	-0.021	-0.021	-0.007	-0.016	-0.026	-0.018	-0.014	0.006	-0.003
	(0.005)	(0.008)	(0.004)	(0.009)	(0.009)	(0.007)	(0.010)	(0.007)	(0.014)
Control Means	0.309	0.300	0.104	0.327	0.553	0.182	0.265	0.079	0.223
Observations	12093	4051	12092	12093	12093	12093	4051	4051	4051
Panel B: Male									
Pre Error × Treated	-0.092	-0.084	0.003	-0.006	-0.002	-0.005	-0.086	0.034	0.040
	(0.016)	(0.026)	(0.019)	(0.032)	(0.033)	(0.026)	(0.030)	(0.028)	(0.051)
Pre Error	0.739	0.745	0.241	0.288	0.174	0.017	0.581	0.148	0.167
	(0.013)	(0.021)	(0.015)	(0.025)	(0.026)	(0.020)	(0.025)	(0.023)	(0.040)
Treated	-0.004	-0.001	-0.001	-0.010	-0.028	-0.021	-0.015	0.013	-0.006
	(0.007)	(0.012)	(0.007)	(0.013)	(0.013)	(0.011)	(0.014)	(0.012)	(0.021)
Control Means	0.312	0.296	0.146	0.420	0.597	0.189	0.264	0.108	0.292
Observations	6124	2189	6124	6124	6124	6124	2189	2189	2189
Panel C: Female									
Pre Error × Treated	-0.218	-0.255	-0.033	-0.050	-0.033	-0.008	-0.082	-0.005	-0.035
	(0.020)	(0.032)	(0.015)	(0.032)	(0.037)	(0.028)	(0.041)	(0.023)	(0.050)
Pre Error	0.733	0.783	0.112	0.190	0.247	0.063	0.493	0.044	0.109
	(0.014)	(0.023)	(0.012)	(0.024)	(0.028)	(0.022)	(0.031)	(0.015)	(0.036)
Treated	-0.034	-0.038	-0.013	-0.022	-0.023	-0.015	-0.010	0.000	0.004
	(0.007)	(0.011)	(0.005)	(0.011)	(0.013)	(0.010)	(0.014)	(0.007)	(0.017)
Control Means	0.307	0.305	0.061	0.234	0.508	0.174	0.266	0.045	0.142
Observations	5969	1862	5968	5969	5969	5969	1862	1862	1862

Notes: This table shows the reduced-form effect of the information treatment on workers' posterior beliefs and adoption behaviors (Equation (1)). Columns (1)-(4) show the effects on workers' beliefs and intended use (coming two weeks) in the main survey. Columns (5)-(6) show the effects on sign-ups and clicks on an information sheet on ChatGPT in the workers' job tasks (described in Appendix B.2). Columns (7)-(9) show effects on workers' beliefs and actual use (past two weeks) in the follow-up survey. Occupation fixed effects are absorbed. Standard errors are in parentheses. Individual productivity is the share of job tasks in which ChatGPT can halve working times.

Online Appendix

The Adoption of ChatGPT

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Contents

A Additional Figures and Tables

Box A.1: Productivity Rubric (Eloundou et al., 2023)

Think of a [**journalist**] **with an average level of experience and expertise** trying to complete a given task. The worker has access to ChatGPT, the internet, a computer with existing software, and other tools typically used to complete the task.

Specify the following tasks according to the rubric below. Equivalent quality means someone reviewing the work would not be able to tell whether the worker completed it with or without assistance from ChatGPT.

Large time savings from ChatGPT
Specify the task's time savings as "Large" if **access to ChatGPT *can halve the time*** it takes for an average [journalist] to complete the task with equivalent quality.

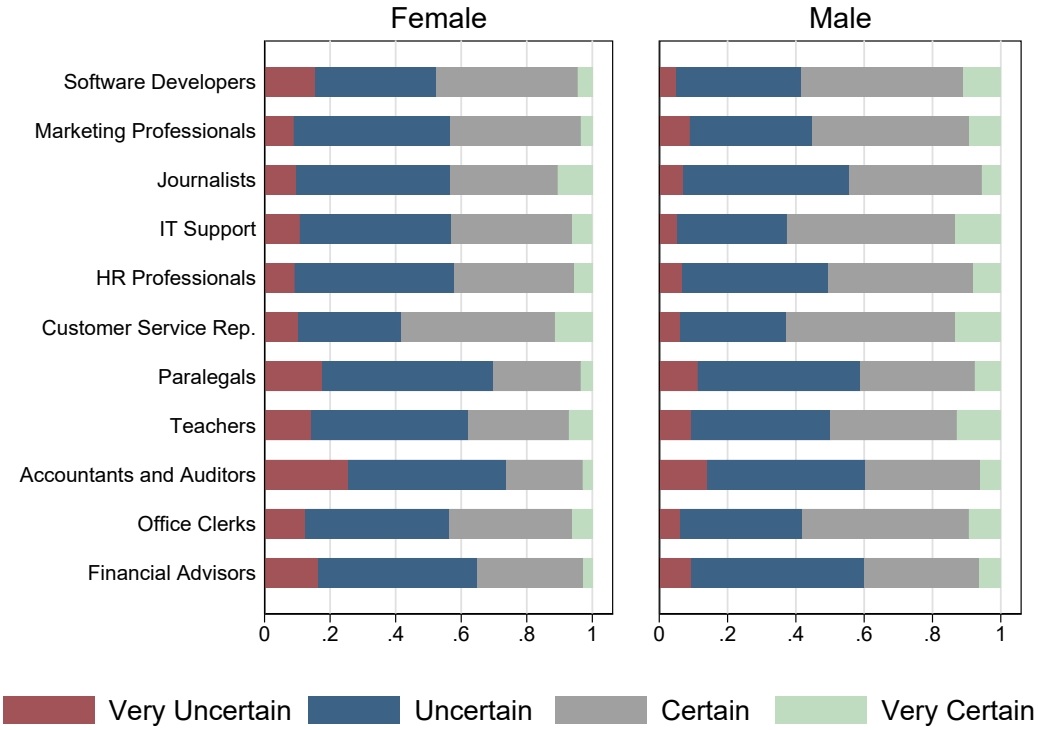
Small or no time savings from ChatGPT
Specify the task's time savings as "Small" if **access to ChatGPT *cannot halve the time*** it takes for an average [journalist] to complete the task with equivalent quality.

[***Write commentaries, columns, or scripts***]

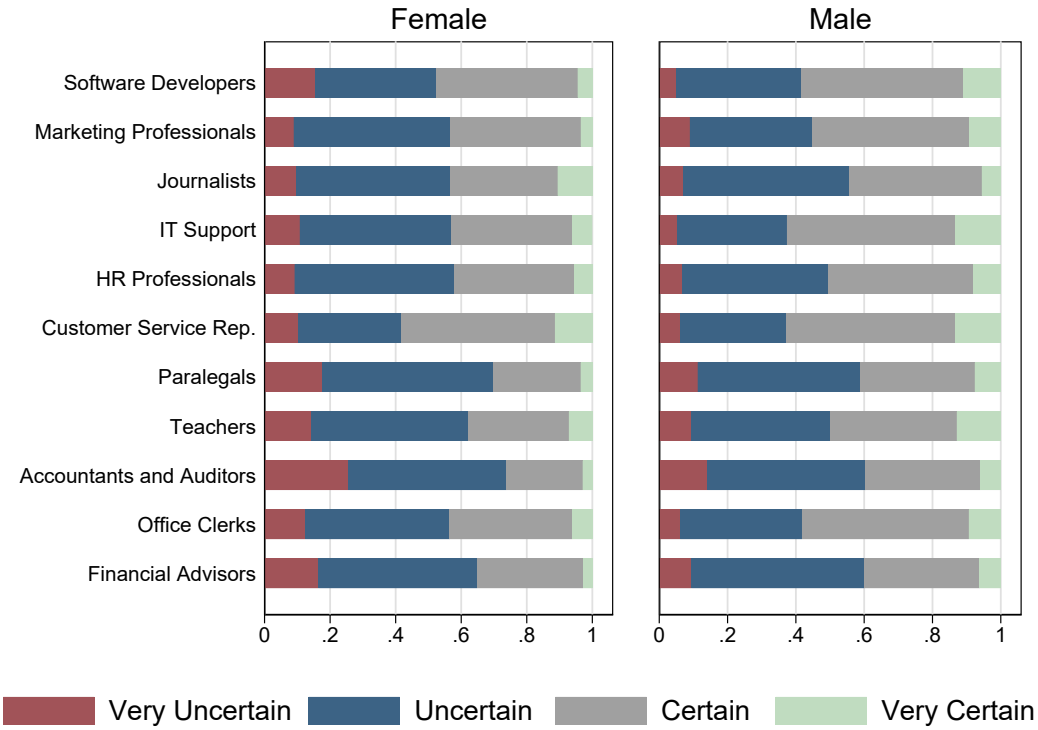
Notes: This figure provides the rubric for our *productivity* metric.

Figure A.1: Uncertainty of Worker Beliefs

(a) Productivity



(b) Expertise Complementarity



Notes: This figure shows workers' uncertainty in their assessment of the productivity (time savings for an average worker) and expertise-complementarity (time savings for greater expertise) of ChatGPT.

Table A.1: Educational Achievements and the Adoption of ChatGPT

(a) Years of Schooling

	Univariate						Multivariate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Years of Schooling	0.002						0.001
	(0.000)						(0.000)
Age		-0.010					-0.009
		(0.000)					(0.001)
Experience			-0.016				-0.006
			(0.001)				(0.001)
log(Earnings)				0.024			0.081
				(0.009)			(0.011)
Net Wealth / Earnings					-0.025		0.000
					(0.001)		(0.002)
Female						-0.215	-0.188
						(0.008)	(0.008)
Observations	15406	15406	15406	15406	15406	15406	15406

(b) High School GPA (Cohorts Ages 22-38)

	Univariate							Multivariate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years of Schooling	0.000							0.002
	(0.000)							(0.000)
GPA High School		0.013						0.021
		(0.009)						(0.009)
Age			-0.011					-0.010
			(0.002)					(0.002)
Experience				-0.010				0.000
				(0.003)				(0.003)
log(Earnings)					-0.009			-0.026
					(0.012)			(0.016)
Net Wealth / Earnings						-0.017		-0.012
						(0.005)		(0.006)
Female							-0.265	-0.269
							(0.017)	(0.017)
Observations	3079	3079	3079	3079	3079	3079	3079	3079

Notes: This table compares workers within occupations and asks what characterizes those who have used ChatGPT. Panel (a) focuses on all workers with registered education data. Panel (b) focuses on workers for whom we have data on their high school diplomas, which generally cover workers ages 22-38. *Years of schooling* is the minimum years of schooling required for the workers' highest completed education (`HFPRIA`). *GPA High School* is the workers' grade point average in high school, standardized within cohorts (`KARAKTER`). See Table 1 for other variable definitions. Occupational fixed effects have been absorbed. Standard errors in parentheses.

Table A.2: Gender Gap in the Adoption of ChatGPT

	(1)	(2)	(3)	(4)	(5)
Female	-0.262	-0.204	-0.191	-0.170	-0.161
	(0.007)	(0.008)	(0.008)	(0.010)	(0.010)
Occupation FEs		✓	✓	✓	✓
Task Importance FEs			✓	✓	✓
Workplace FEs				✓	✓
Worker Characteristics (Table 1)					✓
Observations	18088	18088	18088	14426	14341

Notes: This table studies the gender gap in the adoption of ChatGPT. Column (1) reports the raw gap in our 11 exposed occupations. Column (2) adds occupation fixed effects. Column (3) adds fixed effects for task importance levels (330 fixed effects, reflecting 5 importance levels for the 6 job tasks of each of the 11 occupations). Column (4) add workplace fixed effects. Column (5) additionally controls for the worker characteristics of Table 1.

Table A.3: Adoption Frictions by Occupations

Occupation	Friction (1)	Need Training (2)	Restrictions on Use (3)	Data Confidentiality (4)	Reduces Joy (5)	Fear Being Replaced (6)	Fear Becoming Dependent (7)	Other (8)
Software Dev.	.369	.263	.475	.308	.103	.047	.093	.193
Marketing	.377	.368	.367	.348	.11	.085	.092	.143
Journalists	.468	.478	.233	.241	.216	.105	.076	.283
IT Support	.464	.34	.419	.33	.119	.074	.107	.138
HR Prof.	.563	.414	.343	.294	.085	.044	.036	.218
Customer Service	.556	.344	.293	.252	.169	.163	.149	.111
Legal Prof.	.666	.342	.501	.408	.062	.04	.047	.194
Teachers	.591	.642	.058	.206	.253	.052	.096	.15
Accountants	.616	.526	.344	.289	.06	.053	.054	.116
Office Clerks	.617	.423	.29	.244	.089	.084	.036	.191
Financial Adv.	.82	.379	.552	.222	.066	.071	.045	.096

Notes: This table shows the shares of adoption frictions by occupations. Column (1) reports the share of tasks where workers do not intend to use ChatGPT despite its ability to save time (that is, tasks subject to an "adoption friction"). Columns (2)-(8) report the reasons (in shares) workers report for their adoption frictions.

Table A.4: Adoption Frictions in the Information Experiment

	Need Training (1)	Restrictions on Use (2)	Data Confidentiality (3)	Reduces Joy (4)	Fear Being Replaced (5)	Fear Becoming Dependent (6)	Other (7)
Panel A: All							
Complier	0.441	0.384	0.265	0.083	0.058	0.062	0.183
	(0.011)	(0.011)	(0.010)	(0.007)	(0.006)	(0.006)	(0.009)
Control	0.432	0.351	0.286	0.109	0.073	0.071	0.169
	(0.006)	(0.006)	(0.006)	(0.004)	(0.003)	(0.003)	(0.005)
Observations	72558	72558	72558	72558	72558	72558	72558
Panel B: Male							
Complier	0.391	0.447	0.294	0.093	0.063	0.073	0.162
	(0.015)	(0.015)	(0.014)	(0.010)	(0.008)	(0.008)	(0.011)
Control	0.374	0.413	0.314	0.105	0.082	0.084	0.146
	(0.009)	(0.009)	(0.009)	(0.006)	(0.005)	(0.005)	(0.007)
Observations	36744	36744	36744	36744	36744	36744	36744
Panel C: Female							
Complier	0.486	0.320	0.234	0.076	0.053	0.052	0.207
	(0.016)	(0.015)	(0.014)	(0.010)	(0.008)	(0.008)	(0.013)
Control	0.481	0.299	0.263	0.112	0.065	0.060	0.189
	(0.008)	(0.008)	(0.007)	(0.005)	(0.004)	(0.004)	(0.007)
Observations	35814	35814	35814	35814	35814	35814	35814

Notes: This table shows complier and control means for the reported adoption frictions, that is, reasons workers do not use ChatGPT in a job task despite believing it can halve their working times. Compliers are workers who report adoption friction only if receiving the treatment. We estimate compliers mean outcomes using the Abadie (2002) methodology on a task-level version of the reduced-form estimating Equation (1).

Table A.5: Effects of the Information Treatment by Gender and Uncertainty

	Main Survey						Follow Up		
	Ind. Productivity (1)	Ind. Productivity Follow Up Sample (2)	Intent to Use in Job Tasks (3)	Intent to Use (4)	Interest in Material (5)	Clicks on Material (6)	Individual Productivity (7)	Use in Job Tasks (8)	Use (9)
Panel A: Uncertain									
Pre Error × Treated	-0.109	-0.109	-0.001	-0.039	-0.030	0.009	-0.106	0.016	0.042
	(0.027)	(0.042)	(0.022)	(0.049)	(0.053)	(0.039)	(0.049)	(0.029)	(0.072)
Pre Error × Treated × Female	-0.098	-0.166	-0.031	-0.035	-0.015	-0.018	-0.013	-0.040	-0.116
	(0.038)	(0.062)	(0.027)	(0.063)	(0.073)	(0.055)	(0.073)	(0.039)	(0.094)
Observations	6534	2126	6533	6534	6534	6534	2126	2126	2126
Panel B: Certain									
Pre Error × Treated	-0.085	-0.065	-0.002	0.019	0.007	-0.012	-0.064	0.052	0.042
	(0.019)	(0.031)	(0.027)	(0.042)	(0.043)	(0.034)	(0.037)	(0.042)	(0.069)
Pre Error × Treated × Female	-0.136	-0.164	-0.019	-0.017	-0.025	0.010	0.016	-0.042	-0.035
	(0.034)	(0.053)	(0.038)	(0.066)	(0.069)	(0.054)	(0.070)	(0.057)	(0.106)
Observations	5559	1925	5559	5559	5559	5559	1925	1925	1925

Notes: This table shows the effects of the information treatment by gender and prior belief uncertainty. The estimates are based on interacting Equation (1) with gender: $Y_i = \beta_0 + \beta_1 \text{PE}_i + \beta_2 \text{T}_i + \beta_3 \text{T}_i \text{PE}_i + \beta_4 \text{F}_i + \beta_5 \text{T}_i \text{F}_i + \beta_6 \text{T}_i \text{PE}_i \text{F}_i + \epsilon_i$, where we abbreviate PE for pre-treatment estimation error, T for treated, and F for female. The table displays our parameters of interest, β_3 and β_6. Panel A focuses on workers who are uncertain or very uncertain in their prior beliefs about the productivity of ChatGPT, while Panel B focuses on workers who are certain or very certain in their priors. Columns (1)-(4) show the effects on workers' posterior beliefs and intended use (coming two weeks) in the main survey. Columns (5)-(6) show the effects on sign-ups and clicks on an information sheet on ChatGPT in the workers' job tasks (described in Appendix B.2). Columns (7)-(9) show effects on workers' beliefs and actual use (past two weeks) in the follow-up survey. Occupation fixed effects are absorbed. Standard errors are in parentheses. Individual productivity is the share of job tasks in which ChatGPT can halve working times.

B Data

B.1 Expert Assessments

B.1.1 Selecting Occupations

We use a combination of occupational codes (ISCO), industry codes (DB, a disaggregation of NACE), and educational codes (HFAUDD) to identify our target occupations in the registers.

1. Accountants and Auditors: ISCO 2411, 3313.
2. Customer Service Representatives: ISCO 4222, 4225, 4229.
3. Financial Advisors: ISCO 2412 and DB 641900.
4. Human Resource Professionals: ISCO 2423, 4416.
5. IT-support workers: ISCO 351.
6. Journalists: ISCO 264, DB 581300, 581410, 581420, 601000, 602000.
7. Lawyers and Paralegals: ISCO 2611, 2619, 3411.
8. Marketing Professionals: ISCO 2431, 2433, 2434.
9. Secretaries and Office Clerks: ISCO 334, 411, 412.
10. Software Developers: ISCO 251, DB 620000-620900.
11. Teachers
    (a) Primary school: ISCO 2341, DB 852010, HFAUDD 5440, 5441.
    (b) High school: ISCO 233, DB 853120.

B.1.2 Selecting Job Tasks

We include six job tasks for each occupation in our survey. We select the job tasks to represent ChatGPT's average capabilities in the entire set of job tasks in the occupations (the O*NET database typically contains 20-50 job tasks per occupation). In addition to

matching the average productivity scores (the E1 score of Eloundou et al. (2023)), we also ensure the job tasks are representative with respect to expertise-complementarity (expert assessment of whether ChatGPT delivers smaller/similar/larger time savings for workers with greater expertise) and the forward-looking productivity measures E2 ("Exposure by LLM-powered applications") and E3 ("Exposure given image capabilities") of Eloundou et al. (2023).

Define scores X_t of tasks t to target

$$X = \{\text{E1}(0/1), \text{E2}(0/1), \text{E3}(0/1), \text{Complementarity}(-1/0/1)\}. \tag{2}$$

Our goal is to find a combination of six job tasks t whose average scores X match those in the entire set of job tasks $\mathcal{T}_o$ of occupation o.

First, to address the fact that the scores above are not measured on the same scale, we calculate distances in standard deviations of each score (calculated among all tasks of occupation o). Second, to allow some scores to receive higher priority, we assign each score a weight $\omega = (\omega_1, ..., \omega_S)$, where $S = \#M$.

Define all combinations of six job tasks drawn from $\mathcal{T}_o$ without replacement by $\mathcal{C}(\mathcal{T}_o)$. Our objective function reads

$$\min_{\mathcal{T}_c \in \mathcal{C}(\mathcal{T}_o)} \sum_{s=1}^{S} \omega_s \frac{(m_c(X_s) - m_{Po}(X_s))^2}{v_{Po}(X_s)}, \tag{3}$$

where $m_c(X)$ is the mean score of task combination c, and $m_{Po}(X)$ and $v_{Po}(X)$ are the population mean and variances of scores in occupation o.

Solving equation (3) by brute force, we, for each occupation, successfully find a task selection that exactly matches the productivity and complementarity scores. In the case of multiple minima of Equation (3), we prioritize job tasks with higher O*NET importance scores for the occupation.

B.2 Information Sheets

We create information sheets for each of the 11 occupations, containing three ChatGPT prompts that exemplify use cases in their exposed job tasks. We use GPT to generate example prompts for the exposed job tasks, which we then manually review and test. In the survey, workers may sign up for the sheets, thus revealing their interest in information about using ChatGPT. The information sheets are available at `www.andershumlum.com/s/sheets.zip`.

B.3 Survey Sample

B.3.1 Representativeness

Table B.1: Robustness to Non-Response Bias

		Reweighting on	
	Raw	Observables	Unobservables
	(1)	(2)	(3)
Use	0.553	0.530	0.561
	(0.497)	(0.499)	(0.497)
Use at Work	0.399	0.378	0.405
	(0.490)	(0.485)	(0.490)
Average Productivity	0.364	0.361	0.363
	(0.310)	(0.309)	(0.310)
Complementarity	-0.186	-0.191	-0.188
	(0.565)	(0.559)	(0.566)
Share with Leontief Belief	0.404	0.410	0.398
	(0.491)	(0.492)	(0.491)
Share with Inelastic Belief	0.385	0.384	0.393
	(0.487)	(0.486)	(0.486)
Share with Elastic Belief	0.211	0.206	0.209
	(0.408)	(0.405)	(0.408)

Notes: This table shows how accounting for non-response bias affects summary statistics of workers' adoption of and beliefs about ChatGPT. Column (1) shows the raw means of the survey responses. Column (2) reweighs the survey responses according to workers' inverse probability of survey participation. Column (3) reweighs the survey responses according to workers' latent resistance to survey participation, following Dutz et al. (2022). We use a second-order polynomial for the marginal survey response (MSR) function. Standard deviations in parentheses.

Table B.2: Balance Table for Survey Respondents

	Population	Sampled	Responded
	(1)	(2)	(3)
Age	42.43	42.42	45.40
	(11.57)	(11.57)	(11.50)
Female	0.52	0.52	0.49
	(0.50)	(0.50)	(0.50)
log(Earnings)	13.07	13.07	13.11
	(0.58)	(0.59)	(0.53)
Experience	6.05	6.05	7.11
	(4.58)	(4.57)	(4.67)
Years of Schooling	14.76	14.77	14.82
	(2.13)	(2.13)	(2.07)
Wealth / Earnings	4.09	4.87	4.10
	(157.39)	(262.30)	(39.57)
Observations	283,398	99,817	18,088

Notes: This table compares the mean characteristics of workers in the population, our sampled survey invitees, and the survey respondents. Standard deviations in parentheses.

Table B.3: Balance Table for Participation Prize Categories

	1000 DKK	2500 DKK - 1000 DKK	5000 DKK - 1000 DKK	10000 DKK - 1000 DKK	p-value
Age	45.40	-0.46	-0.43	-0.50	0.14
		(0.24)	(0.84)	(0.85)	
Female	0.49	0.00	-0.01	-0.00	0.44
		(0.01)	(0.03)	(0.03)	
Earnings	13.11	-0.03	-0.00	-0.02	0.04
		(0.01)	(0.05)	(0.05)	
Experience	7.11	-0.01	-0.01	-0.05	0.95
		(0.09)	(0.35)	(0.35)	
Importance	3.34	-0.03	-0.02	-0.01	0.37
		(0.02)	(0.06)	(0.06)	
Expertise	2.25	-0.02	-0.01	-0.01	0.23
		(0.01)	(0.03)	(0.03)	
Use	0.55	-0.02	-0.01	-0.01	0.42
		(0.01)	(0.03)	(0.03)	
Use at Work	0.40	-0.01	-0.00	-0.00	0.63
		(0.01)	(0.03)	(0.03)	
Productivity	0.36	0.00	0.01	0.01	0.10
		(0.01)	(0.02)	(0.02)	
Complementarity	-0.19	0.01	0.01	0.01	0.63
		(0.01)	(0.04)	(0.04)	
p-value		0.07	0.21	0.30	
Response Rate	0.16	0.02	0.02	0.04	0.00
		(0.00)	(0.00)	(0.00)	
Observations	4,021	4,518	4,547	5,002	

Notes: This table shows individuals assigned to the different participation prize categories (1,000 DKK, 2,500 DKK, 5,000 DKK, and 10,000 DKK) have similar characteristics (first four rows) and survey responses (next six rows) but differ in their rates of completed responses (last row). We use these differences in take-up to account for non-response bias in the survey responses, following Dutz et al. (2022).

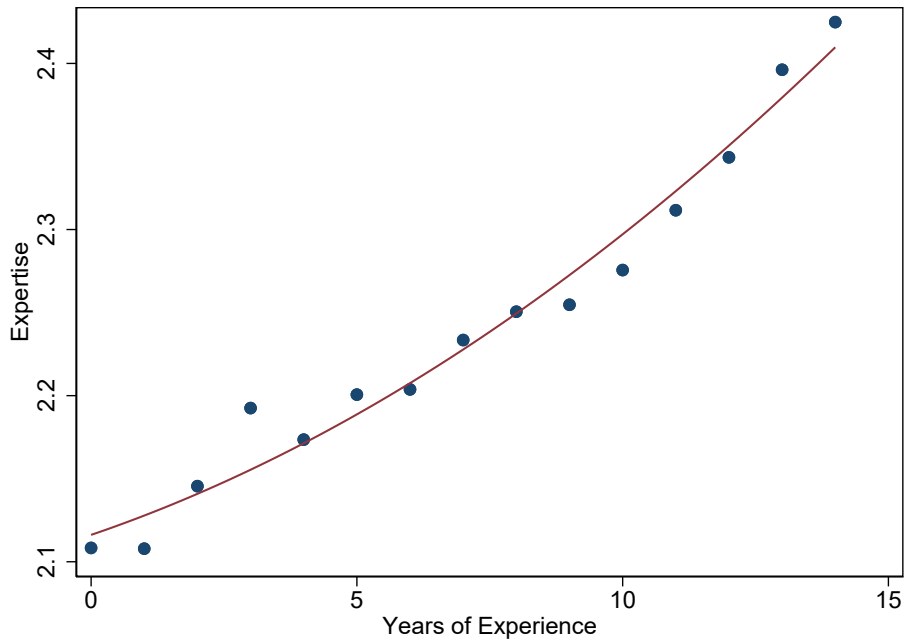
B.3.2 Response Quality

Table B.4: Correlation between Occupation in Survey vs. Register, P(Survey|Register)

		In Survey											
		Journalists	Software Developers	Paralegals	Accountants and Auditors	Customer Service Rep.	Marketing Professionals	Financial Advisors	HR Professionals	Office Clerks	Teachers	IT Support	Observations
Register	Journalists	0.97	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	555.00
	Software Developers	0.00	0.87	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.08	3,185.00
	Paralegals	0.01	0.03	0.79	0.02	0.01	0.00	0.01	0.02	0.08	0.01	0.01	2,518.00
	Accountants and Auditors	0.00	0.02	0.01	0.85	0.01	0.01	0.02	0.02	0.05	0.00	0.01	2,710.00
	Customer Service Rep.	0.01	0.03	0.01	0.01	0.79	0.04	0.01	0.01	0.07	0.01	0.01	869.00
	Marketing Professionals	0.00	0.05	0.00	0.00	0.09	0.74	0.01	0.01	0.06	0.00	0.03	2,125.00
	Financial Advisors	0.00	0.00	0.00	0.00	0.01	0.00	0.95	0.00	0.02	0.00	0.00	1,918.00
	HR Professionals	0.01	0.03	0.06	0.01	0.00	0.01	0.02	0.68	0.14	0.01	0.02	1,434.00
	Office Clerks	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.96	0.00	0.01	3,395.00
	Teachers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	4,135.00
	IT Support	0.00	0.15	0.00	0.00	0.02	0.02	0.00	0.01	0.03	0.00	0.76	2,277.00

Notes: This table shows the correlation between the occupational codes reported in the survey and those registered in the administrative data of Statistics Denmark. The cells show the probability of reporting the column occupation in the survey, conditional on having the row occupation registered with Statistics Denmark. The average agreement rate (diagonal element) is 87%.

Figure B.1: Self-Reported Task Expertise vs. Registered Experience in Occupation



Notes: This figure shows the correlation between workers' self-reported expertise and their years of experience in the relevant occupation. Expertise is reported on a three-point scale: 1 (Low), 2 (Average), and 3 (High).

Table B.5: Self-Reported Expertise vs. Task Importance

		Expertise			
		Low	Average	High	Observations
Importance	Not Important	0.68	0.22	0.10	15,784.00
	Somewhat Important	0.35	0.48	0.17	13,067.00
	Important	0.13	0.54	0.32	24,113.00
	Very Important	0.05	0.39	0.55	29,419.00
	Extremely Important	0.02	0.22	0.76	25,689.00

Notes: This table shows the correlation between workers' reported expertise in and importance of tasks in the main survey. The cells show the probability of reporting the column expertise score, conditional on reporting the row importance score.

Table B.6: Persistence of Importance Score, $P(\text{Follow-Up}_{it}|\text{Main}_{it})$

		Follow Up					
		Not Important	Somewhat Important	Important	Very Important	Extremely Important	Observations
Main Survey	Not Important	0.69	0.14	0.09	0.05	0.03	5,116.00
	Somewhat Important	0.33	0.31	0.22	0.11	0.03	4,287.00
	Important	0.16	0.21	0.36	0.22	0.06	7,878.00
	Very Important	0.10	0.11	0.28	0.38	0.13	9,725.00
	Extremely Important	0.08	0.06	0.13	0.31	0.42	8,982.00

Notes: This table shows the correlation between the task importance scores reported in the follow-up and the main survey. Whereas the main survey asked about the tasks' general importance, the follow-up asked about their importance in the past two weeks. The cells show the probability of reporting the column importance score in the follow-up, conditional on having reported the row importance score in the main survey.

Table B.7: Persistence of Expertise Score, $P(\text{Follow-Up}_{it}|\text{Main}_{it})$

		Follow Up			
		Low	Average	High	Observations
Main	Low	0.64	0.28	0.07	6,538.00
	Average	0.16	0.60	0.25	13,116.00
	High	0.04	0.23	0.73	16,334.00

Notes: This table shows the correlation between the task expertise scores reported in the follow-up and the main survey. The cells show the probability of reporting the column expertise score in the follow-up, conditional on having reported the row expertise score in the main survey.

C Experimental Evidence

Table C.1: Balance Table for Information Experiment

	Control	Treatment - Control	p-value
Age	45.40	0.15	0.45
		(0.20)	
Female	0.49	-0.00	0.59
		(0.01)	
Earnings	13.11	0.02	0.01
		(0.01)	
Experience	7.11	0.06	0.46
		(0.08)	
Importance	3.34	-0.03	0.07
		(0.02)	
Expertise	2.25	-0.01	0.24
		(0.01)	
Use	0.55	-0.01	0.17
		(0.01)	
Use at Work	0.40	-0.01	0.17
		(0.01)	
Productivity	0.36	-0.00	0.63
		(0.01)	
Complementarity	-0.19	0.01	0.22
		(0.01)	
p-value		0.12	
Observations	6,077	6,016	

Notes: This figure shows worker characteristics, assessments, and adoption (before treatment) balance across the treatment arms.

Figure C.1: Treatment Page of the Information Experiment

(a) Treatment

Write comments, columns, or articles	
Question: Can ChatGPT save time?	
Your assessment	Small or no time savings
Expert assessment	Large time savings
Explanation of the **expert assessment**	ChatGPT can generate drafts, suggest changes, and provide ideas for articles, etc.
Question: Can someone with greater expertise save more time?	
Your assessment	Similar time savings for the journalist with greater expertise

(b) Control

Write comments, columns, or articles	
Question: Can ChatGPT save time?	
Your assessment	Small or no time savings
Question: Can someone with greater expertise save more time?	
Your assessment	Similar time savings for the journalist with greater expertise

Notes: This figure shows an English translation of the treatment screen of the information experiment, focusing on an example task of journalists. Panel (a) shows the treatment page, comparing expert assessments of the time savings from ChatGPT with workers' prior assessments. The expert assessments are supported by short explanations. Panel (b) shows the placebo page of the control group, summarizing workers' prior assessments.

D Invitation Letter

This section contains the invitation letter for the main survey. We sent three reminders, two by e-mail (Digital Post) and one by text (SMS).

The English translation starts on page 18, with the original Danish version on page 20.

November 2023

Artificial intelligence and your job tasks

Dear [name]

Statistics Denmark is inviting you to participate in a research project about ChatGPT and your job tasks. You participate by clicking the link below and answering the questionnaire.

ChatGPT is a chatbot with artificial intelligence. You have been selected because you work in an occupation where it may be relevant to use ChatGPT.

Your answers are important regardless of your knowledge of artificial intelligence or ChatGPT. Your participation will advance research about new technology in the labor market. Everyone who completes the questionnaire will automatically participate in a lottery with **a prize of [X,XXX] Kr. tax free**.

Statistics Denmark is conducting the survey for researchers at the University of Copenhagen and the University of Chicago. It takes **about 15 minutes** to complete the questionnaire.

Start the survey [url]

Or access www.dst.dk/ditsvar and enter your response code **[code]**.

Statistics Denmark handles your data confidentially. We convey the results in a way that makes it impossible to see how individuals have responses, and the data is used solely for statistical and scientific purposes.

Participation is voluntary. If you do not wish to participate, you can indicate this: [refusal_link]

If you have questions, you can write to info@dstsurvey.dk or call on 7777 7708 (every day between 9am and 4pm). Please provide your response code when contacting us.

Best regards,

Marie Fuglsang
Head of Division, DST Survey

Anders Humlum
Assistant Professor, University of Chicago

We take care of your answers

Statistics Denmark processes personal data in accordance with the rules of the European General Data Protection Regulation (GDPR) and the Danish Data Protection Act. Furthermore, Statistics Denmark has a data confidentiality policy, which ensures that information about citizens is protected and exclusively used for statistical or scientific studies. We handle your responses confidentially and only use the results in such a way that no one can see your individual answers.

Your responses in this survey are exclusively used for statistical and scientific purposes within this survey. Your responses are deleted or archived according to applicable legislation when the information no longer serves a purpose in the study.

Statistics Denmark is the data processor for collecting your responses in the survey. Once you have answered the questions, your responses in pseudonymized form are forwarded to the University of Copenhagen, which is the data controller for the survey. This means that your responses cannot be directly traced back to you.

The legal basis for data processing is Article 6(1)(e) of the GDPR. If sensitive information is involved, the legal basis is Article 9(2)(j) of the GDPR and § 10 of the Danish Data Protection Act.

You can contact the data protection advisor of Statistics Denmark via databeskyttelse@dst.dk

Read more:

Statistics Denmark's compliance with GDPR also applies to the information about you in this survey. Read more about the processing and what rights and complaint options you have here

Read more about security and confidentiality at Statistics Denmark here

Read more about the data controller here

Who is invited to Statistics Denmark's surveys?

Anyone residing in Denmark can be invited to participate in one of Statistics Denmark's surveys. In our surveys, it is important to know the opinions and attitudes of the entire population across gender, age, education, and residence.

Why may we contact you?

Statistics Denmark has three main tasks according to the Statistics Denmark Act:

- to collect, process, and publish statistical information about society, possibly in co-operation with other statistics producers. In addition, to prepare statistical analyses and forecasts.
- to contribute to international statistical cooperation.
- to perform statistical projects for private and public customers for a fee under the rules of income-generating activities.

It is as part of the third bullet that we are allowed to contact you about this survey.

November 2023

Kunstig intelligens og dine arbejdsopgaver

Kære [navn]

Danmarks Statistik inviterer dig til at deltage i et forskningsprojekt om ChatGPT og dine arbejdsopgaver. Du deltager ved at klikke på nedenstående link og svare på spørgeskemaet.

ChatGPT er en chatbot med kunstig intelligens. Du er blevet udvalgt, fordi du arbejder i et erhverv, hvor det kan være relevant at bruge ChatGPT.

Dine svar er vigtige uanset dit kendskab til kunstig intelligens eller ChatGPT. Din deltagelse vil fremme forskning i ny teknologi på arbejdsmarkedet. Alle der gennemfører spørgeskemaet, deltager automatisk i lodtrækningen om **en præmie på [X.XXX] kr. skattefrit.**

Danmarks Statistik gennemfører spørgeskemaet for forskere på Københavns Universitet og University of Chicago. Det tager **ca. 15 minutter** at besvare spørgeskemaet.

Start undersøgelsen [url]

Eller gå ind på www.dst.dk/ditsvar og tast svarkoden **[kode]**

Danmarks Statistik behandler dine svar fortroligt. Vi formidler resultaterne på en måde, så ingen kan se, hvad den enkelte har svaret og data anvendes alene til statistiske og videnskabelige formål.

Det er frivilligt at deltage. Ønsker du ikke at deltage, kan du tilkendegive det: [refusal_link]

Har du spørgsmål, kan du skrive til info@dstsurvey.dk eller ringe på tlf. 7777 7708 (alle dage ml. kl. 9-16). Oplys venligst din svarkode ved henvendelse.

Med venlig hilsen

Marie Fuglsang
Kontorchef, DST Survey

Anders Humlum
Adjunkt, University of Chicago

Vi passer på dine svar

Danmarks Statistik behandler personoplysninger i overensstemmelse med reglerne i den europæiske databeskyttelsesforordning (GDPR) og den danske databeskyttelseslov. Danmarks Statistik har derudover en datafortrolighedspolitik, som sikrer, at oplysninger om borgerne beskyttes og udelukkende behandles til statistiske eller videnskabelige undersøgelser. Vi behandler dine svar fortroligt og bruger kun resultaterne på en måde, så ingen kan se, hvad du har svaret.

Dine svar i denne undersøgelse bruges udelukkende til statistiske og videnskabelige formål i denne undersøgelse. Dine svar slettes eller arkiveres efter gældende lovgivning, når oplysningerne ikke længere har et formål i undersøgelsen.

Danmarks Statistik er databehandler for indsamlingen af dine svar i undersøgelsen. Når du har svaret på spørgsmålene, videregives dine svar i pseudonymiseret form til Københavns Universitet, der er dataansvarlig for undersøgelsen. Det betyder, at dine svar ikke direkte kan tilbageføres til dig.

Retsgrundlaget for databehandling er databeskyttelsesforordningens artikel 6, stk. 1, litra e. Hvis der indgår følsomme oplysninger er retsgrundlaget forordningens artikel 9, stk. 2, litra j, og databeskyttelseslovens § 10.

Du kan kontakte Danmarks Statistiks databeskyttelsesrådgiver via databeskyttelse@dst.dk

Læs mere:

Danmarks Statistiks efterlevelse af GDPR gælder også for oplysningerne om dig i denne undersøgelse. Læs mere om behandlingen og hvilke rettigheder og klagemuligheder du har her

Læs mere om sikkerhed og fortrolighed hos Danmarks Statistik her

Læs mere om den dataansvarlige her

Hvem bliver inviteret til Danmarks Statistiks undersøgelser?

Alle, der har bopæl i Danmark, har mulighed for at blive inviteret til at deltage i en af Danmarks Statistiks undersøgelser. I vores undersøgelser er det vigtigt at kende meninger og holdninger fra hele befolkningen på tværs af køn, alder, uddannelse og bopæl.

Hvorfor må vi kontakte dig?

Danmarks Statistik har tre hovedopgaver ifølge Lov om Danmarks Statistik:

- at indsamle, bearbejde og offentliggøre statistiske oplysninger om samfundet, evt. i samarbejde med andre statistikproducenter. Herudover at udarbejde statistiske analyser og prognoser.
- at bidrage til det internationale statistiksamarbejde.
- at udføre statistiske opgaver for private og offentlige kunder mod betaling efter reglerne for indtægtsdækket virksomhed.

Det er som led i den tredje bullit, at vi har lov til at kontakte dig om denne undersøgelse.

E Survey Questionnaire

This section contains our survey questionnaire. The questionnaire follows a common structure for the different occupations but with job tasks and titles tailored to each specific occupation.

For the sake of brevity, the questionnaire below focuses on one occupation (journalism), listing one of their six job tasks (write comments, columns, or articles). We indicate the occupation-specific fields by square brackets.

The questionnaire below corresponds to the main survey. The follow-up survey follows the same structure with two exceptions: in Block 1, we ask about adoption and task importance in the past two weeks (Questions 3, 6, 8). We make this change to be consistent with the time window of intended adoption in Block 4 of the main survey (Questions 18 and 19). Second, we exclude Block 3 (Question 17, i.e., treatment/control) from the follow-up survey.

The English translation starts on page 23, with the original Danish version on page 33.

1. Introduction

ChatGPT is a chatbot that uses artificial intelligence. You have been selected to participate in this survey because you work in an occupation where it may be relevant to use ChatGPT.
Your participation is important regardless of your knowledge of artificial intelligence or ChatGPT.

Block 1: Adoption

2.a Occupation

Are you employed in [journalism]?

- Yes
- No

2.b Occupation [if 2.a='No']

Are you employed in one of the following occupations?
If you are employed in more than one occupation, please select your primary work area.

- Auditing and accounting
- Customer support
- Financial advising
- Human resources
- IT support
- Legal work
- Marketing
- Office and secretarial work
- Software development
- Teaching
- I am not employed in the above occupations

2.c Screen Out [if 2.b = 'I am not employed in the above occupations']

Thank you for participating in the survey. Unfortunately, you are not in the target group for this survey, and we therefore have no more questions.

3. Task Importance [all tasks]

We will first ask about some typical tasks among [journalists].
For each task, please assess how **important the task is for your job**.
Extremely important means that the task is critical for carrying out your job.
[Write comments, columns, or articles]

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

4. Task Expertise [all tasks]
For each task, please assess your **own expertise** in the task.
Expertise may, for example, come from previous experience with or innate abilities in performing the task.
[Write comments, columns, or articles]

- Low expertise
- Average expertise
- High expertise

5. Awareness of ChatGPT
We will now ask about your experiences with ChatGPT.
Had you heard about ChatGPT before this survey?

- Yes
- No

6. Prior Use of ChatGPT [if 5='Yes']
Have you used ChatGPT?

- Yes
- No

7. Purposes of Prior Use [if 6='Yes']
For what purposes have you used ChatGPT?

- Work only
- Leisure only
- Both work and leisure

8. Prior Use in Job Tasks [if 7='Work only' or 7='Both work and leisure'; all tasks]
Have you used ChatGPT to perform the following job tasks?
Mark all tasks where you have used ChatGPT.
[Write comments, columns, or articles]

9. Current Use of ChatGPT [if 6='Yes']
Have you used ChatGPT in the past two weeks?

- Yes
- No

10. Plus Subscription [if 6='Yes']
Do you have an active Plus subscription to ChatGPT?

- Yes
- No

Block 2: Prior Beliefs

11. Prior Beliefs: Productivity Introduction

Time Savings from ChatGPT

We will next ask for your assessment of whether ChatGPT can save time on various job tasks.
Note: Your answers are important regardless of your knowledge of ChatGPT. If you are not familiar with ChatGPT, we ask you to give your best guess. You will later get the opportunity to indicate how certain you are in your evaluations.

12. Prior Beliefs: Productivity of ChatGPT [all tasks]

Think of **a [journalist] with an average level of experience and expertise** trying to complete a given task. The worker has access to ChatGPT, the internet, a computer with existing software, and other tools typically used to complete the task.

Specify the following tasks according to the description below. Equivalent quality means someone reviewing the work would not be able to tell whether the worker completed it with or without assistance from ChatGPT.

Large time savings from ChatGPT

Specify the task's time savings as "Large" if **access to ChatGPT *can halve the time*** it takes for an average [journalist] to complete the task with equivalent quality.

Small or no time savings from ChatGPT

Specify the task's time savings as "Small or no" if **access to ChatGPT *cannot* halve the time** it takes for an average [journalist] to complete the task with equivalent quality.

Please provide your best estimates even if you are unsure of them.

[Write comments, columns, or articles]

- Small or no time savings from ChatGPT
- Large time savings from ChatGPT

13. Uncertainty of Productivity Prior

How certain are you about your previous assessments of the time savings from ChatGPT for an average [journalist]?

- Very uncertain
- Uncertain
- Certain
- Very certain

14. Prior Beliefs: Complementarity Introduction
We now ask you to assess how the potential time savings from ChatGPT relate to [journalists'] expertise in given job tasks.

15. Prior Beliefs: Expertise Complementarity of ChatGPT [all tasks]
Imagine two [journalists] with average levels of experience and expertise but who differ in their expertise in a given task.

A [journalist] with greater expertise in the task: The worker has extensive experience in the task, has in-depth knowledge of its nuances, and has a track record of accuracy and efficiency in executing it.

A [journalist] with less expertise in the task: The worker has a broad understanding of the principles of the task but lacks expertise in executing the specific task.

The two [journalists] are similar in all other aspects except their expertise in the specific task.

Specify the following tasks according to whether access to ChatGPT in the task yields smaller, similar, or larger time savings for the worker with greater expertise compared to the worker with less expertise in the task.

Please provide your best estimates even if you are unsure of them.

[Write comments, columns, or articles]

- Smaller time savings for the [journalist] with greater expertise
- Similar time savings for the [journalist] with greater expertise
- Larger time savings for the [journalist] with greater expertise

16. Uncertainty of Complementarity Prior
How certain are you about your previous assessments of how the time savings from ChatGPT relate to [journalists'] expertise?

- Very uncertain
- Uncertain
- Certain
- Very certain

Block 3: Treatment

17.a Productivity Treatment [if randomized into productivity treatment group; all tasks]
We previously asked you to evaluate the time savings from ChatGPT in various job tasks.

The University of Pennsylvania and OpenAI (the developer of ChatGPT) conducted an expert assessment in August 2023 of the time savings from ChatGPT in the same tasks. Researchers from the University of Copenhagen have validated and extended the expert assessments in collaboration with industry experts from Denmark.

Please take the time to review the table, as the information may become useful in the rest of the survey.

Note: You can continue by clicking on the "next" button after 15 seconds on this page. Once you proceed, you cannot go back to this table.

[Write comments, columns, or articles]	
Question: Can ChatGPT save time?	
Your assessment	Small or no time savings
Expert assessment	Large time savings
Explanation of the **expert assessment**	ChatGPT can generate drafts, suggest changes, and provide ideas for articles, etc.
Question: Can someone with greater expertise save more time?	
Your assessment	Similar time savings for the [journalist] with greater expertise

17.b Complementarity Treatment [if randomized into complementarity treatment group; all tasks]
We previously asked you to evaluate the time savings from ChatGPT in various job tasks.

The University of Pennsylvania and OpenAI (the developer of ChatGPT) conducted an expert assessment in August 2023 of the time savings from ChatGPT in the same tasks. Researchers from the University of Copenhagen have validated and extended the expert assessments in collaboration with industry experts from Denmark.

Please take the time to review the table, as the information may become useful in the rest of the survey.

Note: You can continue by clicking on the "next" button after 15 seconds on this page. Once you proceed, you cannot go back to this table.

[Write comments, columns, or articles]	
Question: Can ChatGPT save time?	
Your assessment	Small or no time savings
Question: Can someone with greater expertise save more time?	
Your assessment	Similar time savings for the [journalist] with greater expertise
Expert assessment	Smaller time savings for the [journalist] with greater expertise
Explanation of the **expert assessment**	A competent [journalist] can more easily prepare drafts and revise articles, etc., and therefore has less benefit from ChatGPT in the task.

17.c Control [if randomized into control group; all tasks]
We previously asked you to evaluate the time savings from ChatGPT in various job tasks.

Please take the time to review the table, as the information may become useful in the rest of the survey.

Note: You can continue by clicking on the "next" button after 15 seconds on this page. Once you proceed, you cannot go back to this table.

[Write comments, columns, or articles]	
Question: Can ChatGPT save time?	
Your assessment	Small or no time savings
Question: Can someone with greater expertise save more time?	
Your assessment	Similar time savings for the [journalist] with greater expertise

Block 4: Intended Adoption and Posterior Beliefs

18. Intentions to Use ChatGPT

Do you expect to use ChatGPT in the next two weeks?

- Yes
- No

19. Intentions to Use in Job Tasks [if 18='Yes'; all tasks]

Do you expect to use ChatGPT in the following job tasks in the next two weeks?

[Write comments, columns, or articles]

- Yes
- No

20. Posterior Beliefs: Individual Productivity of ChatGPT [all tasks]

Time savings from ChatGPT in your own job

Now, considering your own job, given your individual experience and expertise as a [journalist]. Assume that you have access to ChatGPT, the internet, a computer with existing software, and other tools you typically use to complete the task.

Specify the following tasks according to the description below. Equivalent quality means someone reviewing the work would not be able to tell whether you have completed it with or without assistance from ChatGPT.

Large time savings from ChatGPT

Specify the task's time savings as "Large" if **access to ChatGPT *can halve the time*** it takes for you to complete the task with equivalent quality.

Small or no time savings from ChatGPT

Specify the task's time savings as "Small or no" if **access to ChatGPT *cannot* halve the time** it takes for you to complete the task with equivalent quality.

Please provide your best estimates even if you are unsure of them.

[Write comments, columns, or articles]

- Small or no time savings from ChatGPT
- Large time savings from ChatGPT

13. Uncertainty of Productivity Prior

How certain are you about your previous assessments of the time savings from ChatGPT for yourself?

- Very uncertain
- Uncertain
- Certain
- Very certain

22. Final Questions: Introduction

We will now ask you some follow-up questions about your assessment of ChatGPT in the job tasks.

23.a Task Substitution

If ChatGPT saves time in completing a task, do you then expect to complete more of that type of tasks during your workday?

Please provide your best estimate, even if you are unsure.

- Yes
- No

23.b Task Substitution [if 23.a='Yes']

If ChatGPT saves time in completing a task, do you expect that type of tasks to occupy more of your workday, while other kinds of tasks occupy less?

The task can occupy more if the larger number of tasks completed outweighs the time saved in each individual task solution.

- Yes
- No

Block 5: Frictions

24. Beliefs Frictions [tasks with 12!=20]

Your assessment of the time savings from ChatGPT for an average [journalist] and yourself differed in the following job tasks.

Please indicate for each of the tasks the reasons why your assessments differed from one another.

[Write comments, columns, or articles]

- I changed my view on the time savings from ChatGPT.
- The time savings for an average [journalist] are not relevant given my expertise.
- I don't know how to use ChatGPT.
- I use specialized software that does integrate with ChatGPT.
- I am concerned about the correctness of ChatGPT's responses.
- I am concerned about ChatGPT's lack of capabilities in Danish.
- Other, please specify: [open text field]

S25: Adoption Frictions [tasks with 19='No' and 20='Large time savings from ChatGPT']
You indicated for the following job tasks that:

1. ChatGPT can offer you a large time savings in completing the task.
2. You do not expect to use ChatGPT for the task in the next two weeks.

Please state the reasons why you do not expect to use ChatGPT in the job task despite its time savings.

[Write comments, columns, or articles]

- I do not expect to encounter the task in the next two weeks.
- I am subject to restrictions on using ChatGPT in my job.
- I am concerned about how ChatGPT will handle my data confidentially.
- It would require training before I can benefit from ChatGPT.
- I fear that ChatGPT will eventually make me redundant in my job.
- ChatGPT will reduce my joy of performing the task.
- I am concerned about becoming dependent on ChatGPT in the task.
- Other, please specify: [open text field]

26. Information Sheets
Are you interested in receiving additional material with examples of how a [journalist] can use ChatGPT? The material has been prepared by researchers from the University of Copenhagen and the University of Chicago in collaboration with industry experts in Denmark. You can access the material at the end of the survey.

- Yes
- No

Side 27.(a) End of Survey [if 26='Yes']
Thank you for participating in the survey.
You can download the material prepared by researchers from the University of Copenhagen and the University of Chicago in collaboration with Danish industry experts, here: **ChatGPT for [journalists]**
If you win one of the prizes, you will be notified directly in your e-Boks.
We may contact you again in two weeks with a short follow-up survey. We hope very much that you are willing to participate in this brief follow-up.

Side 27.(b) End of Survey [if 26='No']
Thank you for participating in the survey.
If you win one of the prizes, you will be notified directly in your e-Boks.
We may contact you again in two weeks with a short follow-up survey. We hope very much that you are willing to participate in this brief follow-up.

Survey Questionnaire – Danish Version

1. Introduction
ChatGPT er en chatbot, der bruger kunstig intelligens. Du er blevet udvalgt til at deltage i denne undersøgelse, fordi du arbejder i et erhverv, hvor det kan være relevant at bruge ChatGPT.
Din deltagelse er vigtig uanset dit kendskab til kunstig intelligens eller ChatGPT.

Block 1: Adoption

2.a Occupation
Er du beskæftiget med [journalistik]?

- Ja
- Nej

2.b Occupation [if 2.a='Nej']
Er du beskæftiget inden for et af følgende områder?
Hvis du er beskæftiget indenfor flere områder, vælg da dit primære arbejdsområde.

- HR-arbejde
- IT-support
- Kontor- og sekretærarbejde
- Kundesupport
- Juridisk arbejde
- Marketing
- Revisions- og regnskabsarbejde
- Softwareudvikling
- Undervisning
- Økonomisk rådgivning
- Jeg er ikke beskæftiget inden for ovenstående arbejdsområder

2.c Screen Out [if 2.b = 'Jeg er ikke beskæftiget inden for ovenstående arbejdsområder']
Mange tak for at deltage i undersøgelsen.
Du er desværre ikke i målgruppen for undersøgelsen, og vi har derfor ikke flere spørgsmål.

3. Task Importance [all tasks]
Vi vil først spørge ind til nogle typiske arbejdsopgaver blandt [journalister].
Til hver opgave bedes du vurdere, hvor **vigtig opgaven er for dit arbejde**.
Ekstremt vigtig betyder, at opgaven er kritisk for varetagelsen af dit nuværende job.
[Skrive kommentarer, klummer eller artikler.]

- Ikke vigtig
- Lidt vigtig
- Vigtig
- Meget vigtig
- Ekstremt vigtig

4. Task Expertise [all tasks]
Til hver arbejdsopgave bedes du vurdere din **egen ekspertise** i opgaven.
Ekspertise kan f.eks. komme fra tidligere erfaring med eller naturlige evner for at løse opgaven.
[Skrive kommentarer, klummer eller artikler.]

- Lille ekspertise
- Gennemsnitlig ekspertise
- Stor ekspertise

5. Awareness of ChatGPT
Vi vil nu spørge ind til dine erfaringer med ChatGPT.
Havde du hørt om ChatGPT før denne undersøgelse?

- Ja
- Nej

6. Prior Use of ChatGPT [if 5='Ja']
Har du benyttet ChatGPT?

- Ja
- Nej

7. Purposes of Prior Use [if 6='Ja']
Til hvilke formål har du benyttet ChatGPT?

- Kun arbejde
- Kun fritid
- Både arbejde og fritid

8. Prior Use in Job Tasks [if 7='Kun arbejde' or 7='Både arbejde og fritid'; all tasks]
Har du benyttet ChatGPT til at udføre følgende arbejdsopgaver?
Markér alle opgaver, hvor du har benyttet ChatGPT.
[Skrive kommentarer, klummer eller artikler.]

9. Current Use of ChatGPT [if 6='Ja']
Har du benyttet ChatGPT i løbet af de seneste to uger?

- Ja
- Nej

10. Plus Subscription [if 6='Ja']
Har du et aktivt Plus-abonnement på ChatGPT?

- Ja
- Nej

Block 2: Prior Beliefs

11. Prior Beliefs: Productivity Introduction

Tidsbesparelser fra ChatGPT

Vi vil i det følgende spørge til din vurdering af, om ChatGPT kan spare tid i forskellige arbejdsopgaver. Bemærk: Dine svar er vigtige uanset dit kendskab til ChatGPT. Hvis du ikke kender til ChatGPT, beder vi dig give dit bedste gæt. Du vil senere få mulighed for at angive hvor sikker du er i dine vurderinger.

12. Prior Beliefs: Productivity of ChatGPT [all tasks]

Tænk på **en [journalist] med en gennemsnitlig erfaring og ekspertise**, der vil udføre en given arbejdsopgave. Vedkommende har adgang til ChatGPT, internettet, en computer med eksisterende programmer samt andre hjælpemidler, der typisk anvendes i arbejdsopgaven.

Specificér de følgende arbejdsopgaver ud fra beskrivelsen nedenfor. Tilsvarende kvalitet betyder, at hvis andre tjekker arbejdet, vil de ikke kunne vurdere, om opgaven er løst med eller uden hjælp fra ChatGPT.

Stor tidsbesparelse fra ChatGPT

Angiv tidsbesparelse i arbejdsopgaven som "Stor", hvis **ChatGPT mindst *kan halvere den tid***, det tager for en gennemsnitlig [journalist] at løse arbejdsopgaven med tilsvarende kvalitet.

Lille eller ingen tidsbesparelse fra ChatGPT

Angiv tidsbesparelse i arbejdsopgaven som "Lille eller ingen", hvis ***ChatGPT ikke kan halvere tiden***, det tager for en gennemsnitlig [journalist] at løse arbejdsopgaven med tilsvarende kvalitet.

Angiv venligst dine bedste vurderinger, også selvom du er usikker på dem.

[Skrive kommentarer, klummer eller artikler.]

- Lille eller ingen tidsbesparelse fra ChatGPT
- Stor tidsbesparelse fra ChatGPT

13. Uncertainty of Productivity Prior

Hvor sikker er du i dine forrige vurderinger af tidsbesparelse fra ChatGPT for en gennemsnitlig [journalist]?

- Meget usikker
- Usikker
- Sikker
- Meget sikker

14. Prior Beliefs: Complementarity Introduction
Vi beder dig nu vurdere, hvordan eventuelle tidsbesparelser fra ChatGPT relaterer sig til [journalisters] ekspertise i de givne arbejdsopgaver.

15. Prior Beliefs: Expertise Complementarity of ChatGPT [all tasks]
Forestil dig to [journalister] med gennemsnitlig erfaring og ekspertise, men som har forskellig ekspertise indenfor én given arbejdsopgave.

En [journalist] med større ekspertise indenfor opgaven: Vedkommende har stor erfaring indenfor netop dén opgave, har indgående kendskab til arbejdsopgavens nuancer og har tidligere løst opgaven effektivitet med stor nøjagtighed.

En [journalist] med mindre ekspertise indenfor arbejdsopgaven: Vedkommende har en bred forståelse for arbejdsopgavens principper, men mangler ekspertise i den konkrete opgave.

De to [journalister] er sammenlignelige i alle andre sammenhænge end deres ekspertise indenfor den specifikke arbejdsopgave.

Specificér følgende arbejdsopgaver ud fra, om brug af ChatGPT kan spare mindre, tilsvarende eller mere tid for medarbejderen med større ekspertise sammenlignet med medarbejderen med mindre ekspertise indenfor opgaven.

Angiv venligst dine bedste vurderinger, også selvom du er usikker på dem.

[Skrive kommentarer, klummer eller artikler.]

- Mindre tidsbesparelse for [journalisten] med større ekspertise
- Samme tidsbesparelse for [journalisten] med større ekspertise
- Større tidsbesparelse for [journalisten] med større ekspertise

16. Uncertainty of Complementarity Prior
Hvor sikker er du i dine forrige vurderinger af, hvordan tidsbesparelse fra ChatGPT relaterer sig til [journalisters] ekspertise?
Meget usikker
Usikker
Sikker
Meget sikker

Block 3: Treatment

17.a Productivity Treatment [if randomized into productivity treatment group; all tasks]
Vi bad dig tidligere vurdere tidsbesparelsen fra ChatGPT i forskellige arbejdsopgaver.

University of Pennsylvania og OpenAI (udvikleren af ChatGPT) foretog i august 2023 en ekspertvurdering af tidsbesparelsen fra ChatGPT i samme opgaver. Forskere fra Københavns Universitet har valideret og udvidet ekspertvurderingerne i samarbejde med danske brancheeksperter.

Tag dig venligst tid til at gennemgå tabellen, da informationen kan blive nyttig for dig i resten af spørgeskemaet.

Bemærk: Du kan fortsætte ved at klikke på "næste" knappen efter 15 sekunder på denne side. Når du går videre, kan du ikke klikke tilbage til denne tabel.

Skrive kommentarer, klummer eller artikler.	
Spørgsmål: Kan man spare tid med ChatGPT?	
Din vurdering	Lille eller ingen tidsbesparelse fra ChatGPT
Ekspertvurdering	Stor tidsbesparelse fra ChatGPT
Forklaring til **ekspertvurderingen**	ChatGPT kan generere udkast, foreslå ændringer og give idéer til artikler mv.
Spørgsmål: Kan en med større ekspertise spare mere tid?	
Din vurdering	Samme tidsbesparelse for [journalisten] med større ekspertise

17.b Complementarity Treatment [if randomized into complementarity treatment group; all tasks]
Vi bad dig tidligere vurdere tidsbesparelsen fra ChatGPT i forskellige arbejdsopgaver.

University of Pennsylvania og OpenAI (udvikleren af ChatGPT) foretog i august 2023 en ekspertvurdering af tidsbesparelsen fra ChatGPT i samme opgaver. Forskere fra Københavns Universitet har valideret og udvidet ekspertvurderingerne i samarbejde med danske brancheeksperter.

Tag dig venligst tid til at gennemgå tabellen, da informationen kan blive nyttig for dig i resten af spørgeskemaet.

Bemærk: Du kan fortsætte ved at klikke på "næste" knappen efter 15 sekunder på denne side. Når du går videre, kan du ikke klikke tilbage til denne tabel.

Skrive kommentarer, klummer eller artikler.	
Spørgsmål: Kan man spare tid med ChatGPT?	
Din vurdering	Lille eller ingen tidsbesparelse fra ChatGPT
Spørgsmål: Kan en med større ekspertise spare mere tid?	
Din vurdering	Samme tidsbesparelse for [journalisten] med større ekspertise
Ekspertvurdering	Mindre tidsbesparelse for [journalisten] med større ekspertise
Forklaring til **ekspertvurderingen**	En kompetent [journalist] kan nemmere udarbejde udkast til og revidere artikler mv. og har derfor mindre gavn af ChatGPT i opgaven.

17.c Control [if randomized into control group; all tasks]
Vi bad dig tidligere vurdere tidsbesparelsen fra ChatGPT i forskellige arbejdsopgaver.

Tag dig venligst tid til at gennemgå tabellen, da informationen kan blive nyttig for dig i resten af spørgeskemaet.

Bemærk: Du kan fortsætte ved at klikke på "næste" knappen efter 15 sekunder på denne side. Når du går videre, kan du ikke klikke tilbage til denne tabel.

Skrive kommentarer, klummer eller artikler.	
Spørgsmål: Kan man spare tid med ChatGPT?	
Din vurdering	Lille eller ingen tidsbesparelse fra ChatGPT
Spørgsmål: Kan en med større ekspertise spare mere tid?	
Din vurdering	Samme tidsbesparelse for [journalisten] med større ekspertise

Block 4: Intended Adoption and Posterior Beliefs

18. Intentions to Use ChatGPT

Forventer du at benytte ChatGPT i løbet af de næste to uger?

- Ja
- Nej

19. Intentions to Use in Job Tasks [if 18='Ja']

Forventer du at benytte ChatGPT i de følgende arbejdsopgaver de næste to uger?
[Skrive kommentarer, klummer eller artikler.]

- Ja
- Nej

20. Posterior Beliefs: Individual Productivity of ChatGPT [all tasks]
Tidsbesparelse fra ChatGPT i eget job

Tag nu udgangspunkt i **dit eget job**, givet din egen erfaring og ekspertise som [journalist]. Antag, at du har adgang til ChatGPT, internettet, en computer med eksisterende programmer, samt andre hjælpemidler, du typisk anvender til at udføre en given arbejdsopgave.

Specificér de følgende arbejdsopgaver ud fra beskrivelsen nedenfor. Tilsvarende kvalitet betyder, at hvis andre tjekker arbejdet vil de ikke kunne vurdere, om du har løst opgaven med eller uden hjælp fra ChatGPT.

Stor tidsbesparelse fra ChatGPT
Angiv tidsbesparelse i arbejdsopgaven som "Stor", hvis ***ChatGPT mindst kan halvere tiden***, det tager for dig at løse arbejdsopgaven med tilsvarende kvalitet.

Lille eller ingen tidsbesparelse fra ChatGPT
Angiv tidsbesparelse i arbejdsopgaven som "Lille eller ingen", hvis ***ChatGPT ikke kan halvere tiden***, det tager for dig at løse arbejdsopgaven med tilsvarende kvalitet.

Angiv venligst dine bedste vurderinger, også selvom du er usikker på dem.

[Skrive kommentarer, klummer eller artikler.]

- Lille eller ingen tidsbesparelse fra ChatGPT
- Stor tidsbesparelse fra ChatGPT

21. Uncertainty of Individual Productivity Posterior
Hvor sikker er du i dine forrige vurderinger af tidsbesparelsen fra ChatGPT for dig selv?

- Meget usikker
- Usikker
- Sikker
- Meget sikker

22. Final Questions: Introduction
Vi vil her til sidst stille dig nogle opfølgende spørgsmål om din vurdering af ChatGPT i de forskellige arbejdsopgaver.

23.a Task Substitution
Hvis ChatGPT sparer tid i løsningen af en opgave, forventer du så at løse flere af den type opgaver i løbet af din arbejdsdag?
Angiv venligst din bedste vurdering, også selvom du er usikker på den.

- Ja
- Nej

23.b Task Substitution [if 23.a='Ja']
Hvis ChatGPT sparer tid i løsningen af en opgave, forventer du så, at den type opgaver vil fylde mere i din arbejdsdag, mens andre slags opgaver vil fylde mindre?
Opgaven kan fylde mere, hvis det større antal løste opgaver opvejer tidsbesparelsen i den enkelte opgaveløsning.

- Ja
- Nej

Block 5: Frictions

24. Beliefs Frictions [tasks with 12!=20]
Din vurdering af tidsbesparelserne fra ChatGPT for en gennemsnitlig [journalist] og dig selv var forskellige fra hinanden i de følgende arbejdsopgaver.

Angiv til hver af opgaverne årsagerne til, at dine vurderinger adskilte sig fra hinanden.

[Skrive kommentarer, klummer eller artikler.]

- Jeg ændrede mit syn på tidsbesparelsen fra ChatGPT.
- Tidsbesparelsen for en gennemsnitlig [journalist] er ikke relevant givet min ekspertise.
- Jeg tror ikke, at jeg kan finde ud af at bruge ChatGPT.
- Jeg anvender specialiseret software, der ikke kan integreres med ChatGPT.
- Jeg er bekymret for, om ChatGPTs svar er korrekte.
- Jeg er bekymret for ChatGPT's manglende evner på dansk.
- Andet, skriv venligst: [open text field]

S25: Adoption Frictions [tasks with 19='Nej' and 20='Stor tidsbesparelse fra ChatGPT']
Du angav for følgende arbejdsopgaver, at
1. ChatGPT kan give dig store tidsbesparelser i opgaveløsningen.
2. Du ikke forventer at benytte ChatGPT i opgaven de næste to uger.

Angiv årsager til, at du ikke forventer at benytte ChatGPT i arbejdsopgaven på trods af dens tidsbesparelser

[Skrive kommentarer, klummer eller artikler.]

- Jeg forventer ikke at stå over for opgaven de næste to uger.
- Jeg er pålagt restriktioner om brugen af ChatGPT i mit job.
- Jeg er bekymret for, om ChatGPT varetager mine data fortroligt.
- Det vil kræve oplæring, før jeg kan få gavn af ChatGPT.
- Jeg frygter, at ChatGPT på sigt vil gøre mig overflødig i jobbet.
- ChatGPT vil mindske min fornøjelse ved at udføre opgaven
- Jeg er bekymret for at blive afhængig af ChatGPT i opgaveløsningen
- Andet, skriv venligst: [open text field]

26. Information Sheets
Er du interesseret i at modtage uddybende materiale med eksempler på, hvordan en [journalist] kan anvende ChatGPT?
Materialet er udarbejdet af forskere fra Københavns Universitet og University of Chicago i samarbejde med danske brancheeksperter. Du kan tilgå materialet i slutningen af spørgeskemaet

- Ja
- Nej

Side 27.(a) End of Survey [if 26='Ja']
Mange tak for at deltage i undersøgelsen.
Du kan hente materialet, der er udarbejdet af forskere fra Københavns Universitet og University of Chicago i samarbejde med danske brancheeksperter, her: **ChatGPT for [journalister]**
Hvis du vinder en af præmierne, vil du få direkte besked i din e-Boks.
Vi vil muligvis kontakte dig igen om to uger med en kort opfølgningsundersøgelse. Vi håber meget, at du er villig til at deltage i denne korte opfølgning.

Side 27.(b) End of Survey [if 26='Nej']
Mange tak for at deltage i undersøgelsen.
Hvis du vinder en af præmierne, vil du få direkte besked i din e-Boks.
Vi vil muligvis kontakte dig igen om to uger med en kort opfølgningsundersøgelse. Vi håber meget, at du er villig til at deltage i denne korte opfølgning.