

Generative AI at Work

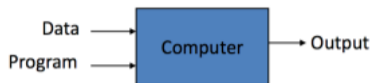
Erik Brynjolfsson (Stanford), Danielle Li (MIT), and Lindsey Raymond (MIT)

NABE, September 2024

What's exciting about machine learning?

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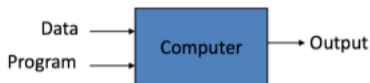
Traditionally, computers **require** instructions



- ▶ Use inputs X and instructions $f(X)$ to produce output Y
- ▶ **Computers traditionally need instructions in order to work**

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ML works differently



- ▶ Takes *examples*—inputs X and outputs Y —and infers instructions $f(X)$
- ▶ **ML models do not need instructions**

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Expand the set of tasks machines can perform

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- ▶ Growing literature suggesting AI can outperform humans on average

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Learn what makes people good at their job

- ▶ Most training data are generated by human actions: doctors diagnosing, managers hiring, loan officers lending
- ▶ When ML learns on this data, it is learning how workers w/ good outcomes **behave**—incl. tacit behaviors they may not explicitly understand

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Produce “best practices”

- ▶ **Generative AI**: predict and produce what a good worker might actually say or do

“Generative AI at Work” (w/ Lindsey Raymond and Erik Brynjolfsson)

Setting: Technical customer support chat

- ▶ One of the top use cases for modern AI tools

Technology: Conversational customer support assistant

- ▶ Provides real-time recommendations for how to communicate

Empirical Design: Staggered roll-out in technical support for a large Fortune 500 software firm

- ▶ 3,000,000 conversations from 3,000 agents

Technical customer support

The screenshot displays the LiveEngage interface for a customer support agent. At the top, a navigation bar shows 'Connections' with a dropdown arrow, and a status summary: OPEN (15), PENDING (3), OVERDUE (6), SOON TO BE OVERDUE (4), and CSAT (90%).

The main chat area is titled 'Emma Ros' and shows a conversation from 18 Aug 2019. The customer's message is highlighted in purple: 'Hello! Order number: W071674340 I need to change pickup name for this order.' The agent's response is in a blue bubble: 'Hi Emma, thanks for reaching out today. For identification purposes, can I ask for the address and payment method?' The agent's name 'Daniel' and time '12:03pm' are visible below the response.

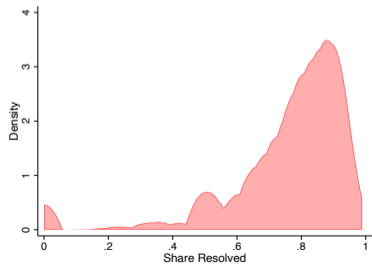
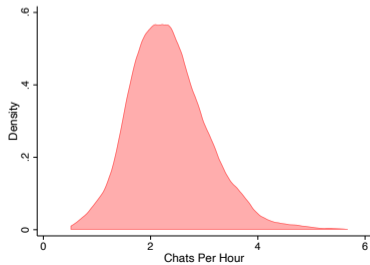
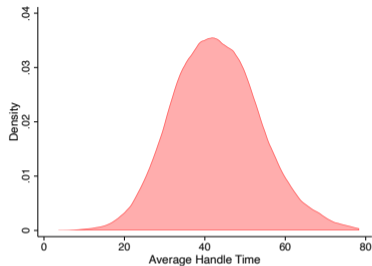
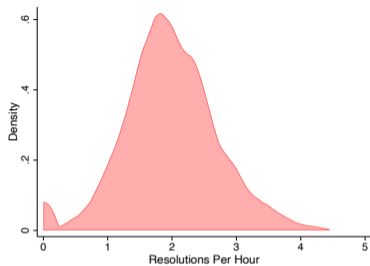
On the left, a list of other active connections is shown, including Emma Ros, Marian Reved, Christian Allen, May Lavin, Lora Panfo, Tomi Rosde, Sylvia Long, Tony Ramos, Glen Ferguson, and Max Holdes.

On the right, a 'CONSUMER INFO' panel is expanded, showing the following details:

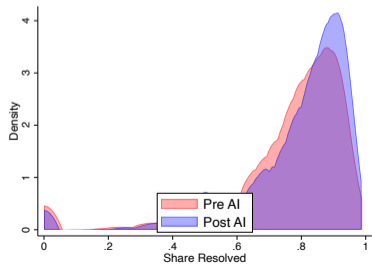
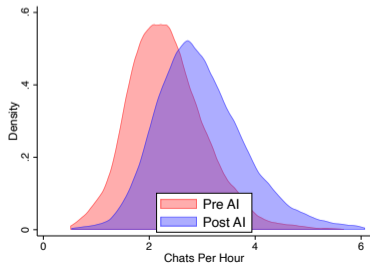
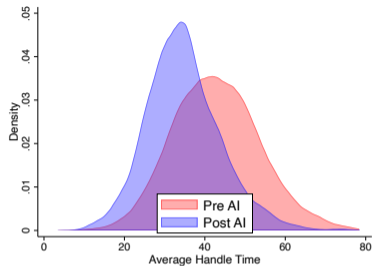
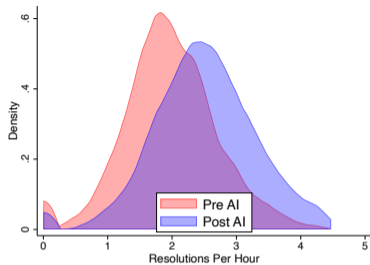
- Consumer info**
 - Consumer name: Emma Ros
 - Consumer ID: 17169125011
- Conversation info**
 - Skill: Online Sales
 - Start time: 18 Aug, 2019 - 12:01pm
 - Source: Mobile App
 - ID: d07aacb3-f5c3-493b-8e57-ce042e03a20b
- Personal info**
 - Phone number: +17165123010
 - Email: emmar@gmail.com

A 'SUMMARY' panel is also visible on the right, with a text input field for 'Enter conversation summary...'. At the bottom of the chat area, there is a toolbar with icons for emojis, attachments, and a send button.

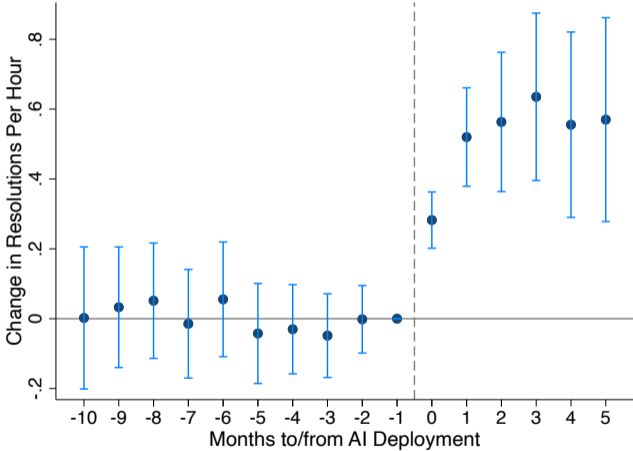
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Workers successfully resolve more issues



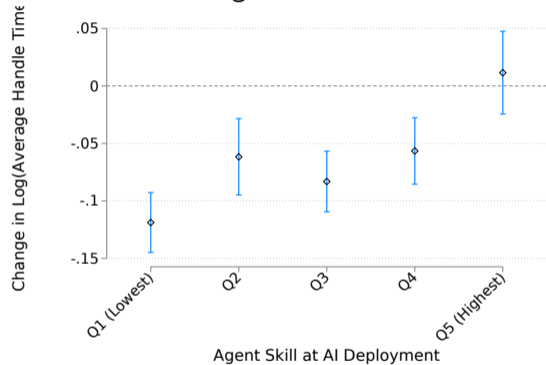
Heterogeneity by pre-AI worker skill: chat efficiency

a. Average Handle Time

b. Chats per Hour

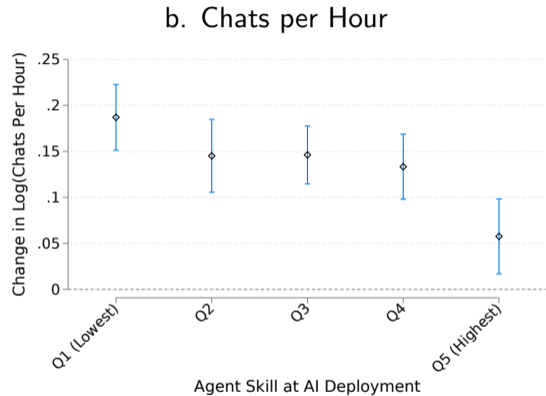
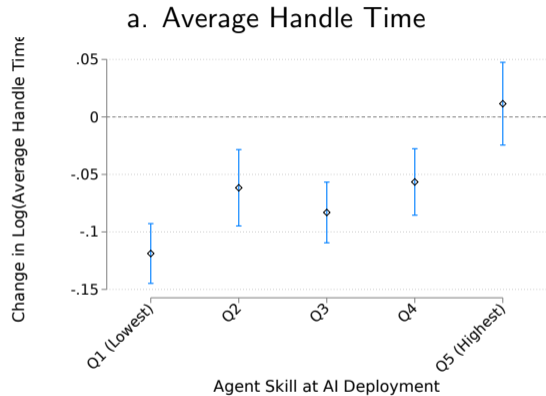
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Heterogeneity by pre-AI worker skill: chat efficiency



- ▶ 35% productivity gains for less-skilled workers. Zero for most-skilled workers

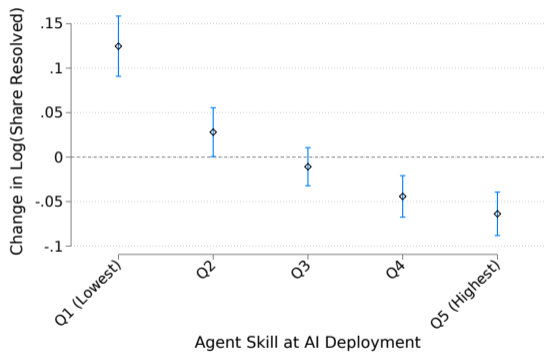
Heterogeneity by pre-AI worker skill: chat quality

a. Resolution Rate

b. Customer Satisfaction

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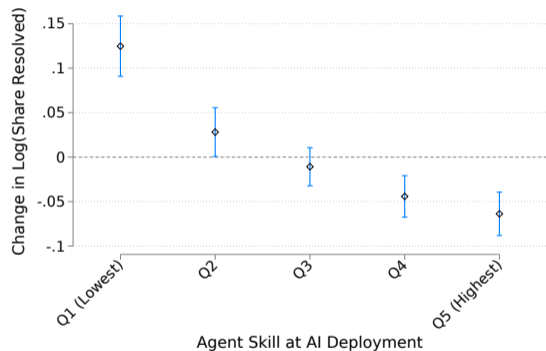
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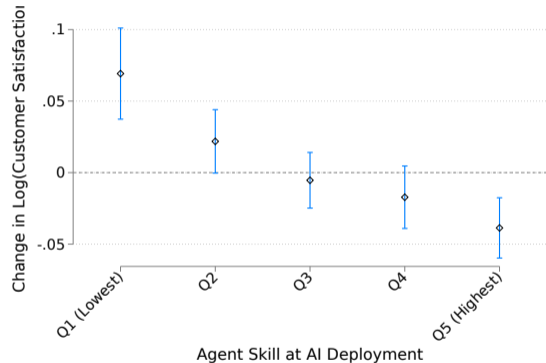
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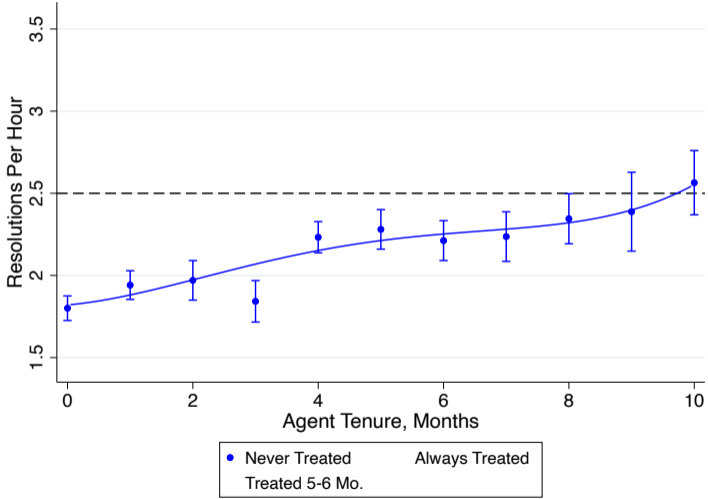


b. Customer Satisfaction

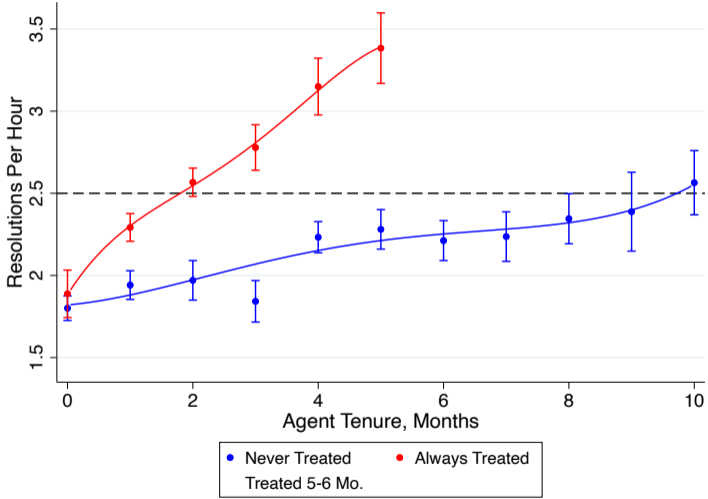


- ▶ Large gains for lowest skilled. Small *negative* effects for highest skilled workers

AI assistance helps newer agents “catch up”

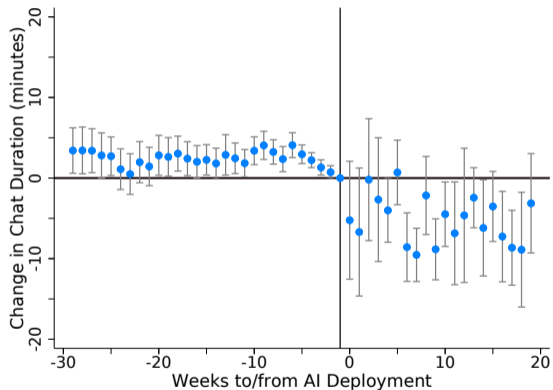


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What happens during a software outage?

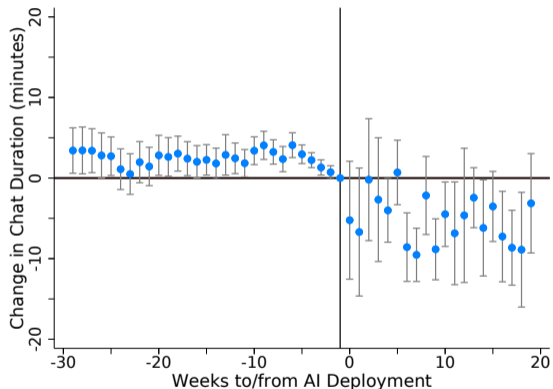
Workers who are trying AI recommendations



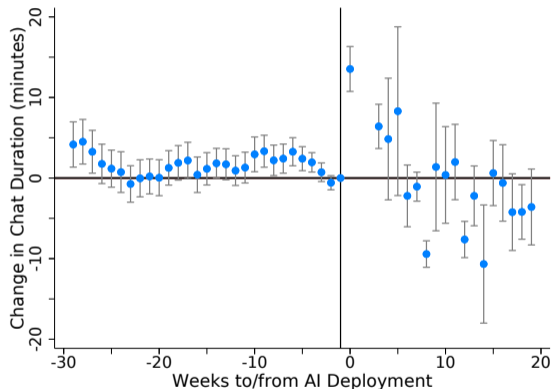
Workers who do their own thing

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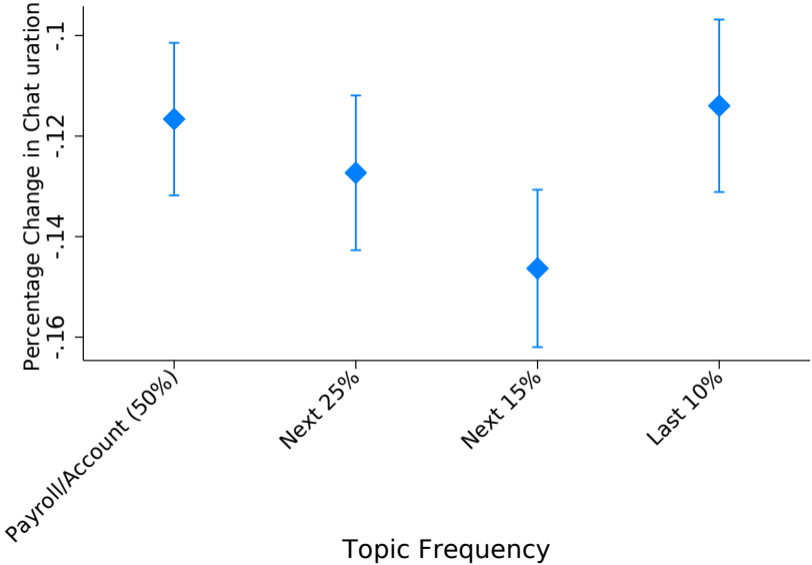


Workers who do their own thing



- ▶ Suggests that engaging with AI builds skills: you have to actually say something new in order to observe how the customer reacts, and see that it works.

AI assistance improves productivity most for relatively rare problems



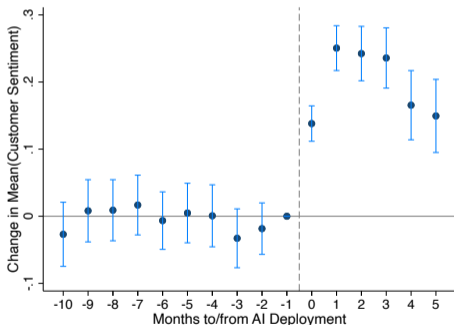
What happens to the experience of work?

This is a job where workers do a lot of emotional labor: anonymous encounters with customers who are stressed about things like taxes and payroll

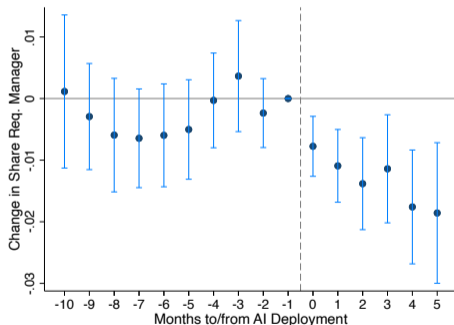
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a. Customers speak more nicely



b. And ask to speak to the manager less



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- ▶ Generative AI need not be bad for workers, or inequality
- ▶ Helps workers get better at a stressful job
- ▶ Closes the performance gap between high and skill workers

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- ▶ Pay for contributions to training?

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The unknown

- ▶ Aggregate demand for human customer service tasks (as we know it) will likely decrease.
- ▶ Will the jobs go too or how will they evolve?