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Discussion of “Generative AI and Firm Values”

Eisfeld, Schubert, Taska, and Ben Zhang
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What is the paper about?

- Research question:
 - Does using Generative AI (e.g., Chat GPT) affect firm value? How? Why?

- Answer
 - Yes, it does. Firm value increases.
 - Expected future cash flows increase ...
 - ... because costly labor capital will get replaced by cheaper AI technologies

What is the paper about?

➤ Main findings

- **Event study**-type of analysis.
 - After CHAT GPT introduction
 1. Firms exposed to AI generate higher returns
 2. Firms exposed to AI generate more earnings (but not more revenues?)
 3. Analysts adjust earnings expectations upward (but not sales expectations)
 4. Firms exposed to AI decrease job postings
 5. Firms exposed to AI decrease wages
- **Cross-section variation** points out to a **substitution mechanism** rather than a complementarity one
 - **Horse race** between **Core** vs. **Supplemental** tasks
 6. All effects come from Core task exposure to AI

My discussion

- Fascinating and excellent paper
 - Found the paper very informative and I learnt a lot
 - Very rich with many things to like
 - E.g., rigorous execution, large array of results on different outcome variables supporting the main hypothesis + back-of-the envelope calculation to verify results consistency + Cross-section analysis + many robustness tests + discuss alternative explanations (Competition effects ...) + ...
 - Internet Appendix is already (almost) as large as the paper :-)

- I only have minor comments
 1. Measurement
 2. Empirical Design
 3. Future Research Venues

1. Measurement

- Could the conclusion already be in the premise?
 - AI exposure measurement is a choice by the econometrician
 - Different approaches equally reasonable / possible
 - Definition used in the paper
 - “Direct Exposure = 1 if Chat GPT reduces the time required to complete the task by at least half”
 - Could this choice “orient” / “condition” the results / findings?
 - Chosen approach (“Same task is performed using less (time) resource”) may identify tasks for which Chat GPT is more likely to be a substitute rather than a complement
 - No easy fix
 - Studying the effect of AI → Requires identifying whether a firm is exposed to AI → Requires measuring this exposure → Requires to characterize this exposure ...
 - ... which is precisely what the econometrician also wants to understand !

Suggestions: Is there any country where Chat GPT was not deployed on November 20? Could you use this country as control to avoid the conditioning pb. ?

2. Empirical design

Results on substitution vs. complementarity using core and supp. Tasks generate super nice results on job postings

➤ Use core vs. supplemental tasks to identify mechanism (Subst. or Comp.)

- From Column 2

- If ShareSupp=0
 - Stronger Negative AI Effect
 - **-0.672** (vs. -0.387 unconditionally)

- From Column 3

- If ShareCore=0
 - Positive AI Effect of **0.387**
 - Opposite AI Effect (More posting)

- Interpretation?

- If all tasks are core → Substitution effect → Less Job postings (**-0.672**)
- If all tasks are supp. → Complementarity effect → More Job posting (**0.387**)

- Column 2 and Column 3 produce the same results (as it should be)

- If ShareSupp=1 in col. (2) → AI Effect = $-0.672 + 1.059 = \mathbf{0.387}$

Dep var.:	Job Postings	
	(2)	(3)
Post × GenAI Exp _o	-0.672*** (-5.369)	0.387** (2.074)
Post × ShareSupp _o	-0.258*** (-3.543)	
Post × GenAI Exp _o × ShareSupp _o	1.059*** (3.842)	
Post × ShareCore _o		0.258*** (3.544)
Post × GenAI Exp _o × ShareCore _o		-1.059** (-3.845)
Observations	12,920	12,920

REMARK:
Column 3 with ShareCore=0 is equivalent to Column 2 with ShareSupp=1

2. Empirical design

Assuming this approach allows to identify the mechanism behind value improvement, exposure of both core and supp. task should induce value improvement

Results on firm value, EPS imply complementarity is value destructive, which I found not easy to understand

- Let's verify that both substitution and comp. are value enhancing

Measure:	CAR[-1,10]	EPS	LTG	Gross Profit
	(1)	(2)	(3)	(4)
GenAI Exp	0.380*** (2.579)			
ShareSupp	-1.117 (-1.117)			
GenAI Exp × ShareSupp	-1.937** (-3.226)			
Post × GenAI Exp		2.563** (2.431)	21.077* (1.967)	6.087*** (3.369)
Post × ShareSupp		-1.559** (-2.337)	9.121 (6.754)	6.786* (2.401)
Post × GenAI Exp × ShareSupp		-4.892 (-1.797)	-87.229** (-2.057)	-24.678*** (-3.193)
Observations	2,084	11,664	4,125	22,267

- Substitution plays out when all tasks are core. In this case, $\text{ShareSupp}=0 \rightarrow$ Effect of AI is **positive** on firm value (0.380), EPS (2.563), LTG (21.077) and Profit (6.087)
- Complementarity plays out when all tasks are supp. In this case, $\text{ShareSupp}=1 \rightarrow$ But then AI effect is **negative** on firm value (0.380-1.937=-1.55), EPS (2.563-4.892=-2.33), LTG(21.077-87.299=-66.15) and Gross Profit (6.087-24.678=-18.59)

3. Future Research Venues

➤ What is the cost of Generative AI?

- Total (direct + indirect) cost of AI is still obscure to me
 - Many unanswered naïve questions
 - ✓ How much is charged now for Chat GPT? Under what conditions can Chat GPT be used? How much is charged by request? And in the future? Will it change?
 - ✓ What is the cost of developing your AI technology? What is the maintenance cost? How fast are upgrades needed? For how much?
 - Other less naïve questions
 - ✓ AI requires massive computation power and consumes a lot of energy. Who bears that cost? Where does the energy come from? Any externally? On who?
 - ✓ Risk of error committed by AI is not zero. What is the loss given default?
 - ✓ Is there any downside of AI on data privacy? On product conformism? On thinking diversity and collective decision making? ...

Is the substitution technology really less costly for the same output?

Is the output of AI vs. HI always the same?

3. Future Research Venues

- Could AI affect tasks combination vs. segmentation?
 - Tasks that used to be combined may now be segmented (and vice versa).
 - Why? How? For who?
- Could new occupations and tasks also appear / be created?

More research needed !

Conclusion

- Fascinating / super interesting / Exciting paper.
- I learnt a lot. Thank you !