Is the Impact of AI different from IT?

Yueling Huang

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- AI as a **"General Purpose Technology" (GPT)** (Agrawal et al., 2017, Brynjolfsson, Rock and Syverson, 2018).
- **What is AI?** Use big data and machine learning techniques to reduce the role of human judgment in knowledge production (Abis and Veldkamp, 2020).
- **Broad question:** Is the impact of AI different from IT?

This Paper

Empirically assess whether the impact of AI is different from IT:

1. Occupation exposure
2. Industry exposure
3. Market power
4. Innovation

If any of the above is yes, think about "why" and "so what".

Related Literature

IT as a GPT:

- Job polarization: Acemoglu and Autor (2011), Goos, Manning and Salomons (2014).
- Market power: Aghion et al. (2019), Lashkari, Buaer and Boussard (2019).

Related Literature

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AI:

- Automation: Acemoglu and Restrepo (2019), Acemoglu, Lelarge and Restrepo (2020), Moll, Rachel and Restrepo (2019).
- Big data: Jones and Tonetti (2019), Abis and Veldkamp (2019).
- Empirical studies: Acemoglu et al. (2019), Alderucci et al. (2019).

Occupation Exposure

Felten et al. (2018): AI

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- Task-based approach: routine cognitive (RC), routine manual (RM), non-routine cognitive (analytical NRCA/interpersonal NRCI), non-routine manual (NRM).

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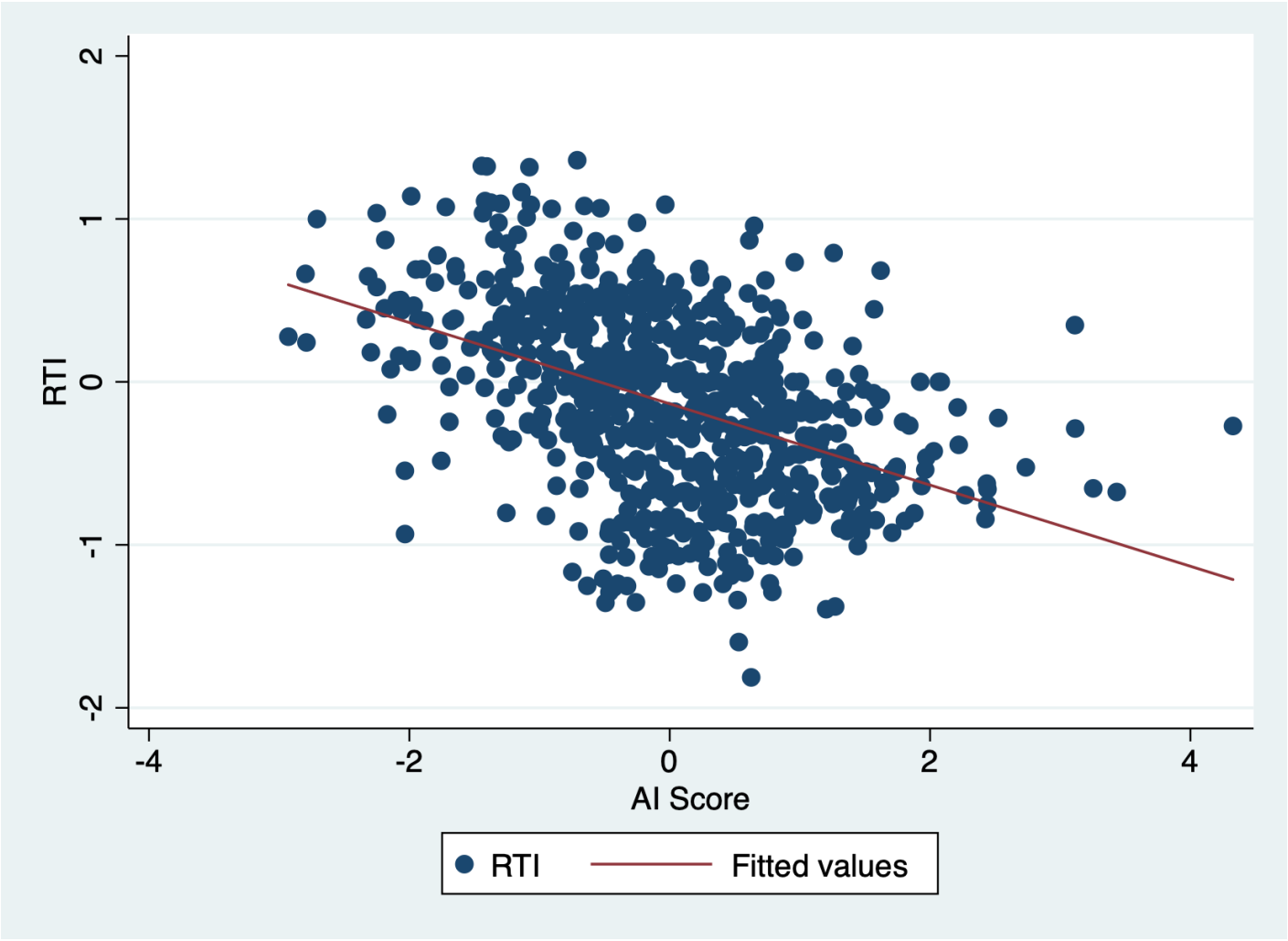
- $RTI_k = (RC + RM - NRCA - NRCI - NRM)/5$

▸ Alternative Measures

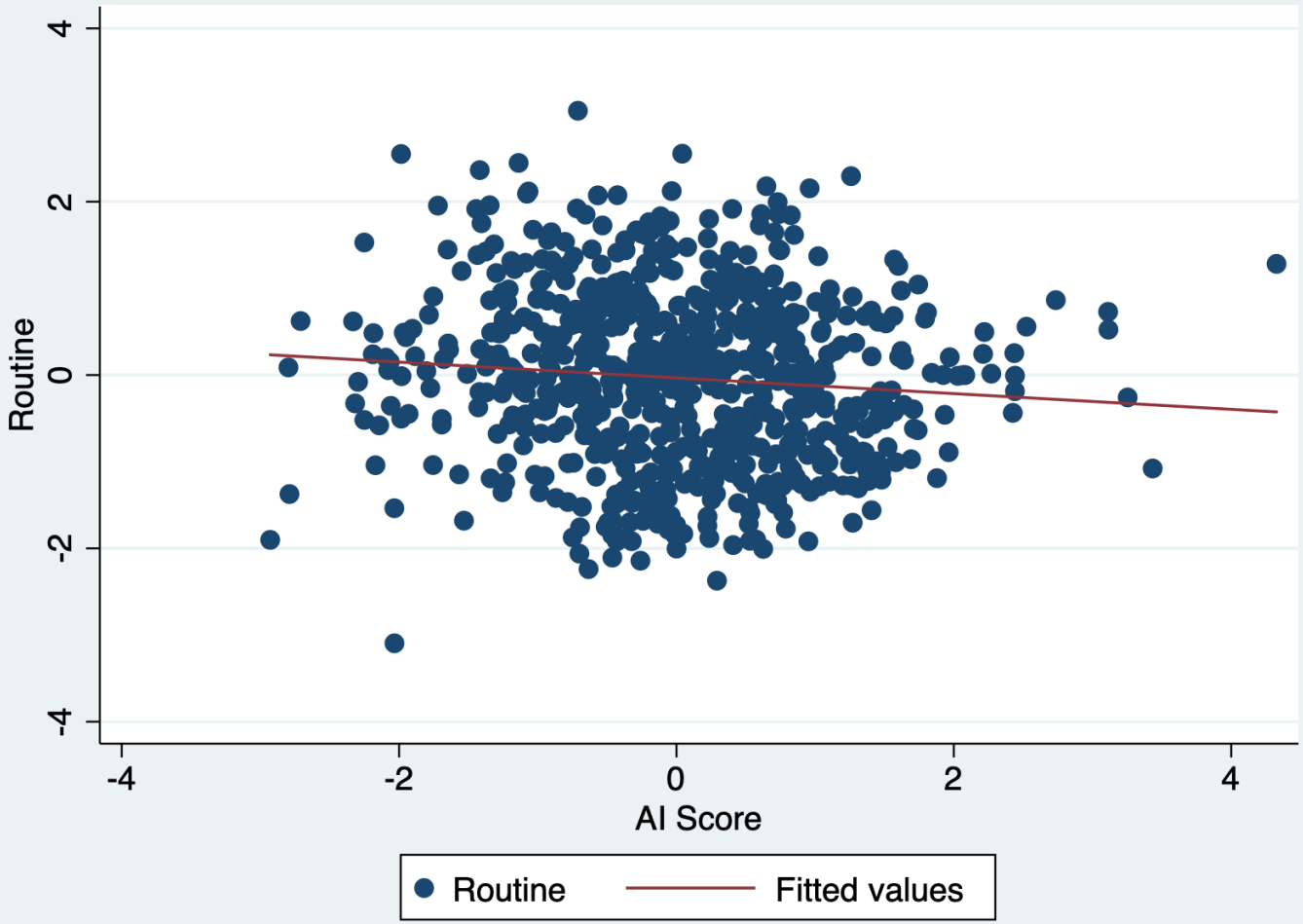
Detailed SOC Occupations

RTI vs. AI



Detailed SOC Occupations

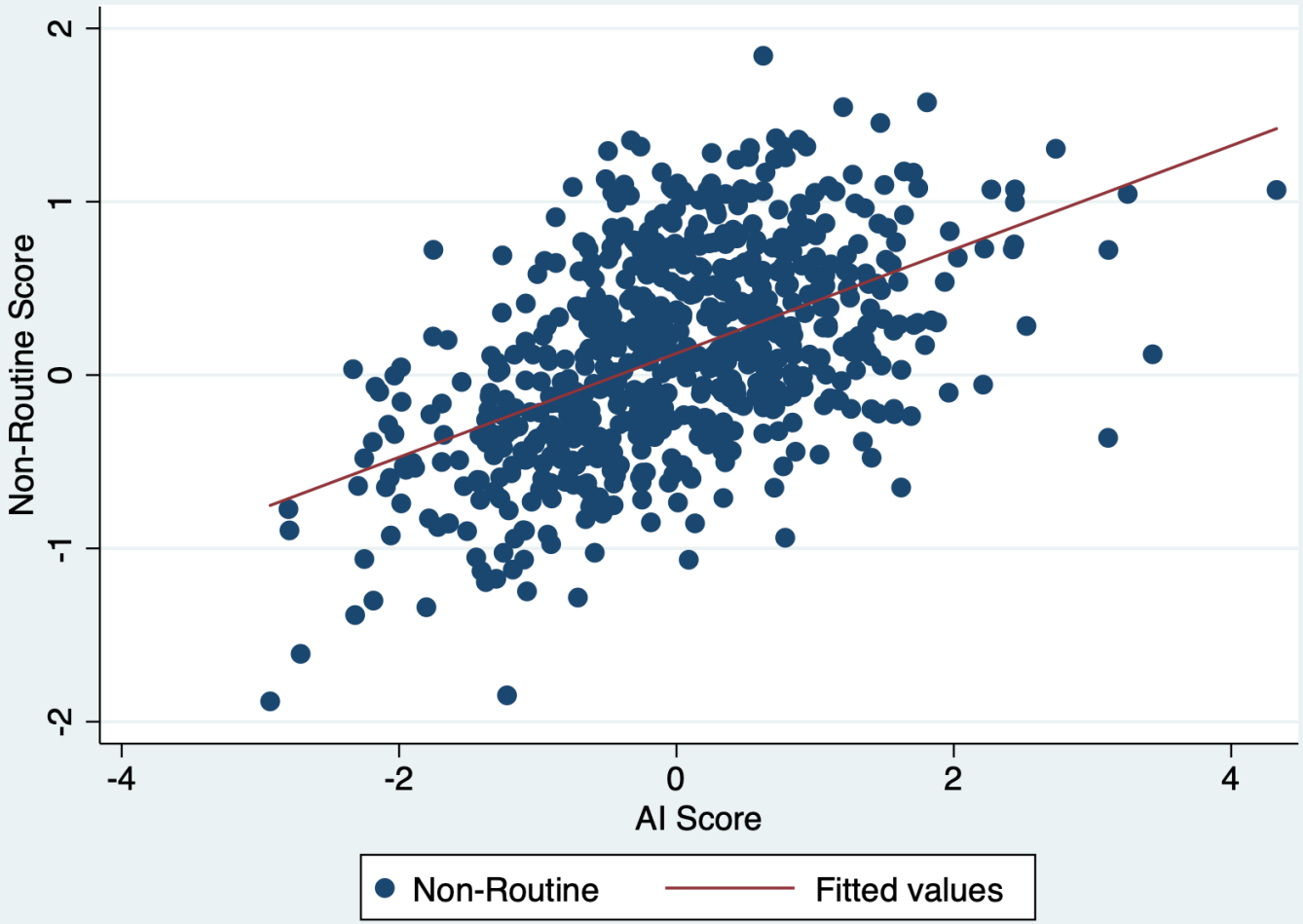
Routine (RC+RM) vs. AI



▸ Routine Cognitive ▸ Routine Manual

Detailed SOC Occupations

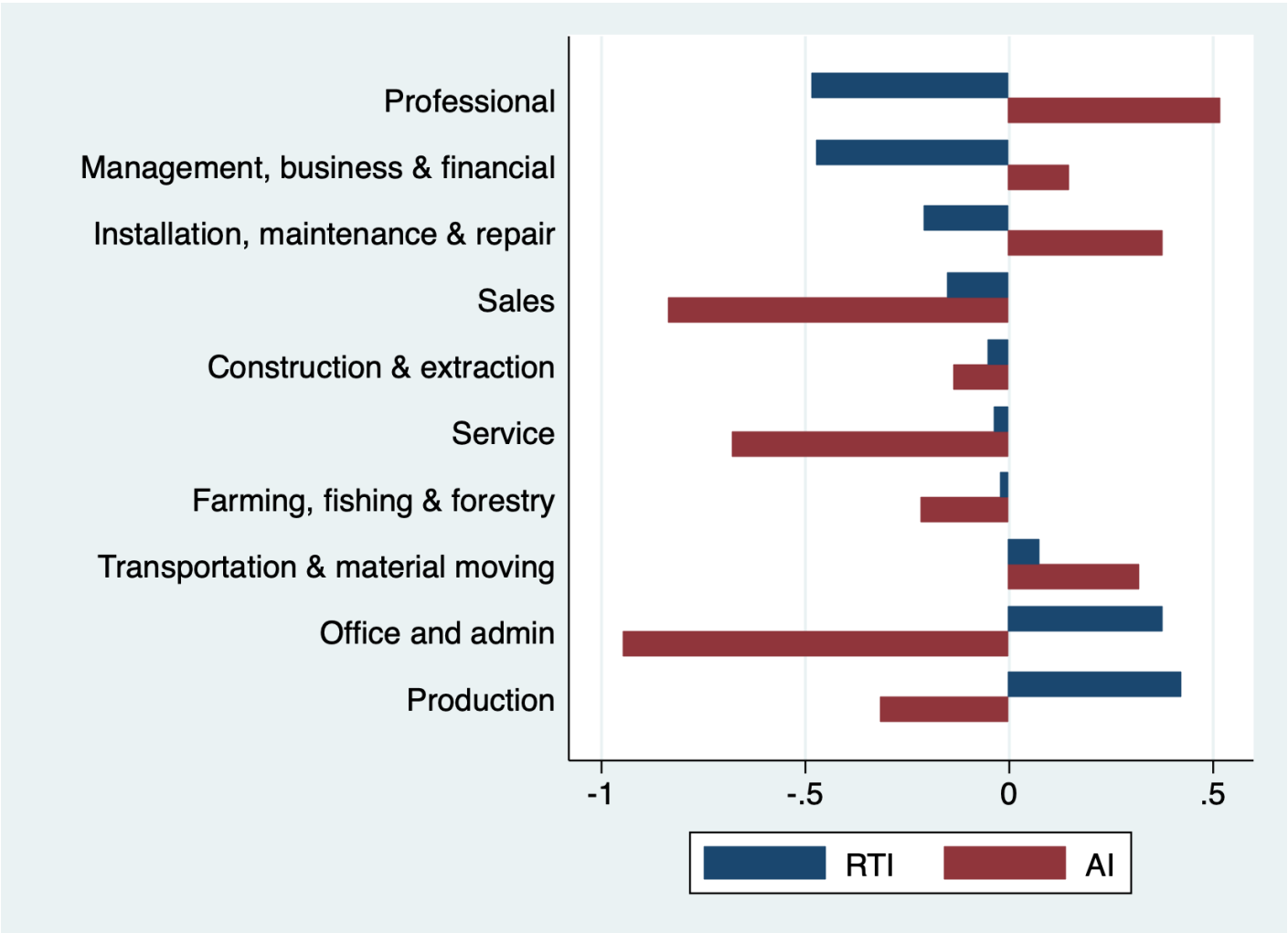
Non-Routine (NRCA+NRCI+NRM) vs. AI



▸ Non-Routine Cognitive ▸ Non-Routine Manual

Ten Major Occupation Groups

RTI vs. AI



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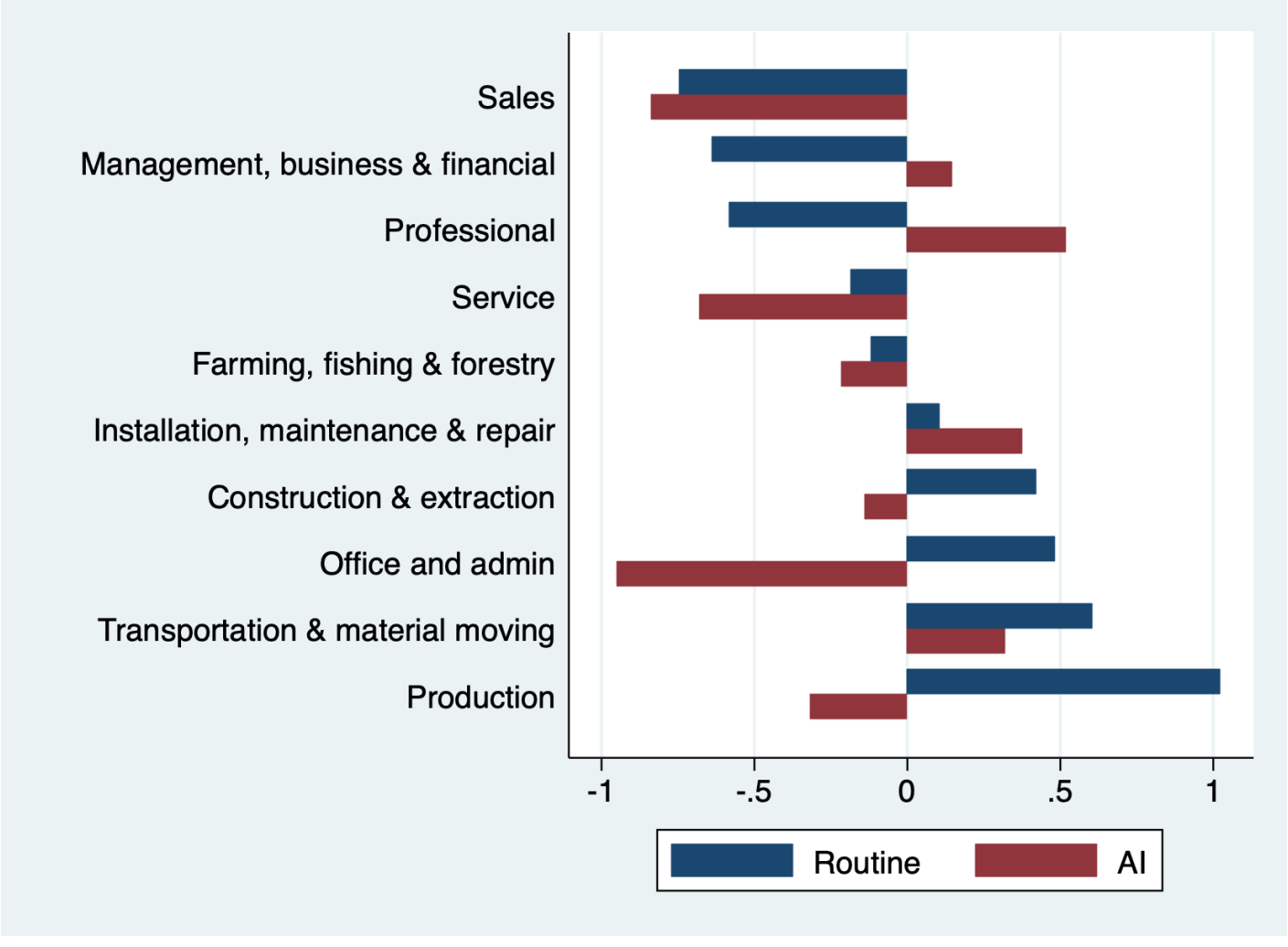
Routine vs. AI



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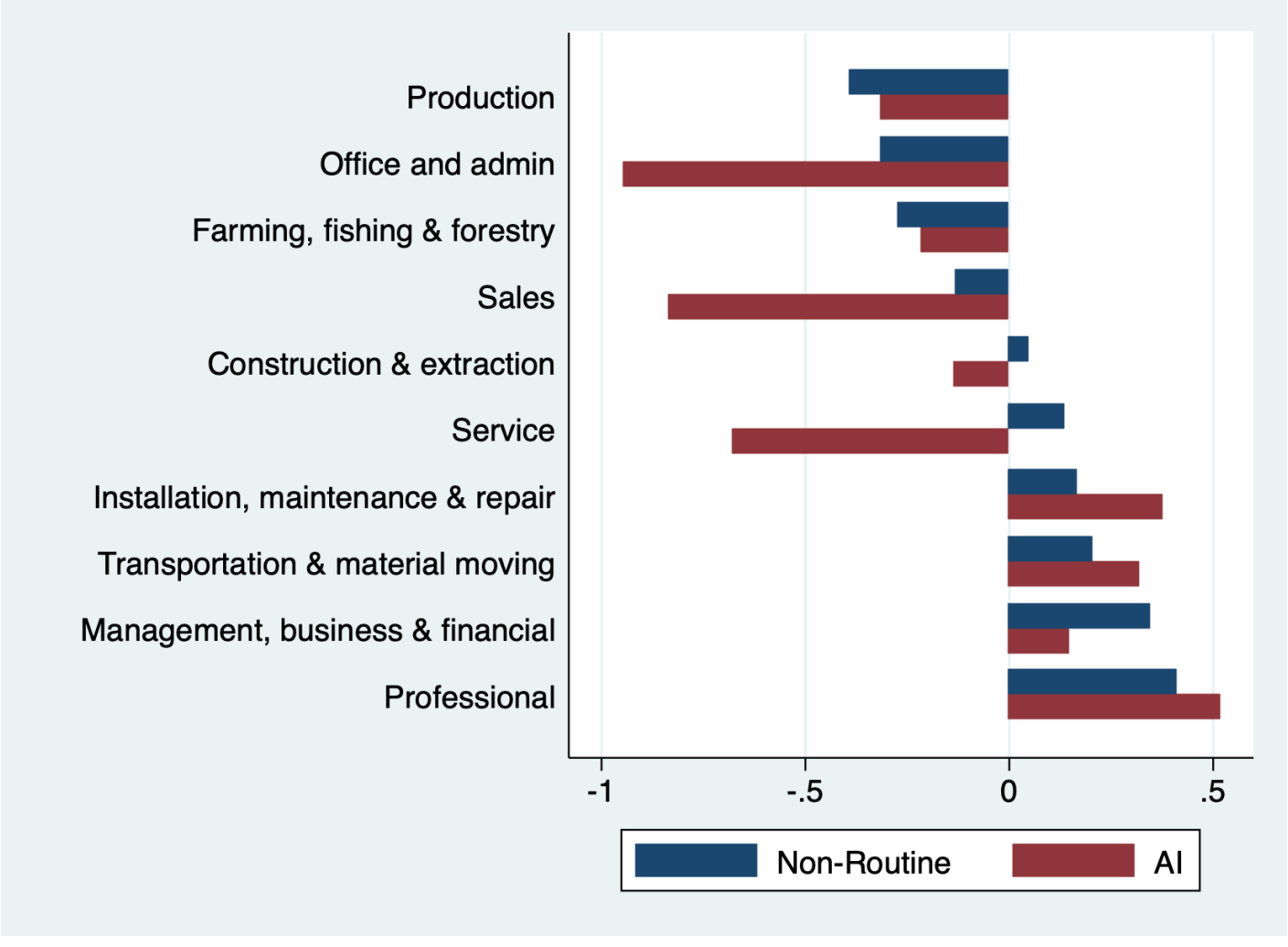


Industry Exposure

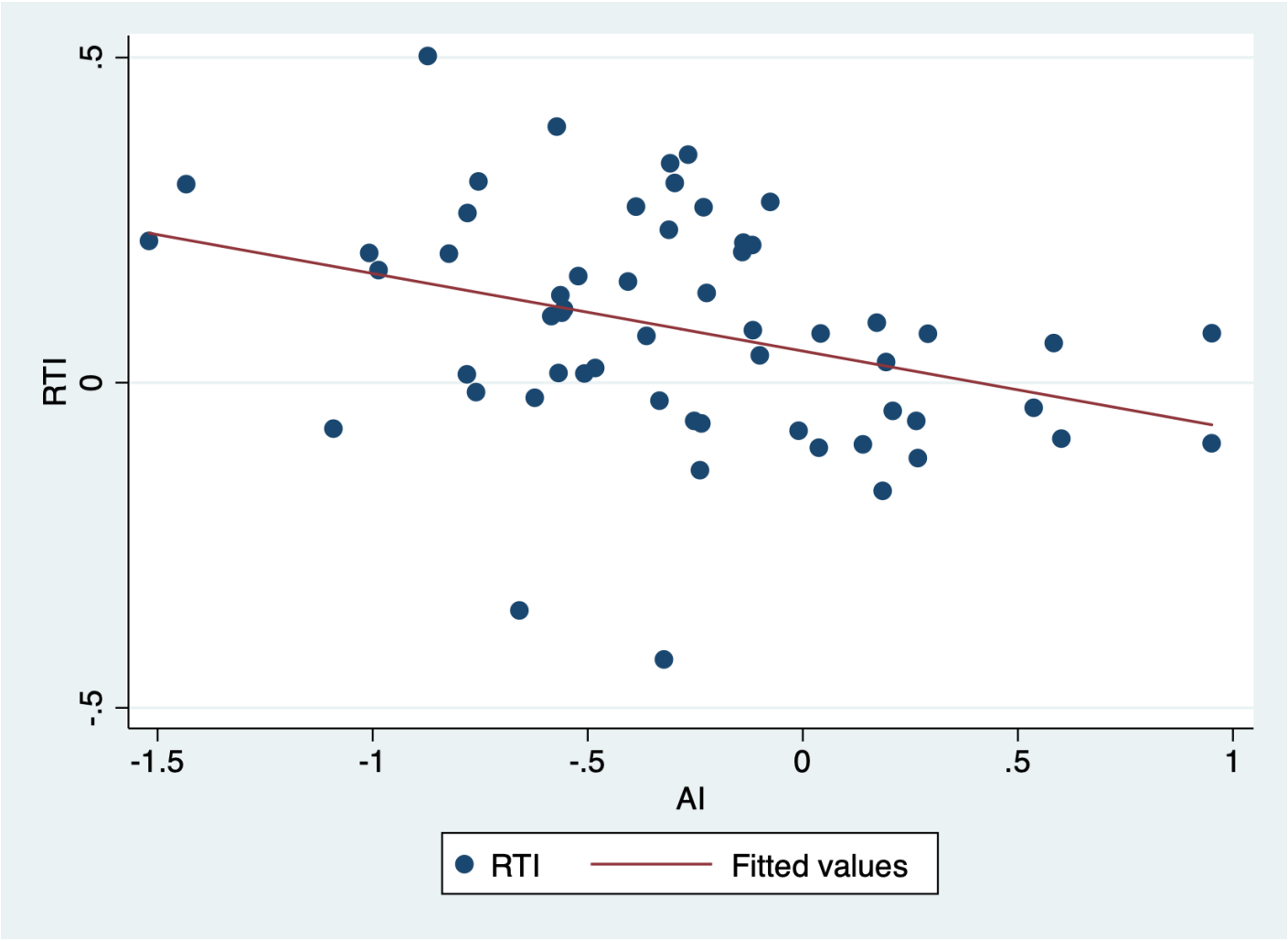
Obtain an industry-level of AI/IT exposure using our task-based measures + Occupational Employment Statistics (OES):

$$T_{jt} = \sum_{k} \frac{L_{jkt}}{L_{jt}} T_{kt} \tag{1}$$

where $T \in AI, RTI, R, NR$, j is industry, k is occupation, T_k is k's exposure to T.

NAICS 3-Digit Industry

RTI vs. AI



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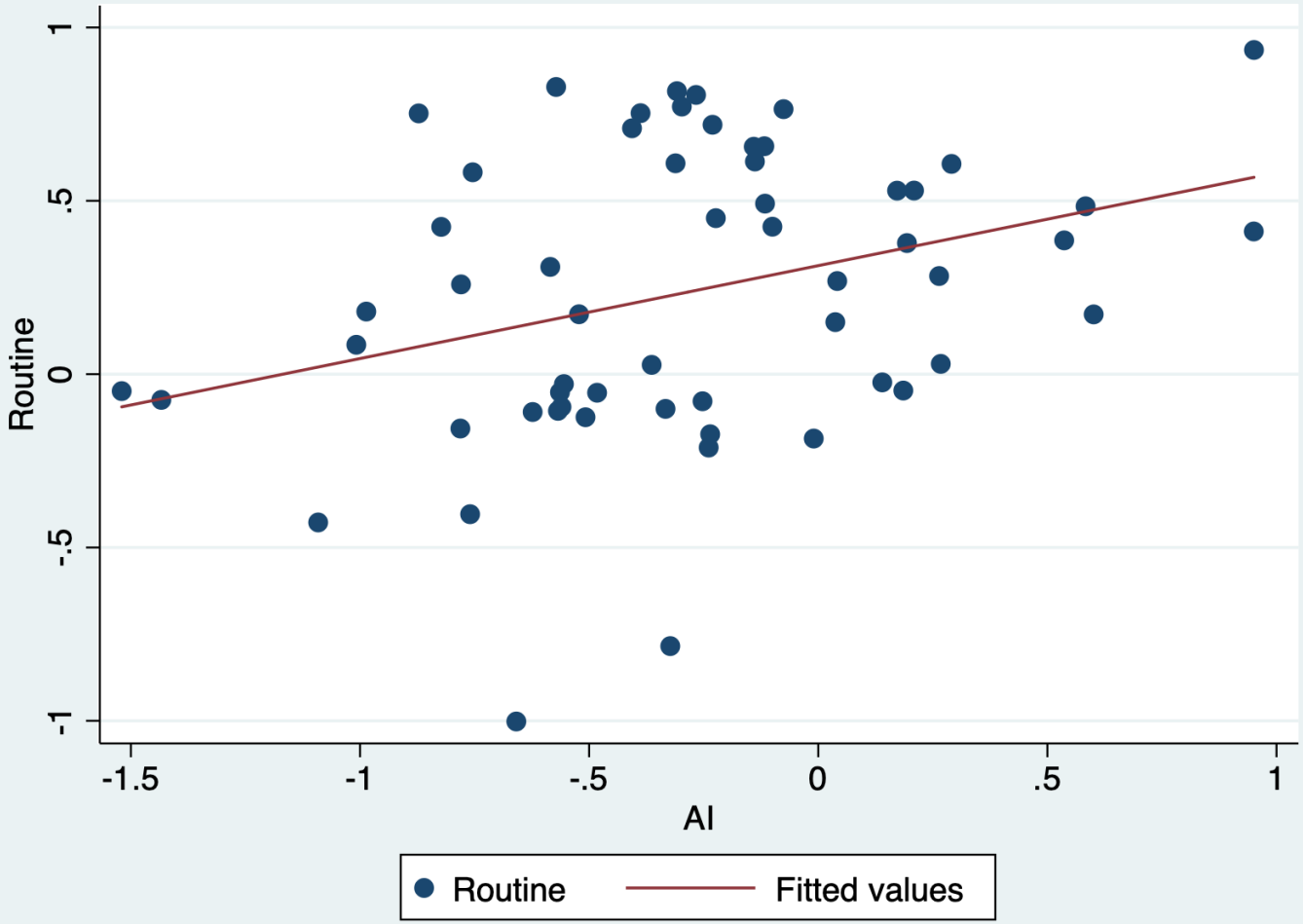

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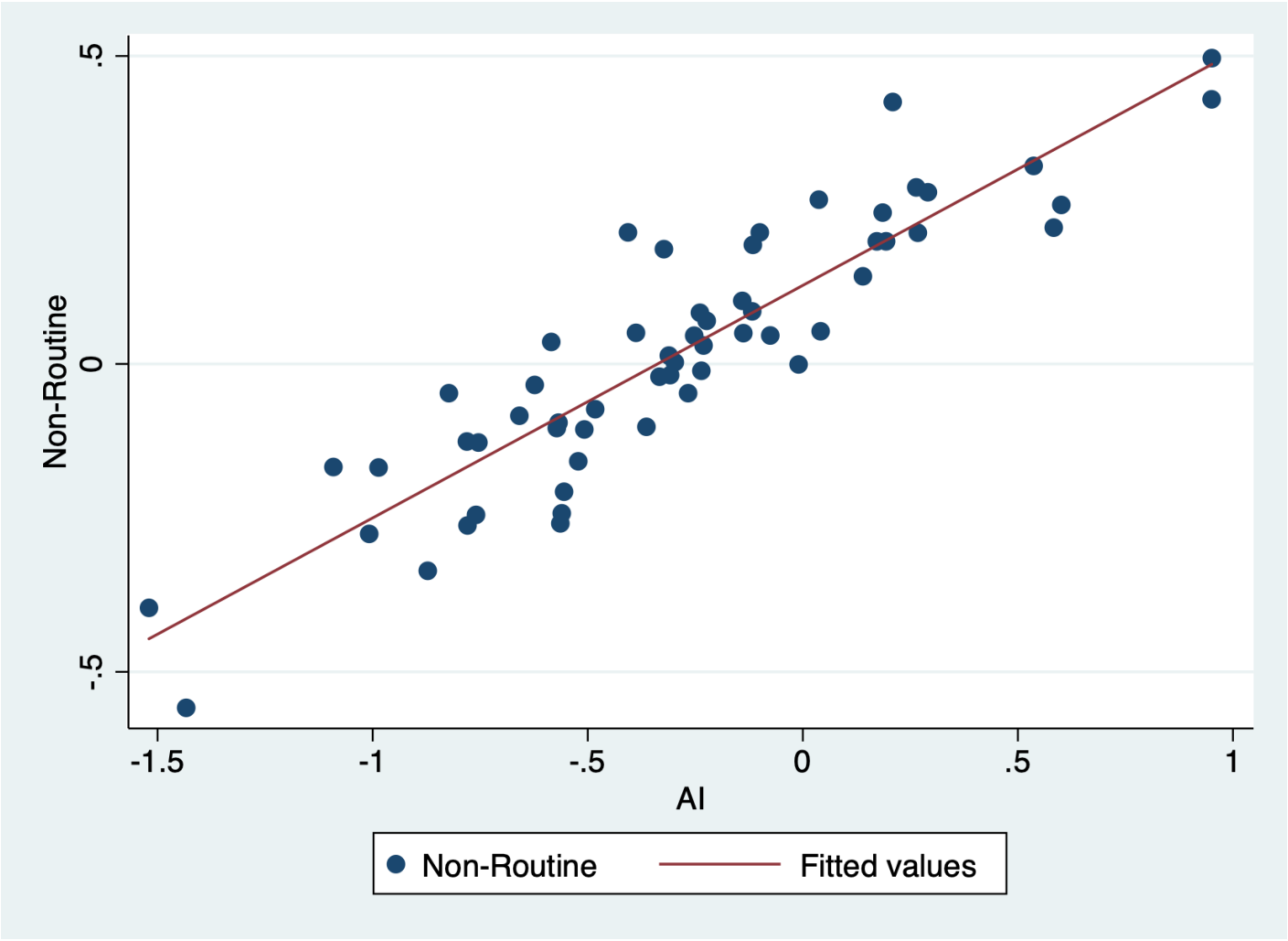
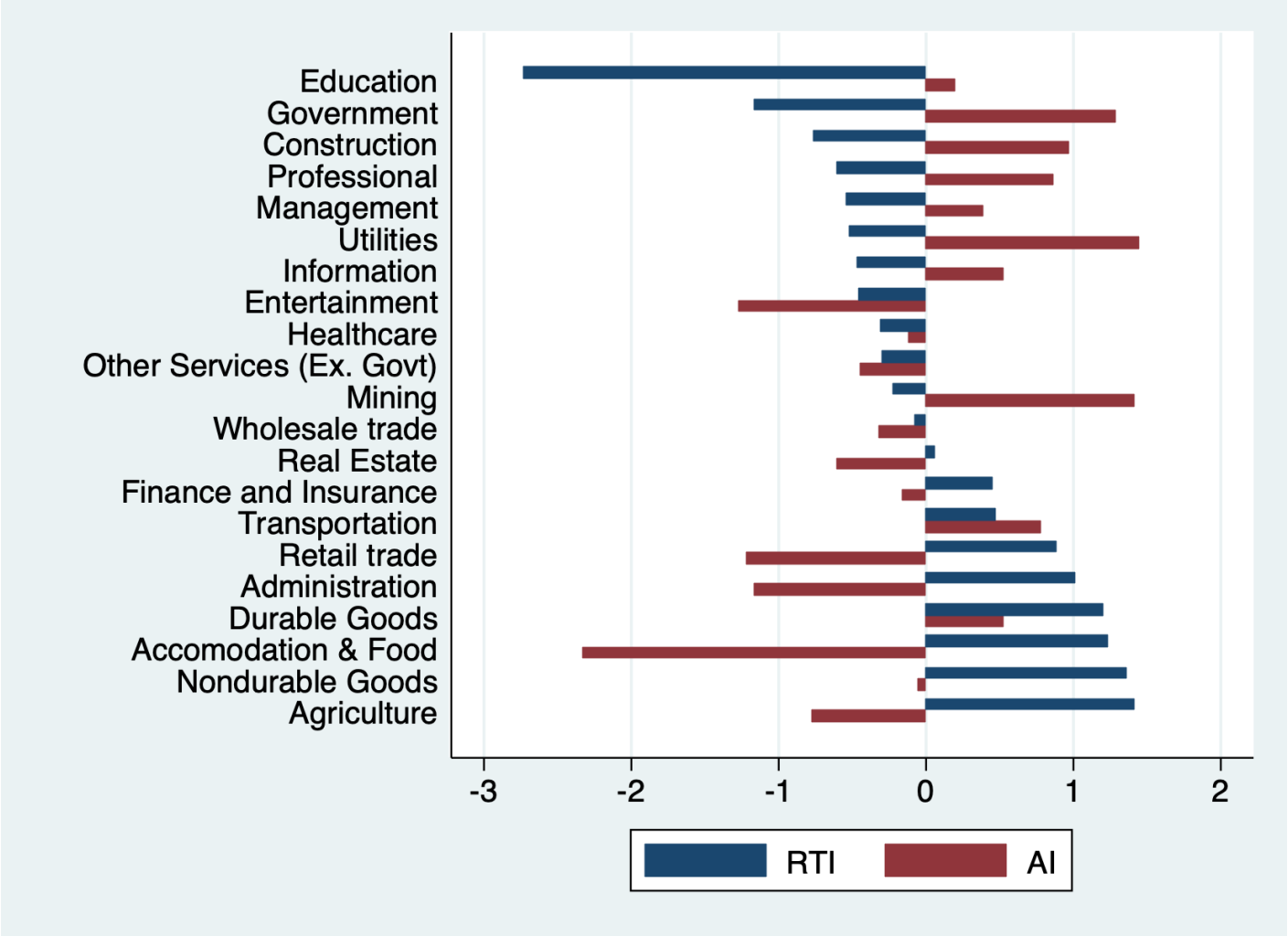


NAICS 2-Digit Sector

RTI vs. AI



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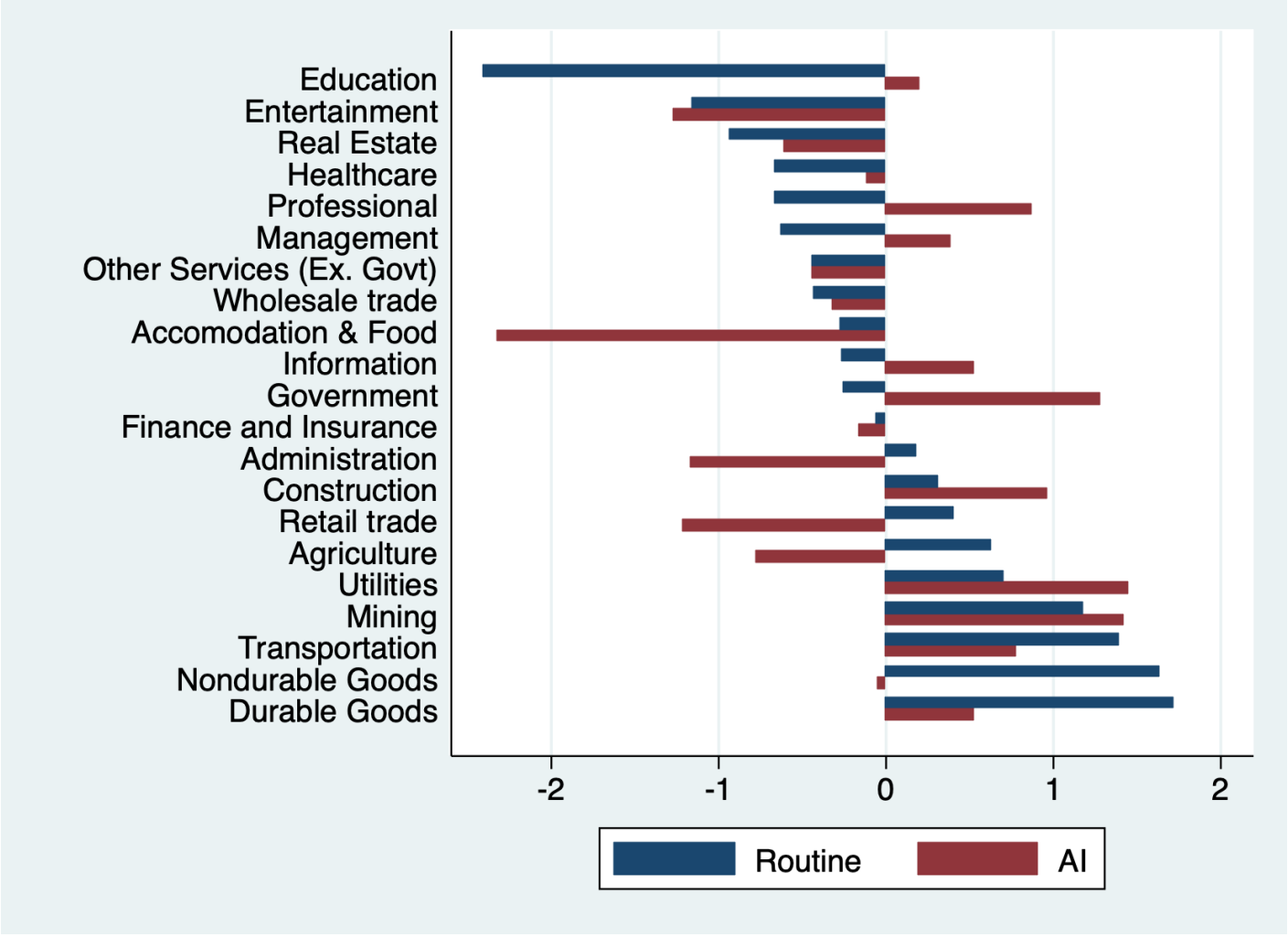

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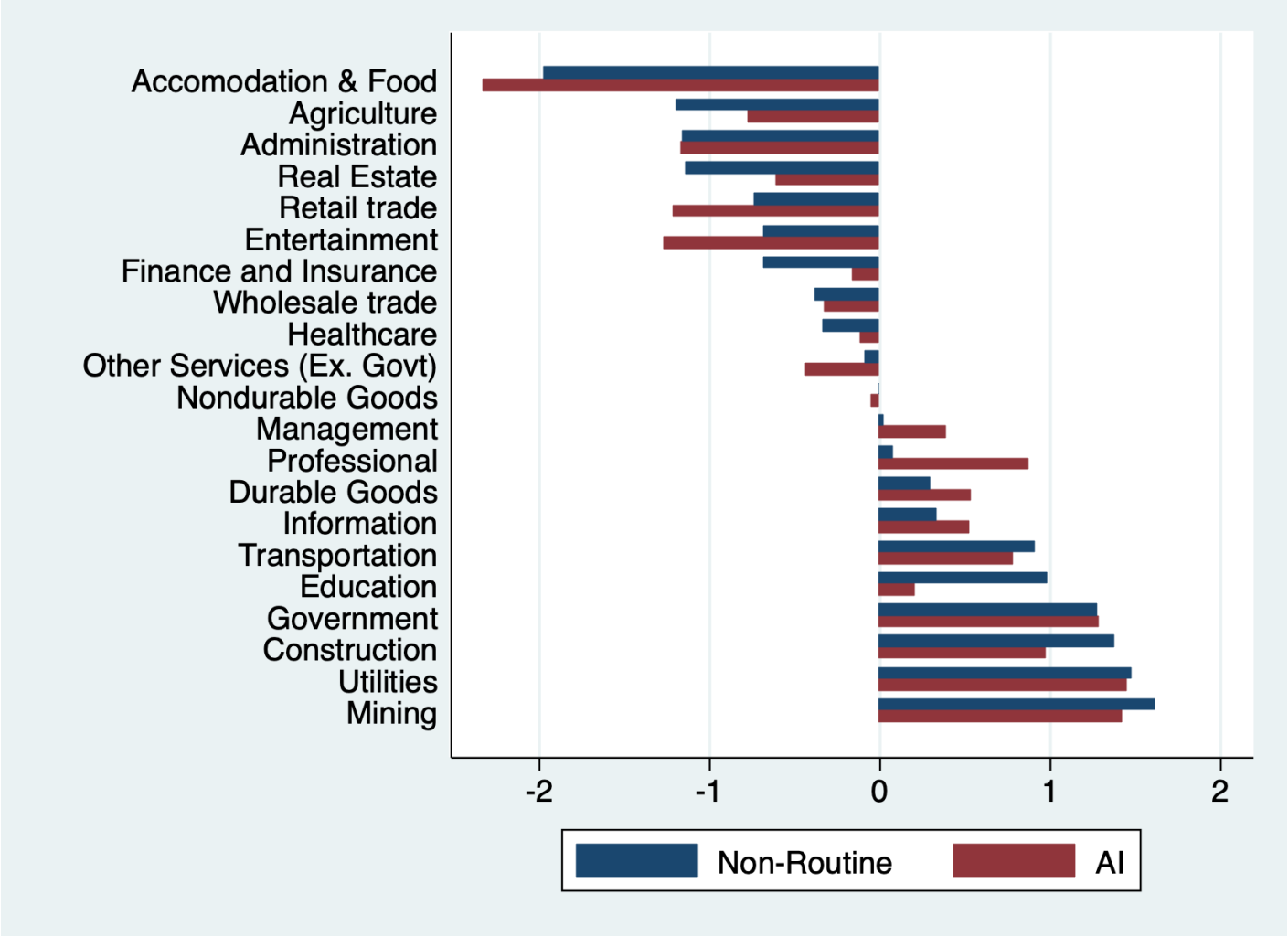

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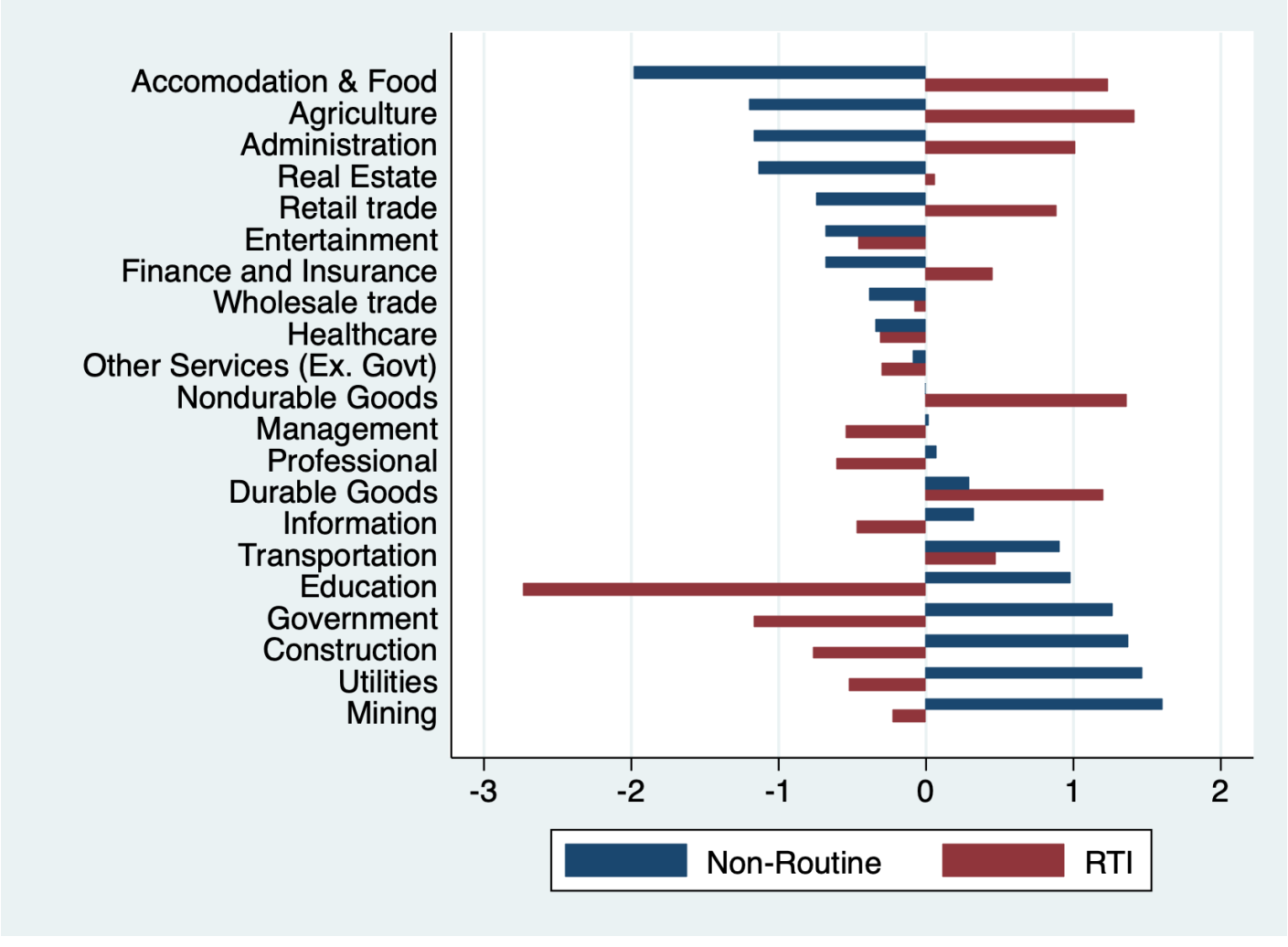
Non-Routine vs. RTI



Taking Stock

Approach:

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- Construct occupation-based industry/sector exposure to technology.

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- IT and AI hit different occupations/industries.
- Routine occupations/industries more exposed to IT. Non-routineness seems negatively correlated with IT exposure.
- Non-routine occupations/industries more exposed to AI. Routineness seems uncorrelated with AI exposure.

Future Work

- Think more about which types of non-routine tasks are now exposed to AI. ▸ Occupation Groups
  $\Rightarrow$ Professionals, management/business/finance, installation/maintenance/repair.

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- What is going to happen to high-skilled workers, inequality, the skill premium?

Bigger Questions

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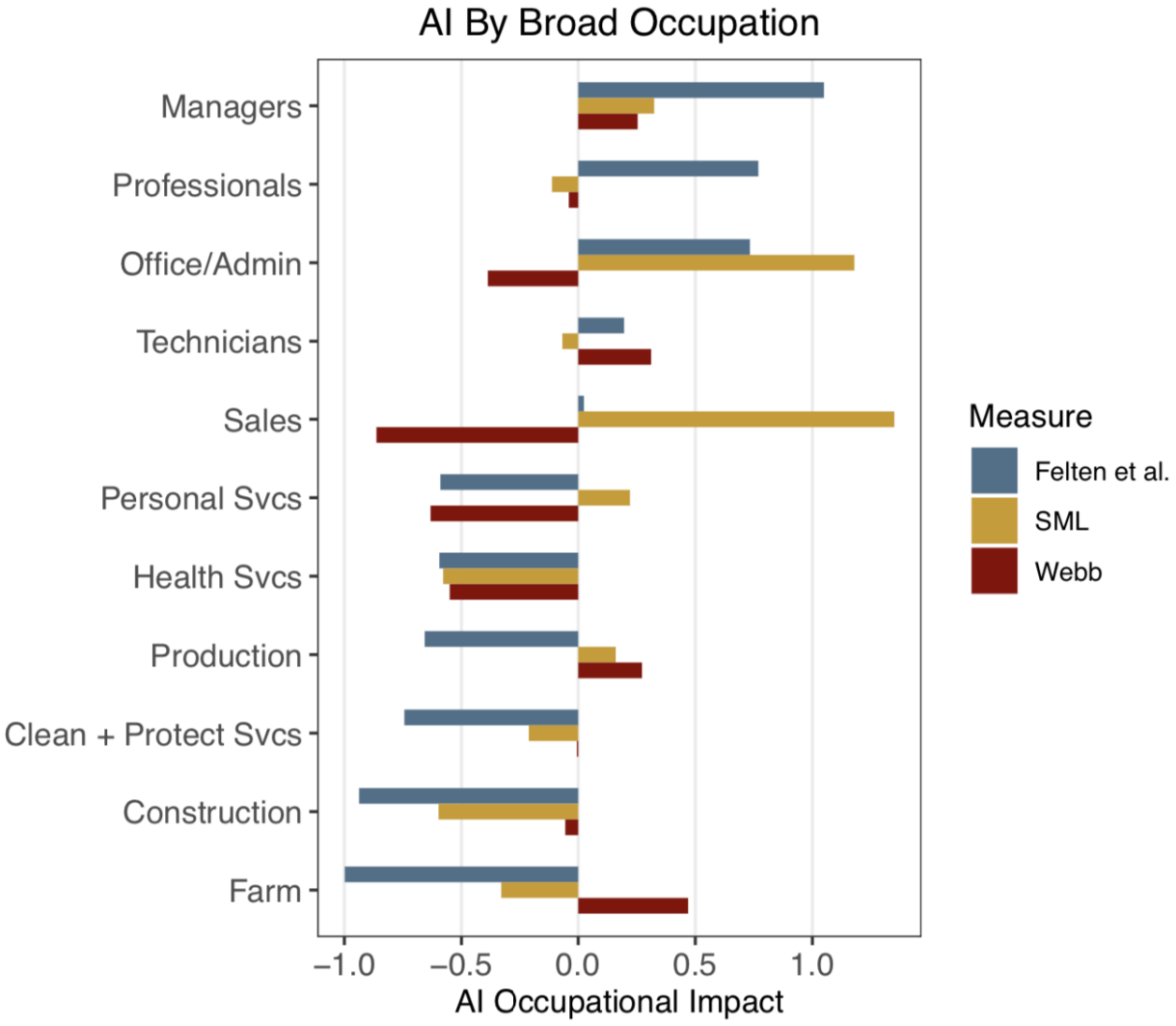
- Market power: HHI/concentration ratio/mark-ups/firm distribution.
- Patent records.

Thank you!

Appendix

Alternative AI Exposure Measures



Source: Acemoglu et al. (2019).

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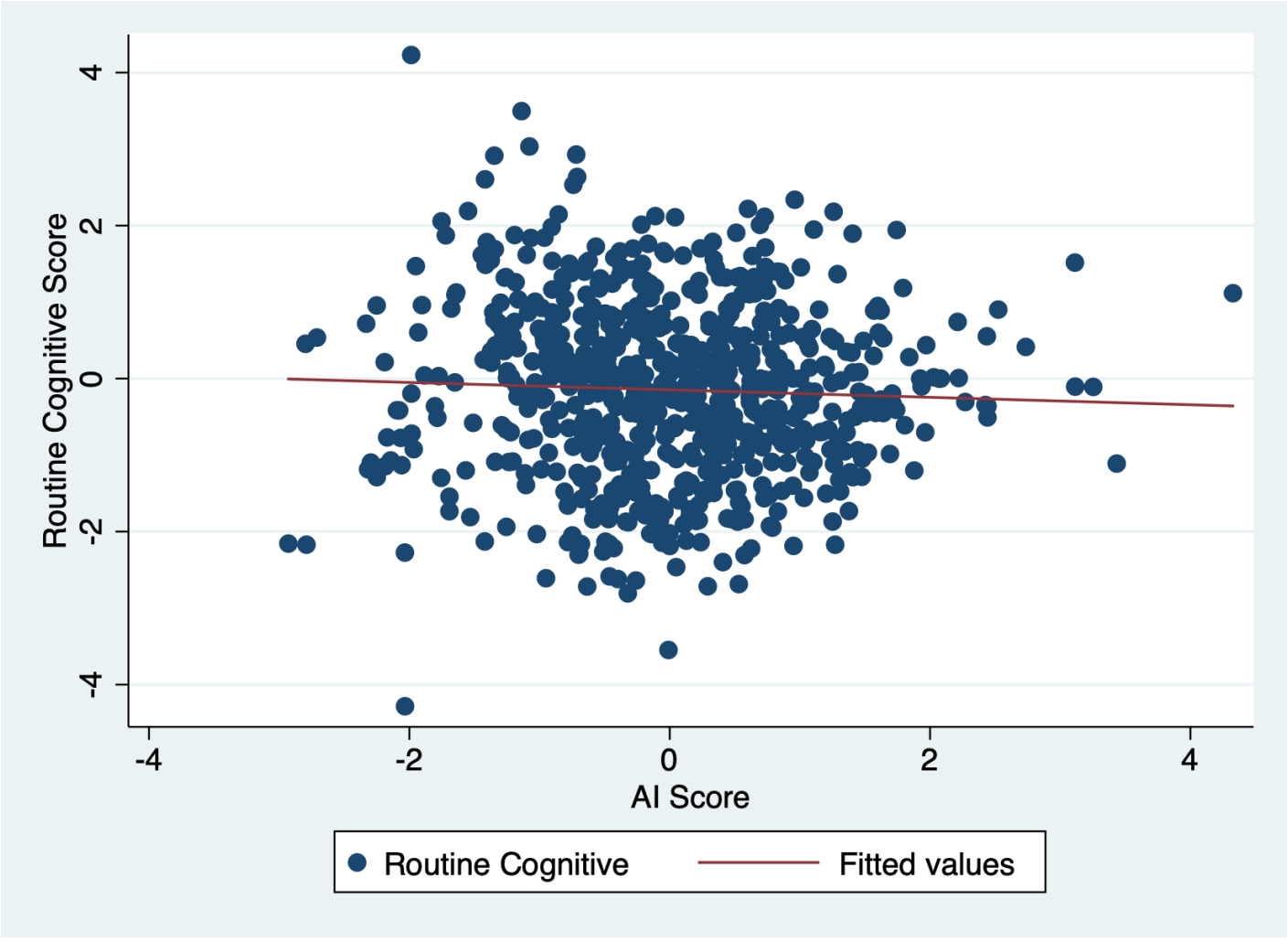
Routine Cognitive vs. AI



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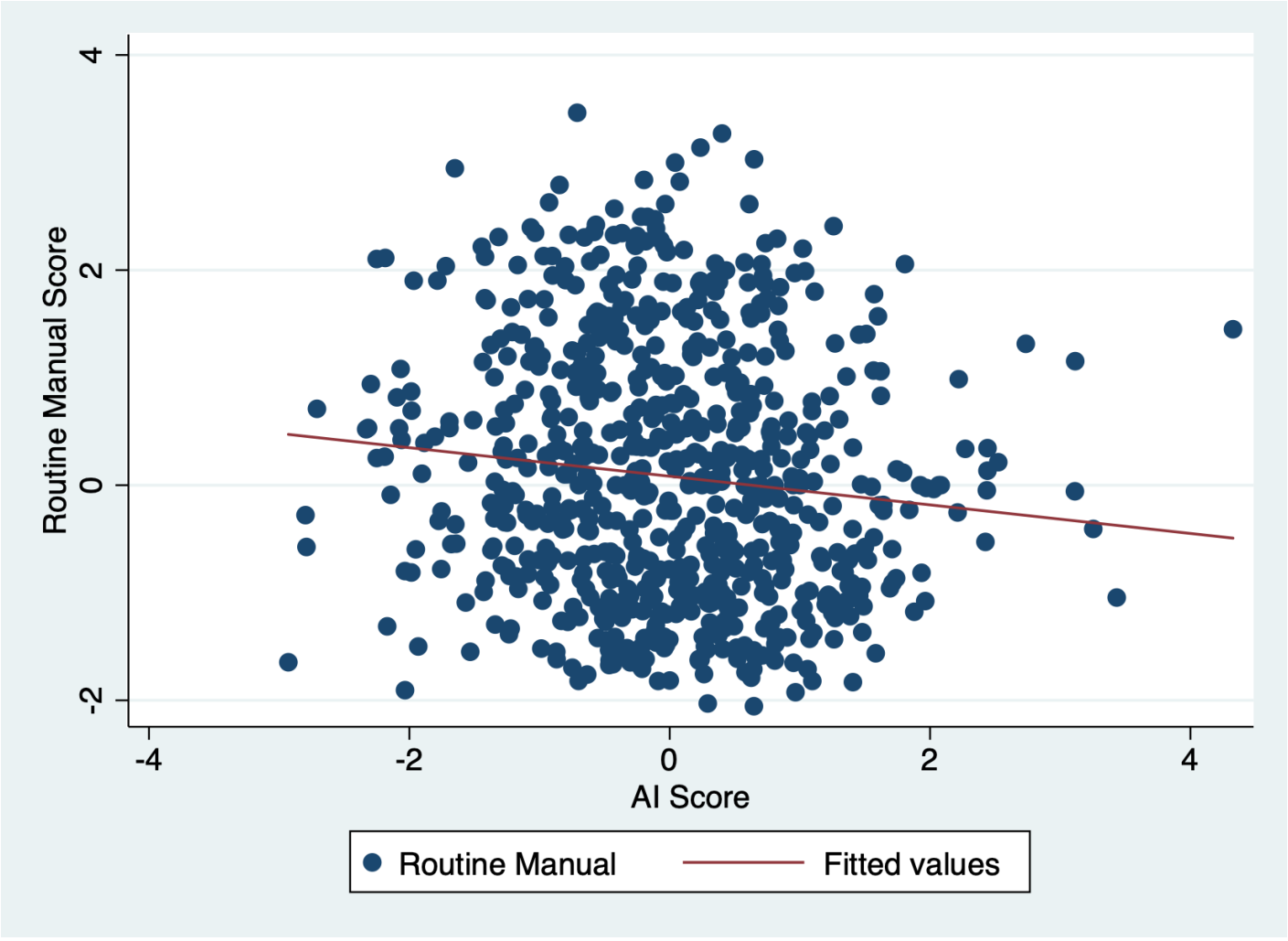
Routine Manual vs. AI



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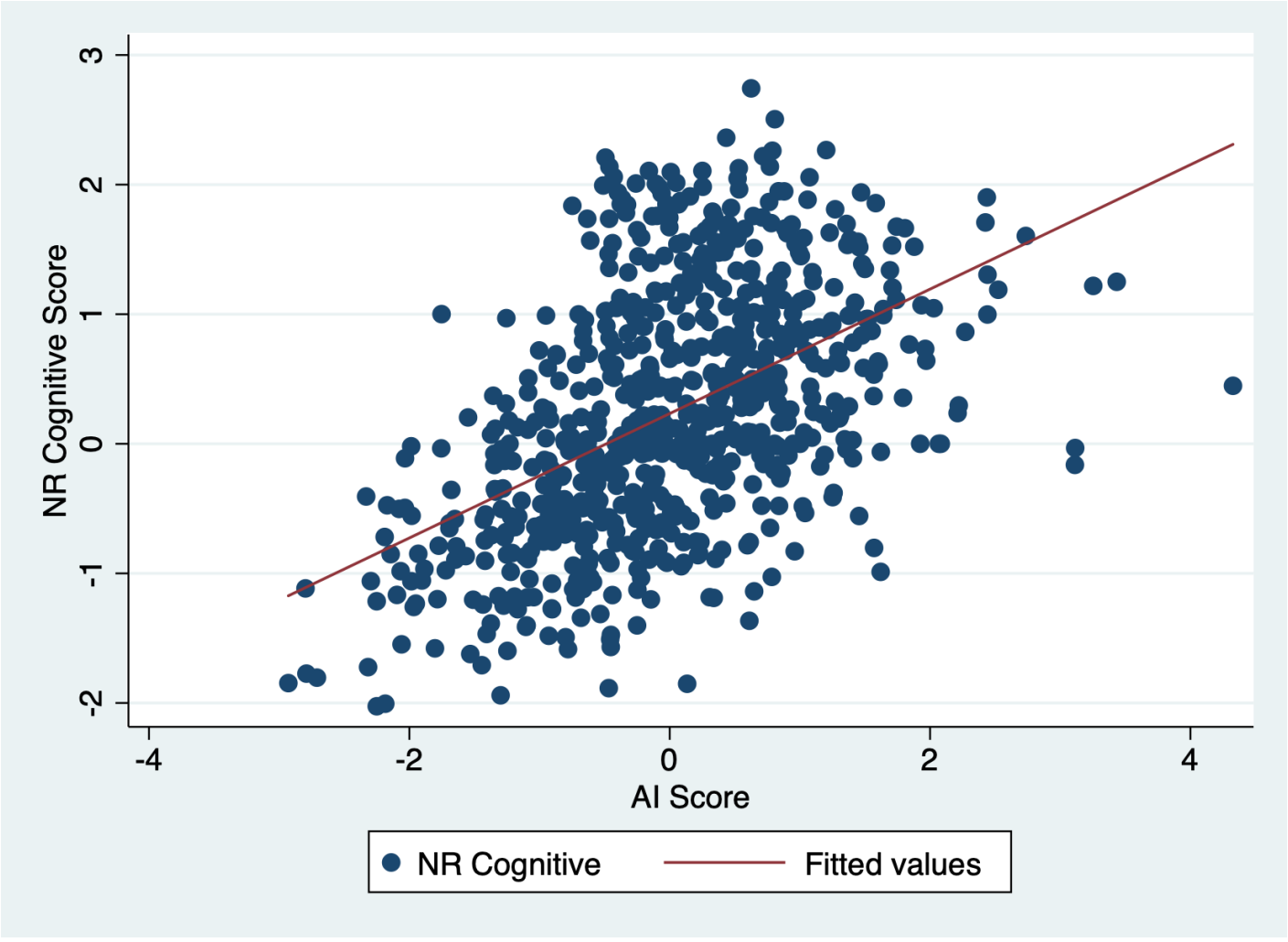
Non-Routine Cognitive vs. AI



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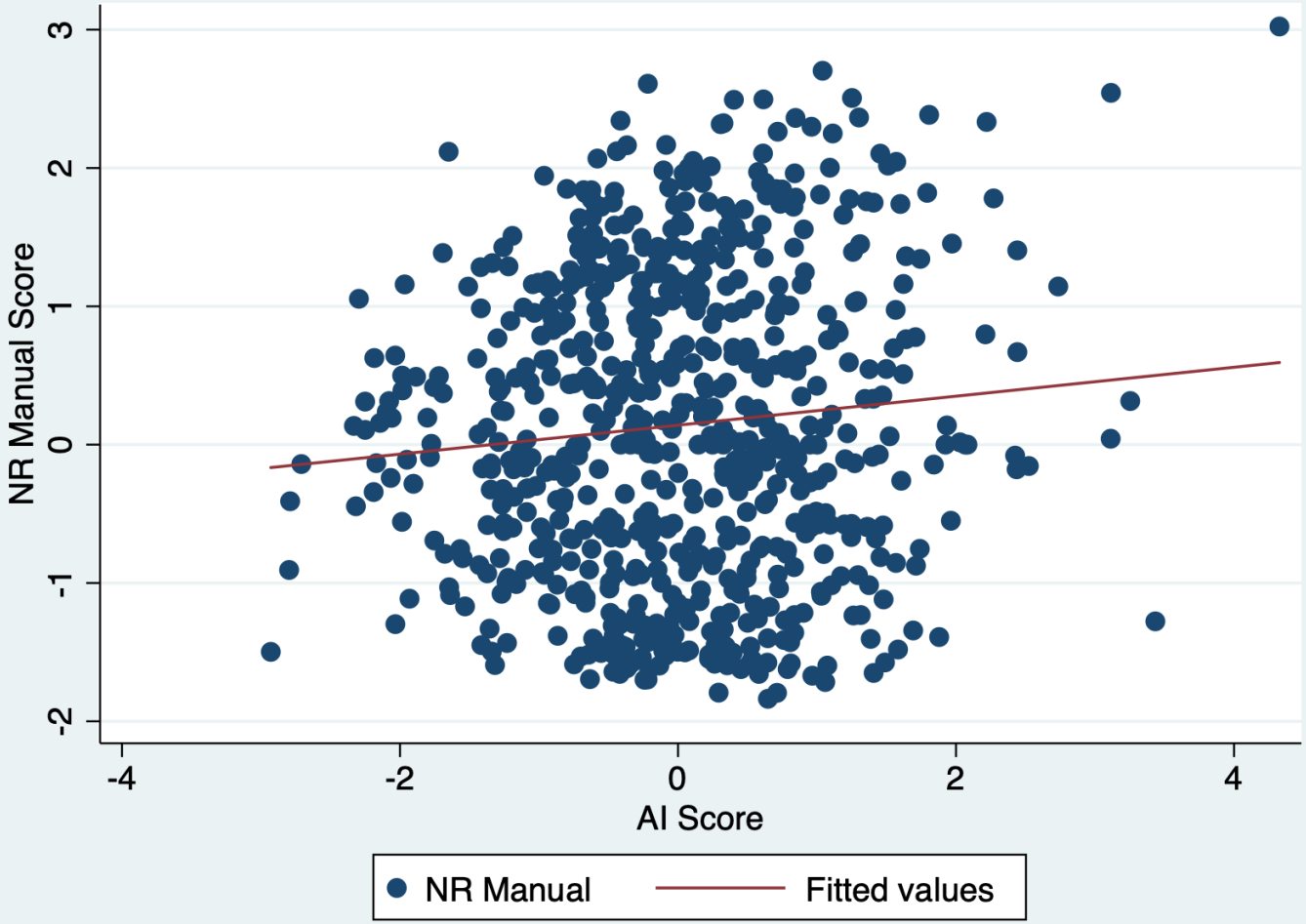
Non-Routine Manual vs. AI



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