Advancing Mississippi's Human Capital in the Age of AI: Targeted Workforce Strategies from AI Exposure and Complementarity Analysis

Duy Nguyen
Department of Business Education
Mississippi Valley State University

Motivation

- How will AI reshape jobs in Mississippi?
- Note that AI can:
  - Substitute for human work (replace workers -> Risk).
  - Complement human work (make workers more productive -> Opportunity).
- But it's hard to predict because AI capabilities are evolving rapidly.

Methodology & Data

- **Foundation:** Felten et al. (2021) - AI Occupational Exposure (AIOE)
- **Enhancement:** Pizzinelli et al. (2023) - Complementarity Adjustment (C-AIOE)
- **Application:** Apply C-AIOE to Mississippi OEWS Data (2019-2024)

› This provides a nuanced view of AI's impact, distinguishing between jobs AI will replace vs. augment.

AIOE – AI Occupational Exposure

- **Step 1. AI → Human Abilities**
  - 10 AI applications (e.g., speech recognition, image recognition, NLP).
  - Linked to 52 human abilities (e.g., oral comprehension, reasoning, dexterity).
- *Example: Speech recognition ↔ Oral comprehension.*

AIOE – AI Occupational Exposure

- **Step 2. Abilities → Occupations**
  - O*NET shows which abilities matter for 800+ jobs.
  - Each job = "bundle" of abilities.
- *Example: Customer Service Rep = oral comprehension + active listening + speaking.*

AIOE – AI Occupational Exposure

- **Step 3. Calculate Exposure**

$$AIOE\ Score_{occupation} = \sum_{i=1}^{52} AI_AbilityLink_i \times Occupation_AbilityWeight$$

  - Yields an **exposure score** per job.

- *Example: Customer Service Rep scores high because AI speech tools overlap strongly with required abilities.*
- 👉 **Note:** Exposure = potential AI impact, **not automatic job loss**.

Complementarity Adjustment (C-AIOE)

- Not all AI exposure is the same.
- AI can **substitute** (replace tasks) or **complement** (support workers).
- **How it's measured:**
  - Uses O*NET **work context**: these describe *how* a job is performed — settings, social interactions, teamwork, decision-making, face-to-face contact.
  - Uses O*NET **job zones**: these measure the education, training, and preparation level typically required.

Complementarity Adjustment (C-AIOE)

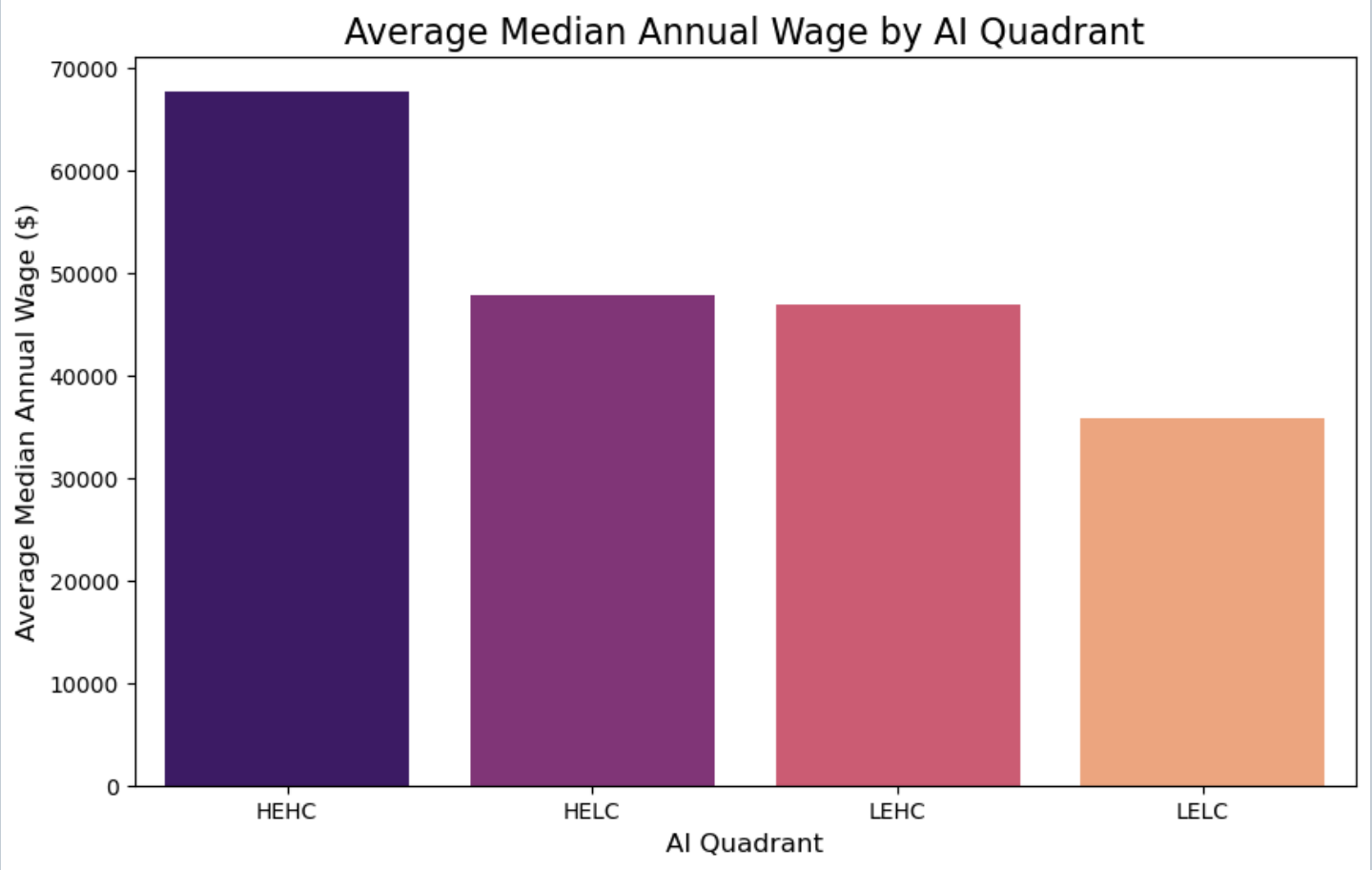
Examples:

- **High exposure + high complementarity → Productivity gains**
  - *Radiologist*: AI helps detect tumors in scans → speeds up diagnosis, doctor still needed.
- **High exposure + low complementarity → Displacement risk**
  - *Data entry clerk*: AI can fully automate copying data → fewer human workers needed.
- 👉 The **C-AIOE index** adjusts the raw exposure score to reflect whether AI is more likely to **assist or replace** workers.

MS ANNUAL MEDIAN WAGE BY AI QUADRANT

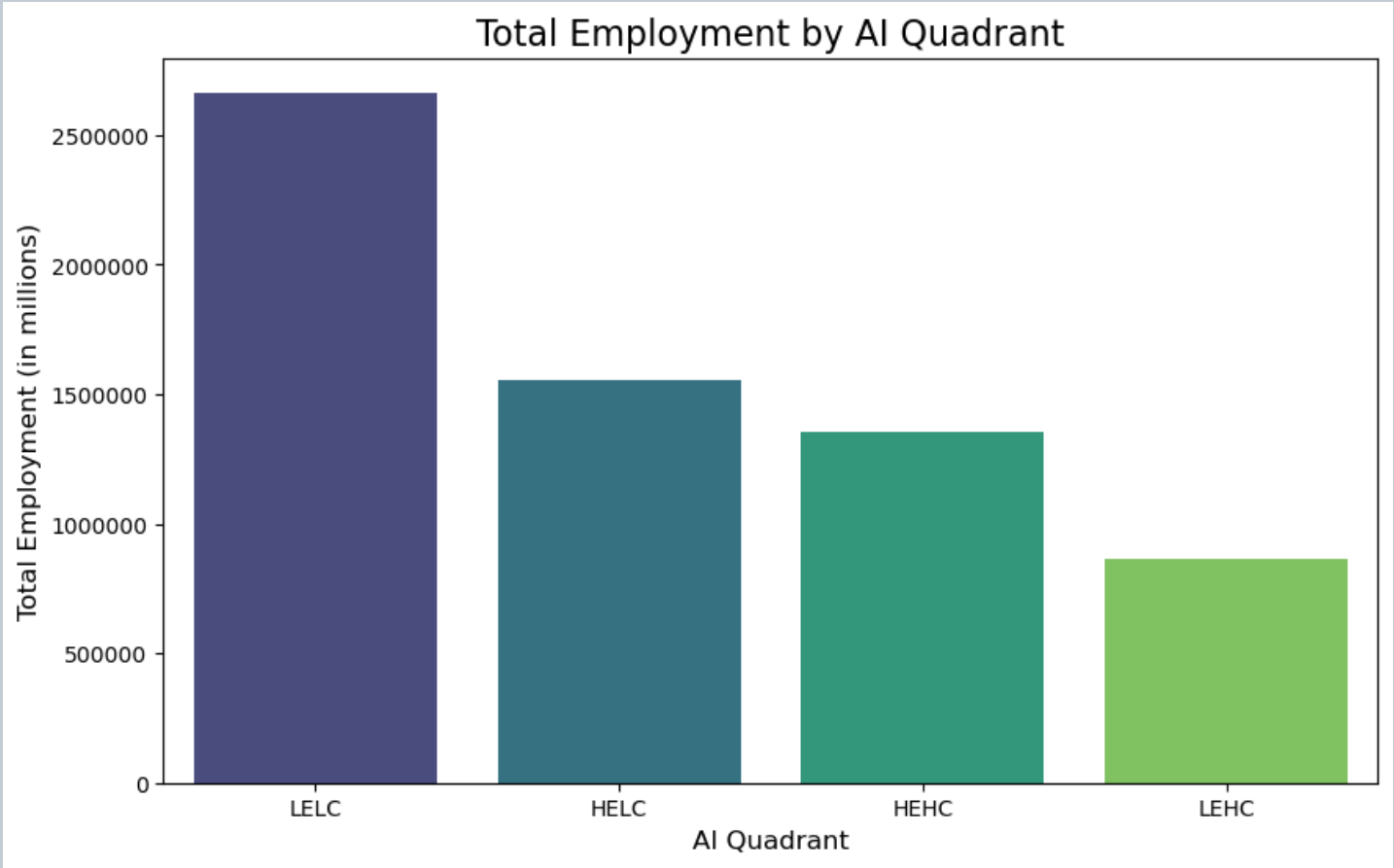
Higher Wages are in AI-Augmented Roles

- Occupations where AI complements human skills (HEHC) command significantly higher median wages, highlighting the economic value of non-automatable skills.



MS EMPLOYMENT BY AI QUADRANT

- The majority of Mississippi's workforce is concentrated in Low Exposure & Low Complementarity (LELC & HELC) occupations.
- These jobs are less affected by current AI, but are often routine and repetitive, offering limited scope for productivity gains.As a result, they face risks of long-term stagnation and eventual automation.



Top 5 HEHC & HELC MS Occupations

› These lists provide a clear priority for policymakers: **upskilling** for HEHC roles (e.g., Managers, Engineers) and **reskilling** for HELC roles (e.g., Clerks, Tellers)."

Category	Occupation Title	Employment	Median Ann. Wage
HEHC	Registered Nurses	29,400	$74,470
HEHC	General & Operations Managers	14,530	$88,290
HEHC	Elementary School Teachers	11,680	$48,440
HEHC	Secondary School Teachers	11,110	$49,340
HEHC	First-Line Sup. of Production & Oper. Workers	9,580	$64,510
HELC	Retail Salespersons	36,330	$27,810
HELC	Customer Service Representatives	20,240	$35,580
HELC	Office Clerks, General	18,290	$32,480
HELC	Secretaries & Administrative Assistants	16,200	$36,000
HELC	First-Line Supervisors of Retail Sales Workers	13,670	$43,110

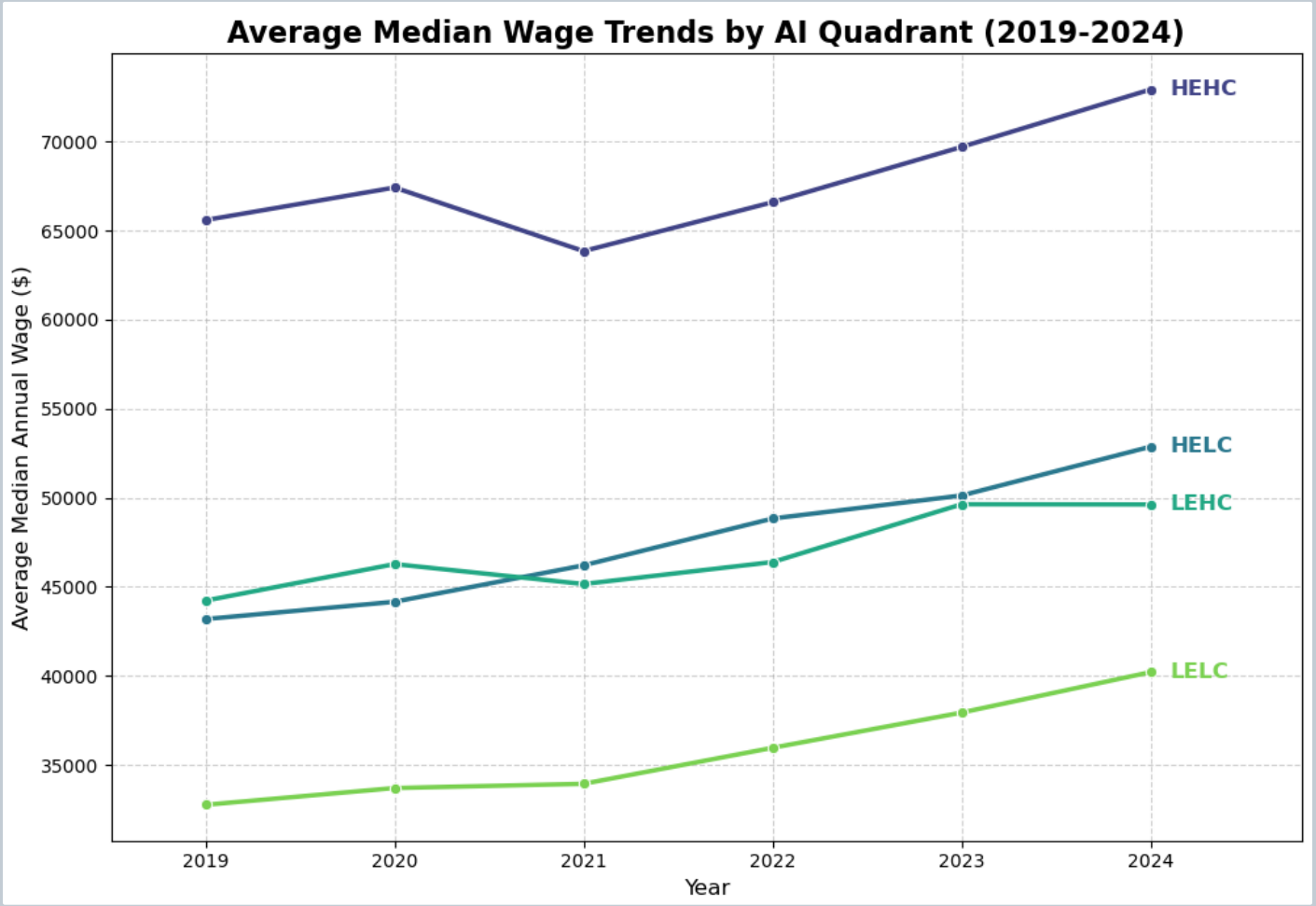
Top 5 LEHC & LELC MS Occupations

- **LEHC jobs are skilled, stable roles** where AI is less relevant but human judgment is critical (e.g., supervision, hands-on repair). These represent a **core of resilient middle-skill employment.**
- **LELC jobs are high-volume, lower-wage roles** (e.g., cashiers, laborers). While at lower *current* AI risk, they are highly vulnerable to any future automation advances and economic downturns.

Category	Occupation Title	Employment	Med Ann. Wage
LEHC	Maintenance and Repair Workers, General	13,530	$40,580
LEHC	First-Line Sup. of Food Prep and Serving Workers	11,610	$34,230
LEHC	Licensed Practical and Licensed Vocational Nurses	9,880	$48,850
…	…	…	…
LELC	Cashiers	31,870	$22,410
LELC	Fast Food and Counter Workers	31,010	$22,280
LELC	Laborers and Freight, Stock, and Material Movers	28,460	$35,920

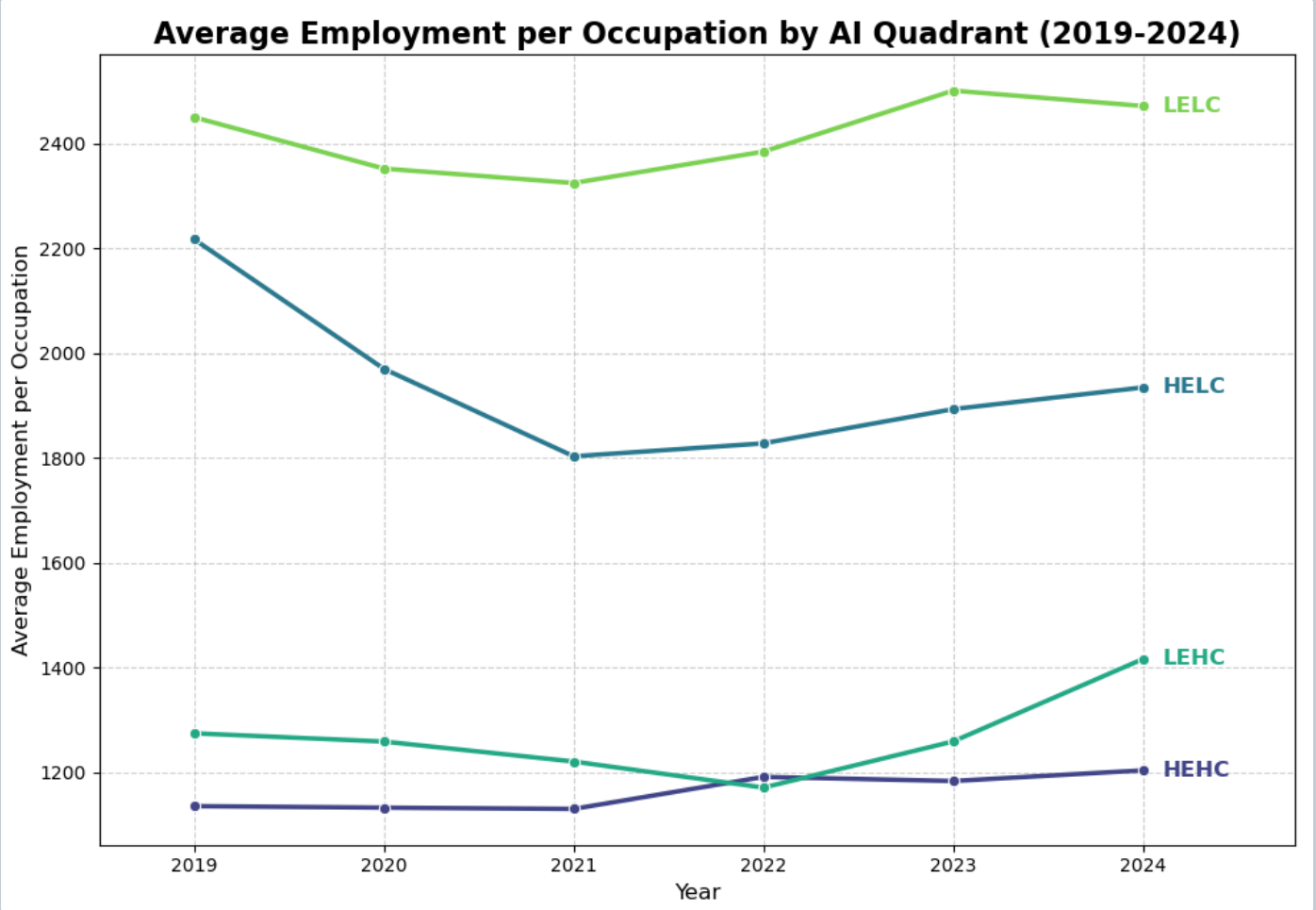
MS MEDIAN WAGE TRENDS BY AI QUADRANT

All quadrants experienced wage growth, with HEHC showing the largest gains and LELC posting the smooth growth.



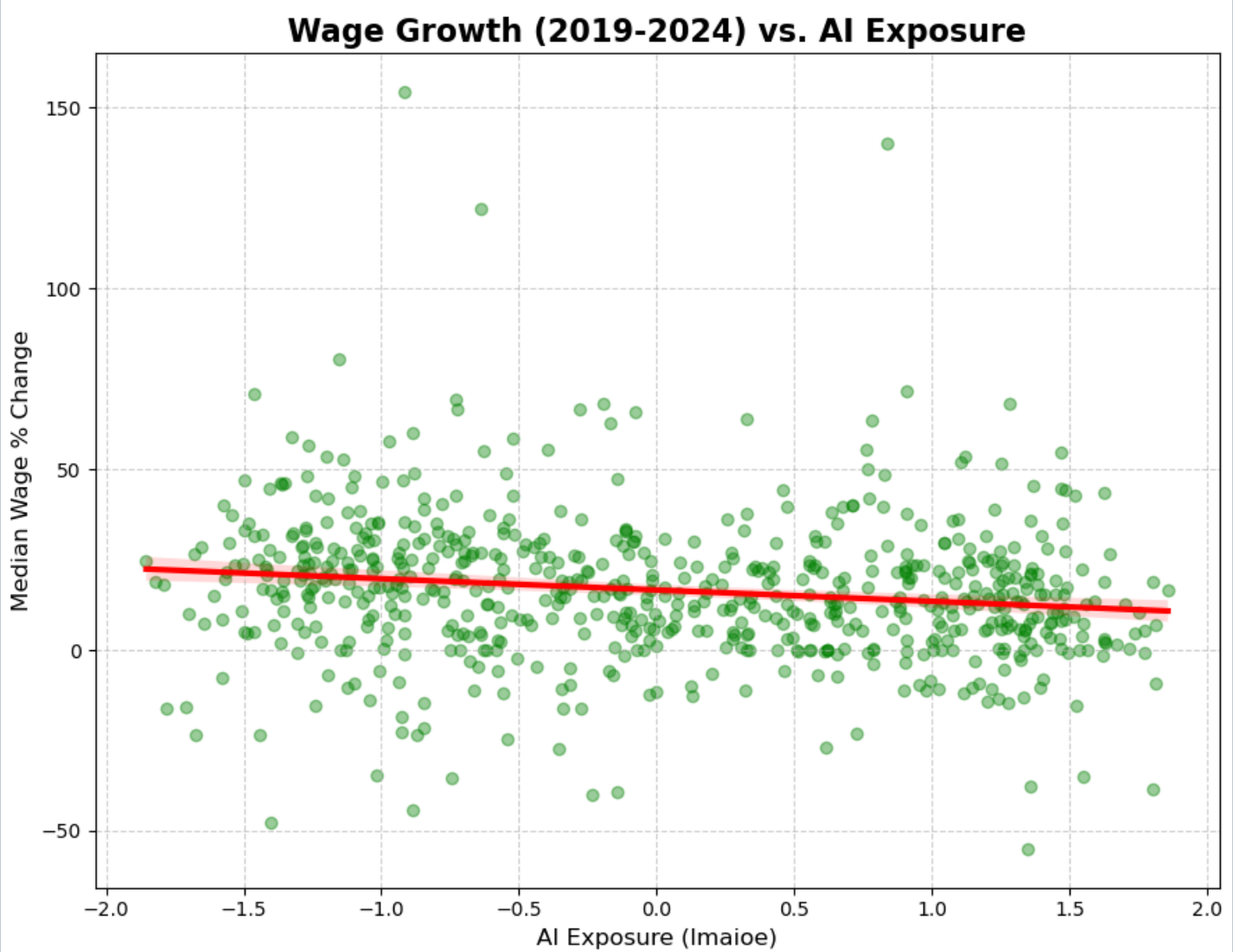
MS EMPLOYMENT TRENDS BY AI QUADRANT

Occupations leveraging **human + AI complementarity** (LEHC, HEHC) show the most promising upward trajectories



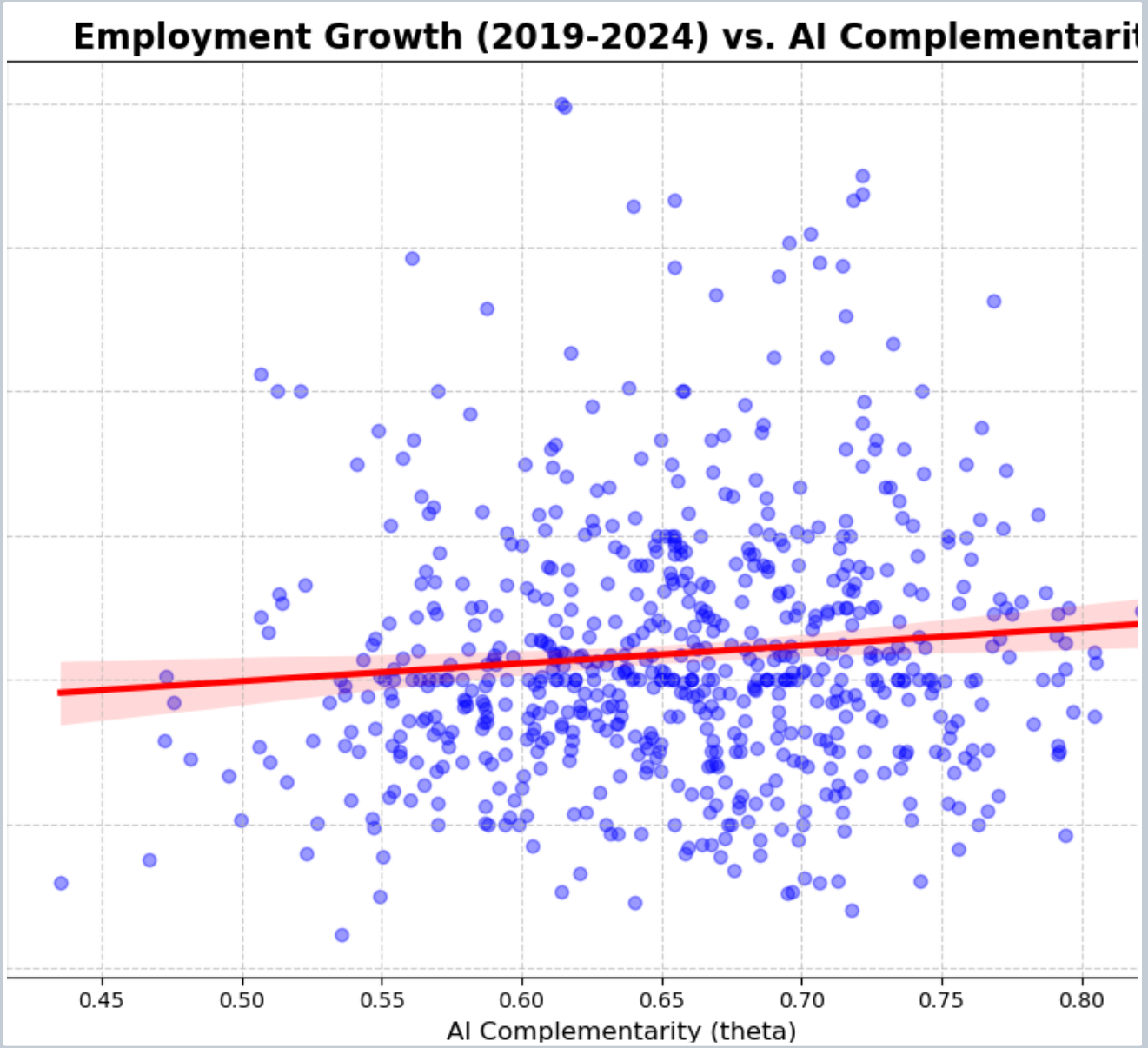
MS WAGE GROWTH VS AI EXPOSURE

This negative correlation suggets that higher AI exposure acts as a significant headwind against wage growth."



MS EMPLOYMENT GROWTH VS AI COMMENTARITY

The strong positive relationship suggets that 'AI-as-a-tool' is a powerful driver of job creation.



MS Panel OLS Regression Post 2022

Variables	Log Employment (β, p-value)	Log Wages (β, p-value)
post_x_Expos.	0.043 (p=0.13)	**-0.019 (p=0.04)**
post_x_Comm	**0.872 (p=0.006)**	-0.226 (p=0.06)
post_x_HEHC	-0.137 (p=0.06)	0.007 (p=0.77)
post_x_HELC	-0.078 (p=0.18)	-0.005 (p=0.79)
post_x_LEHC	-0.108 (p=0.06)	-0.009 (p=0.63)

These panel regression results show how AI metrics and quadrant categories interact with employment and wage trends in Mississippi from 2019–2024, controlling for occupation and year fixed effects.

After 2022 in MS:

- "AI as a tool," measured by complementarity (theta), is correlated with increases employment.
- But “AI as a competitor” measured by exposure (lmaioe) is associated with lower wage growth.

National Panel OLS Regression Post 2022

Variables	Log Employment (β, p-value)	Log Wages (β, p-value)
post_x_Expos.	0.019 (p=0.14)	-0.012 (p=0.52)
post_x_Comm	**0.662 (p<0.001)**	0.842 (p=0.06)
post_x_HEHC	-0.022 (p=0.48)	-0.058 (p=0.09)
post_x_HELC	-0.010 (p=0.71)	-0.022 (p=0.51)
post_x_LEHC	-0.041 (p=0.09)	**-0.118 (p=0.02)**

These panel regression results show how AI metrics and quadrant categories interact with employment and wage trends national from 2019–2024, controlling for occupation and year fixed effects.

Post-2022 national trends

- Occupations with higher AI task complementarity show stronger employment growth.
- Certain groups also experience wage pressures, particularly in high-complementarity occupations.
- This pattern is consistent with the 2023 Annual Business Survey, which found payrolls rising but wages suppression among AI-adopting firms.

A Resilient Workforce: Four Strategic Pillars

- **Pillar 1: Invest Upskill in AI-Augmented Roles (HEHC)**
  - Target training for managers, healthcare specialists, engineers. Focus on judgment, ethics, creativity.
- **Pillar 2: Reskill for Displacement Risk (HELC)**
  - Create pathways from clerical/data-entry roles to mid-skill tech or management support roles.
- **Pillar 3: Foster Responsive AI Adoption**
  - Partner with businesses to promote complementary AI use that elevates workers, not just replaces them.

A Resilient Workforce: Four Strategic Pillars

- Pillar 4: Integrate AI Literacy Statewide
  - **Why Start with Educators?** Teachers are among the most AI-exposed—and most complementary—occupations in Mississippi.
  - Equip educators with AI tools and training first—they will become multipliers of AI literacy for the next generation.

Occupation	Empl.	AI Exposure	AI Comp.	Quadrant
Foreign Language & Literature Teachers	550	1.857	0.685	HEHC
History Teachers	210	1.813	0.692	HEHC
Law Teachers	70	1.802	0.713	HEHC
Psychology Teachers	280	1.716	0.701	HEHC
Literal Arts Teachers > Quantitative STEM Teachers	…	…	…	…

Conclusion: Humans Powered By AI

- AI's impact is not uniform; it's defined by **exposure** and **complementarity**.
- Our data shows a clear divergence: **"AI as a tool"** creates jobs, while **"AI as a competitor"** suppresses wage growth.
- The higher future wages will go to workers who **leverage AI to amplify uniquely human skills** like creativity and judgment.
- The strategic imperative is to **accelerate complementarity** through targeted education and policy.
- By investing in human skills that AI augments, we can ensure Mississippi's workforce isn't just prepared for the future—it thrives in it.

- Thank You
- 10th Annual Advancing Mississippi Conference
- For comments and suggestions, please contact: duy.nguyen@mvsu.edu