The Future Of U.S. Productivity Growth: A Skeptical View

Robert J. Gordon

Symposium: U.S. Productivity Growth – Looking Ahead

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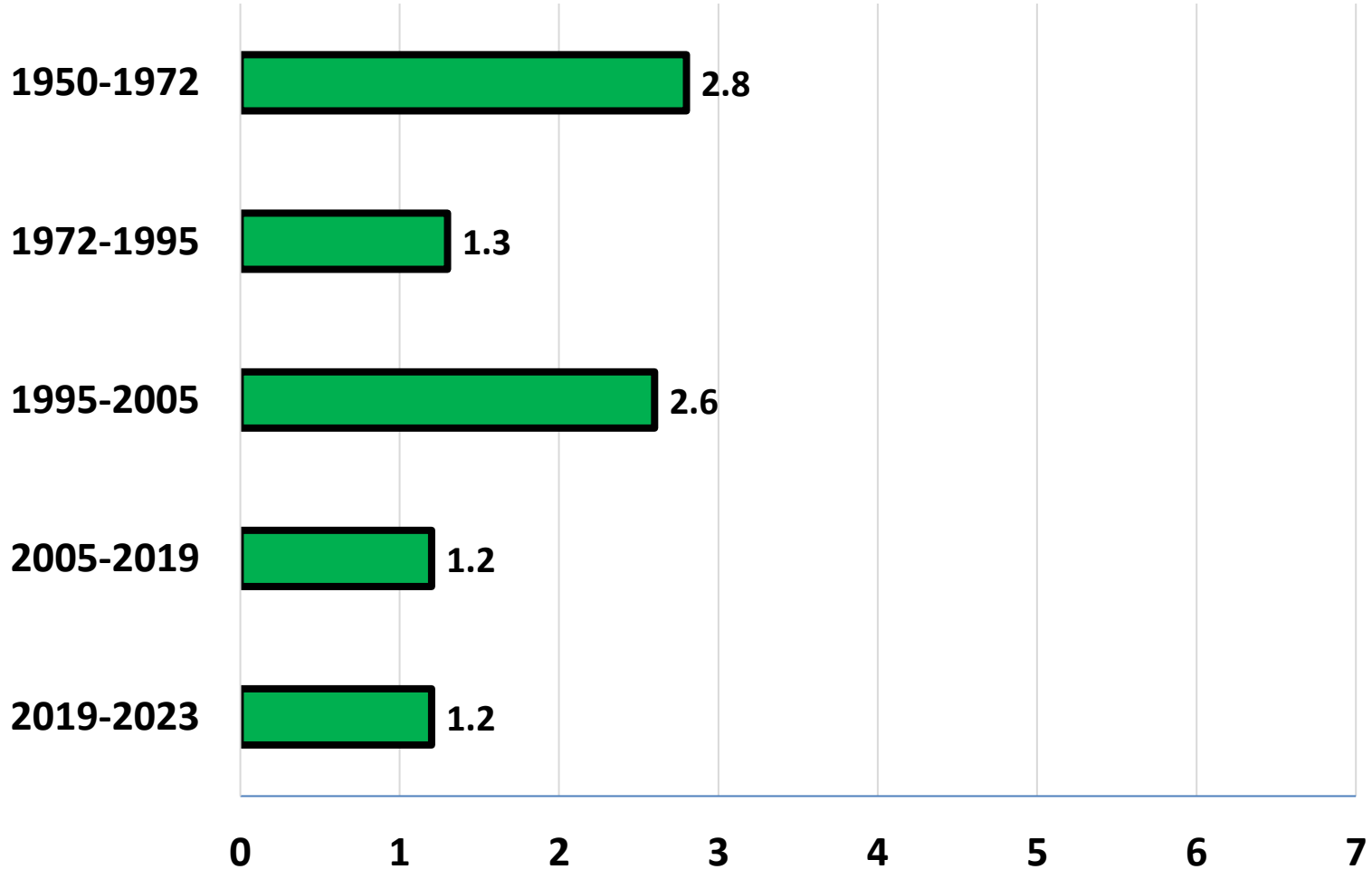
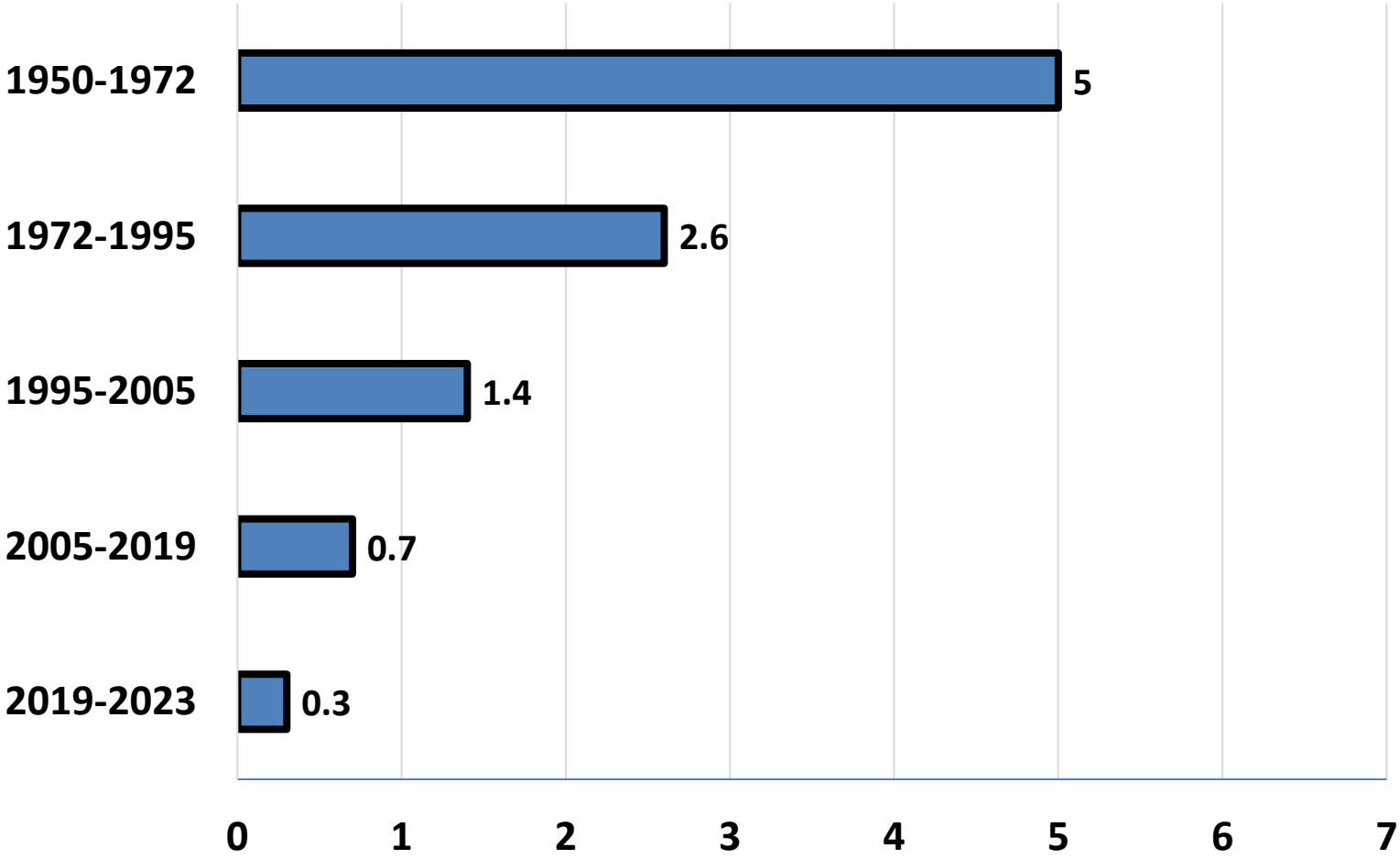
To Forecast the Future We Need a Starting Point

- Will U.S. Productivity Growth Over the Next Two Decades be:
  - 1.0%? 1.5? 2.0%? 2.5%? 3.0%?
- CBO new forecast 1.4% for 2024-34
- Review U.S. History since 1950
- Comparison to E17 (17 nations of Western Europe) and to Developed East Asia since 1950
- What factors will make productivity grow faster or slower than this history?

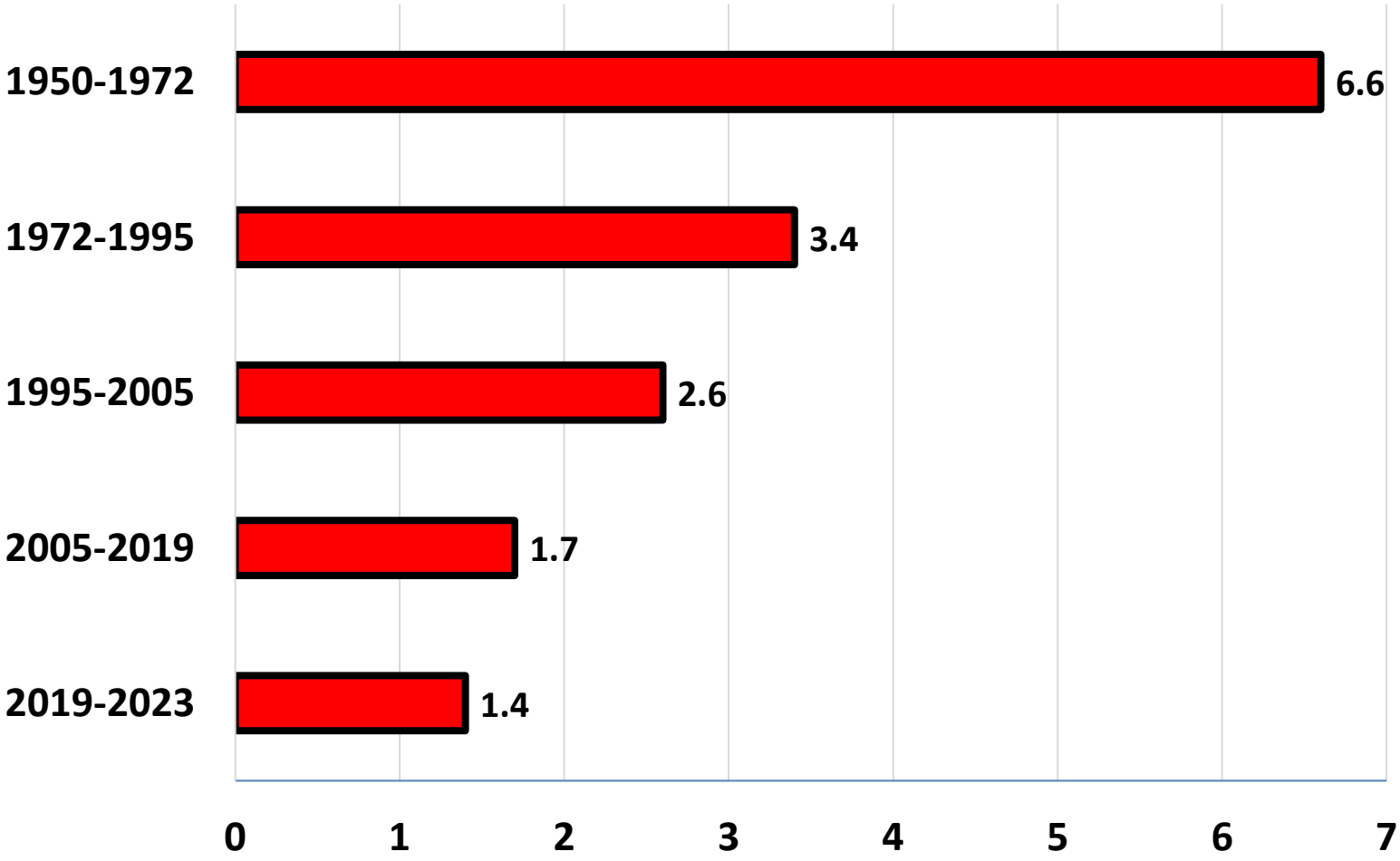
U.S. Total Economy Productivity Growth, 1950-2023



Western Europe 17 Nations, Productivity Growth, 1950-2023



Developed East Asia, Productivity Growth 1950-2023



Confronting This History

- U.S. record 1.3% 1950-72, 1.2% 2005-2023
  - Contrast to 2.6% 1995-2005, more later
- Continuous slowdown in Europe, Asia
- Sources of slowdown to date
  - Innovation is less potent
  - “Ideas are getting harder to find”
  - Education plateau
  - Corporate profits used for dividends and share buybacks in place of innovation-oriented investment

Conference Agenda for this Session

- Conference agenda: demographics, superstar firms and employees
- Demographics?
  - Babyboom teen bulge 1970s cited for initial post-1970 slowdown
  - Bulge over by 2028, then even age distribution.
  - Flat age distribution means little productivity impact of aging: Vigorous youth vs. experienced older workers

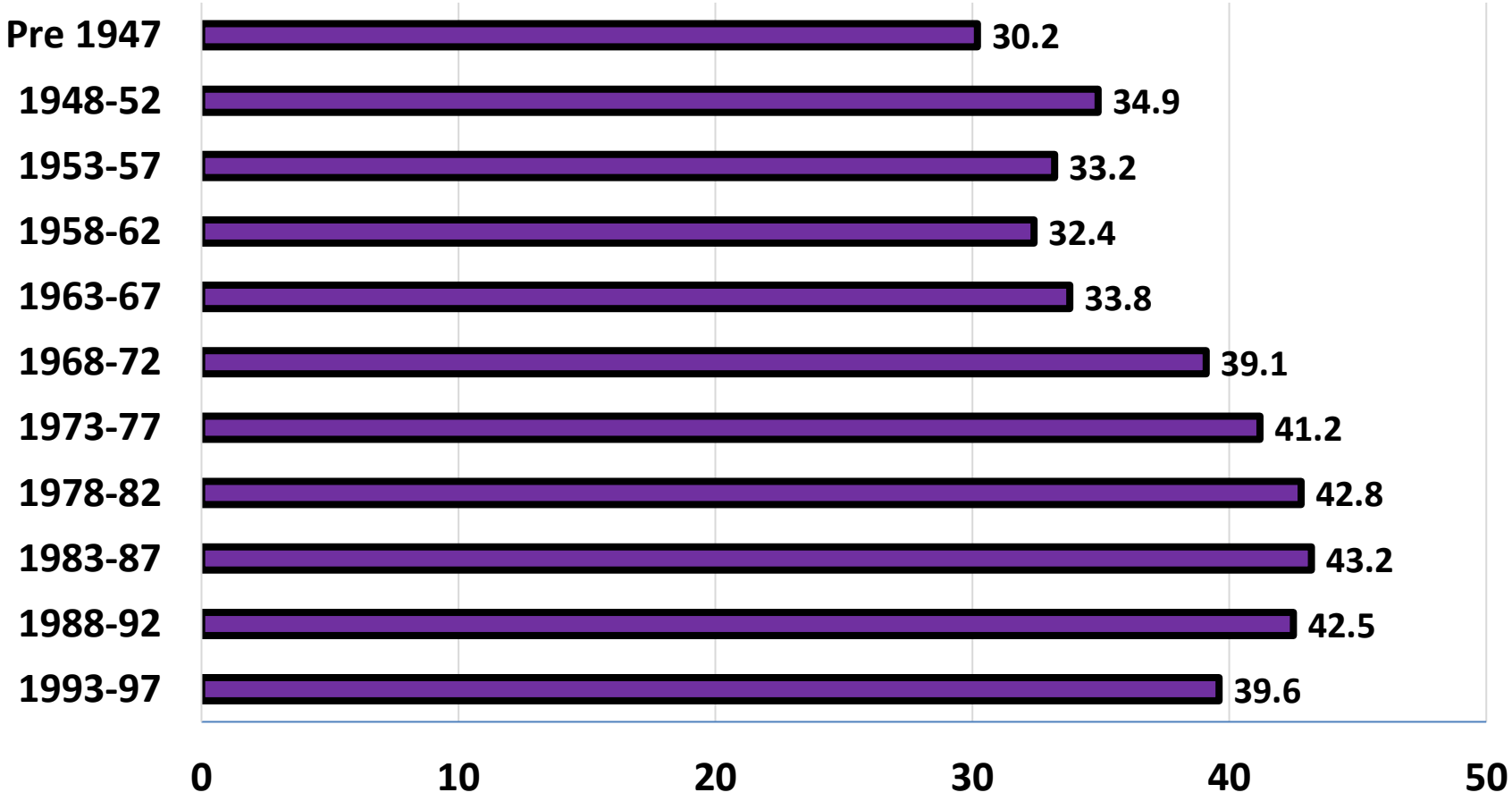
More Important than Productivity Differences by Age: Fiscal Debt

- This topic depends on immigration policy
- Agiing population implies growing dependency ratio
  - Sustained consumption, labor shortage
- Depletion of Medicare and Soc. Sec. Funds
  - Higher taxes or lower benefits
- Debt/GDP ratio from 99% now to 116% in 2034
- Continuing rise of debt service from 2.4% of GDP now to 3.9% in 2034
- Crowding out of private investment, government R&D and infrastructure spending

The Educational Plateau

- Conference agenda: superstar workers, inequality, and superstar firms
  - Differing impact across Europe and Asia but the growth slowdown is common
- More important, educatial plateau
  - 1900-1970, HS graduation 10 to 80%
  - Gradual increase college completion
  - Goldin-Katz, added 0.4% to LP growth
  - But HS and college completion flatline
    - Completion of 4-year BA and higher degree: born 1968 39.1%, 1997 39.6%

Percent Completing BA or More Advanced Degrees, By Birth Year (2022 Data)



End of Education's Contribution to Productivity Growth

- Plateau in educational attainment has already occurred after rapid rise in 20th century
- Declining demand for college education
  - Rising tuition, student debt
  - 40% of BAs cannot find a suitable job
  - Low U.S. standing on intl PISA tests
  - Lack of systematic apprenticeships
- Social changes
  - Age 25-54 %married down 67 => 53
  - "Unpartnered" now 38%
  - Children of single-parent families

Conference Agenda: The Green Technology Transition

- Green transition implies crowding out
  - Discarding fossil fuel heating and industrial equipment to be replaced by electic equipment
  - Replacement of diesel truck fleet
  - Multifold increase in electric grid for EVs
  - Crowding out of R&D and productivity-enhancing technology
  - Humble example: gas leaf blowers
- Higher productivity in making Evs and in operating solar and wind renewables

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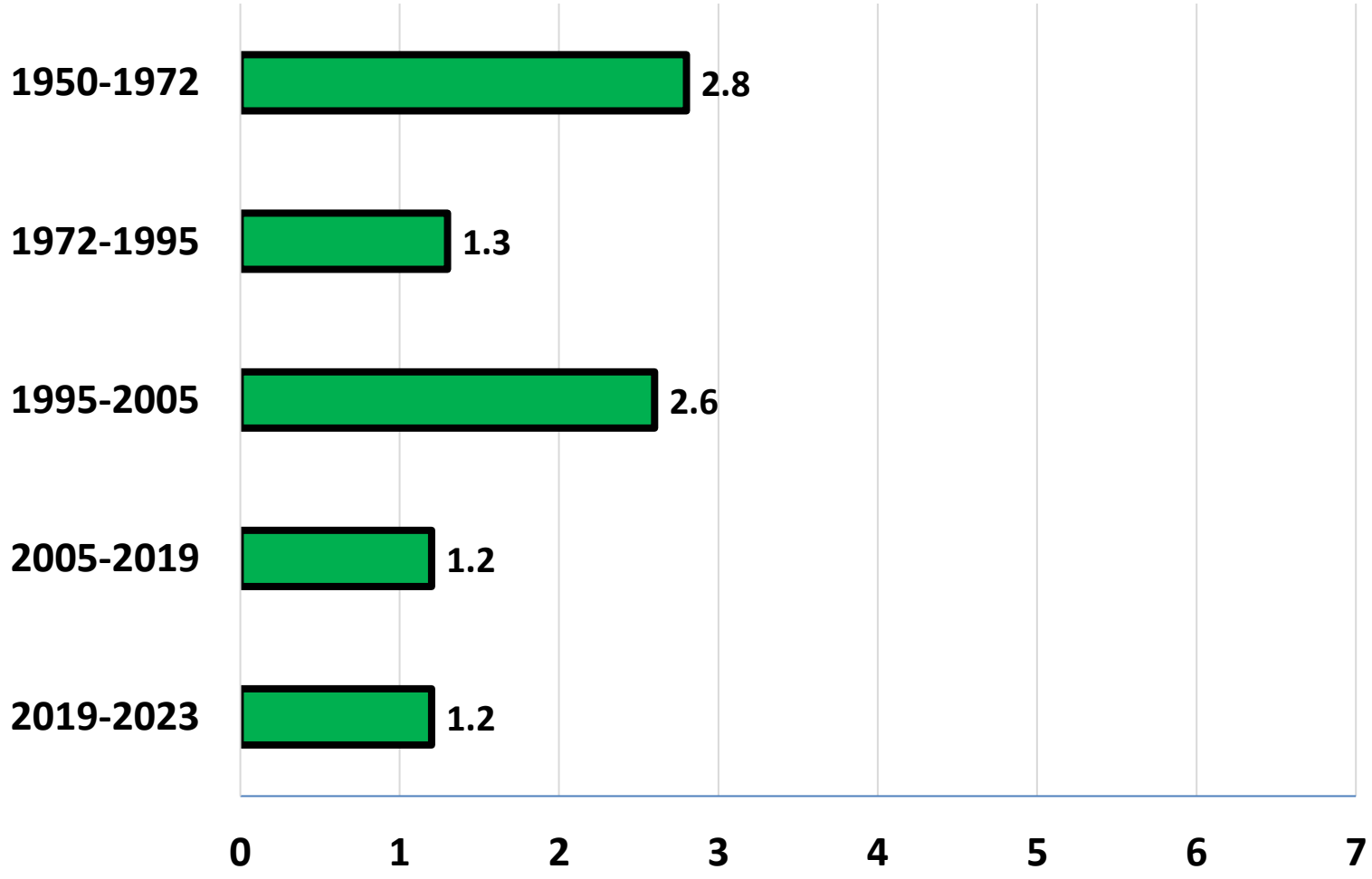
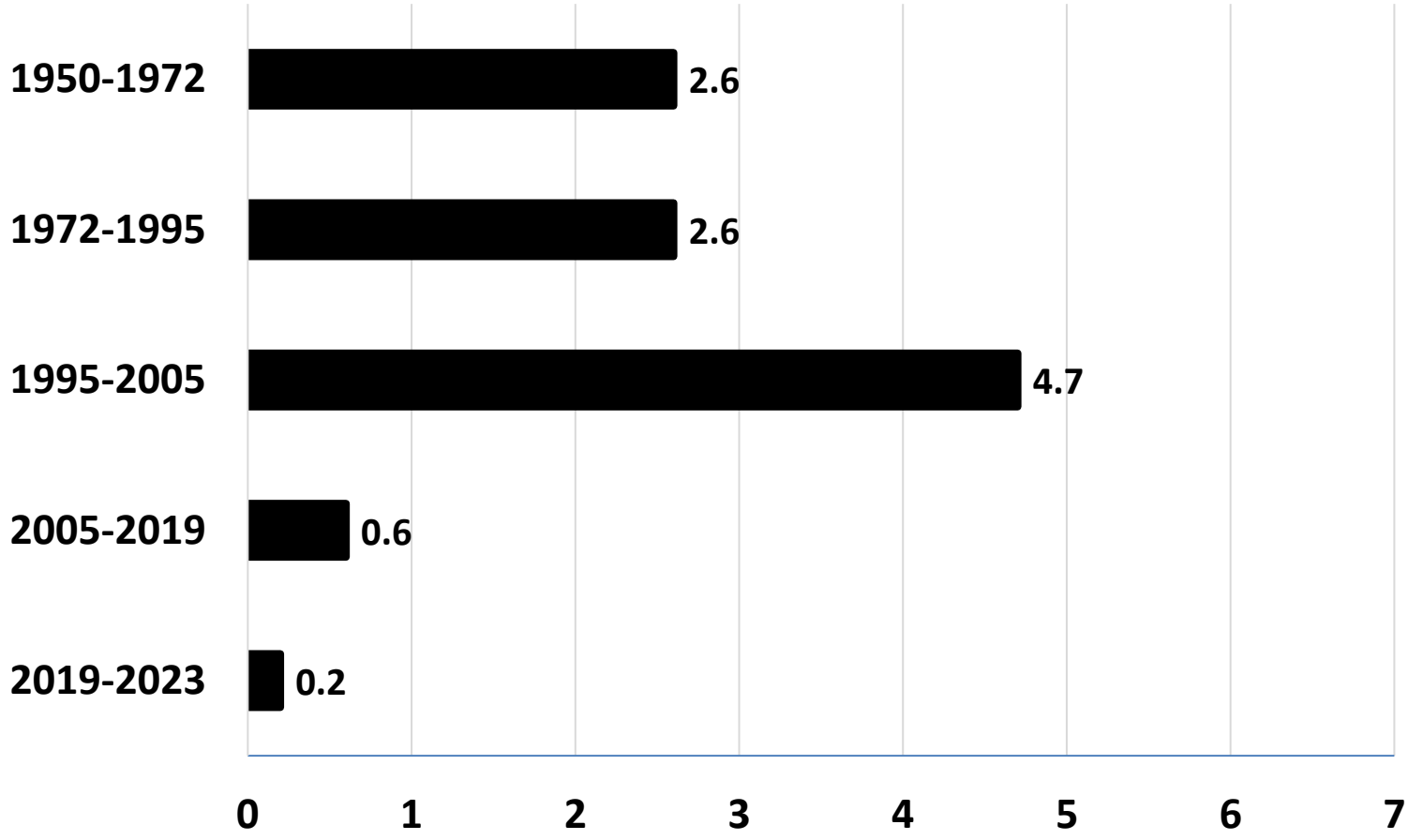


Industrial Revolutions, #3 vs. #4

- Total economy productivity growth in 1995-2005 was 2.6%
- Upsurge vs. pre-1995 and post-2005 linked to digital revolution, “dot.com” decade
- Ubiquity of IR#3. Web, e-mail, spreadsheets, end of repetitive retyping, conversion of paper records to digital, bar-code scanning, electronic checkout, medical records
- How can IR#4 match this pervasiveness?
- Consider robots in manufacturing
- Then consider LLMs

The Robot Paradox: U.S. Manufacturing Productivity Growth, 1950-2023



AI Revolution is Already Here

- Last decade expansion of AI in . . .
  - Customer service phone response
  - Voice recognition (my doctor's dictation)
  - Language translation
  - Legal searches
  - Radiology diagnosis
- New: Large Language Models (LLMs)
  - Creation of written text, memos, sales
  - Creation of moving and still images
  - Creation of software code

How Many Jobs Will Vanish?

- Consider what workers actually do
- 20% are producing goods
  - Manufacturing, mining, construction, utilities
- 53% are producing contact services
  - Retail, wholesale, transportation, recreation, food, education, health
- 27% are producing creative services
  - Management, information, technical, scientific, administrative, finance, insurance, real estate

How Many Jobs Will Be Lost in Creative Services?

- Substantial job loss in content creation
  - Sofware coding, Image creation
  - Marketing documents, TV scripts
- But each call to a LLM requires a person to:
  - feed prompts & review results for errors and hallucinations
  - Check copyright violations & robocalls
  - Wall St. Journal, Wed Feb 14, p. A4
- LLMs are trained by scraping the web
  - They know the past, not the future
  - Corporate data confidentiality

Conclusion:
Pros and Cons for Faster Growth

- Starting 1.2% since 2005, slower than CBO
- Education attainment plateau
- Future crowding out
  - Student debt, government debt
  - Green transition
- 4th IR less pervasive than 3rd IR 1995-2005
- Robots: too few to revive manufacturing
- AI: Main source of optimism, but how much?
  - Impact on 25% of workers, little on 75%
  - Worker still needed to prompt and manage LLMs