April 2024

THE AGE OF AI, JOBS, AND INEQUALITY

Anxieties about job displacement and income insecurity in the Age of Artificial Intelligence (AI) are widespread. History provides reassurance that such concerns are not novel. From the more recent Industrial Revolution to the current Age of AI, each wave of technological advancement has reshaped the workplace, prompting concerns about job displacement with machines replacing human labor. At the Bletchley Park AI summit in 2023, Elon Musk famously forecast a future where AI will render all jobs obsolete, leading to a paradigm of abundance without scarcity of goods and services. Such prophecies echo sentiments from as early as 1930s when John Maynard Keynes spoke of "technological unemployment," a phenomenon where the pace of technological innovation outstrips the creation of new jobs.

The debate on technological unemployment among economists has been long-standing and intense. Scholars such as Robert Solow and Karl T. Compton have argued that while technological progress drives economic growth and prosperity, it can also lead to disruptions in employment. Solow emphasized that income distribution is ultimately a hard societal choice, not solely determined by technological change. Erik Brynjolfsson and Andrew McAfee have painted a sobering picture of the great decoupling between wages and productivity, signaling a potential crisis in income inequality. They argue that professions of all kinds – from lawyers to truck drivers – will be upended, with economic indicators reflecting fewer people working, and incomes stagnating or even falling despite increasing productivity and profits. Carl Frey and Michael Osborne's seminal paper predicted significant job automation in the coming decades, particularly affecting routine tasks, pointing to the hollowing out of the labor market and income polarization in some countries. Daron Acemoglu and Simon Johnson argue that AI adoption could boost productivity and global GDP, and

caution against assuming it will generate more jobs than it displaces. David Autor contends that expert commentators and journalists tend to overstate the extent of job substitution and ignore the strong complementarities between automation and human labor that increase productivity, raise earnings, and augment demand for labor. It should be noted that much of the literature is focused on developed countries with fewer from developing countries.

How similar and how different might AI-driven transformation be from earlier economic transformations? AI has been around for decades, although the hype has peaked and waned. Backed by the exponential global diffusion of mobile devices and the internet -- yet persistent and gendered digital divide -- one conjecture is that the impacts might be more dramatic than expected in developing contexts such as in Africa or Asia, in rural and remote contexts. Emerging markets and low-income countries are less well prepared to leverage AI which could exacerbate the digital divide and cross-country income disparity. Cross-country implications of labor market exposure to AI reveal that advanced countries face a higher risk due to the prevalence of cognitive-task-oriented jobs; however, they are also better positioned to exploit the benefits of AI compared to emerging market and developing economies. Women and highly educated workers also face greater exposure, with also high potential complementarity. The 2016 WDR showed for the first time that the labor market is hollowing out in developing countries as well, with low skilled jobs facing increasing competition and declining wages, disproportionally held by the least educated and the bottom 40 percent of the income distribution. The biggest risks may not be massive unemployment but widening inequality, risks of exclusion, and harms. Fei Fei Li, professor of Computer Science and Director of the Stanford Institute for Human-Centered AI, advocates for keeping humanity at the forefront of this technological revolution. Timnit Gebru, a former student of Li's, emphasizes the need for institutional and structural changes to ensure Ethical AI.

AI's trajectory is not predetermined and it can develop in very different directions. The future that emerges will be a consequence of policy decisions made today. Carefully calibrated policies should not only foster skill development but also facilitate the adaptive capacity of the workforce to navigate this evolving landscape. Investment in education and alternative skill development formats becomes paramount to use human capital to its full potential. A critical reexamination of the social contract and the hard social choices of income distribution will likely come into play. Social protection systems will need to adapt to support the vulnerable, including job displacement, ensuring economic inclusion in the digital economy and Age of AI.

History has afforded rich lessons for humanity in building resilience in the face of technological change. By embracing ethical considerations, proactive policy interventions, and investing in human capital, we can navigate the Age of AI while reducing poverty and inequality, fostering inclusion, and boosting shared prosperity for all.
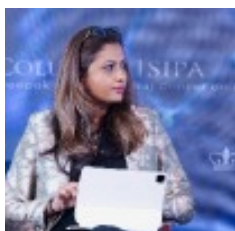
Tina George Karippacheril
Guest Editor

Kevwe Pela
K4J Coordinator

Senior Social Protection Specialist

Social Protection and Jobs, Africa Western and Central

Economist

Jobs Group

FEATURED STUDIES IN THIS DIGEST

The Macroeconomics of Artificial Intelligence

Brynjolfsson & Unger | Article | December 2023

The article discusses the potential impacts of artificial intelligence (AI) on various aspects of the economy, focusing on productivity growth, income inequality, and industrial concentration. It highlights that AI's trajectory is not predetermined and can vary significantly, with the future outcomes heavily influenced by present policy choices. It emphasizes the need for a nuanced understanding of AI's potential and advocates for proactive policy measures to steer AI development towards outcomes that promote sustained and inclusive economic growth. The implications of AI on three broad areas of macroeconomic interest are explored with forks in the road for each: productivity growth (low or high), income inequality (high or low), and industrial concentration (high or low).

Rebalancing AL

Acemoglu & Johnson | Article | December 2023

Based on the book [Power and Progress: Our 1000 Year Struggle with Technology and Prosperity](#), the article discusses the implications of automation and artificial intelligence (AI) on the economy, particularly focusing on the potential impacts on jobs, productivity, and shared prosperity. It highlights the historical context of technological advancements and raises concerns about the prevailing emphasis on automation, which could lead to increased inequality and job displacement. The authors suggest redirecting AI development towards human-complementary technologies to foster job creation and inclusive economic growth. It also proposes policy reforms to ensure that AI benefits all segments of society and contributes to shared prosperity.

Polanyi's Paradox and the Shape of Employment Growth

David Autor | Working paper
September 2014

The paper discusses the concept introduced by philosopher Michael Polanyi in 1966, highlighting the idea that our tacit knowledge often surpasses our explicit understanding. It connects this concept to the history of computerization and explores its implications in various areas, including labor market polarization and the challenges of substituting machines for human labor in tasks requiring adaptability and creativity.

Why Are There Still So Many Jobs? The History and Future of Workplace Automation

David Autor | Journal Article | Summer 2015

The paper delves into the intricate relationship between automation and labor, explaining why widespread job loss hasn't occurred despite concerns. It highlights that while automation replaces some tasks, it also complements human labor, increasing productivity and demand for labor elsewhere. Moreover, as machines take over routine tasks, humans are better positioned to excel in tasks requiring problem-solving, adaptability, and creativity.

The Future of Employment: How Susceptible are Jobs to Computerisation?

Frey & Osborne | Journal Article
January 2017

The study assesses job vulnerability to computerization through a novel methodology that estimates the likelihood of computerization across various occupations. It analyzes the potential impacts on the US labor market, emphasizing the number of jobs at risk and the relationship between a job's susceptibility to computerization, wages, and educational requirements. The study predicts that 47 percent of US employment could be automatable within the next two decades.

Applying AI to Rebuild Middle Class Jobs

David Autor | Working Paper | February 2024

The paper discusses the unexpected outcome of the Information Age, where instead of flattening economic hierarchies as anticipated, computerization has reinforced the significance of decision-making, predominantly in the hands of elite experts. It argues that AI presents an opportunity to broaden the application of human expertise by enabling a broader set of workers with complementary knowledge to engage in higher-stakes decision-making tasks currently monopolized by elite professionals (such as doctors, lawyers, computer engineers and professors).

Skills or Degree? The Rise of Skill-Based Hiring for AI and Green Jobs

Ehlinger & Stephany | Working Paper
December 2023

Drawing evidence from a large time series dataset, the result show that for emerging professions in AI or green jobs, employers have started so-called "skill-based hiring" where university education does not show an educational premium for AI roles. It recommends making use of alternative skill-building formats such as apprenticeships, on-the-job training, MOOCs, vocational education, training, micro-certificates, and online bootcamps to use human capital to its full potential and to tackle talent shortages.

Labor Market Exposure to AI: Cross-country Differences and Distributional Implications

Pizzinelli et al. | Working Paper | October 2023

The paper provides a nuanced exploration of AI's potential impact on labor markets. The analysis reveals that, while AI poses risks of labor displacement through task automation, it also holds promise in its ability to boost productivity and complement human labor, especially in occupations that require high level of cognitive engagement and advanced skills. It highlights that women and highly educated workers face greater exposure, with also high potential complementarity.

The impact of artificial intelligence on labor markets in developing countries: a new method with an illustration for Lao PDR and urban Viet Nam

Carbonero et al. | Journal Article | February 2023

The paper addresses the impact of AI on global labor markets, noting a gap in research focus between advanced and developing economies. It proposes a new methodology to assess AI

AI development and employment skill structure: A case study of China

Ma et al. | Journal Article | December 2023

The paper, based on the panel data of 30 provinces and cities in China from 2003 to 2017, shows that AI will significantly affect the structure of employment skills, with a negative effect on the employment of low skilled labor force and a positive effect on the employment

impacts across countries by translating measures from the US. Findings suggest that workers in urban Vietnam face greater exposure to AI-related disruptions compared to Lao PDR, primarily due to a higher concentration in occupations exposed to AI. Notably, certain highly populated occupations in Vietnam, such as building frame workers, are less compatible with machine learning technologies. The paper underscores the necessity for adaptive measures to alleviate the risk of displacement.

of medium and high skilled labor force. The paper suggests training and education, continuous investment in basic education, and improvements in comprehensive quality of low skilled labor force. It calls for support for on-the-job and job transfer training and education of medium skilled labor force, and investment in highly skilled labor and scientific and technological research.

Automation and AI: Implications for African Development Prospects?
Charles Kenny | Blog | October 2019

This extensive blog examines how technological advancements, including automation and global service trade, may affect manufacturing and development in Africa. It raises concerns about the concentration of low-skill jobs that are vulnerable to automation and the insufficient number of quality jobs to accommodate the growing working-age population. It proposes policy measures, such as investing in human capital and social protection, to mitigate challenges arising from automation and globalization, emphasizing Africa's potential to benefit from technological progress and the importance of addressing historical growth barriers through market expansion, infrastructure enhancement, and human capital development.

OTHER READINGS ON AI AND INEQUALITY

Gen-AI: Artificial Intelligence and the Future of Work
Cazzaniga et al.| Discussion Note | January 2024

AI will affect income and wealth inequality. Unlike previous waves of automation which had the strongest effect on middle-skilled workers, displacement risks extend to high wage earners. Older workers are more vulnerable. Women and educated workers face greater risks and opportunities. Almost 40 percent of global employment is exposed to AI, with advanced economies at greater risk but also better poised to exploit benefits. Emerging markets and low-income countries are less well prepared to leverage AI which could exacerbate

Algorithmic Exclusion: The Fragility of Algorithms to Sparse and Missing Data
Catherine Tucker | Working Paper | February 2023

The paper argues that algorithmic exclusion is a source of persistent inequality and calls for a shift in focus towards considering missing inputs and outputs in algorithmic policy. It highlights the importance of understanding how background characteristics influence data availability and accuracy and suggests that regulators should explore policies to promote fairness in business decisions, especially concerning the accuracy of digital profiles and the accessibility of information for individuals to correct inaccuracies.

the digital divide and cross-country income disparity.

On the Dangers of Stochastic Parrots: Can Language Models be Too Big?

Bender at al. | Journal Article | March 2021

The paper assesses the trend towards ever larger language models (LM), especially for English. It questions whether the pursuit of ever larger LMs is necessary, considering the associated costs and risks. The paper calls on natural language processing (NLP) researchers to carefully consider the risks and explore alternative approaches that are effective without excessively relying on large datasets.

Good Economics for Hard Times

Banerjee & Duflo | Book
November 2019

One key argument in the book is that while some proponents of universal basic income may see it as a way to buy off those who will be made unproductive by the new economy and won't be able to find work, all the evidence suggests that people want to work, not just because they need the money; work brings with it a sense of purpose, belonging, and dignity.

BONUS BOOK

The Worlds I See: Curiosity, Exploration, and Discovery at the Dawn of AI

Fei Fei Li

The book connects Li's personal story as a young immigrant and scientist with the origin stories of artificial intelligence and human-centered AI. Known to the world as the creator of ImageNet, a key catalyst of modern AI, Dr. Li's career in science was improbable from the start. As immigrants, her family faced a difficult transition from China's middle class to American poverty. Her adolescent knack for physics positioned her to make a crucial contribution to the breakthrough we now call AI. It provides a riveting story of a scientist at work and a clear explanation of what AI actually is – and how it came to be.
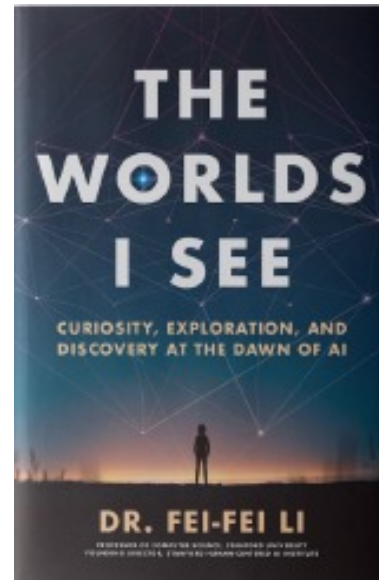

CONTRIBUTORS

This newsletter is a joint product of the Jobs Group and the Labor & Skills Global Solutions Group of Social Protection & Jobs Global Practice. Contributions were made by Tina George Karippacheril, Asbath Alassani, and Kevwe Pela. For more information kindly contact Kevwe Pela (kpela@worldbank.org).

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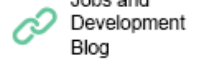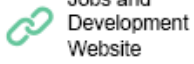
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