

**2024 Scholar Of Tomorrow Economics Essay Contest:****Artificial Intelligence and Income Distribution: Does the continuous evolution of AI  
exacerbate inequality among people?**

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## Abstract

The widespread application of artificial intelligence may exacerbate income and development inequality worldwide, impacting economic structural changes and social equity and justice. This study aims to construct an analytical framework for understanding the impact of artificial intelligence on income distribution by utilizing the Gini coefficient to quantitatively assess income inequality, the Phillips curve to explore the dynamic relationship between employment and economic output, marginal tax rate theory to analyze the regulatory role of tax policies on income distribution, and other economic analysis tools. Additionally, specific cases from representative countries such as the United States and Canada will be selected from an international perspective to reveal the differentiated impact of artificial intelligence technology on income distribution in different economies through comparative analysis. Based on the research conclusions, this paper will propose targeted policy recommendations aimed at promoting the healthy development of artificial intelligence technology and fostering harmonious coexistence of society and economy.

## Introduction

Artificial intelligence (AI) technology is rapidly transforming and upgrading the global economy. A recent report released by the ILO and the Office of the United Nations Secretary-General's Special Envoy for Technology, titled "Focusing on the AI Divide: Shaping the Future of Work through a Global Perspective," highlights that the AI revolution has the potential to further widen the development gap between high- and low-income countries. Additionally, according to a report from the International Monetary Fund (IMF) titled "Gen-AI: Artificial Intelligence and the Future of Work," AI is projected to have a profound impact on the global labor market. It is estimated that nearly 40% of jobs worldwide will be affected by AI, with advanced economies experiencing particularly significant impacts, where about 60% of jobs could be affected. While this presents an opportunity for advanced economies to enhance productivity and efficiency through AI, it also raises concerns about job displacement leading to reduced labor demand, potentially resulting in lower wages and decreased hiring opportunities.

## Theoretical analysis

### **International Measurement of Income Inequality: A Quantitative Analysis of Gini Coefficient and Lorenz Curve**

When discussing the complex issue of income inequality, the Gini coefficient and Lorenz curve, as two core analytical tools in economics, provide powerful means to quantify and visualize

this phenomenon.<sup>1</sup> ( Zapucioiu, , Sterie, , & Dumitru, . 2023 ) According to the latest data released by the World Bank, many developed and emerging economies have shown varying degrees of volatility in their Gini coefficients. Developed countries such as the United States (0.415) and the United Kingdom (0.362) showed an upward trend, reflecting increasing inequality due to technological progress and globalization. Germany (0.297) and France (0.291) are relatively stable, thanks to policy interventions and social welfare systems. (Figure 1) Among emerging economies, China's Gini coefficient has decreased through policy adjustment but still exhibits a gap between urban and rural areas at 0.385; Brazil (0.498) and South Africa (0.620) have high coefficients reflecting deep socioeconomic inequality.

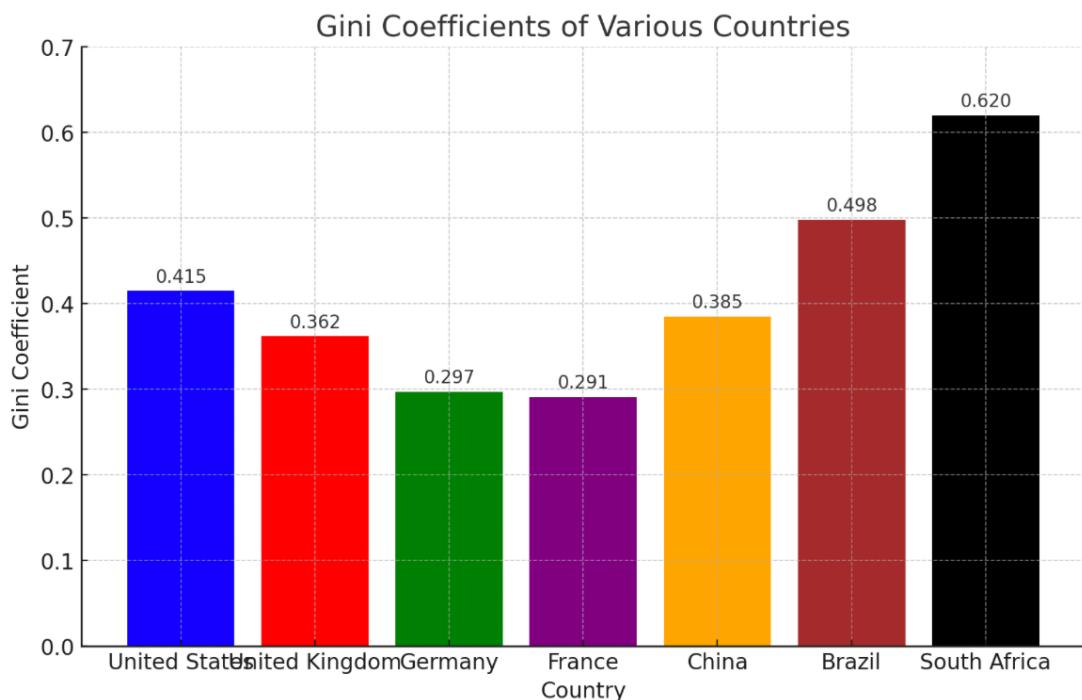


Figure 1

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<sup>1</sup> Zapucioiu, L. F. , Sterie, M. C. , & Dumitru, E. A. . (2023). Economic Analysis of Potato and Tomato Trade in Romania: The Gini Coefficient.

The impact of AI on developed countries will be relatively large because high-skilled labor leads to increased information technology adoption; however, some developed countries have effectively alleviated this impact on low-skilled labor through policy intervention such as strengthening vocational education and promoting technology popularization resulting in stable or declining Gini coefficients. Therefore, it is critical for policymakers to consider potential impacts on income inequality from further advancements in AI technology.

### **The Dual Impact of AI on the International Labor Market: An Extended Quantitative Analysis of the Phillips Curve**

The development of AI technology has a significant impact on the scale of employment through both substitution and absorption effects.<sup>2</sup> The price elasticity (PED) of low-skilled labor exceeds 1, indicating that demand is highly responsive to changes in wages. (Marabucci,A.2023) Low-skilled jobs are often considered to be highly substitutable; therefore, even a slight increase in wages may lead employers to significantly reduce their hiring of these workers and turn to artificial intelligence and automation instead. As a result, AI technology enhances the substitutability of low-skilled jobs, leading to decreased demand for low-skilled labor and lower wages. (Figure 2)

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<sup>2</sup> Marabucci, A. . (2023). Price elasticity of fuel demand: an econometric approach. European Transport/Trasporti Europei.

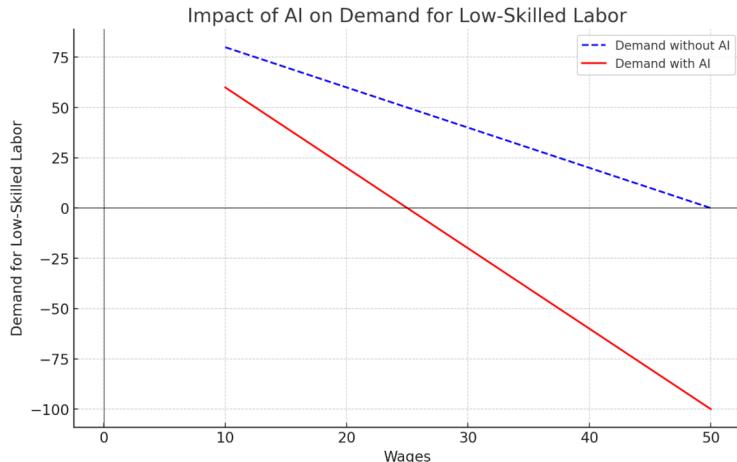


Figure 2

The price elasticity (PED) of highly skilled labor is less than 1, meaning that its demand is less sensitive to price changes. High-skilled jobs, such as data scientists and artificial intelligence engineers, are less responsive to wage changes. Even if wages rise, companies' demand for these high-skilled jobs will not decrease significantly as they are crucial in AI development and management. Therefore, as AI develops, the demand for highly skilled labor will increase and may lead to higher pay levels for these positions

### **AI impact on the national unemployment rate**

According to the classic theory of the Phillips curve, there is an inverse correlation between the unemployment rate and economic growth (often with the inflation rate as a proxy variable).<sup>3</sup> (Holm, Lerdalen, & David. 2024). In other words, when the unemployment rate decreases, economic growth accelerates and inflation increases. Conversely, when the unemployment

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<sup>3</sup> Holm, M. B. , Lerdalen, L. O. , & David, V. . (2024). The effect of capacity constraints on the slope of the phillips curve. *Oxford Economic Papers*.

rate rises, economic growth slows down and inflation decreases. However, in light of the rapid advancement of AI technology, this traditional relationship may be called into question.

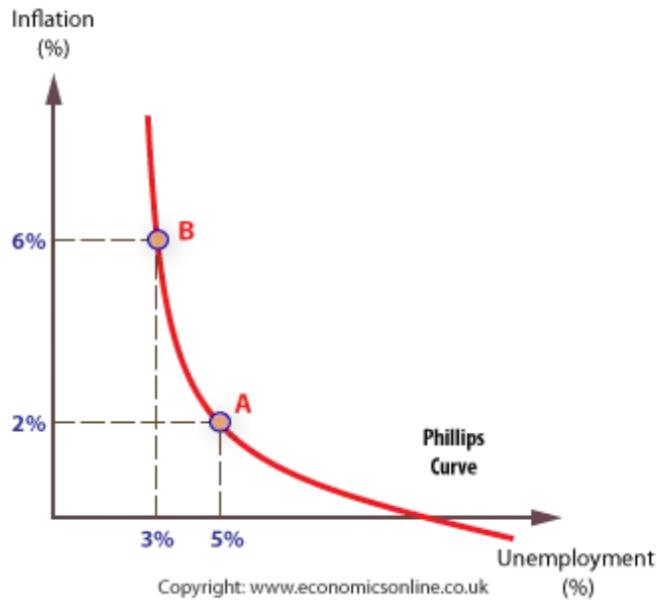


Figure 3

(Resource: [https://www.economicsonline.co.uk/global\\_economics/phillips\\_curve-2.html/](https://www.economicsonline.co.uk/global_economics/phillips_curve-2.html/))

In the initial stages of AI technology becoming more widespread, due to substitution effects, certain segments of low-skilled labor may face potential job displacement risks leading to an increase in unemployment. This could potentially have a dampening effect on economic growth as higher levels of unemployment tend to reduce overall consumption and investment willingness.

Over time though, with continued development in AI technology and absorption effects taking place, new employment opportunities are likely to emerge. Simultaneously, AI technology applications will enhance production efficiency and innovation capabilities which will drive

economic growth. Therefore it is anticipated that in the long term AI technology will contribute towards reducing unemployment rates while also boosting economic growth.

### **Mechanisms through which AI exacerbates income inequality**

#### **The reduction and automation of low-skilled jobs**

The rapid advancement of AI technology, particularly the implementation of automation technology, has significantly decreased the number of low-skilled jobs in the manufacturing and service industries in the United States. According to a report published by the World Economic Forum, AI is projected to eliminate up to 26 million record-keeping and administrative positions, such as cashiers, ticket clerks, data entry workers, and accountants, within the next five years. These roles typically require lower levels of education and professional skills, making them more susceptible to replacement by AI technology. The OECD estimates that around 14% of jobs could be lost due to AI and automation, with a particularly severe impact in the United States where over 20% of middle-skilled jobs are at risk. A study by McKinsey further refines this forecast by noting that 13 million low-skilled jobs in the United States will be displaced by automation by 2030. These statistics clearly demonstrate that AI technology is leading to a significant decline in low-skilled employment opportunities, consequently impacting the income levels of workers in these roles and exacerbating economic hardship at the bottom end of society.

#### **Higher income groups benefit**

In stark contrast to the challenges faced by low-skilled workers and the middle class, high-income groups have significantly benefited from the advancement of AI technology. According to a study by the IMF, the share of total income for the top 10 percent of households in the

United States increased from 34.7 percent in 1980 to 47 percent in 2018, with AI and automation likely playing a significant role in this trend. PwC estimates that AI could potentially have a \$15.7 trillion impact on the global economy by 2030, with a substantial portion of economic growth in the US being concentrated in technology-intensive industries. These industries typically offer higher wages, leading to faster income growth for high earners, while low-skilled workers in traditional industries may experience stagnant or declining wages.

### **Artificial Intelligence Alleviates the Potential Path of Income Inequality**

Artificial intelligence (AI) technology is rapidly reshaping the economic landscape and altering the distribution of employment opportunities, offering new potential for addressing income inequality. Taking Canada as a case study, it is projected that AI and digital economy will generate at least 350,000 high-skill jobs by 2023, as reported by the Information and Communications Technology Council (ICTC). These roles are primarily concentrated in data analysis, machine learning, and software development.

The expansion of AI-driven economic growth extends beyond the tech sector to drive advancements and transformations in other industries. The government is committed to ensuring broader participation in AI economic development and equitable sharing of its benefits through policy support and investment in education. Furthermore, government-led retraining initiatives such as the \$250 million Canadian Skills Boost Fund allocated in 2021 aim to facilitate skill transformation for a large number of workers, mitigate unemployment risks stemming from technological changes, and offer opportunities for low-income groups to enhance their economic standing.

### **Conclusion**

This paper provides a exploration of the dual impact of AI technology on the international labor market. It discusses the short-term displacement effect on low-skilled jobs and the long-term absorption effect on high-skilled jobs. Additionally, it analyzes how AI can contribute to income inequality by eliminating low-skilled jobs, squeezing the income of the middle class, and boosting the earnings of high-income groups. However, this paper also proposes strategies to mitigate income inequality through the creation of high-skilled jobs, promoting new opportunities arising from economic growth, and implementing potential paths of policy intervention and tax regulation. In summary, while reshaping employment patterns and economic structures, AI technology has brought about new challenges and opportunities that require joint efforts from government, enterprises, and all sectors of society to achieve sustainable development in technology and economy.

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