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The Impact of Artificial Intelligence on the Share of Labor Income Distribution

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Abstract

Unlike most relevant researches from a single perspective, this paper explores the mechanism of artificial intelligence influencing labor income share in China from different industry and gender perspectives based on previous studies and technology bias.Further empirical analysis and case analysis are conducted based on enterprise survey data to comprehensively investigate the impact of ARTIFICIAL intelligence on domestic labor income share.It expands the research content of the influence mechanism of labor income share in China and fills the gap between theoretical research and empirical measurement.

Keywords

Artificial Intelligence; Common Prosperity.

1. The Impact of Artificial Intelligence on Income Distribution

The impact of AI on income distribution is mainly concentrated in three aspects: First, the impact of AI on labor and wages.Second, the impact of AI on the share of labor income.Third, the impact of artificial intelligence on income inequality.

1.1. The Impact of Artificial Intelligence on Labor and Wages

Nardhaus (2015), Berg et al.(2016) And others believe that the development of artificial intelligence does not necessarily have an alternative effect on artificial intelligence, so it will not necessarily lead to a wage decline. The impact of AI on labor wage levels depends on the relationship between labor and AI technology. If there is an alternative relationship between AI and labor, AI will have a negative impact on labor wages. If the productivity effect is large, it may drive the increase of labor wages. Krusell et al.(2000) Estimating factor substitution elasticity based on US capital and labor data, it is found that there is a complementary relationship between equipment capital and skill labor. The growth of equipment capital promotes the rise of skill labor wages, and then increases the skill premium. According to Acemoglu and Restrepo (2017,2018), the impact of AI on labor wages depends on which type of labor force AI will compete with. If the work of highly skilled labor is automated, AI will have a negative impact on the wages of highly skilled labor; if the work of low-skilled labor is automated, AI will negatively affect the wages of low-skilled labor. In addition, artificial intelligence can increase labor wages by improving labor productivity and marginal output levels. Autor (2015) analyzed from the perspective of productivity improvement effect of artificial intelligence, the productivity effect of artificial intelligence is better in abstract and creative fields, and AI and workers are very complementary, so the labor force income working in such fields will be significantly increased.Graetz and Michaels (2018) found that the effect of AI on improving labor wages is "U". As total factor productivity and robot density increases, both productivity and average wages increase, but the positive impact of AI on wages will gradually decline in the long term.When the economic development is at a low level, the development of AI technology will greatly increase productivity, increase the income of employees, and increase the economic level, the wage level. Although the AI technology

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continues to promote economic growth, the wage increase rate of the higher level will gradually decrease. Guo Kaiming (2019) pointed out that the impact of AI development on labor income depends on the sector characteristics of the employer, and the impact of AI on different sector income is significantly different.Meng Yuanyuan and Chen Jin (2019) believe that with the improvement of economic development level, the popularization of AI has a positive effect on raising the overall wage level, but the effect of such wage increase is gradually weakened.

1.2. The Impact of AI on the Share of Labor Income

Scholars generally believe that the application of artificial intelligence will reduce the share of labor income. Acemoglu and Restrepo (2018) believes that as AI-related machines and equipment will replace tasks previously performed by labor, machines will replace labor force, and the share of labor in national income also declines.On the other hand, AI increases its labor productivity more than its wages, leading to a decline in the share of labor income.In addition, they believe that AI and robots can replace previous jobs done by workers, creating a substitution effect, indicating that AI does not increase labor productivity, but will reduce labor wages and employment rates, thus reducing the proportion of labor in national income.Autor and Salomons (2018) noted that increased automation has reduced the share of labor income in 19 industrialized countries; Dao et al.(2017) Using panel data from 49 newly industrialized countries, it shows that with the use of industrial robots, the share of labor income in countries and industries engaged in conventional work will decline rapidly; Acemoglu and Restrepo (2018) points out that although the improvement of AI application level increases the output of unit workers, the wage rate does not increase accordingly and the share of labor income decreases; Berg et al.(2018) It is pointed out that as robot technology continues to mature, the cost of unit robot is lower, the share of capital in total revenue will increase, and the share of labor revenue will fall significantly.Guo Kaiming (2019) believes that there is industry heterogeneity in the impact of AI on the share of labor income.When labor-intensive industries have more output flexibility and less product substitution between production sectors, or capital-intensive industries, capital-intensive industries, or less labor income, and the direction of the industrial structure transformation and the labor income share.

The current domestic research discussion robot income distribution effect of literature, in the few literature, guo (2019) that artificial intelligence as a way of automated production, namely the process of capital replace labor, enterprises in the production task is to use labor or machine capital production, when the capital output ratio increases, the labor output ratio fell. Therefore, this process will inevitably lead to a decline in the share of labor income.Chen Lifeng et al. (2020) believe that in the short term, with the improvement of the investment efficiency of AI, the higher the promotion degree of the use scope, the greater the decline of labor income share.Zhang Gang et al. (2020) believe that the development of artificial intelligence technology will change the structure of the labor market, which will then affect the share of labor income.He Qin (2019) believes that when AI technology is applied on a large scale, the wages of senior enterprise managers increase while the underlying unemployment increases during the primary distribution process.In particular, those who have been isolated from the labor market for a long time without investing in human capital will have less and less adaptable jobs and will have lower income in the absence of social subsidies.

1.3. Cause Influence

Wang Linhui et al. (2020) analyzed from three aspects that artificial intelligence technology may induce the unequal distribution of labor, wages and income.First, while artificial intelligence technology causes the change of labor positions, it asymmetrically changes the productivity of different technical sectors. Departments with high labor productivity have higher income, on the contrary, which is affecting the distribution of labor income.Empirical research has found that AI may lead to an annual 0.75% increase in the labor income gap

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between high-and low-technology sectors.Second, the job change effect of AI technology tends to aggravate income inequality through automation in low-tech sectors and creating new jobs in high-tech sectors, while the productivity effect has threshold characteristics.Third, the income distribution effect of AI technology in capital-and non-technology-intensive areas is more prominent, and its impact on labor-and technology-intensive areas is increasing.He believes that AI will inevitably cause unequal income distribution, so it needs to deal with low-skill employment training and social security.Xie Lu (2019) from the national level analysis income gap, artificial intelligence development degree has different impact on labor income, artificial intelligence in the core technology, and widely used artificial intelligence advanced countries may get more benefits of global production and trade, and those technology underdeveloped behind may be locked in the low-end industry, in a more development disadvantage.The income gap between countries expands, even the polarization of the level of development and income distribution.

However, there are some more optimistic views in the academic community, who believe that the impact of AI and automation on labor revenue share is uncertain. Acemoglu and Autor (2011), Autor and Salomons (2019) and Fueki and Maehashi (2019) said that despite the development of AI, increased labor substitution and unemployment, such as low-skilled labor unemployment, resulting in a widening income gap.But this is only the analysis of the substitution effect, but it is not the creation effect or the productivity effect.They argue that AI development will also significantly increase labor productivity, increasing the size of companies and labor demand, and wages, and the end result may not worsen income distribution.Wang Xiongyuan and Huang Yujing (2017) decomposed the impact of AI on labor income share into the labor saving effect and labor enhancement effect of AI.On the one hand, the technological progress brought about by the application of AI technology may lead to labor savings, leading to a decline in the share of labor income. Acemoglu and Restrepo (2018) believes that labor force is replaced by mechanical equipment, resulting in the decline of labor balanced wages and labor income share; Jin Chenfei et al (2020) indicates that with the continuous application of artificial intelligence, technology dividend will replace demographic dividend, workers' wages decline and "bargaining" power is weakened, thus further reducing the share of labor income.On the other hand, the technological progress brought about by the application of artificial intelligence also has the labor enhancement effect.Acemoglu and Restrepo (2018) noted that AI may create labor-intensive tasks and increase demand for labor, offset some of the negative impact of declining labor revenue due to increased automation. Chen et al (2020) agreed that AI will create new jobs, such as equipment maintenance, with increasing competition in the AI industry.Yu Lingzheng et al. (2019) believe that although the application of robots simultaneously promotes the growth of wage rate and labor productivity, the former increases less than the latter, thus leads to the decline of labor income share; Acemoglu and Restrepo (2018) shows that the substitution effect of artificial intelligence on the negative effect and productivity effect, but the final impact on labor income share is negative.

At the same time, the influence of artificial intelligence on the share of labor income has industry heterogeneity.Some foreign studies believe that AI accelerates the expansion of factors, so the impact on labor income share is uncertain and depends on the alternative elasticity of capital and labor; Guo Kaiming (2019) By constructing a multi-sectoral dynamic general equilibrium model, the research found that the development of AI will promote the flow of production factors between different industrial sectors, and the flow direction of factors mainly depends on the difference of AI output elasticity and the alternative elasticity of AI and traditional production methods.With higher output elasticity of AI in labor-intensive industries and lower product substitution elasticity between production sectors, the increase of AI technology will reduce the share of labor income.Moreover, the effect of artificial intelligence on the share of enterprise labor income is heterogeneous among different types of enterprises.

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Jin Chenfei et al (2020) concluded that the application of AI significantly increased the share of labor income, which suppressed the greater effect on private enterprises and the positive effect on labor-intensive enterprises. Yu Lingzheng et al (2019) found that the negative effect of robot on share of labor income in good labor protection mechanism and state-owned collective enterprises.

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