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**A Study on Artificial Intelligence and Inflation: Balancing Cost-Push Pressures and
Productivity-Driven Deflation**

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Abstract

Artificial Intelligence (AI) influences the process of production, employment, distribution chains, and markets. These influences might impact prices in various ways. In the short run, AI use will drive up prices because companies must incur costs, demand for certain workers will rise, and employees will need time to adjust. However, in the long run, AI will lower prices through increased productivity, process automation, market analysis, waste reduction, improved distribution chains, and lower production costs. This paper uses a conceptual review approach and draws on prior research. The effect of AI on prices may be different across industries such as manufacturing, logistics, healthcare, and education. Whether AI increases or decreases prices depends on how quickly it is adopted, how much productivity improves, and how competitive the market is.

Keywords: Artificial Intelligence, Inflation, Cost-push inflation, Productivity, Deflation, Labour market, Supply chains, Market concentration.

JEL Classification: **E31, O33, O47, J24, D43**

INTRODUCTION

AI technology has changed from being used for specific tasks to becoming a technology that can be used in many areas. It affects production, jobs, investment, markets, and the overall economy. As firms begin using AI technologies, they could incur huge expenses for computers, software, information systems, and qualified labour. However, these costs might be offset in the future by the increased efficiency and productivity provided by AI technologies. Hence, AI might affect the connection between technology and inflation.

AI might cause short-term inflation because firms incur high costs when implementing AI technologies. Firms may need new computers, software, information systems, and qualified

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labour. Labour will need time to adapt or transition from automated jobs to other positions. Moreover, if a small number of technology firms hold a monopoly over most AI technologies, they will gain greater influence over prices.

On the other hand, AI technologies will reduce inflation by increasing productivity. It can automate tasks, improve forecasting, manage stocks and transportation better, reduce waste, and use resources more efficiently. These can reduce production costs and may lead to lower prices when there is enough competition in the market. Therefore, AI can have both inflationary and deflationary effects, and its overall effect on inflation cannot be determined by looking only at the initial cost of adopting AI.

OBJECTIVES OF THE STUDY

- To examine the channels through which AI adoption can generate cost-push inflation.
- To analyse the mechanisms through which AI-driven productivity improvements can contribute to lower production costs and prices.

REVIEW OF LITERATURE

Bareith et al. (2024) studied how AI is used to predict inflation and manage portfolios, stressing the importance of AI-driven financial decision-making as a way to protect against inflation risk. The study emphasises AI's ability to stabilise financial markets and reduce inflationary risk. This view is consistent with the finding that AI's application is not limited to production and pricing.

Doerr et al. (2024) examined the sectoral effects of AI adoption on inflation and growth, showing that AI boosts investment and productivity but affects inflation differently depending on what firms and households expect. This is consistent with the study's hypotheses about a J-shaped curve, in which case the effect of AI is inflationary at first but eventually leads to a price decline. Nevertheless, there is another significant element that is brought into the discussion, which is called "sectoral heterogeneity". The paper concludes that the deflationary effect of AI works more efficiently in consumer goods industries than in investment goods.

Jabari et al. (2024) explore the macroeconomic effects of AI, focusing on how it improves economic stability through better decision-making and efficiency. The research shows that AI can help optimise economic planning, cut costs, and even avoid financial crises. The research identifies the deflationary effects of AI and builds on this idea by showing how AI can improve macroeconomic governance. The research does not consider the duality of inflation and deflation but instead focuses on how AI helps the economy withstand instability.

Sood et al. (2024) investigate the implications of AI for economic inequality, labour force structure, and economic growth. These results are in line with the authors' claim that the labour market disruption caused by AI leads to an increase in inflation pressure in the initial stages. Nevertheless, the authors highlight the point that the impact of AI can cause an increase in income inequality and, thus, results in the persistence of inflationary effects. It is in line with the AI-induced wage inflation among high-skilled occupations; however, it is more specific as it highlights the negative long term social and economic consequences of the highlights the negative long-term social and economic consequences of the unequal distribution of AI technology. It indicates that the deflationary effect of AI will not be evenly distributed, thus hampering AI's long-term influence on price stability.

Yusuf et al. (2024) develop a new theoretical approach that treats AI as a separate component of production, apart from labour and capital, and analyse its influence on macroeconomic variables such as inflation, GDP, and unemployment rates. The analysis made by the authors through the case of Sweden proves that AI can help to overcome labour shortages and ensure the steady growth of the economy in the face of demographic changes. In contrast to the approach presented by the researcher considers AI as a stabilising element rather than a disruptive one. Although AI poses threats of monopolisation and job losses, AI-driven growth can offset these problems. Thus, the researcher's arguments suggest that AI may not become a permanent source of inflationary pressure in the economy.

RESEARCH GAP

The reviewed literature on AI and macroeconomic developments covers a range of topics, including inflation forecasting, growth and productivity, inequality, financial stability, labour shortages, and macroeconomic governance. Nevertheless, some of the studies discussed do not consider the coexistence of the cost-push and productivity effects on price levels. Another gap is sectoral heterogeneity, as AI can significantly reduce costs in certain sectors but generate smaller or delayed price effects in those that require human interaction.

RESEARCH METHODOLOGY

This study uses a conceptual review-based approach. In this study, the claims in the paper have been classified into two main streams:

- (i) Cost-push inflation caused by Artificial Intelligence and Economic Restructuring
- (ii) Productivity deflation caused by efficiency gains.

The literature review supports these claims.

AI AND COST - PUSH INFLATION

AI is causing cost-push inflation, as seen in its high installation costs, impact on the labour market, and monopolisation. Implementing AI requires costly investments in technology, software, and expertise, which firms can pass on to consumers through higher prices. This trend is similar to other technological advancements in which costs temporarily outweighed productivity gains before driving inflation.

Furthermore, AI-driven automation leads to job losses for many people whose jobs can be automated. Although this could lower labour costs in the future, it has more complicated impacts in the short run. With job loss, many workers cannot find jobs, increasing structural unemployment and income disparity. Increased demand for AI specialists leads to wage inflation in some areas and lower wages in others.

Another key concern is AI's effect on market structures. In this case, a few large technology corporations tend to develop and implement AI technologies. This results in market concentration, since a small number of firms controlling certain industries can use their power to set prices. This is the case in industries such as cloud computing and AI-based automation, where a few firms control prices. AI-induced monopolies can cause cost-push inflation by restraining price competition. While the above arguments suggest that AI causes inflation,

technology adoption is dynamic; moreover, the idea that short-term AI costs imply long-run inflation ignores precedents where disruptions in technology adoption led to deflation.

AI AND PRODUCTIVITY DRIVEN DEFLATION

AI's long-term deflationary effects stem from its ability to increase productivity, optimise supply chains, and reduce labour dependence. Automation allows firms to produce goods and services more efficiently, reducing production costs and lowering prices. Unlike other capital investments, machine learning continues to improve, creating deflationary pressure. Predictive analytics, autonomous logistics, and demand forecasting are some ways AI contributes to deflation by optimising supply chains. As companies use AI to become more efficient, prices fall because input costs decrease.

Past examples, such as the mechanisation of agriculture and the digital revolution, show that although technologies initially shake up markets, they eventually result in lower costs and greater efficiency. Nonetheless, the argument that artificial intelligence will lead to deflation everywhere ignores industry differences. Industries do not benefit equally from the cost savings of AI. AI technology reduces costs in manufacturing and logistics, but industries involving personal interactions may see minimal productivity gains. Government regulation of AI-created monopolies and worker retraining can spread the effects of AI-driven deflation.

BALANCING INFLATIONARY AND DEFLATIONARY PRESSURES

Nevertheless, the key problem remains: which force - cost-push inflation or productivity-based deflation - will prevail in the long term? Empirical observations suggest a J-curve effect in which AI generates inflation first, then leads to long-term deflation. Such behaviour of AI corresponds to the dynamics observed during previous technological revolutions, including industrial automation and digitalisation, when the process of disruption was followed by productivity improvements.

However, the transition from inflation to deflation poses economic challenges. If inflation lasts longer than expected because of rigid labour markets and monopolisation, central banks will struggle to control inflation expectations. On the other hand, if deflationary pressure prevails too soon, the economy will see declining wages and demand, requiring additional measures to sustain economic stability.

In general, the challenge for policymakers is how to manage the inflationary period of the AI transition and ensure that its deflationary benefits are distributed widely enough. To do this, governments need to invest in developing the skills workers need to cope with displacement and implement regulations that prevent AI monopolisation, ensuring efficiency gains translate into lower consumer prices rather than excessive corporate profits. Central banks, meanwhile, must reassess their inflation targets in an AI-driven economy, balancing short-term inflation risks with long-term deflationary trends.

ANALYSIS

Overall, this study attempts to explain AI's dual effect on inflation through cost-push inflation and productivity-driven deflation. While acknowledging AI's initial inflationary effects from investments in AI development, job losses, and monopolistic characteristics, the study argues that the long-run effect will be deflationary due to higher efficiency, supply chain optimisation, and lower production costs. Therefore, this study gives a thorough review of both

inflationary and deflationary effects of AI. In comparison with the reviews analysed in this work, the analysis is more comprehensive because it addresses cost-push inflation and productivity-driven deflation, while the reviews add additional dimensions – financial stability, sectoral specifics, economic inequality, and labour market transformations. This means that although the analysis effectively highlights the risks of market monopolisation and AI-driven inflation, incorporating ideas from these reviews will help the author strengthen his argument. The interaction of AI with labour markets and economic regulation is an important area for further research because the deflationary effect of AI's efficiency gains will depend largely on how economies cope with technological transformation.

SUGGESTIONS

Based on the discussion, the following suggestions can help manage the possible effects of AI on inflation.

- Government should promote investment in AI which is productive and contributes to enhancing productivity through adoption of AI.
- Skill development programs should be initiated to enable workers to cope with AI changes.
- Government should enhance digital infrastructure and ensure that there is widespread access to AI technologies.
- Policymakers should keep track of the impacts of the adoption of AI on the cost of production and pricing to detect both inflationary and deflationary impacts of the adoption of AI.
- Policymakers should foster competition within the AI industry and avoid domination of AI technologies by a handful of firms.
- Governments should assist small businesses to adopt AI technologies so that the benefits of higher productivity are available to a wider range of firms.

FINDINGS AND CONCLUSION

The influence of AI on inflation cannot be characterised as purely inflationary or deflationary; it is a complex, dynamic phenomenon shaped by investment, labour-market shifts, and market structure. While artificial intelligence can cause cost-push inflation through the high costs of implementation and labour-market disruption, in the long run it is expected to have a deflationary effect on the economy by increasing productivity and lowering production costs. Nevertheless, the shift from inflationary to deflationary effects is not guaranteed.

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