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Human capital, unemployment, FDI, labor productivity and gross domestic product

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ABSTRACT

The economic performance of a country can be evaluated by looking at Gross Domestic Product, which is considered one of the most significant measurement. The factors that drive economic growth are Human Capital, Unemployment, FDI, and Labor Productivity. China, Japan, South Korea, India and Australia have important roles not only in their strategic location but also rapidly developing into regional economic centers in the world. The purpose of this study was to analyze the effect of Human Capital, Unemployment, FDI, Labor Productivity on Gross Domestic Product in these countries of China, Japan, South Korea, India and Australia using cross section data for 10 years from 2010 to 2019. The results show that Human Capital and FDI have a positive and significant effect on Gross Domestic Product. While other variables have no significant effect on Gross Domestic Product. These findings show that the key factors influencing economic growth are investments in education, training, human resource development, and foreign direct investment.

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1. INTRODUCTION

The relationship between human capital, unemployment, foreign direct investment (FDI), labor productivity, and gross domestic product (GDP) is a complex and interconnected one that has been extensively studied in recent years. Human capital, which encompasses the knowledge, skills, and abilities of individuals, plays a crucial role in attracting FDI and driving economic growth (Anetor, 2020). Countries with higher levels of human capital tend to attract more FDI, which in turn can lead to increased economic growth. Additionally, the interaction between FDI and human capital has been shown to have a positive effect on economic growth, highlighting the importance of investing in education and skills development (Petrović-Ranđelović et al., 2020). Countries that invest in improving labor productivity through skills development and technological advancements tend to experience higher levels of economic growth and prosperity. Overall, the relationship between human capital, unemployment, FDI, labor productivity, and GDP is multifaceted and requires a comprehensive understanding of how these

factors interact with each other. Investing in human capital development, creating employment opportunities, attracting FDI, and enhancing labor productivity are essential components for sustainable economic growth and development.

China, Japan, South Korea, India and Australia have important roles in the regional and global region, apart from having a very strategic location and big markets. They are seen as very competitive, and are considered globally due to geopolitical and geoeconomic shifts in Asia and Australia due to increased competition in trade wars between countries. These countries entered into a free trade agreement called the Regional Comprehensive Economic Partnership (RCEP). Along the way, this organization received neutral or negative reactions from other parties, with some analysts saying that the economic benefits of this trade agreement were not very large (Estrades et al., 2023; Jin et al., 2024; Mahadevan & Nugroho, 2019; Wong, 2020).

The Gross Domestic Product of the five developed countries in Asia and Australia shows varying trends, but GDP growth in these five countries actually shows a declining trend, especially in the last 3 years. Even though China has shown an increase in Gross Domestic Product, but GDP growth in the last 3 years has decreased.

Increasing Human Capital and Labor Productivity will be suspected lead to increased economic growth and be able to compete with other countries in the midst of globalization, because these countries are very competitive in terms of increasing efficient and effective production and increasing a more productive workforce, as was the goal of establishing the economic community that are creative and skilled workers who can increase productivity in a country which will ultimately affect the economic growth of a country. (Zhang et al., 2023) found that the improvement of the human capital leads to convergence in economic growth in regions of China and it can give an explanation of the differences in economic growth in different China's provinces level. Unemployment is also considered an important determinant of economic growth, as it affects the utilization of labor resources and overall productivity. Foreign direct investment (FDI) is another important factor that can influence economic growth, as it can bring in new technologies, resources, and knowledge to the host country, leading to improved productivity and competitiveness.

Several previous studies have different opinions regarding the influence of human capital, unemployment, FDI, labor productivity on economics growth. Studies by (Doré & Teixeira, 2023; Indrajaya, 2021; Shaban & Khan, 2023; Sultana et al., 2022; Zhang et al., 2023) report that human capital has a positive and significant influence on economic growth. On the other hand, (Delgado et al., 2014; Maasoumi et al., 2007) state that human capital doesn't have a significant effect on economic growth. Unemployment (UMP) has no significant effect on economic growth by the researches of (Ardin, 2023; Indrajaya & Iskamto, 2023; Mura et al., 2020; Pasara & Garidzirai, 2020). But (Niken et al., 2023; Rahman et al., 2023; Razia et al., 2023) reveal a significant effect and relationship among unemployment and GDP. Labor productivity (LP) has a significant effect on economic growth (Indrajaya, 2021; Yu et al., 2024). However, (Emsina, 2014) findings argue that there are weak or no relations between productivity increase and economic growth. (Faisal et al., 2021; Indrajaya, 2021; Jiao et al., 2024; Magazzino & Mele, 2022; Triatmanto et al., 2023) suggest that FDI has a positive and significant effect on economic growth, but (Ridha & Budi, 2020) states that FDI has no significant effect on economic growth.

Based on the background and problems that have been described previously, this research will confirm differences of opinion regarding the influence of human capital, unemployment, FDI, and labor productivity on economics growth. Therefore, research on how the effect of those variables on economic growth needs to be done. It can be formulated a form of problem that will be examined in this study is how do human capital, unemployment, FDI, and labor productivity affect GDP in China, Japan, South Korea, India and Australia in 2010-2019?

2. RESEARCH METHOD

We know that there is a gap between education, skills or expertise, and health in countries that are members of several Asian countries and Australia. Although in terms of productivity some countries have increased, this is difficult to escape from problems related to labor, so that it has an impact on many considerations that must be considered by the government in making a policy in the field of employment.

The hypothesis can be formulated as follows: (1). Human Capital of these countries have a positive effect on economic growth; (2). Unemployment of these countries have a negative effect on economic growth in China, Japan, South Korea, India and Australia; (3). Foreign Direct Investment (FDI) of these countries have a positive effect on economic growth in China, Japan, South Korea, India and Australia; (4). Labor productivity of of these countries has a positive effect on economic growth.

By researching the effect of labor productivity on economic growth in China, Japan, South Korea, India, and Australia, the research model uses the following equation:

$$LnGDP_{it} = \alpha + \beta_1 LnLP_{it} + \beta_2 LnFDI_{it} + \beta_3 UMP_{it} + \beta_4 HC_{it} + \varepsilon_{it}$$

Notes:

$LnGDP$ = Natural Logarithm of Gross Domestic Product
$LnLP$ = Natural Logarithm of Labor Productivity
$LnFDI$ = Natural Logarithm of Foreign Direct Investment
UMP = Unemployment
HC = Human Capital
ε = Error Term
i = Cross section data of 5 countries
t = Time series data year of 2010-2019

The type of data used in this study is secondary data, obtained from the World Bank, UNDP, and the ILO. The data is presented in panel data which is a combination of 10-year time series data from 2010 to 2019 and cross section data from 5 countries China, Japan, South Korea, India, and Australia can be seen in table 1.

Table 1. Data Types and Sources

Data	Type	Unit	Data Source
Gross Domestic Product	GDP	US$	World Bank
Labor Productivity	LP	US$	ILO
Foreign Direct Investment	FDI	US$	World Bank
Unemployment	UMP	% Population	World Bank
Human Capital	HC	% Population	World Bank,UNDP

3. RESULTS AND DISCUSSIONS

The condition of GDP in China, Japan, South Korea, India and Australia can be seen below.

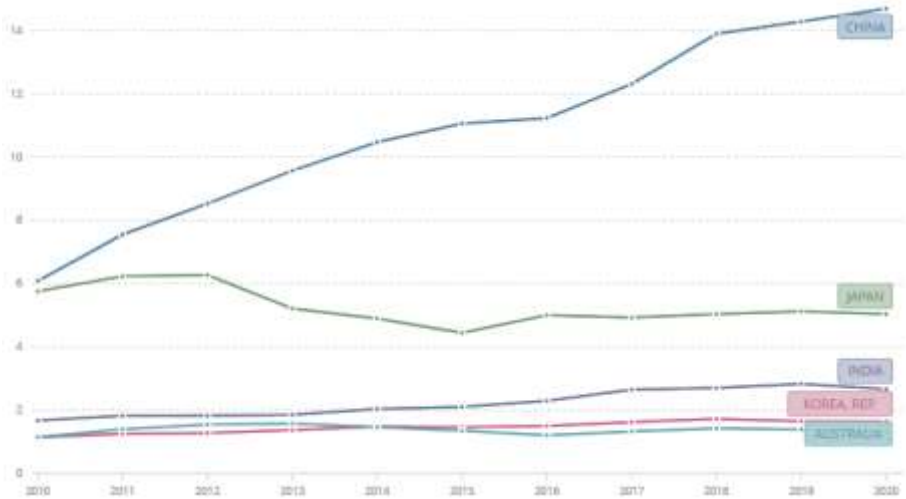

Figure 1. Gross Domestic Product (current US$)

Based on Figure 1, the Gross Domestic Product of the five developed countries in Asia and Australia shows varying trends, but GDP growth in these five countries actually shows a declining trend, especially in the last 3 years. Even though China has shown an increase in Gross Domestic Product, but GDP growth in the last 3 years has decreased.

This study also uses descriptive analysis to describe and facilitate the interpretation of secondary data through the help of tables and graphs. To achieve the first objective in this study, an exploratory descriptive analysis was used to provide an overview of the condition of labor productivity in China, Japan, South Korea, India, and Australia from 2010 to 2019.

Table 2. Descriptive Statistics

	GDP (US$)	FDI (US$)	HC (%)	LP (US$)	UMP (%)
Mean	4.17E+12	6.99E+10	0.819180	56981.56	4.469040
Median	2.07E+12	3.95E+10	0.897500	73478.10	4.560000
Maximum	1.43E+13	2.91E+11	0.944000	98581.30	6.080000
Minimum	1.14E+12	5.47E+08	0.579000	12105.70	2.400000
Std. Dev.	3.71E+12	8.62E+10	0.126286	32364.97	1.019653
Skewness	1.302471	1.516778	-0.660166	-0.273076	-0.443076
Kurtosis	3.620343	3.754975	1.797724	1.325561	2.061527
Jarque-Bera	14.93864	20.35927	6.643218	6.462557	3.470827
Probability	0.000570	0.000038	0.036095	0.039507	0.176327
Sum	2.09E+14	3.49E+12	40.95900	2849078.	223.4520
Sum Sq. Dev.	6.73E+26	3.64E+23	0.781465	5.13E+10	50.94495
Observations	50	50	50	50	50

Labor productivity conditions in several countries in Asia and Australia for the period 2010 to 2019 tend to fluctuate, however, Australia has the highest labor productivity value with an average of 98,581 (US$) in 2019 and South Korea with a productivity value the lowest, with a labor productivity of 12,105 (US$) in 2010.

Foreign Direct Investment in several countries in Asia and Australia for the period 2010 to 2019 has mean of 69.9 billion US$. While GDP, HC, and unemployment have mean of 4.17 trillion US$, 0.82%, and 4.47% respectively in several countries in Asia and Australia for the period 2010 to 2019.

Table 3. Model Fit Test

Test	Indicator	Value	Hypothesis
Chow Test	Chi-Square statistics	49.072873	H_0 rejected
	Probability	0.0000	Fixed Effect Model
Haussman Test	Cross-section rand.	68.402040	H_0 rejected
	Probability	0.0000	Fixed Effect Model

Based on table 3, the values of probability of the tests are 0.000 (< 0.05) so the best model to use is the FEM. The next is panel data estimation model by OLS, FEM, FEM with GLS (Generalized Least Square) weight, and REM method shown in the following table.

Table 4. Result of Model Estimation

	OLS	FEM	REM	FEM with GLS Weight
HC	-315.4975** (113.8758)	996.6169** (317.4836)	-315.498** (73.03399)	697.5553* (295.5087)
LnFDI	5.559341** (1.990716)	2.684699 (2.087623)	5.55934** (1.276741)	3.070246* (1.993877)
LnLP	49.50464* (19.37425)	-42.21340 (37.61812)	49.5046** (12.42563)	-13.14232 (35.48632)
UMP	-9.174027** (2.284520)	4.438014 (3.448581)	-9.17403** (1.465172)	1.912560 (2.883576)
Constant	-326.3705* (149.4232)	-409.7049* (178.6773)	-326.37** (95.83223)	-474.2643** (170.6173)
R-Squared	0.288698	0.733429	0.2887	0.769225

Based on the table 4, FEM with GLS weight or Fixed Effect Model with weighting in cross-section data shows the biggest R-square value. The results of the three models are relatively consistent, so we can conclude that the best model of the three models is FEM with GLS weight.

Human Capital (HC) in table 4 has a significant positive effect on GDP in the observed countries. The coefficient value is 697.55, which means, with an increase in Human Capital of 1%, it can increase GDP by 697.55%. The estimation results are in accordance with research by (Doré & Teixeira, 2023; Indrajaya, 2021; Shaban & Khan, 2023; Sultana et al., 2022; Zhang et al., 2023) which show that human capital has a positive and significant influence on economic growth. The positive influence is caused by human capital being included as one of the input factors in the production function, the accumulation of human capital can obtain positive externalities so that in the future it can be more productive. This has an impact on endogenous growth, accumulation of human capital resulting in higher innovation and more research and development. Authority should pay attention to focus on education and human resource development.

The estimation results prove that FDI has a significant effect on GDP in the observed countries. This result is in line with the result by (Faisal et al., 2021; Indrajaya, 2021; Jiao et al., 2024; Magazzino & Mele, 2022; Triatmanto et al., 2023) which suggest that it can have a positive and significant effect on economic growth, but it's not in line with the research of (Ridha & Budi, 2020). Economic growth is seen from the positive side of FDI, because there is foreign investment that can be used as a means of structural improvement such as infrastructure, office buildings, roads, and investment to

increase production capacity. In addition, foreign investment also helps reduce unemployment because foreign investment costs can be used as a means to create new jobs for local workers or allocated as a form of increasing human resources through education.

Labor productivity (LP) has no significant effect on economic growth in the observed country. This estimation result is not in line with research by (Indrajaya, 2021; Yu et al., 2024) which shows that the relationship between technology and labor productivity, and finds that technology that enables higher labor productivity can significantly increase economic growth. The positive influence on labor productivity can be seen from the increase in productivity which has an impact on increasing living standards through increased output so that there will be an increase in Gross Domestic Product (GDP) and an increase in economic growth.

Unemployment (UMP) has no significant effect on economic growth in China, Japan, South Korea, India and Australia with a probability value of 0.51 and a coefficient value of -0.03. The estimation result is in line with the research of (Ardin, 2023; Indrajaya & Iskamto, 2023; Mura et al., 2020; Pasara & Garidzirai, 2020) but it's not in line with (Niken et al., 2023; Rahman et al., 2023; Razia et al., 2023) that reveals a significant relationship among unemployment and GDP.

4. CONCLUSION

Overall economic growth is influenced by the independent variables in this study by 76.9%. The estimation results of panel data show that human capital and FDI have a positive and significant effect on economic growth in the countries in this study, while unemployment, and labor productivity have no significant effect on economic growth in China, Japan, South Korea, India and Australia. The implication of this research is that investment in human resource development (Human Capital) has a significant positive impact on Gross Domestic Product (GDP) in the countries observed. This shows the importance of efforts to improve the quality and skills of the workforce as a strategy to accelerate economic growth. These findings show that the key factors influencing economic growth are investments in education, training and human resource development. Therefore, governments and organizations may have to prioritize policies that improve the quality and quantity of the workforce through effective education and training programs.

Foreign investment (FDI) which has a positive and significant impact on a country's GDP (Gross Domestic Product) indicates that investment from abroad has made an important contribution to economic growth. FDI usually means investment in infrastructure, technology and human resources. This can result in increased production of goods and services, which in turn increases overall economic output as measured by GDP. Foreign investment often creates new jobs, either directly or indirectly. This can reduce the unemployment rate and increase household income, which in turn can increase domestic consumption and investment. FDI often brings new technology, management, and more efficient business practices into the country. This can increase the productivity and competitiveness of domestic industry, which will ultimately contribute to GDP growth. FDI can create a more attractive environment for domestic investors by increasing economic confidence and stability. This can encourage more domestic investment, which will also have a positive impact on economic growth and GDP. Foreign investment often opens up access to global markets for domestic companies, allowing them to increase exports and expand their market share. This can generate additional income that will contribute to GDP growth.

Increasing labor productivity does not have a significant effect on GDP, which shows that there are challenges in increasing labor productivity and creating jobs which have an impact on economic growth. This may require more specific policies to improve

production efficiency and create a business environment that supports job growth. Lastly, although the unemployment rate does not have a significant effect on GDP in this study, attention to unemployment remains important in the context of social welfare and economic stability. High unemployment rates can cause serious social and economic problems.

The contribution of this research is to provide deeper insight into the factors that influence economic growth in the countries observed, so that it can help policy makers in designing more effective strategies to encourage sustainable economic growth. It is necessary for the country's government to increase the human capital of the local workforce by developing skills and expertise, good discipline, high work ethic, creative, innovative, and knowledge attitude, and conduct coaching so that the work environment remains in a healthy condition to spur the performance of the workers. It is necessary for the country's government to increase FDI because it can produce various positive impacts on a country's GDP. First, FDI can increase investment in infrastructure, industry and other sectors that support economic growth. This can create new jobs, increase production of goods and services, and increase people's income. Second, FDI can also bring new technology and knowledge into a country. This can increase production efficiency, expand technical and managerial capabilities, and increase the competitiveness of national industry in the global market. Thus, FDI not only increases economic output directly through financial investment, but also improves the quality and productivity of the economy as a whole. Third, FDI can expand access to global markets for local companies through partnerships or joint investments with multinational companies. This can help increase exports and expand the company's market share on an international scale, which in turn can increase the company's revenue and contribution to the country's GDP. Thus, increasing FDI can be an important strategy for the government in accelerating economic growth and increasing a country's competitiveness in the global market, which will ultimately have a positive impact on GDP and the overall welfare of society.

It is also necessary to take other countries as lessons learned with consistent labor productivity, both in terms of planning and budgetary support that has succeeded in building a highly competitive workforce. The government also needs to take a holistic approach that can be proposed for human capital management in China, Japan, South Korea, India and Australia to have a common vision, goals, and strategies to maximize the potential of its human resources. Should launch and implement specific policies and programs appropriate to their own context and needs that can have a positive effect on increasing human capital on economic growth in China, Japan, South Korea, India and Australia.

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