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The role of social variables on growth in South of Sumatera: A dynamic panel data analysis

Riska Putri Meilinda and Mahrus Lutfi Adi Kurniawan*

Universitas Ahmad Dahlan, Indonesia

*Correspondence email: mahrus.kurniawan@ep.uad.ac.id

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ABSTRACT

Policy makers in all countries have an orientation towards economic growth and identify the factors that influence growth. This study applies social variables in the economic growth model, this is inseparable from the views of classical and neoclassical economists that human resources play an important role in economic growth. The research gap is applying short-term and long-term estimates of social variables to the economic growth model in South Sumatra Province. Research using dynamic panel data on the GMM system. The results showed that the human development index (HDI) as a proxy for human capital has a positive effect on economic growth in the short and long term, another result, the labor force, unemployment and poverty consistently have a negative effect on growth in South Sumatra Province in the short and long term. The implication of this research is to improve the quality and quantity of education and health facilities and policy for education to improve cognitive skills because it can produce a labor force with high skills. Sustainable fiscal policy and pro-poor visions and encouraging investment to create more jobs.

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INTRODUCTION

Policy makers in all countries have an orientation towards economic growth and identify the factors that influence economic growth. Analysis of the determinants of economic growth has been developed by many previous researchers. Solow (1956) states that apart from capital and labor, technological progress has a significant contribution to growth. Nelson & Phelps (1980) stated that education is an important element in improving human resources and technology performance in the role of economic growth. Barro (1991) applied cross-sectional analysis to economic growth and showed that economic growth has a positive correlation with human capital,

besides that a country that has a high level of human capital will have a low fertility rate. and has a high level of investment to GDP ratio.

Economists from neoclassic to the early 1990s research shows that human capital has an important role in economic growth. Teixeira & Fortuna (2010) with a cointegration approach analyzing long-run growth in Portugal shows that human capital and R&D have an important role in long-run growth. In addition, human capital has a stronger direct effect on productivity levels than R&D on productivity. Research by Sultana et al. (2022) which uses 141 developing and developed countries, shows that human resources play an important role in economic growth, especially in developing countries through life expectancy,

whereas in developed countries life expectancy hinders economic growth due to population levels. increasing old age and dependency ratio. Teixeira & Queirós (2016) state that human capital has a direct effect on economic growth because individuals who have a better level of education will become more productive and innovative so they can create new products and increase their productivity. Hanushek (2013) states that developing countries have been able to reduce the gap in education levels with developed countries, but several recent findings underscore the importance of cognitive skills to be able to increase economic growth.

The Wealth of Nation, The essay from the classical economist, Adam Smith, stated that the population is a necessary source of labor force in development, even though its role is passive. Although Adam Smith's socio-economic views are at a certain age and economic theory has undergone many developments and adjustments, his views have made a major contribution to understanding the economy and human resources. The role of human capital can be analyzed from two perspectives. In a micro perspective, human capital is seen as part of the individual production function related to the quality of human resources. In a macro perspective, the contribution of human capital is analyzed through the accumulation of a micro perspective and becomes part of national economic development. This economic development reflects an increase in welfare which can be seen from an increase in the level of gross regional domestic product (Utami, 2020).

The discussion above shows the important role of human capital in economic growth. Broadly speaking, development indicators are basically divided into economic indicators and social indicators which include human development. There is a measuring tool called Human Development Index (HDI) which was introduced by United Nations Development Program (UNDP) which is used to measure the quality of human resources. Research using the HDI variable as a proxy for human capital has been widely developed in Indonesia (Utami, 2020; Sari et al., 2020; Prameswari et al., 2021; Kusumawati et al., 2021; Alkhoiriyah & Sa'roni, 2021; Rorimpandey et al., 2022). The use of HDI as a proxy for human capital has advantages because HDI components include life expectancy, the average number of years spent in education, and spending per capita.

This research relates to the research of Bean & Pissarides (1993) and Chen et al. (2016) who investigated the effect of unemployment on economic growth in the long term. The issue of the effect of unemployment on growth is growing because in recent years there has been a change in the direction of economic policy from the industrial sector, namely the change from labor-intensive to capital-intensive. The application of the unemployment variable in the growth model is based on Eriksson (1997) which states that technological change, capital accumulation and economic growth can create unemployment in the short term, this is reinforced by research by Schubert & Turnovsky (2018) which states that the tradeoff between unemployment and growth weak in the long term while the tradeoff in the short term is stronger.

Research on the relationship between unemployment and growth in Indonesia has been developed by many previous researchers (Septiatin et al., 2016; Novriansyah, 2018; Yanti et al., 2020; Arifin & Fadlan, 2021; Fajri & Iriani, 2022). The research that has been developed does not explain short-term or long-term estimates, this does not explain in detail the tradeoff of unemployment and growth in the short or long term. Chen et al. (2016) emphasize the nature of unemployment to growth which has a negative relationship, but it is necessary to explain further about this relationship through short-run and long-run estimation. Schubert & Turnovsky (2018) explained that the tradeoff of unemployment and growth that occurs in the long term can be based on structural changes in the economy. The original research on unemployment and growth from Okun (1962) stated that there is a relationship between unemployment and growth and vice versa.

Research contribution to literature and as a gap in previous research through 3 criteria: (i) research examines the opinion of the classical economist Adam Smith regarding the role of the labor force and human resources in the model of economic growth; (ii) research using short-term and long-term estimates, where research using these two estimates is still very few in Indonesia, this is an important aspect of research to determine the nature and sensitivity of the variables used in the economic growth models; (iii) the research was conducted in regencies and cities in South Sumatra Province, where the region has consistently increasing HDI values, so that there is equality of community access at the levels of education, health and increased income.

Another contribution from the research is the application of control variables on the labor force and poverty levels in South Sumatra Province. The labor force variable is used to test Adam Smith's hypothesis of the extent of the role of the labor force in economic growth. The role of the work force can produce inconclusive conclusions, where research by Lubis (2014) and Haq & Yuliadi (2018) shows that the work force has a positive effect on economic growth, the opposite result from research by Ma'ruf & Wihastuti (2008) and Sodik (2009). There is controversy over the use of poverty variables in economic growth models (Ravallion, 2001; Dollar & Kraay, 2004) but there is agreement that economic growth can reduce poverty levels. Under certain conditions economic growth is not sufficient to alleviate poverty (Kraay, 2006; Hazmi et al., 2022) and other findings indicate that high poverty rates can exacerbate conditions for economic growth (Rahmadi & Parmadi, 2019; Amponsah et al., 2023).

RESEARCH METHOD

This study combines time-series and cross-sectional data in the Province of South Sumatra. The cross-sectional data consists of 15 districts and cities out of 17 and leaves 2 districts and cities which are divisional districts to reduce the problem of bias in estimating models in the long term and time-series from 2010-2021. By combining time-series and cross-section data, panel data is used. The method used for panel data follows Arellano & Bond (1991) and Blundell & Bond (1998) with a total of 180 observations. The specification of the research model follows the research of Teixeira & Queirós (2016) on cross-country analysis and is modified at a smaller level, namely district and city. The equation can be written as follows:

$$y_{it} - y_{it-1} = \alpha y_{it-1} + \beta X'_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Equation (1) can be written as:

$$y_{it} = \alpha_1 y_{it-1} + \beta X'_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

Where $\alpha_1 = 1 + \alpha$ is conditional convergence factor. Specifically, the research model can be written as follows:

$$y_{it} = \alpha_1 y_{it-1} + \beta_1 HDI_{it} + \beta_2 LF_{it} + \beta_3 UNEM_{it} + \beta_4 POV_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Where y adalah growth, HDI is human development index as proxy for human capital, LF is labor force, UNEM is unemployment rate, POV is poverty rate. All

data is sourced from the Central Bureau of Statistics (BPS) of South Sumatra Province. In this study, the GMM estimation system was applied. So there is a lag in the dependent variable. GMM panel data cannot be applied if there are still autocorrelation problems in the model (Teixeira & Queirós, 2016). To overcome this problem, the Arellano-Bond test is applied for first-order (AR(1)) and second-order (AR(2)). The use of first-difference in the model shows that there is no serial correlation problem in which the model is valid (Arellano & Bond, 1991).

RESULT AND DISCUSSION

Human Development Index and Growth

Figure 1 shows the economic growth and HDI rate in South Sumatra Province which explains the different patterns. The decline in economic growth in 2015 and 2016 was followed by an increase in the HDI rate and an increase in economic growth in 2016-2018 followed by a decrease in the HDI rate. The same pattern occurred during the Covid-19 crisis where there was a decline in economic growth and the HDI rate in the province of South Sumatra.

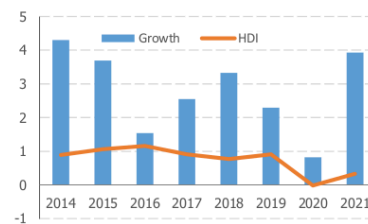


Figure 1. Pattern for human development index and growth in South Sumatera, 2014-2021

The HDI concept used by the Central Statistics Agency (BPS) applies 4 components, namely life expectancy, literacy rate, average length of schooling and purchasing power. Based on data shows that there has been an increase in literacy rates, number of schools, number of health facilities and purchasing power in South Sumatra Province. The increase in the number of schools occurred at all school levels.

These findings do not guarantee that an increase in the HDI component can improve economic conditions, in line with Hanushek (2013) that an increase in the number of schools in developing

countries does not guarantee an increase in economic conditions. Hanushek (2013) compares OECD countries and developing countries, the main findings show that there is a strong demand for labor with basic skills and weak demand for high skills in developing countries and the results are in contrast to OECD countries, this is due not to the different number of schools and health facilities, but to the quality of education, the increase in soft skills and cognitive skills in OECD countries which are more advanced than developing countries. However, infrastructure development in the education and health sector must continue because it can provide convenience for the community in accessing education and health and according to Amponsah et al. (2023) with the right policies, infrastructure in education and health can boost economic growth through productivity levels in the long term.

Factors Affecting Economic Growth

Table 1 on the pooled model shows that there are 3 variables that influence economic growth in South Sumatra, namely the human development index with a positive coefficient value indicating that the higher the level of human development index, the economic growth will increase. At the labor force level, it shows a negative coefficient value, which means that an increase in labor force will reduce the level of economic growth in South Sumatra Province. These

results support Hanushek (2013) statement about increasing cognitive skills needed to increase productivity and in several developing countries the direction of education policy has not yet been implemented. touches related to cognitive skills so that absorption of workers with high skills is weak. Another result in pooled OLS is that there is a bias in the poverty variable which has a positive coefficient value on economic growth in South Sumatra Province.

Also, Table 1 presents static model panel data on the fixed effect and random effect models. To get more comprehensive results on the model of economic growth and the application of social variables in South Sumatra Province, the researchers applied dynamic panel data to the GMM system. GMM system panel data applies a lagged dependent variable to reduce orthogonally problems, or situations where there is no correlation with values error term. With no correlation with valueerror term it will produce consistent parameters. The study spanned 12 years so applied time-effect and autocorrelation tests on GMM system models. According to Arellano & Bond (1991) the GMM system model requires an autocorrelation test to eliminate time-effect problems in the model, the AR test (2) has a probability value of > 5%, this means that the GMM system model is free from autocorrelation problems (Schubert & Turnovsky, 2018)

Table 1. Factors Affecting Economic Growth

Variables	Pooled (PLS)	FEM	REM	Sys GMM
Growth-1				0.8134 (35.85)***
Human development index	0.0705 (3.72)***	0.0799 (26.01)***	0.0800 (35.74)***	0.0102 (4.87)***
Labor Force	-0.0401 (-2.96)***	0.0001 (0.17)	0.0001 (0.14)	-0.0006 (-1.71)*
Unemployment rate	-0.0268 (-0.65)	-0.0044 (-1.43)	-0.0045 (-1.43)	-0.0094 (-3.35)***
Poverty rate	0.1671 (6.05)***	0.0003 (0.06)	0.0007 (0.14)	-0.0050 (-3.37)***
Constanta	5.1727 (2.93)***	3.8378 (19.03)***	3.8294 (12.16)***	1.2620 (10.01)***
Diagnostic Tools				
Time Effect		YES	YES	YES
No of Observation	165	165	165	150
Hausman		YES		
Wald Test			0.0000***	0.0000***
AR(1)				0.0091
AR(2)				0.5911

***, **, and * indicate the statistically significant level 1%, 5% and 10% respectively; Pooled Least Square (PLS), Fixed Effects Model (FEM), dan Random Effects Model (REM)

Table 2. Factors Affecting Economic Growth in Short and Long Run Estimation

Variables	Dynamic Panel on Short Term	Dynamic Panel on Long Term
Growth_1	0.8134 (35.85)***	
Human development index	0.0102 (4.87)***	0.0545 (9.03)***
Labor Force	-0.0006 (-1.71)*	-0.0034 (-1.69)*
Unemployment rate	-0.0050 (-3.37)***	-0.0267 (-3.23)***
Poverty rate	-0.0094 (-3.35)***	-0.0505 (-3.49)***
Cons	1.2620 (10.01)***	

***, **, and * indicate the statistically significant level 1%, 5% and 10% respectively.

Table 2 shows that the dynamic panel results on the HDI variable have positive coefficient values in both the short and long term, which means that an increase in HDI will increase economic growth in South Sumatra Province. A higher increase occurs in the long term with a greater long-term coefficient value than the short term. The HDI components, namely in the education, health and income-generating sectors, are the driving force in increasing economic growth. The importance of education lies in its ability to increase the capacity of developing countries to adopt modern technology and create sustainable growth and development. Meanwhile, health also plays an important role as a condition for increasing productivity, and educational success also depends on good health conditions. Therefore, both are also considered as vital elements of growth and development as inputs for the aggregate production function. Both also have a dual role as input and output so that they have an important meaning in economic development. This is in line with research conducted by Teixeira & Fortuna (2010); Teixeira & Queirós (2016); Utami (2020); Prameswari et al. (2021); and Rorimpandey et al. (2022). Hanushek (2013) explains that the backwardness of developing countries compared to developed countries in the concept of human capital is the development of cognitive skills so that not only education and health facilities are added in quantity but also the quality and direction of educational policies on increasing cognitive skill capacity.

The estimation results in the short and long term show that the labor variable has a negative parameter sign, this can happen because based on the 2020

report from the Central Statistics Agency for South Sumatra Province, it is stated that the labor sector is still dominated by the informal sector, causing low quality manpower Work. According to business field, the labor sector is dominated by three main jobs in the informal sector, namely agriculture, trade and manufacturing industry. Of the three sectors, the agricultural sector contributed 45.99% of South Sumatra's employment, meaning that almost half of the labor force in South Sumatra worked in the agricultural sector. However, in reality the agricultural sector only contributes 14.16% to economic growth, this shows that labor productivity is still low in the agricultural sector. Hanushek (2013) states that OECD countries or developed countries have a strong demand for workers with high skills, while developing countries show a strong demand for workers with basic skills and weak demand for high skills.

The unemployment variable consistently has a negative effect on economic growth in the short and long term. Has a negative effect in the short term with a coefficient value having a sign (-) supporting the research of Septiatin et al. (2016); Novriansyah (2018); Yanti et al. (2020); Arifin & Fadlan (2021) and Fajri & Iriani (2022) that an increase in unemployment reduce economic growth. Previous studies did not explain the nature of the variables used and this research explores that the nature of unemployment also has a negative effect on economic growth in the long term. The coefficient value of the unemployment variable in the long term is greater than the coefficient value in the short term, this indicates that if the unemployment rate in South Sumatra Province is not resolved it will worsening the domestic economy, hindering development which has an impact on reducing the level of economic growth in South Sumatra Province. Chen et al. (2016) explained that unemployment which has a negative effect on economic growth can hinder sustainable development, has large compensation for unemployment and exacerbates labor market conditions and Schubert & Turnovsky (2018) explains that it will reduce the quality of the labor force itself.

The negative effect shown by poverty on economic growth in South Sumatra Province in the short and long term. An increase in the poverty rate will reduce economic growth, this is in line with the research of Rahmadi & Pamadi (2019). Amponsah et al. (2023) explain that high poverty in the long term can reduce

economic growth which has an impact on increasing income inequality and can expand to social conflict. Adeleye et al. (2020) state that the relationship between poverty and income inequality is stronger than the relationship between poverty and economic growth, but high poverty can reduce the level of economic growth and their research supports the argument that high inequality can increase poverty regardless of the positive impact on economic growth. occurs because of the uneven distribution of economic growth.

Research Implication

The results showed that the human development index has a positive effect on economic growth in South Sumatra Province both in the long term and the short term. Estimates in the long term have a larger coefficient value than the coefficient in the short term, so the human development index has a greater influence in the long term. These findings indicate that the human development index plays an important role in economic growth and this is in accordance with research from Okunade et al. (2022); Ahsan & Haque (2017) and Pelinescu (2015). This research is more strongly related to human capital development through education and innovation as suggested in the new theory of economic growth in the early 1980s that education and innovation as human capital can have a long-term effect on economic growth. Pelinescu (2015) emphasizes that human capital is also related to intangible assets such as research, patents and intellectual capital can affect national and even regional economic growth and is a view of the new theory of economic growth.

Following discussion will address the connection between poverty and unemployment to economic growth. Many studies analyze the role of economic growth on poverty. Study from Garza-Rodriguez (2018) which states that a 1% increase in economic growth can reduce the poverty rate by 2.4% in Mexico. Other research from Murjani (2019) that 1% increase in economic growth can reduce the poverty rate by 0.94% in Indonesia. Contrary to research Škare & Družeta (2016) that economic expansion cannot reduce poverty both before and after the crisis. These findings suggest that an economy focuses on economic growth has not been able to reduce poverty. This study focuses on the effect of poverty on economic growth. The results show that increasing poverty can reduce the level of economic growth. In

the long term, the coefficient value is greater than the short term, so that increasing poverty can worsen economic conditions. In line with research Perry et al. (2006) poverty levels can reduce investment levels and economic growth, especially in poorly developed financial market systems. However, the poverty rate in developing countries, especially in the province of South Sumatra, occurs because of the poverty trap itself. Study from Azariadis & Stachurski (2005) that poverty traps can hinder capital accumulation, human capital development and slow down technology transfer. Poverty traps are not only based on economic conditions but also on the institutions themselves (Bowles et al., 2006). Overall, the results show short- and long-term consistency that poverty has a negative effect on economic growth in line with research from Gründler & Scheuermeyer (2018) and Breunig & Majeed (2020).

Research on unemployment to economic growth still has an open space for debate. Some studies show that economic growth has a positive relationship with unemployment. (Seth et al., 2018; Soylyu et al., 2018). Several other studies show that unemployment has a negative relationship with economic growth (Makarange & Khobai, 2018; Yanti et al., 2020; Arifin & Fadlan, 2021; Fajri & Iriani, 2022). The results show that unemployment has a consistently negative effect both in the short and long term in South Sumatra, these results are in line with research Makarange & Khobai (2018) that unemployment has a negative effect in the short and long run in South Africa. Increased unemployment can worsen economic conditions, this shows that unemployment has many dimensions in the economy, especially the social dimension. Unemployment worsens economic conditions through weak labor conditions (Murjani, 2019) which will reduce the investment rate (Perry et al., 2006).

CONCLUSION AND SUGGESTION

This study applies social variables such as the human development index as a proxy for human capital, labor, unemployment and poverty in developing a model of economic growth in South Sumatra Province. The research uses dynamic panel data of the GMM system to reduce orthogonally problems by applying lagged dependent variables so that the model built does not correlate with the error term value. Besides that, by applying the GMM system

panel to get short-term and long-term estimates in the model. The results showed that all the variables used had a consistent effect on the short and long term. The HDI variable has a positive coefficient value both in the short and long term, which means that an increase in HDI will increase economic growth in South Sumatra Province. the labor variable has a negative parameter sign, which means that an increase in the labor force will reduce the rate of economic growth in South Sumatra Province, this can happen because the informal sector labor force dominates in South Sumatra Province, especially in the agricultural and plantation sectors and demand for labor is stronger on basic skills than labor on high skills. Unemployment consistently has a negative effect on economic growth in the short and long term and the coefficient value in the long term which is greater indicates that unemployment can burden the domestic economy, hinder development which has an impact on reducing the rate of economic growth in South Sumatra Province and poverty has a negative effect on growth economy, where increasing poverty will reduce economic growth this can have an impact on increasing income inequality which can expand into social conflict in South Sumatra Province.

The research implication is the need to improve the quality and quantity of health and education facilities to increase people's access to education and health as well as policy direction in the education sector to increase cognitive skills because it can improve skills. Increasing cognitive skills to form a labor force that has high skills so as to create a labor force of high quality and competitiveness in the labor market. In addition, there is a need for an even distribution of economic growth to reduce unemployment and poverty through sustainable fiscal policies and encourage investment to create lots of jobs. The limitation in this research is not to apply the income inequality variable to examine the relationship between poverty and economic growth.

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