EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

Disaggregated Approach of Regional Government Expenditure and Poverty Eradication in South Sulawesi, Indonesia

Ecces: Economics Social and Development Studies

Andi Nur Ildha Arfanita[1], Fatmawati[2], Sultan Suhab[3]

[1] School of Economics, The Faculty of Business, Economics and Law, University in St. Lucia, Queensland, Australia
E-mail: a.arfanita@uqconnect.edu.au*

[2,3] Economics Department, Faculty of Economics and Business, Hasanuddin University, Indonesia

(Article history) Received: 2023-04-01, Revised: 2023-06-24, Accepted: 2023-06-24,
Available online: 2023-06-28, DOI: 10.24252/ecc.v10i1.36899
Stable URL: http://journal.uin-alauddin.ac.id/index.php/ecc/index

Abstract: Disaggregated Approach of Regional Government Expenditure and Poverty Eradication in South Sulawesi, Indonesia

Government spending is one of the pillars of fiscal decentralisation which plays an important role in overcoming poverty. However, many empirical studies are still being debated, especially at the regional level. Government spending can contribute to reducing poverty depending on the type of government spending. This study focuses on specific types of government spending that contribute to productivity, such as government spending on infrastructure, health, education, and social assistance. The study aims to analyze the effect of regional government expenditures on infrastructure, education, health, social protection, and economic growth on poverty reduction. The measurements of poverty used in this study include Headcount Index, Poverty Gap Index, and Poverty Severity Index. The data were analyzed using a panel data regression from 2015-2020 through multiple regression models directly and indirectly. The estimation results of the direct effect show that only government spending on health can reduce poverty through its three indicators, while government spending on social protection is ineffective. Government expenditures on infrastructure and education are only significant in reducing the income gap between the poor and the depth of poverty. The indirect effect results in the four government spending types being statistically significant on all poverty indicators through accelerating economic growth. Therefore, economic growth at the regional level is an important variable that strengthens the relationship between government spending and poverty reduction

for all poverty indicators in the region. In addition, government spending on social protection is helpful for the poor but needs to optimize its utilization with more precise targets.

Keywords: Regional Government Expenditure; Poverty Measurements; Economic Growth

INTRODUCTION

The COVID-19 pandemic first emerged among Indonesian communities at the beginning of 2020 and has had significant impact on increasing the poverty problem both at the national and at the regional scale. In 2020, there was a more dramatic rise in the percentage of poor people in Indonesia compared to the previous years. In 2019, the poor constituted 9.22% of the population in Indonesia, which increased to 10.19% in 2020. Furthermore, the number of the poor increased from 24.7 million in 2019 to 27.5 million in 2020 or increased by approximately 2.8 million (Central Bureau of Statistics, 2021). Such conditions happened all over Indonesia including South Sulawesi Province.

South Sulawesi Province had 8.99% of its population poor in 2020, higher than the value in 2019, which was 8.56%. The number of the poor increased from 759.5 thousand in 2019 to 800.4 thousand in 2020 or increased by 40.6 thousand. That was the biggest growth among all provinces in Indonesia excluding Jawa and Sumatera. It has been suggested that increase in the number of poor people was due to the COVID-19 pandemic (Suryahadi et al., 2020; Martin et al., 2020; UNICEF, 2020; Manuel et al., 2020; Sumner et al., 2020).

One of the strategies implemented to solve the poverty problem in every country or region is increasing the budget for government expenditure. Theoretical and empirical studies have supported the relationship between government spending and poverty. The relationship between government spending and poverty refers to the theory of Musgrave (1989) about three functions such as distribution, allocation, and stabilization. The allocation function explains that the government should allocate financial resources to provide public facilities for societies. The availability of reliable and good-quality public will, directly and indirectly, support poverty reduction. Government expenditures such as transfer payments directly contribute to increasing the purchasing power of the poor (Perkins et al. 2013). Likewise, government spending on infrastructure can encourage the economy, which in turn by increasing productivity for the poor (Romer, 2012). In addition, the view of Keynesian theory also strengthened the relationship between government spending and poverty, where government spending could increase aggregate demand and reduce poverty through accelerated economic growth and employment (Mankiw, 2021).

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

Some earlier empirical studies estimated the effect of government expenditure on the reduction of poverty and found several results. Types of expenditure and the analysis models affect the findings. According to Anderson et al.,(2018), the correlation between government expenditure and poverty reduction is complex and depends on the type of government expenditure. Expenditure on education, health, and infrastructure is the type of expenditure that has a different effect on poverty reduction (Rodríguez, 2009). Government expenditure on social protection spending is also quite popular in various countries like Indonesia. Social protection programs are strategic programs that can directly reduce poverty (Perkins et al., 2013). The budget for the social protection program has benefited poor households by purchasing assets and providing training (Javed et al. 2021). Rodríguez (2009) found that the government expenditure for social protection programs is ineffective in poverty reduction in Mexico, and the program even reduces productivity and economic growth. There are not many empirical studies that emphasize the importance of spending on social protection in reducing poverty.

The relationship between government spending and poverty reduction is not only crucial to observe from the disaggregated expenditure approach but also essential to observe the mechanism linking government spending and poverty reduction. Government expenditure affects poverty reduction through some paths, the most important of which is economic growth (Barro, 1990) in his endogenous growth theory. In addition, the measurement of poverty through the headcount index, poverty gap index, and severity gap index has a different response from the increase in government spending. However, previous empirical studies have generally used the headcount index as a measure of poverty, so the result of the studies has not provided more comprehensive policy recommendations on poverty reduction. The development of poverty indicators aims to observe whether the effect of government spending on education, health, infrastructure, and social protection more effectively contributes to a reduction of the headcount index or to improve the poverty depth index both directly and indirectly through economic growth.

This study aims to estimate the effect of local government expenditure on education, health, infrastructure, and social protection on poverty reduction based on the three indicators, either directly or indirectly. Therefore, this study enriches the development of the literature on economic welfare, especially poverty reduction and contributes to the development of Keynesian theory related to the importance of the government's role in achieving macroeconomic policy targets such as economic growth and employment that will benefit the poor. In the empirical study, the results will contribute to policymakers at both national and local levels in formulating

poverty alleviation programs based on the three measurements of poverty indicators.

To get the right recommendation to solve poverty in South Sulawesi, the study needs to develop various methods from previous empirical studies like (i) poverty measurement through three poverty indicators, including headcount index, depth index, and severity index. The development of poverty indicators aims to observe whether the effect of government expenses more effectively contributes to reducing the percentage of the poor or improving the poverty depth index, (ii) government expenses include 4 sectors, namely health, education, social protection, and infrastructure. Each sector differently influences poverty reduction, (iii) the development of an analysis model that is panel regression analysis by combining the model of the direct influence of government expenses on poverty reduction and indirect influence that is through economic growth. The methodology developed through the economic growth path is still relatively limited. Those three points represent the novelty of this study compared to previous studies.

LITERATURE REVIEW

The correlation between government expenditure and poverty reduction is theoretically undebatable. The mechanism of market failure generally causes the emergence of poverty problems in many countries. Market failure causes most people to be unable to meet their minimum living needs and causes limited access to development resources. To solve the problems of market failure, the government must intervene. This is in line with Musgrave, (1989) about distribution, allocation, and stabilization functions. Although theoretically, there is a strong correlation between government expenditure and poverty reduction, the results of empirical studies are still diverse. Empirical studies such as Sasana & Kusuma (2018) investigate the aggregate effect of government expenditure variables on poverty reduction and find a negative sign, while others like Nursini & Tawakkal (2019) did not find any correlation between them. In Indonesian cases, aggregate government expenditures are mostly allocated for civil servant payment rather than for the needs of the poor people Nursini (2020).

Government expenditure can inhibit the growth of poor citizens depending on the type of expenditure (Anderson et al., 2018). Government expenditure on productive sectors is more effective for the poor than on unproductive sectors (Miežienė & Krutulienė, 2019). The studies conducted by Cyrek (2019), Samuel (2020), and Falade & Babatunde (2020) found that government administration expenditures are ineffective in poverty reduction. However, government expenditure on education, health, and infrastructure generally reduce poverty

Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

confirmed by Cyrek (2019) in the EU, and Muhammad et al. (2019) in Indonesia. Studies not confirming the finding by Celikay & Gumus (2017) in Turkey. Government expenditure on education and health in cities and the countryside affect poverty reduction differently. Taruno (2019) found that education and health expenditures influence poverty reduction in the countryside but not in cities.

Government expenditure on social protection as transfer payments and subsidies can directly improve the quality of life of the poor. This statement is in line with some empirical studies such as Anderson et al. (2018), Miežienė & Krutulienė (2019) and Javed et al. (2021). Other studies like Rodríguez (2009) in Mexico and Falade & Babatunde (2020) in Nigeria also show contrary conclusions. The correlation between government expenditure on the productive sector and economic growth referred to the theory of endogen growth (Barro, 1990). Previous study by Shafuda & De (2020) in Namibia, Southern Africa has analyzed those relations. The results show that aggregate and disaggregated government expenditures influence economic growth. For example, Shafuda & De (2020) identified a long-term relationship between government expenditure on education and health and economic growth in Namibia. However, Hasnul (2015) contradicted this finding as he found a negative correlation between government expenditure on health, education, and safety and economic growth in Malaysia. Economic growth is the importants variable in reducing poverty and improving the quality of human lives. Economic growth affects family expenditure per capita (Suryahadi et al., 2020).

Although many researchers have studied the relationship between government spending and poverty reduction using various analytical models such as Odior (2014), and Cyrek (2019), the results are still debatable. It means that the concept of this theory is still open for further estimation and its relationship to the path of economic growth. Government spending for aggregate and disaggregated has an effect on poverty reduction through its effect on economic growth. It means that government spending accelerates the movement of the economy (Mankiw, 2021) and further provides opportunities for the poor to be involved in the production process and increase their productivity (Barro, 1990). The empirical studies generally used the headcount index. Poverty measurements such as the poverty depth index and the poverty severity index received different responses from the increase in government spending. Thus, expanding the indicators of poverty will contribute to the strengthening of the theory and be useful for policymakers.

METHODS

The current study used panel data from 24 districts/cities in South Sulawesi Province-Indonesia from 2015 to 2020. Secondary data consists of data on government spending on education (G_{edu}), realization data derived from the education function (Alamanda, 2020; Maisarah and Sari, 2020).

Table 1. Description of variables

Variables name	Description	Source
G_{edu}	Natural logarithm of realization of government expenditure according to the education function	Directorate General of Fiscal Balance Ministry of Finance of the Republic of Indonesia
G_{eh}	Natural logarithm of realization of government expenditure according to the health function	Directorate General of Fiscal Balance Ministry of Finance of the Republic of Indonesia
G_{einf}	Natural logarithm of realization of government expenditure according to the economic function	Directorate General of Fiscal Balance Ministry of Finance of the Republic of Indonesia
G_{es}	Natural logarithm of realization of government expenditure according to the social protection function	Directorate General of Fiscal Balance Ministry of Finance of the Republic of Indonesia
$G_{einf(-1)}$	Natural logarithm of realization of government expenditure according to the economic function with a lag of 1 year	Directorate General of Fiscal Balance Ministry of Finance of the Republic of Indonesia
Pov	Poverty measurements include three indicators that are headcount index (HCI), poverty gap index (PGI), poverty severity Index (PSI)	Central Bureau of Statistics Indonesia (BPS)
HCI	Percentage of poor people below the poverty line.	Central Bureau of Statistics Indonesia (BPS)
PGI	Gap between the average expenditure of each poor people and the poverty line	Central Bureau of Statistics Indonesia (BPS)
PSI	Per capita expenditure spreading among poor people.	Central Bureau of Statistics Indonesia (BPS)
Gr	Natural logarithm of the Gross Domestic Regional Product at constant price	Central Bureau of Statistics Indonesia (BPS)
L	Natural logarithm of the number of workers	Central Bureau of Statistics Indonesia (BPS)
GDI	An index to measure the achievement of male and female dimensions related to education, health, and purchasing power	Central Bureau of Statistics Indonesia (BPS)
GEI	An index that shows whether women can play an active role in economic and political life	Central Bureau of Statistics Indonesia (BPS)

Source: own compilation, 2022

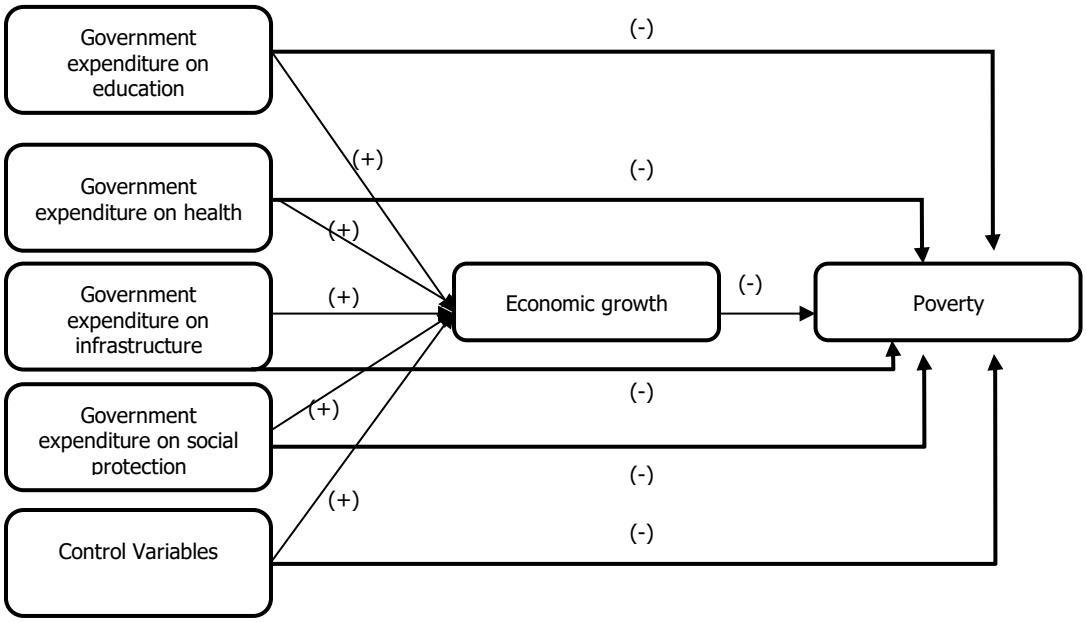
Government expenditure on the health sector (G_{eh}), that is realization data derived from

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

government expenditure according to the health function (Maisarah and Sari, 2020); government expenditure for infrastructure (G_{einf}), that is realization data derived from government expenditure according to the economic function, and expenditure in social protection sectors (G_{es}) that is realization data of government expenditure according to the social protection function (Taruno, 2019). Secondary data results from the Directorate General of Fiscal Balance (DJPK) Ministry of Finance of the Republic of Indonesia.

Poverty (*Pov*) consists of three poverty indicators, namely Headcount Index (HCI), Poverty Gap Index (PGI), and Poverty Severity Index (PSI). Some control variables such as Gross Domestic Regional Product (GDRP), Growth (Gr), Labor (L), Gender Development Index (GDI), and Gender Empowerment Index (GEI) can theoretically and empirically reduce poverty. The government expenditure on infrastructure will reduce poverty through time lag. Therefore, this study includes time lag for infrastructure expenditure. Data regarding poverty indicators and some control variables were from Central Bureau of Statistics Indonesia (BPS), provincial, and regional that was available online. This study transforms all variables not in the form of percentages into a log form. Descriptions of all variables and sources of those variables are in table.

Figure 1: Research Framework



This study empirically estimates the effect of government spending on poverty reduction in South Sulawesi in a disaggregated manner. Government spending includes four types, namely government spending on education, health, infrastructure, and social protection. The first three variables are categorized as productive types of government spending (Barro, 1990) and spending on social protection is also a productive expenditure because it directly contributes to the poor (Perkins, et al 2013). Furthermore, the effectiveness of the influence of government spending on poverty reduction depends on the path of economic growth. Thus, government spending has an indirect effect on poverty reduction through its effect on economic growth.

a. Analysis model

The current study employed a panel data regression model to analyze the influence of the four types of government expenditure on poverty reduction, either directly or indirectly, through economic growth. The estimation equation of the direct effect of government expenditure on poverty reduction refers to equation (1). *Pov* is the poverty variable, *i* is the indicator to measure poverty including HCI, PGI, and PSI. *G* is the government expenditure, and *a* is the type of government expenditure including G_{edu}, G_{eh}, G_{einf} dan G_{es}. *j* is the regency 1…, 24, and *t* is the year 2015-2020. CV stands for control variable, *b* is GDRP, L, GDI, and GEI. GDI dan GEI is an indicator of gender equality included as a crucial variable to overcome poverty problems (Ndinda & Ndhlovu, 2018) and (Ramos et al., 2020).

Estimation model of direct effect

The functional equation of the direct influence of government expenditure on the reduction of poverty can be seen in (1):

$$Pov_{ijt} = F(G_{ajt}, CV_b) \quad (1)$$

Pov is the poverty variable, i is the indicator to measure the poverty including HC, PG, and PS. *G* is the government expenditure, and *a* is the type of government expenditure including G_{edu}, G_{eh}, G_{einf} dan G_{es}. *j* is the regency 1…, 24, and t it the year 2015-2020. *CV* stands for control variable, *b* is the Gross Domestic Regional Product (GDRP), Gr is growth of GDRP, Labor (*L*), Gender Development Index (GDI), and Gender Empowerment Index (GEI). GDI dan GEI is an indicator of gender equality included as an important variable to solve the poverty problems (Morrison et al., 2007); (Ndinda & Ndhlovu, 2018); (Ramos et al., 2020). The functional equation (1) is formulated into the following equation:

$$Pov_{ijt} = \propto_0 + \propto_1 \sum_a^4 G_{jt} + \propto_5 \sum_{b=1}^4 CV_t + \mu \quad (2)$$

by explicitly inserting each government expenditure and the control variables and partially using

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

a natural logarithm. The estimation model is presented below:

$$Pov_{ijt} = \propto_{10} + \propto_{11} LnG_{edu_{jt}} + \propto_{12} LnG_{eh_{jt}} + \propto_{13} LnG_{einf_{jt}} + \propto_{14} LnG_{es_{jt}} + \propto_{15} LnGDRP_{jt} + \propto_{16} GDI_{tj} + \propto_{17} GEI_{jt} + \propto_{18} LnLabor_{jt} + \propto_{19} LnGinf_{jt-1} + \mu_1 \quad (3)$$

Based on the classification of poverty indicators, equation (3) resulted in three models of estimation equation as below:

(1) The equation to analyze the influence of four kinds of government expenditure and all control variables on the reduction of poverty with headcount index indicator is as follow:

$$Pov_{HCjt} = \propto_{20} + \propto_{21} LnG_{edu_{jt}} + \propto_{22} LnG_{eh_{jt}} + \propto_{23} LnG_{einf_{jt}} + \propto_{24} LnG_{es_{jt}} + \propto_{25} LnGDRP_{jt} + \propto_{26} GDI_{tj} + \propto_{27} GEI_{jt} + \propto_{28} LnLabor_{jt} + \propto_{29} LnGinf_{jt-1} + \mu_{21} \quad (3.1)$$

(2) The equation to analyze the influence of four kinds of government expenditure and all control variables on the reduction of poverty with the indicator of poverty gap index is:

$$Pov_{PGjt} = \propto_{30} + \propto_{31} LnG_{edu_{jt}} + \propto_{32} LnG_{eh_{jt}} + \propto_{33} LnG_{einf_{jt}} + \propto_{34} LnG_{es_{jt}} + \propto_{35} LnGDRP_{jt} + \propto_{36} GDI_{tj} + \propto_{37} GEI_{jt} + \propto_{38} LnLabor_{jt} + \propto_{39} LnGinf_{jt-1} + \mu_{31} \quad (3.2)$$

(3) The equation to analyze the influence of four kinds of government expenditure and all control variables on the reduction of poverty using the indicator of poverty severity index is as below:

$$Pov_{PSIjt} = \propto_{40} + \propto_{41} LnG_{edu_{jt}} + \propto_{42} LnG_{eh_{jt}} + \propto_{43} LnG_{einf_{jt}} + \propto_{44} LnG_{es_{jt}} + \propto_{45} LnGDRP_{jt} + \propto_{46} GDI_{tj} + \propto_{47} GEI_{jt} + \propto_{48} LnLabor_{jt} + \propto_{49} LnGinf_{jt-1} + \mu_{41} \quad (3.3)$$

3.2.2. Estimation model of indirect influence

The functional equation of the economic growth is presented as below:

$$Gr_{jt} = F(G_{atj}, CV_b) \quad (4)$$

$$Pov_{ijt} = F(Gr_{tj}, CV_b) \quad (5)$$

Equation (4) explains that economic growth is influenced by four types of government expenditure as well as all control variables. Those variables indirectly reduce the poverty through economic growth (Equation (5).

Functional equation (4) is transformed into an estimation equation as below:

$$Gr_{jt} = \beta_1 + \beta_2 LnG_{edu_{jt}} + \beta_3 LnG_{eh_{jt}} + \beta_4 LnG_{einf_{jt}} + \beta_5 LnG_{es_{jt}} + \beta_6 GDI_{tj} + V_7 GEI_{jt} + \beta_8 LnLabor_{jt} + \beta_9 LnGinf_{jt-1} + e \quad (6)$$

The equation (6) is substituted into equation 3 to produce reduce form equation. The substitution results in estimation model of the indirect influence of all government expenditure types and all control variables on the three poverty indicators.

$$Pov_{ijt} = \propto_{10} + \propto_{11} LnG_{edu_{jt}} + \propto_{12} LnG_{eh_{jt}} + \propto_{13} LnG_{einf_{jt}} + \propto_{14} LnG_{es_{jt}} + \propto_{15} (\beta_1 + \beta_2 LnG_{edu_{jt}} + \beta_3 LnG_{eh_{jt}} + \beta_4 LnG_{einf_{jt}} + \beta_5 LnG_{es_{jt}} + \beta_6 GDI_{tj} + \beta_7 GEI_{jt} + \beta_8 LnLabor_{jt} + \beta_9 LnGinf_{jt-1} + e) + \propto_{16} GDI_{tj} + \propto_{17} GEI_{jt} + \propto_{18} LnLabor_{jt} + \propto_{19} LnGinf_{jt-1} + \mu_1 \quad (7)$$

After being substituted in reduced-form estimation, equation (6) is simplified into an indirect equation model as below:

$$Pov_{itj} = \theta_0 + \theta_1 LnG_{edu_{jt}} + \theta_2 LnG_{eh_{jt}} + \theta_3 LnG_{einf_{jt}} + \theta_4 LnG_{es_{jt}} + \theta_5 GDI_{tj} + \theta_6 GEI_{jt} + \theta_7 LnLabor_{jt} + \theta_8 LnGinf_{jt-1} + \rho) \quad (8)$$

$\boldsymbol{\theta_0}$ is $\propto_{10} + \propto_{15} \boldsymbol{\beta_1}$ is the total intercept, $\boldsymbol{\theta_1}$ is the total score of the influence of government expenditure on education sectors consisting of : $\propto_{11}$ which is the Ged's direct influence coefficient, $\propto_{15} \boldsymbol{\beta_2}$ is the Ged's indirect influence through the economic growth, $\boldsymbol{\theta_2}$ is the total score of the influence of government expenditure on the health sector consisting of: $\propto_{12}$ which is the direct influence coefficient and $\propto_{15} \boldsymbol{\beta_3}$ is the indirect influence coefficient. $\boldsymbol{\theta_3}$ is the total score of the influence of government expenditure for infrastructure consisting of: $\propto_{13}$ which is the direct influence coefficient and, $\propto_{15} \boldsymbol{\beta_4}$ that is the indirect influence coefficient. $\boldsymbol{\theta_4}$ is the total score of the influence of government expenditure on social protection consisting of: $\propto_{14}$ which is the direct influence coefficient and, $\propto_{15} \boldsymbol{\beta_5}$ that is the indirect influence coefficient. $\boldsymbol{\theta_5}$ is the total score of the influence of GDI consisting of: $\propto_{16}$ which is the direct influence coefficient, $\propto_{15} \boldsymbol{\beta_6}$ that is the indirect influence coefficient. $\boldsymbol{\theta_6}$ is the total score of the influence of GEI consisting of: $\propto_{17}$ which is the direct influence coefficient, $\propto_{15} \boldsymbol{\beta_7}$ that is the indirect influence coefficient. $\boldsymbol{\theta_7}$ is the total score of the influence of employment consisting of: $\propto_{18}$ which is the direct influence coefficient, $\propto_{15} \boldsymbol{\beta_8}$ that is the indirect influence coefficient. $\boldsymbol{\theta_8}$ is the total score of the influence of *Ginf* (-1) consisting of: $\propto_{18}$ which is the direct influence coefficient, $\propto_{15} \boldsymbol{\beta_9}$ that is the indirect influence coefficient g. ρ refers to the error term, $\propto_{15} \boldsymbol{\epsilon} +$

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

$\mu 1$. Equation (8) generates the equation to estimate the influence of the four types of government expenditure and all control variables on each poverty measurement indicator including the percentage of poverty reduction, poverty depth, and poverty severity.

RESULT AND DISCUSSION

Descriptive Statistics

Table 2 shows that the highest average government expenditure is education, while the lowest average government expenditure is the field of social protection. The high average government spending on education is in line with the Indonesian government's policy in the field of education, which is 20 percent of the total Indonesian budget. The results of descriptive statistics also found that all variables observed in the 2015-2020 period were distributed, indicated by the P-Value of the Jargue-Bera test, which was smaller than the 5% significant level. This descriptive statistics focuses on summarizing and describing the main features of a dataset. It involves the use of various statistical measures and techniques to provide a concise summary of the data, allowing for better understanding and interpretation.

Table 2. Descriptive Statistics

Variable	Observations	Mean	Std.Dev	Max	Min	JB	P-Value (JB)
Gedu	144	292.13	183.43	978.87	7.27	45.50	0.000
Geh	144	203.06	103.94	533.65	8.27	42.09	0.000
Ges	144	16.66	10.53	63.25	2.97	376.61	0.000
Geinf	144	73.91	33,25	228.46	10.67	133.94	0.000
GDRP	144	18121.41	28858.64	178430.1	4148.37	2711.71	0.000
GDI	144	92.51	3.85	98.80	85.40	10.704	0.004
GEI	144	64.08	8.88	80.53	38.11	7.951	0.018
Labor	144	187.76	164.26	1408.07	54.99	3033.63	0.000
HCI	144	9.909	3.140	16.7	4.28	6.259	0.043
PGI	144	1.674	0.738	3.76	0.58	12.034	0.002
PSI	144	0.445	0.263	1.42	0.09	43.933	0.000

Source: Secondary data output after processing, 2022; (Ildha, 2022)

Table 3. Unit Root Test

Variable	Level	Critical Value		Remarks
	ADF Value	1%	5%	
Gedu	-3.975*	-3.480	-2.883	Stationary
Geh	-5.774*	-3.478	-2.883	Stationary
Ges	-4.989*	-3.476	-2.882	Stationary
Geinf	-8.811*	-3.476	-2.882	Stationary
Geinf(-1)	-8.782*	-3.476	-2.882	Stationary
GDRP	-3.839*	-3.476	-2.881	Stationary
GDI	-3.134**	-3.476	-2.881	Stationary
GEI	-3.344**	-3.476	-2.881	Stationary
Labor	-8.005*	-3.476	-2.881	Stationary
HCI	-3.407**	-3.476	-2.881	Stationary
PGI	-3.844*	-3.476	-2.881	Stationary
PSI	-4.592*	-3.476	-2.881	Stationary

Source: Secondary data output after processing, 2022; (Ildha, 2022) *) significant at 1% **) significant at 5%

Unit Root Test

Based on the results of the Unit root test using the Augmented Dickey-Fuller (ADF) test, it found that all variables were stationary at the level.

Chow Test and Hausman Test

Regression analysis of the panel data employed three approaches involving common effect, fixed effect, and random effect. The study used a random effect model according to the research goals and conditions as the number of cross-sections is higher than the number of coefficients including intercept, and the number of the time series is smaller than the number of cross-sections. Besides that, the selection of the estimated model refers to the statistic test through the Chow test or F test to decide whether to use Common Effect or Fixed Effect (FE).

The Hausman test was performed to decide whether to use FE or Random Effect (RE). Based on the Chow test, it finds that the F test is larger than the significance score of 5% so that the right choice is the FE. Then, through the Hausman test, the cross-section random effect test is greater than 5%, so it decides to use RE. All tests were valid in all direct and indirect estimation equations. This study also fulfilled the classical assumptions regarding multicollinearity and heteroscedasticity.

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

Classical Assumptions of Heteroscedasticity and Multicollinearity

This study uses the Park and the likelihood tests. Both of these test tools aim to observe the problem of heteroscedasticity. Based on the results of the Park test, the study found that three variables faced heteroscedasticity problems as the GDRP, GEI, and Labour. The P-value in each estimation equation is smaller than the significant level of 5%. For simultaneous testing, it found that all of the estimation equations had a P-Value smaller than a significant level of 5%, which means all variables were homoscedasticity. Thus, the conclusion is all data used are free from heteroscedasticity symptoms. Based on the correlation coefficient test, it found that the value of all independent variables was below 75 %. This finding explains that all independent variables are free from multicollinearity problems (Gujarati and Porter, 2009).

Estimation results of direct and indirect effect

Table 5 shows the results of various estimates of the effect of the four types of government spending on the three poverty indicators. The direct effect regression equation shows that government spending on health and infrastructure on poverty reduction through the headcount Index indicator is statistically significant at a significance level of 1%.

It means that every 1% increase in government spending on health from local governments will reduce the percentage of poor people by 0.299%, and every increase in government spending on infrastructure increases the poor people by 0.43%. Furthermore, two of the four control variables, namely economic growth and gender development, have negative coefficients and are statistically at a significance level of 1%. The R square value is 54%, which means that all variables in the estimation model contribute 54%, and variables that are not in the model contribute around 46%. These results have also received support from the statistical results of the F test with a probability of 0.0000. It means that simultaneously all variables reduce poverty.

Furthermore, for the poverty depth index indicator, it found that only the variable of government expenditure in health was statistically significant. The coefficient sign was by the theory. Each 1% increase in government expenditure on the health sector will decrease the poverty depth index means that government expenditure on health can increase the average spending per capita of poor people and bring them closer to the poverty line or even pass it. The significant control variables are the 1-year time lag of infrastructure spending, economic growth, and the GDI.

Table 4. Estimation of the direct and indirect effect of government expenditures and control variables on poverty reduction

Variables	Direct Effect Estimation			Effect of Government Expenditure on Growth	Indirect Effect Estimation Through Growth		
	Head Count Index	Poverty Gap Index	Poverty Severity Index		Head Count Index	Poverty Gap Index	Poverty Severity Index
Gedu	-0,238ns	-0,025ns	-0,471***	0,393***	-0,999***	-0,167***	0,056ns
Geh	-0,299***	-0,019***	-0,124**	0,064***	-0,163***	-0,027***	0,009ns
Ges	0,041ns	0,183ns	0,069ns	0,099***	-0,252***	-0,042***	0,014 Ns
Geinf	0,434***	-0,069ns	-0,038ns	-0,0003ns	0,001ns	0,00001ns	-0,0000 Ns
Geinf-1	0,017ns	0,110***	0,056***	0,032***	-0,081***	-0,014***	0,0000 Ns
GDRP	-2,542***	-0,426***	0,059ns				
GDI	-0,352***	-0,079***	-0,016***	0,002ns	-0,005ns	-0,001ns	-0,0002 Ns
GEI	-0,012ns	-0,010ns	-0,004***	-0,002ns	0,005ns	0,001ns	0,0932 Ns
L	-0,038ns	-0,046ns	-0,112ns	0,652***	-1,657***	-0,278***	0,0045 Ns
R2	0,54	0,25	0,25	0,67			
F-Statistik	11,093	3,45	3,42	22,27			
Prob (F-Stat)	0,00000	0,005	0,002	0,0000			

Source: Secondary data output after processing, 2022; (Ildha, 2022)

** significant at 5%; *** significant at 1%. ns= nonsignificant

The coefficient value of the indirect effect is obtained from multiplying the coefficient value of growth in equations (3.1), (3.2), (3.3), and the coefficient of each independent variable in equation (8)

In the equation for the estimation of the PSI, three government spending variables are statistically significant to poverty, namely, education, health, and infrastructure lag 1. Education and Health spending is negative, but infrastructure spending lag 1 is positive means it does not

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

follow the theory. The coefficient of determination is small; however, the F test is 0.002 and is statistically significant.

The results of the estimation of the effect of government spending on economic growth are in line with the theory. Four of the five types of government spending influence economic growth. These four are education, health, social protection, and lag infrastructure. The coefficient of each expenditure is under the positive hypothesis, which means that every 1% increase in spending on education, health, social protection, and infrastructure lag will increase economic growth by 0.39%, 0.06%, 0.09 %, and 0.03%, respectively. Of the other variables, only labor has a statistically significant effect on economic growth.

The result of the estimation of the indirect effect shows that spending on education, health, social protection, and infrastructure lag 1 is significant at 1%. It explains that the four types of government expenditure reduce poverty through economic growth. Each 1% increase in these expenditures will reduce the percentage of poor people by 0.99%, 0.16%, 0.25%, and 0.05%, respectively through their effect on economic growth. Each increase in the workforce will reduce the percentage of the poor by 1.66% through increasing economic growth effect. However, the GDI and GEI variables are not significant because of the insignificant GDI and GEI on economic growth. A similar outcome on the poverty depth index indicators. Expenditures on education, health, social protection, and lag infrastructure are significant for reducing the poverty depth index at 1% through its effect on increasing economic growth. Another variable that also has a statistical influence with a negative sign is the labor force; the GDI and GEI variables are not statistically significant. It means that government spending and other independent variables have no indirect effect on poverty reduction based on the PSI indicator.

Discussion

Based on the results of direct effect estimation, government spending has a different effect on poverty reduction. It depends on the type of government expenditure and indicators of poverty. In a broader sense, this study reveals that government spending is effective in reducing poverty in South Sulawesi, even amidst the COVID-19 Pandemic. This indicate in the long term, the growth of budget allocations for education can reduce the gap between the incomes of the poor. The reason is that government expenditure on education is a productive expenditure that can enhance the quality of human resources, especially for the poor. Developing a high-quality human is the main asset for developing an area. Therefore, the higher the quality of human resources, the higher the chance to participate in the development and may create a

source of income for poor people. This policy implies that the South Sulawesi regional government should enhance the fund allocation in the education sector, with a particular focus on supporting economically disadvantages families.

Government spending on education benefits the poor through two components: (i) providing educational facilities and infrastructure to make it easier for the poor to access education. Provision of these facilities and infrastructure can improve the quality of human resources and increase their income in the long run; (ii) providing assistance directly to the poor such as the provision of BOS Funds (School Operational Assistance Funds) and Scholarships. This budget allocation can help the poor with their children's school needs. However, the findings of this study contradict the case of Kenya, where government expenditure on education is insignificant in poverty reduction according to the headcount index indicators (Omari & Muturi, 2016) and (Maisarah & Sari, 2020).

A good result from the estimation of the effect of government spending on poverty is the spending in the health sector. Although the proportion of health expenditure is still relatively lower than education, health expenditure is more beneficial for poverty alleviation. The negative sign of the coefficient and is statistically significant for the three poverty indicators have supported the fact. The findings of this study explain that the relationship between government spending on health and the three poverty indicators is quite strong. Factors supporting the effectiveness of budget health are innovative programs applied by each area in providing service to poor communities and others who are vulnerable to poverty. Government expenditure in the health sector, including the provision of free health services and ambulances for remote areas, improves the health status of the community.

It increases work productivity and household income for the poor. An increase in the income of the poor will encourage an increase in the consumption of food and non-food items so that they are closer to the poverty line or can even cross the poverty line. Likewise, an increase in income will reduce the disparity in per capita expenditure between the poor. This study has proven the effectiveness of poverty alleviation programs and initiatives in the health sector across 24 regencies/cities in South Sulawesi, leading to a notable decrease in poverty rates during the observation period. Consequently, it is essential to augment the fund allocation in the health sector specifically targeted towards poor families. The finding is in line with Lanjouw et al. (2001). However, the findings contradict those of Maisarah & Sari (2020).

Increasing infrastructure expenditure is one of the strategies to overcome poverty in countries like Indonesia. Although infrastructure spending does not directly benefit poor people,

Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

it allows them to earn more income in the long term (Miežienė & Krutulienė, 2019). The development of reliable infrastructure can facilitate mobility from one area to another and open access to economic activities in productive sectors for the poor. Infrastructure also enhances the marketing of products created by poor people so that they increase their income. This process will create a multiplier effect and externalities for the poor. This study finds that infrastructure spending reduces the percentage of poor people but does not decrease the severity and depth of poverty because the regression coefficient is not statistically significant. This further shows that the available infrastructure is occupied by the middle and high economic classes, while the spending patterns of the poor remain the same. Reliable infrastructure is generally in the big cities where those who have the opportunity to enjoy it are people with upper middle income. Meanwhile, infrastructure is scarce in rural areas or on the bound where many poor people live.

The social protection program is one of the government's strategic programs to alleviate poverty in many countries like Indonesia. The study found that social protection spending has no effect on poverty reduction for all poverty indicators. It means that increasing government spending on social protection is not effective in overcoming the problem of poverty in the case of Indonesia. The implementation of social protection programs is generally ineffective due to nontargeting (Anderson et al., 2018). Rodríguez (2009) for the cases in Mexico supported the findings. The study contradicts the Case of Nigeria (Samuel, 2020), Miežienė & Krutulienė (2019) for the EU countries, and Celikay & Gumus (2017) in Turkey.

This study also investigated control variables such as economic growth, GDI and GEI, and the working workforce. The estimated results are different for different types of poverty measurement. The economic growth variable has a negative coefficient and is statistically significant in the poverty depth index and the headcount index. The economic growth variable is insignificant in the PSI equation. The conclusion is that accelerating economic growth can reduce the percentage of poor people and reduce the gap between the average poor's spending and the poverty line.

Government spending can contribute to poverty reduction through its impact on economic growth. This assertion means that economic growth plays a crucial role in alleviating poverty for two reasons, namely, (i) promoting economic growth market-oriented, and (ii) providing principal education and health services directly to poor people. In line with these ideas, the current study found that government expenditures on the education and health sectors influence economic growth. It means increased government spending on education and health improves the quality of human resources, which can boost productivity and buying power. The resulting acceleration

of economic growth can give the ability for poor people to be involved in the production process so that there will be income resources for them. The current study confirms Odior's statement (2014) that government spending on education improved the quality of life, accelerated economic growth, and reduced poverty.

Another strategy considered significant in reducing poverty is social protection. Poor people received various social protection programs from the government, for example, cash assistance, fuel subsidies, scholarships, health assistance, and capital assistance to micro and small business actors. These social protection programs ultimately increase the income of the poor, either directly or indirectly through increased economic growth (Perkins et al., 2013). This study found that increased social protection spending indirectly reduces poverty when measured based on the headcount index and the PGI. It means the increase in social protection spending is quite effective at reducing poverty through its impact on the acceleration of inclusive economic growth.

Capital assistance disbursed to micro and small business actors in the regions by the Indonesian government, especially during the pandemic covid-19 can empirically increase business turnover for small and medium-sized enterprises (SMEs) so that in the medium and long terms poverty is reduced both in terms of the percentage of poor people and in terms of increasing the average per capita expenditure for the poor. Another variable that also plays an essential role in decreasing poverty is the growth of the worker number. The negative correlation between workers and poverty reduction is in line with Nepram et al. (2021), who found the absorption of laborers creates a balance income distribution between poor and nonpoor communities.

CONCLUSION

Poverty has become a crucial issue and a vital concern for the government in Indonesia during the past decades include South Sulawesi Province. Increasing government spending on infrastructure, education, and health is the priority strategy for overcoming the problem of poverty in the future. Based on the estimation, the study concludes that government spending has a different effect on reducing poverty in Indonesia. It depends on the type of government spending, poverty measurement indicators, and the analytical model. Increased expenditure on education is quite effective in reducing the percentage of the poor and minimizing the poverty depth index by accelerating economic growth. Increased spending on infrastructure is quite effective in reducing the headcount index but ineffective in minimizing poverty depth and severity levels. While social protection spending was needed by the poor and those vulnerable to poverty,

EcceS:
Economics, Social, and Development Studies
Fakultas Ekonomi dan Bisnis Islam, UIN Alauddin Makassar
Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

this study does not find a strong effect of increasing social protection spending on reducing the headcount, depth, and poverty severity index. Control variables that had to correlate with poverty reduction are economic growth, GDI, and labor growth.

To improve the effectiveness of regional government spending in solving the poverty problem, some policy alternatives are recommended as follows: (i) increasing the quantity and the quality of government spending on education, health, and infrastructure that focus on accelerating inclusive growth, (ii) increasing the quality of human resources that are gender-responsive especially for the poor communities, (iii) providing adequate infrastructure in regions with bigger populations to facilitate access for the poor, and (iv) implementing well-targeted social protection programs for the poor. Strategies and policy directions related to poverty reduction in Indonesia not only focus on the four types of government spending as analysed in this study, but also need to analyse the effect of government spending on the agricultural sector. This is reinforced by the fact that most of the poor in Indonesia live in rural areas and their source of income generally comes from the agricultural sector. Therefore, further research needs to analyse the effect of public spending on agriculture which will have a more beneficial impact on the poor and at the same time be able to reduce income inequality.

REFERENCES

Alamanda, A. (2020). The effect of government expenditure on income inequality and poverty in Indonesia. Info Artha, 4(1), pp. 1–11. https://doi.org/10.31092/jia.v4i1.614

Anderson, E., d'Orey, M. A. J., Duvendack, M., & Esposito, L. (2018). Does government spending affect income poverty? A meta-regression Analysis. World Development, 103, 60–71. https://doi.org/10.1016/j.worlddev.2017.10.006

Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. Journal of Political Economy, 98(5, Part 2), pp. S103–S125. https://doi.org/10.1086/261726

Celikay, F., & Gumus, E. (2017). The effect of social spending on reducing poverty. International Journal of Social Economics, 44(5), pp. 620–632. https://doi.org/10.1108/IJSE-10-2015-0274

Central Bureau of Statistics. (2021). Statistics of Indonesia. https://www.bps.go.id/

Cyrek, M. (2019). Government social spending in the EU countries: Efficiency in poverty and income inequality reduction. Equilibrium, 14(3), pp. 405–424. https://doi.org/10.24136/eq.2019.019

Directorate General of Fiscal Balance (DJPK) Ministry of Finance of the Republic of Indonesia

Gujarati, Damodar N., and Dawn C. Porter. 2009. Basic Econometrics. 5th ed. Boston: McGraw-Hill Irwin.

Falade, O. E., & Babatunde, D. (2020). Functional government spending, unemployment and poverty reduction in Nigeria. Journal of Economics and Development Studies, 8(1). https://doi.org/10.15640/jeds.v8n1a9

Hasnul, A. G. (2015). The Effects of Government Expenditure on Economic Growth: The Case of Malaysia [MPRA Paper No. 71254]. Munich Personal RePEc Archive. https://mpra.ub.uni-muenchen.de/71254/1/

Javed, A., Ahmed, V., & Amal, B. K. (2021). The social safety nets and poverty alleviation in Pakistan: An evaluation of livelihood enhancement and protection programme. Britain International of Humanities and Social Sciences (BIoHS) Journal, 3(1), pp. 21–36. https://doi.org/10.33258/biohs.v3i1.357

Lanjouw, P., Pradhan, M., Saadah, F., Sayed, H., & Sparrow, R. (2001). Poverty, Education and Health in Indonesia: Who Benefits from Public Spending? (Working Paper No. 2739). The World Bank. https://invenio.unidep.org/invenio/record/13011/files/lanjouw.pdf

Mankiw, N. Gregory. (2021). Brief Principles Macroeconomics (9th). Cengage Learning, Inc.

Manuel, M., Carson, L., Samman, E., & Evans, M. (2020). *Financing the Reduction of Extreme Poverty Post-COVID-19* (p. 14) [Briefing Note]. ODI. https://cdn.odi.org/media/documents/reducing_poverty_post_covid_final.pdf

Martin, A., Markhvida, M., Hallegatte, S., & Walsh, B. (2020). Socio-economic impacts of COVID-19 on household consumption and poverty. *Economics of Disasters and Climate Change*, *4*(3), 453–479. https://doi.org/10.1007/s41885-020-00070-3

Maisarah, & Sari, C. P. M. (2020). The influence of government expenditure in health and education on poverty in North Aceh. Journal of Maliksussaleh Public Economics, 3(2), 11. https://doi.org/10.29103/jmpe.v3i2.3209

Miežienė, R., & Krutulienė, S. (2019). The impact of social transfers on poverty reduction in EU countries. Baltic Journal of European Studies, 9(1), pp.157–175. https://doi.org/10.1515/bjes-2019-0009

Muhammad, S., Zulham, T., Sapha, D., & Saputra, J. (2019). Investigating the public spending and economical growth on the poverty reduction in Indonesia. Industrial Engineering & Management Systems, 18(3), pp. 495–500. https://doi.org/10.7232/iems.2019.18.3.495

Musgrave, R. M. (1989). The Theory of Public Finance. NY: McGraw-Hill.

Ndinda, C., & Ndhlovu, T. P. (2018). Gender, poverty and inequality: Exploration from a

Volume 10 Number 1 Ed. June 2023 : page:1-22
p-ISSN: 2407-6635 e-ISSN : 2580-5570

transformative perspective. Journal of International Women's Studies, 19(5), pp. 1–12.

Nepram, D., Singh, S. P., & Jaman, S. (2021). The effect of government expenditure on unemployment in India: A state level analysis. The Journal of Asian Finance, Economics and Business, 8(3), pp. 763–769. https://doi.org/10.13106/JAFEB.2021.VOL8.NO3.0763

Nursini, N. (2020). Micro, small, and medium enterprises (MSMEs) and poverty reduction: Empirical evidence from Indonesia. Development Studies Research, 7(1), 153–166. https://doi.org/10.1080/21665095.2020.1823238

Nursini, N., & Tawakkal, T. (2019). Poverty alleviation in the contex of fiscal decentralization in Indonesia. Economics & Sociology, 12(1), pp. 270–285. https://doi.org/10.14254/2071-789X.2019/12-1/16

Odior, E. S. O. (2014). Government expenditure on education and poverty reduction: Implications for achieving the Mdgs in Nigeria a computable general equilibrium micro-simulation analysis. Asian Economic and Financial Review, 23.

Omari, L. V., & Muturi, W. (2016). The effect of government sectoral expenditure on poverty level in Kenya. Journal of Economics and Sustainable Development, 7(8), pp. 219–242.

Perkins, D. H., Radelet, S., Lindauer, D., & Block, S. (Eds.). (2013). Economics of Development (7th ed). W.W. Norton & Company.

Ramos, M. E., Gibaja-Romero, D. E., & Ochoa, S. A. (2020). Gender inequality and gender-based poverty in Mexico. Heliyon, 6(1), e03322. https://doi.org/10.1016/j.heliyon.2020.e03322

Rodríguez, O. J. C. (2009). Poverty reduction approaches in Mexico since 1950: Public spending for social programs and economic competitiveness programs. Journal of Business Ethics, 88(S2), pp. 269–281. https://doi.org/10.1007/s10551-009-0289-4

Romer, D. (2012). Advanced Macroeconomics (4th). McGraw-Hill Irwin

Samuel, A., O. (2020). Does government spending reduce poverty in Nigeria? Evidence from auto-regressive distributed lag specification. Ekonomi Bisnis, 25(1), 14–25.

Sasana, H., & Kusuma, P. (2018). Government expenditure and poverty in Indonesia. KnE Social Sciences, 3(10), 142. https://doi.org/10.18502/kss.v3i10.3125

Shafuda, C. P. P., & De, U. K. (2020). Government expenditure on human capital and growth in Namibia: A time series analysis. Journal of Economic Structures, 9(1), 21. https://doi.org/10.1186/s40008-020-00196-3

Sumner, A., Hoy, C., Ortiz-Juarez, E., & Unu-Wider. (2020). *Estimates of the Impact of COVID-19 on Global Poverty* (43rd ed., Vol. 2020). UNU-WIDER. https://doi.org/10.35188/UNU-

WIDER/2020/800-9

Suryahadi, A., Izzati, R. A., & Suryadarma, D. (2020). The Impact of COVID-19 Outbreak on Poverty: An Estimation for Indonesia (p. 20). The SMERU Research Institute http://ns2.smeru.or.id/sites/default/files/publication/wp_covid19impact_draft.pdf

Taruno, H. T. (2019). Public spending and poverty reduction in Indonesia: The effects of economic growth and public spending on poverty reduction in Indonesia 2009-2018. The Indonesian Journal of Planning and Development, 4(2), 49–56. https://doi.org/10.14710/ijpd.4.2.49-56

UNICEF. (2020). *Estimating the Impact of COVID-19 on Child Poverty in Georgia Using a Micro-Simulation Model* (p. 32). https://www.unicef.org/georgia/media/4871/file/COVID-19_impact_on_child_poverty_in_Georgia.pdf