The effect of economic growth and poverty on stunting in Indonesia

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Abstract.
Stunting is a critical issue affecting children under five years old, characterized by inadequate growth due to chronic malnutrition and recurrent infections, especially during the crucial first 1,000 days of life (from age 0 to 23 months). Stunting impacts not only height but also vital functions such as brain development and the immune system, potentially leading to decreased intelligence levels and increased susceptibility to diseases later in life. This study examines the impact of the growth of the Gross Regional Domestic Product (GRDP) in the primary, secondary, and tertiary sectors and the level of rural poverty on stunting in Indonesia. This research, which covers time series data from 2015-2020 across 32 provinces in Indonesia, employs a panel data regression model analysis method. The findings indicate that primary sector GRDP growth has a positive effect, whereas secondary sector GRDP negatively impacts stunting. However, the tertiary sector GRDP and rural poverty do not significantly affect stunting rates in Indonesia.

Keywords: *Economic growth, Poverty, Stunting*

JEL Classification: I15, J13, Q18

INTRODUCTION

Stunting is a critical condition characterized by impaired growth in children under five years old, resulting from chronic malnutrition and recurrent infections, particularly during the first 1,000 days of life, from birth to 23 months. This condition signifies that inadequate nutrition intake adversely impacts physical growth and crucial bodily functions such as brain development and the immune system. The development from conception until a child reaches 24 months is pivotal, shaping an individual's potential regarding morbidity and mortality risks, academic performance, earning capabilities, physical strength, and the likelihood of developing chronic diseases (Bloem et al., 2013).

Stunting is identified as a growth disorder arising from malnutrition in children under five (Rahayu et al., 2018). A child is classified as stunted if their height falls below -3 standard deviations from the World Health Organization (WHO) Child Growth Standards median, considering their age and gender (Onis & Branca, 2016).

Stunting recognized as a significant global health challenge, affects approximately 165 million children worldwide (Prendergast & Humphrey, 2014).

Stunting is a linear growth disorder that manifests from pregnancy up to 23 months, reflecting the long-term and cumulative consequences of insufficient nutrition, healthcare, and caregiving practices (Bloem et al., 2013). Various factors contribute to this condition, including poverty, inadequate nutrition, suboptimal health, environmental conditions, and poor sanitation. Social and cultural factors such as education, employment, income levels, re-exposure to infectious diseases, food insecurity, and limited access to health services rank among the primary causes of stunting (Wahdah et al., 2016). Family income is notably linked to the occurrence of stunting in infants aged 6-12 months.

Indonesia is positioned as having the third highest stunting rate in the Southeast Asian Region, following Timor-Leste and India. Although there was a decrease in the percentage of stunting from 37.8% in 2013 to 27.67% in 2019, the prevalence remains alarmingly high. Stunting among children under five in 2019 decreased compared to 2018, dropping from 30.8% to 27.7%. Despite this progress, the statistic is still concerning, with 28 out of every 100 toddlers classified as stunted. The Central Statistics Agency (BPS) has also highlighted that the prevalence of stunting in Indonesia is notably higher than in other middle-income countries. The issue of stunting warrants significant attention due to its impact on cognitive development, susceptibility to diseases, reduced productivity, and broader economic ramifications, including impeded economic growth, increased poverty, and inequality.

There is a consensus that economic growth alone is insufficient for achieving significant reductions in stunting prevalence, as its effect is deemed too marginal (Ruel & Alderman, 2013). This observation is underscored by examples from countries like Sri Lanka and Kerala in India, where the prevalence of stunting exceeds what would be expected based on their income levels, pointing to the importance of other factors such as local policy frameworks and the effectiveness of public health nutrition programs (IFPRI, 2014).

The majority of the literature has explored the relationship between macroeconomic growth and child stunting, yet the overall impact remains a contentious issue (Harttgen et al., 2013; O'Connell & Smith, 2016; Ruel & Alderman, 2013; Smith & Haddad, 2015; Vollmer et al., 2014). A significant gap in these studies is the lack of a definitive answer to whether agricultural growth is more effective in reducing stunting than non-agricultural growth. This study addresses this question, examining the pivotal roles of the agricultural and non-agricultural sectors as strategies for economic growth to mitigate stunting in Indonesia.

Several studies have assessed the impact of sectoral growth on child stunting. For instance, Webb & Block (2012) discovered that stunting is significantly responsive to agricultural growth but less to non-agricultural growth. Their analysis across 29 countries suggested that agricultural growth could be at least twice as effective as non-agricultural growth in reducing stunting. Conversely, Headey (2013) found that while non-agricultural growth led to a reduction in stunting, agricultural growth did not have a statistically significant effect on child stunting, and the difference in estimated impacts between agricultural and non-agricultural growth was statistically negligible. However, Mary (2018) reported that the impacts of agricultural growth are considerably substantial, with a 10% increase in agricultural GDP correlating to a 9.6% reduction in

child stunting, concluding that agricultural growth is more beneficial than non-agricultural growth for achieving reductions in child stunting.

Contrary to several findings, Frimpong et al. (2016) argue that the prevalence of stunting tends to rise with economic growth, particularly highlighting that in developing countries, economic expansion could lead to increased stunting and poverty levels. This perspective diverges from the broader consensus that economic growth is a crucial mechanism for alleviating poverty and reducing child malnutrition, as identified by Rashad & Sharaf (2018), who advocate for economic growth as an effective tool to combat these issues. Specifically, Mary (2018) demonstrates that growth within the agricultural sector is notably more impactful in curbing stunting than in the non-agricultural sector.

Despite various articles in prior literature indicating a relationship between economic growth and a decreased prevalence of childhood stunting, the strength of this association is generally deemed minimal. For instance, Bershteyn et al. (2015) observed that a 10% increase in GDP correlated with a meagre 0-2% reduction in stunting rates in six studies. Harttgen et al. (2013) noted that despite significant GDP growth in numerous low- and middle-income countries over recent decades, rates of stunting and undernutrition have only slightly decreased. Meanwhile, Ruel & Alderman (2013) found that a 10% increase in GDP per capita was linked to a modest decrease in stunting prevalence of about six percentage points. However, this finding contrasts with a more recent study by Subramanyam et al. (2011), which utilized a multilevel analysis across Indian states and concluded that economic growth did not correlate with reductions in stunting or other measures of undernutrition. This discrepancy underscores the complexity of the relationship between economic growth and nutritional outcomes, suggesting that additional factors and sector-specific growth dynamics play critical roles in addressing childhood stunting.

Recent literature has begun to highlight the significance of the quality of economic growth in mitigating child undernutrition. Aguayo & Menon (2016) explored the influence of intermediary factors on stunting, including sanitation, governance, nutrition programs, growth in food production and infrastructure, access to health services, education, and fertility rates. These studies suggest that economic growth, which enhances the incomes of individuals while simultaneously improving the quality and equity of these intermediate factors, is likely to be the most effective strategy for reducing the prevalence of child stunting (Haddad, 2015).

Research in Semarang has indicated that the number of family members is a risk factor for stunting in children aged 24-36 months (Nasikhah & Margawati, 2012). Similarly, a study from Southern Ethiopia revealed that toddlers living in households with 5 to 7 members had a 2.97 times higher risk of stunting compared to those residing in smaller households with 2 to 4 members, attributing this risk to reduced food availability in larger families (Fikadu et al., 2014). In East Java, a study correlating the prevalence of stunting among toddlers with family income in 2015 found that Bangkalan had the highest rate of stunting, with 54.8% of the families of stunted toddlers earning below the minimum wage of 1,414,000 IDR, highlighting income as a critical indicator of economic status (Illahi, 2017). Furthermore, research in Nepal has identified the household wealth index as a risk factor for stunting (Tiwari et al., 2014). The ability of families to purchase food is influenced not only by income but also by the cost of foodstuffs. Consequently, the inability to afford certain expensive food items

results in their infrequent consumption within the family, leading to inadequate nutritional intake (Illahi, 2017).

The disparities among prior research remain a contentious topic among scholars, particularly focusing on Indonesia. This highlights the necessity to accentuate the variances observed in these studies. The debate extends to the effectiveness of agricultural development as a strategy for mitigating child stunting. This matter remains unresolved due to the current divergence in viewpoints and lack of research. Accordingly, this study aims to scrutinize the impact of the Gross Regional Domestic Product (GRDP) across the primary, secondary, and tertiary sectors, as well as the influence of the poverty rate on the prevalence of stunting within Indonesia. The significance of this research lies in its potential to offer evidence-based recommendations for economic policies aimed at stunting reduction. Moreover, it aspires to enrich the academic discourse by contributing valuable insights to the interdisciplinary fields of economics and health.

METHODS

This study employs panel data comprising time series data from 2015 to 2020 across 32 provinces in Indonesia, sourced from the Indonesian Central Bureau of Statistics. The analytical method utilizes a panel data regression model, which is formulated as follows:

$$ST_{it} = \beta_0 + \beta_1 GRDPP_{it} + \beta_2 GRDPS_{it} + \beta_3 GRDPT_{it} + \beta_4 PM_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

- ST_{it} denotes the number of stunting cases in the *i*th province at time *t*.
- β_0 is the intercept, representing the baseline level of stunting when all independent variables are equal to zero.
- β_1, β_2, β_3, and β_4 are the coefficients for the respective independent variables, quantifying the expected change in the number of stunting cases associated with a one-unit change in each variable, holding all other variables constant.
- $GRDPP_{it}$, $GRDPS_{it}$, and $GRDPT_{it}$ represent the Gross Regional Domestic Product (GRDP) from the primary, secondary, and tertiary sectors, respectively, for the *i*th province at time *t*.
- *PMit* refers to the rural poor population in the *i*th province at time *t*.
- ε_{it} is the error term, capturing unobserved factors that influence the number of stunting cases in the *i*th province at time *t*.

The estimation of regression models using panel data can be approached through three distinct methods: the common effect model (CEM), the fixed effect model (FEM), and the random effect model (REM). Several diagnostic tests, including the Chow, Hausman, and Lagrange Multiplier (LM) tests, are employed to determine the most suitable model for analyzing panel data.

- The Chow test aims to determine the optimal model for estimating panel data between the common effect model and the fixed effect model. It assesses the homogeneity of intercepts across entities (e.g., provinces) to decide whether a common intercept (CEM) or entity-specific intercepts (FEM) are more appropriate.
- The Hausman test chooses the most appropriate model between the fixed effect and random effect approaches. It evaluates the consistency of estimators to determine whether unobserved effects are correlated with the independent variables, influencing the choice between FEM and REM.

- The Lagrange multiplier test is designed to identify the preferred method between common effects and random effects in panel data regression. It checks for random effects at the entity level, indicating whether a simpler common effects model suffices or a more complex random effects model is warranted.

RESULTS AND DISCUSSION

Comparison of primary sector GRDP by province in Indonesia

Agricultural growth is considered more effective than non-agricultural growth in reducing undernutrition due to the large multiplier effect and inter-sectoral linkages that cause higher labour demand and wages in rural areas, allowing The more prominent role of agricultural growth also depends on many poor households and stunted children living in rural areas (Brainerd & Menon, 2014).

Upon closer examination of the bar chart displaying the average value of primary sector GRDP by province in Indonesia from 2015 to 2020, several insights emerge. The chart highlights a significant disparity in the economic contribution of the primary sector across different provinces (Figure 1).

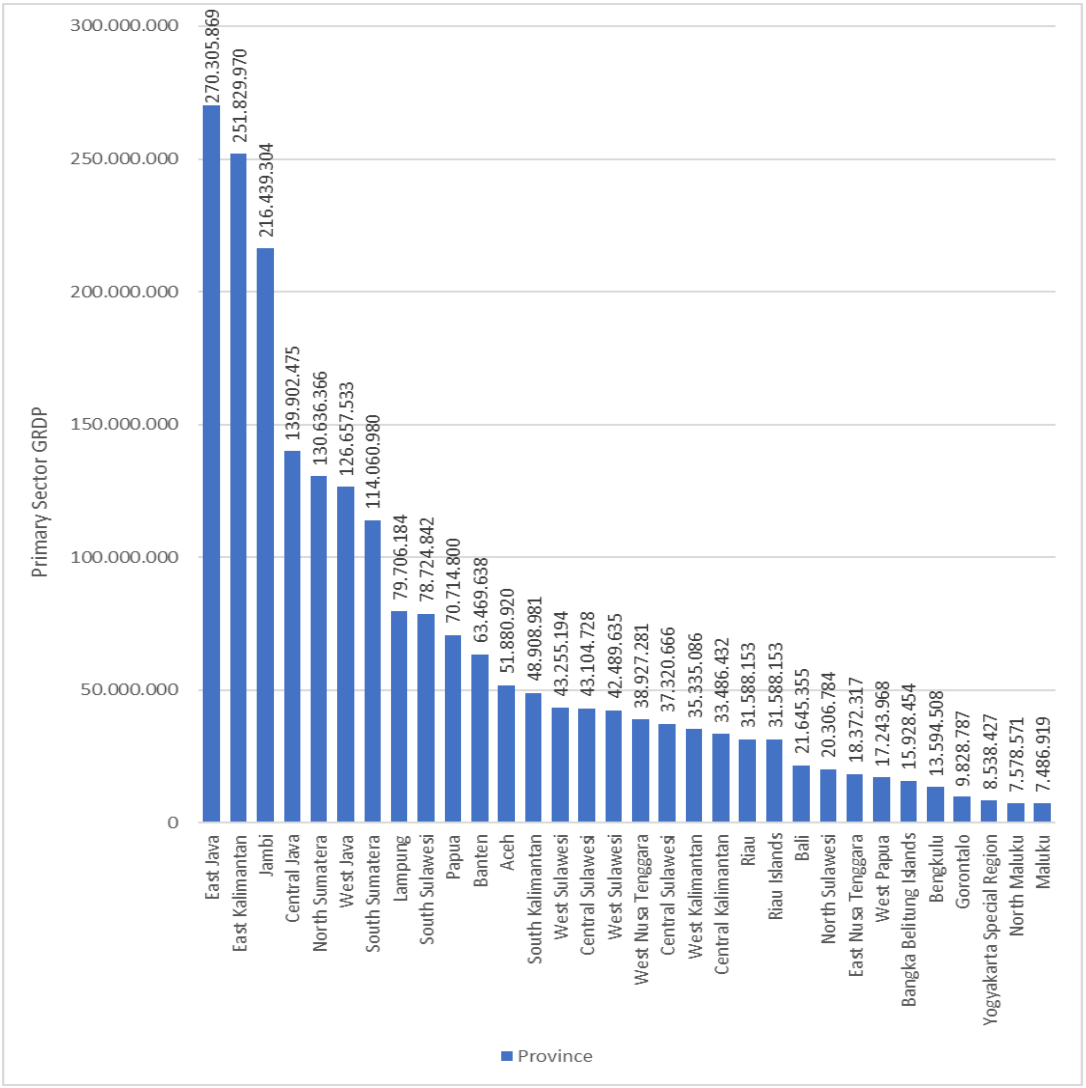

Figure 1. The average value of primary sector GRDP by the province in Indonesia 2015-2020

Source: Indonesia's Central Statistics Agency (BPS)

Provinces such as East Java, East Kalimantan, and Riau appear to have substantially higher GRDP values, which could indicate a robust agricultural or primary sector. This robustness will likely positively impact local economies, especially in rural areas where agriculture constitutes a significant portion of livelihoods. The high GRDP in these regions could correlate with Brainerd & Menon's (2014) findings that agricultural growth effectively reduces undernutrition and poverty through increased labour demand and higher wages, allowing for improved caloric consumption and dietary diversification.

Conversely, provinces like Maluku, West Papua, and North Maluku are shown to have the lowest values in the primary sector GRDP. The low economic output in the primary sector for these regions could suggest less developed agricultural activities or a smaller contribution of the primary sector to the overall economy. This might imply that these provinces could have less benefit from the multiplier effect and inter-sectoral linkages described by Brainerd and Menon. Consequently, these regions might face greater challenges in combating undernutrition and poverty. The potential lack of economic opportunities in the primary sector could lead to lower household incomes, which in turn may limit access to sufficient and diverse foods, perpetuating cycles of undernutrition.

The data presented invites policymakers to consider targeted interventions to bolster the primary sector in underperforming provinces. By understanding the specific challenges and opportunities within each province, strategies can be developed to enhance agricultural productivity, infrastructure, and market access, particularly in regions where the primary sector's potential has not been fully realized. Such strategies could contribute to Indonesia's overall economic growth and the well-being of its rural population, aligning with the observations made by Brainerd and Menon on the importance of agricultural growth in improving nutritional outcomes and reducing poverty at the household level.

Comparison of secondary and tertiary sector GRDP by province in Indonesia

Several studies have analyzed the impact of sectoral growth on child stunting. Webb & Block (2012) found that stunting responds substantially to agricultural growth than non-agricultural growth. Using the sample from 29 countries, Webb & Block (2012) claim that the growth of agriculture may be at least twice as effective as non-agriculture growth. On the other hand, Mary (2018) found that the estimated impacts are relatively large, with a 10% increase in agricultural GDP reducing child stunting by 9.6%, and concluded that agricultural growth is better than non-agricultural growth for decreasing child stunting.

Figure 2 depicts the average value of Secondary Sector GRDP by province in Indonesia from 2015 to 2020. The data illustrates a marked concentration of economic output in provinces like West Java, Central Java, and East Java. These regions, known for their industrial and manufacturing hubs, underscore the significant role of the secondary sector in Indonesia's economy. This finding is particularly relevant in light of research by Webb & Block (2012), suggesting that while agricultural growth is more effective at reducing child stunting, the secondary sector's growth should not be overlooked, as industrialization can lead to improved infrastructure, healthcare, and education, indirectly benefiting child nutrition. Moreover, the secondary sector's ability

to generate employment and increase household incomes can improve food security and access to health services, which are vital in combating stunting.

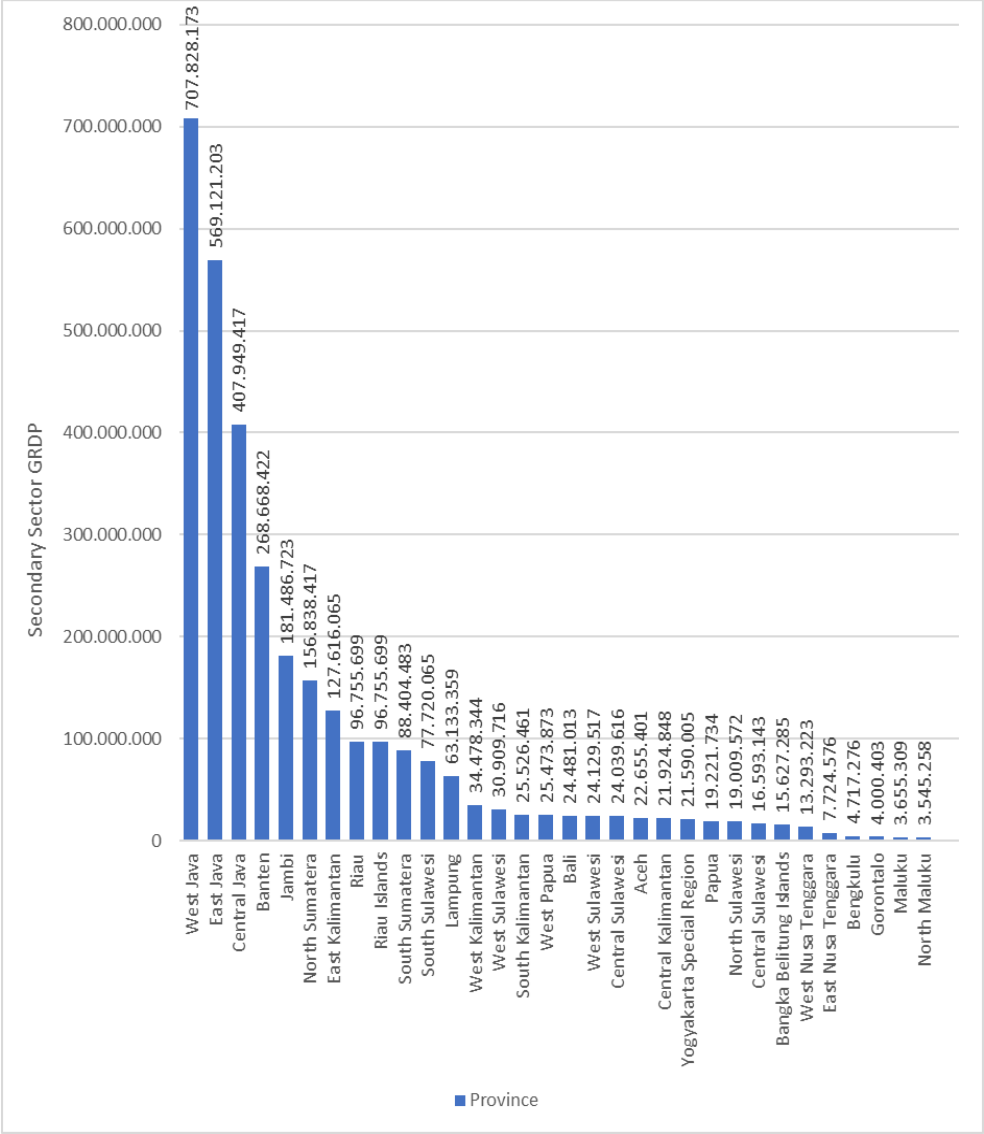

Figure 2. The average value of secondary sector GRDP by province in Indonesia 2015-2020

Source: Indonesia's Central Statistics Agency (BPS)

Moving to Figure 3, which presents the average value of Tertiary Sector GRDP by province in Indonesia for the same period, it is evident that provinces like East Java, Jakarta, and West Java are leading in economic output. The tertiary sector, encompassing retail, transport, and financial services, is crucial for economic diversification and resilience. Although Mary (2018) emphasizes the superior impact of agricultural growth on reducing child stunting, the tertiary sector creates an environment where economic benefits can permeate different layers of society, including rural and agricultural communities. Enhanced services can lead to better health care systems, education, and social services, which are fundamental in addressing child stunting. The tertiary sector's growth could also signify an advancing economy where the agricultural sector's improvements are supported and amplified by better service provision.

In both figures, the high GRDP values in certain provinces suggest a potential for

regional economic strategies tailored to leverage each sector's strengths. Policymakers should consider integrated approaches that focus on enhancing agricultural productivity and developing the secondary and tertiary sectors to support the primary sector's contributions to societal well-being and address the critical issue of child stunting. Such an approach could ensure a holistic development model where economic growth across all sectors reduces child stunting and improves Indonesian children's overall quality of life.

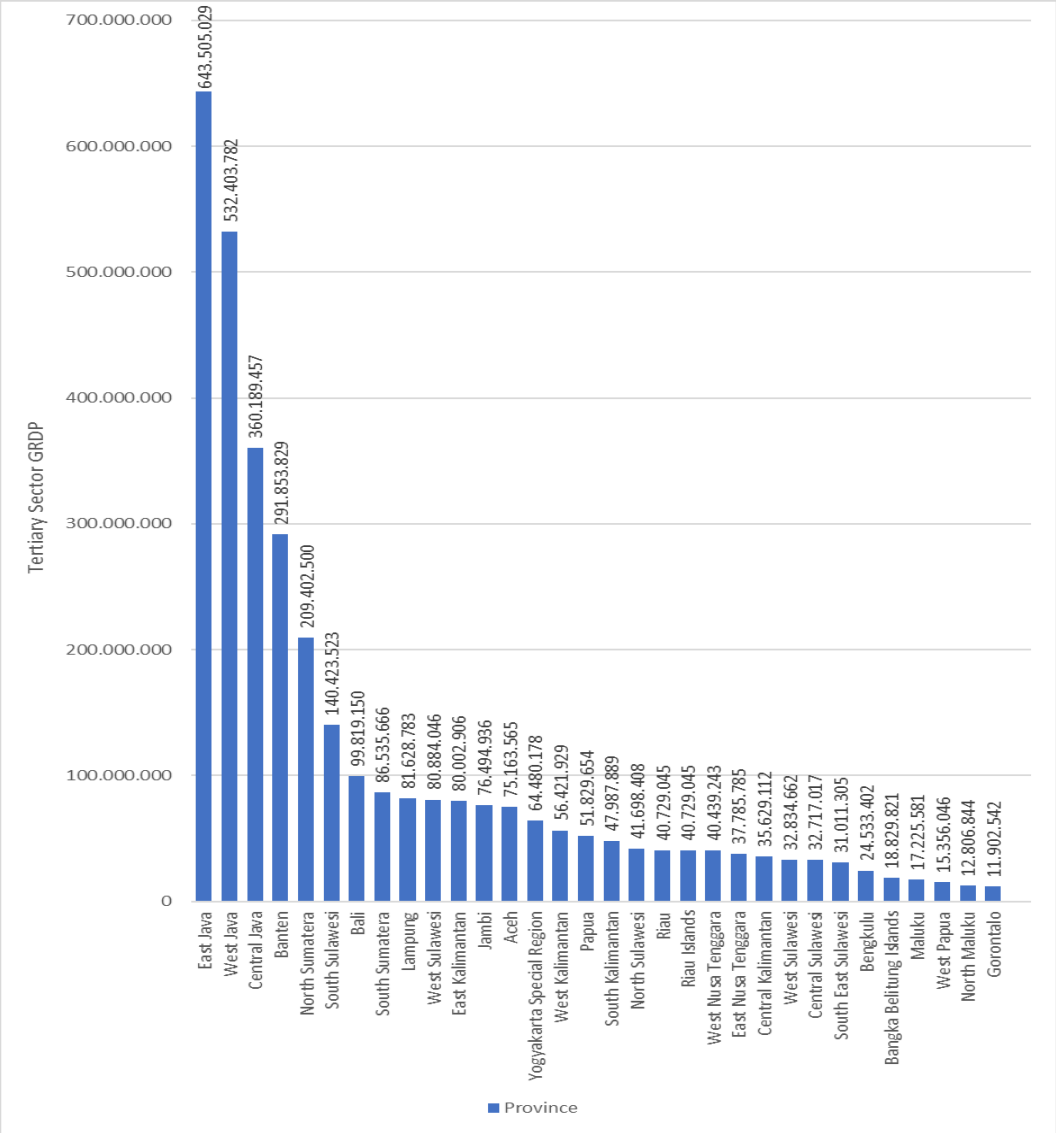

Figure 3. The average value of tertiary sector GRDP by province in Indonesia 2015-2020

Source: Indonesia's Central Statistics Agency (BPS)

Comparison of poverty by province in Indonesia

Given that poverty significantly impacts the reduction of people's welfare, it is identified as a multidimensional issue confronted by nearly all governments globally. This necessitates the formulation of specific policy strategies by governments to tackle the problem of poverty, an imperative, especially for developing countries in the course of national development.

Indonesia's Central Statistics Agency (BPS) has released data on poverty in Indonesia based on the September 2020 National Economic Survey. According to the data, the percentage of poor people in September 2020 rose to 10.19 per cent, an increase of 0.41 per cent in March 2020 and an increase of 0.97 per cent in September 2019. This group of poverty is divided into two, namely urban and rural. The percentage of the urban poverty population in March 2020 was 7.38%, which increased to 7.88% in September 2020. Meanwhile, the percentage of the rural poor in March 2020 was 12.82%, which increased to 13.20% in September 2020.

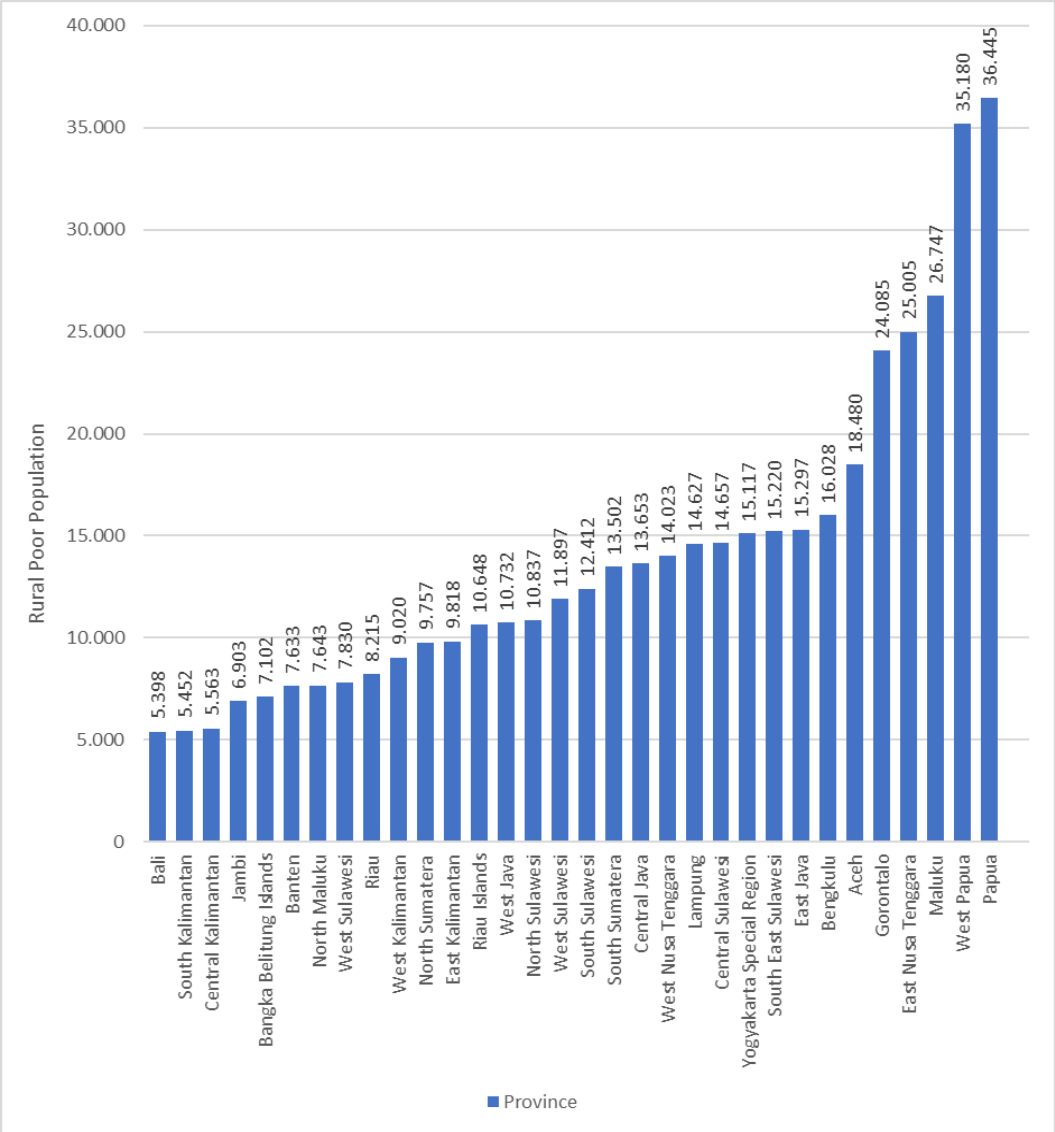

Figure 4. Average rural poor population by province in Indonesia 2015-2020

Source: Indonesia's Central Statistics Agency (BPS)

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The effect of economic growth and poverty on stunting in Indonesia

Common effect model

The analysis unfolds through several stages, starting with the common effect. The estimation of the common effect model is presented in Table 1.

Table 1. Common effect model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.535125	16.53945	0.274201	0.7844
GRDPP	3.148507	1.135087	2.773803	0.0063
GRDPS	-2.965654	1.240870	-2.389979	0.0183
GRDPT	0.795346	1.483797	0.536021	0.5928
PM	0.290051	0.161208	1.799230	0.0743
R-squared	0.118561	Mean dependent var		25.26737
Adjusted R-squared	0.091851	S.D. dependent var		8.432472
S.E. of regression	8.035879	Akaike info criterion		7.041524
Sum squared resid	8523.946	Schwarz criterion		7.148092
Log-likelihood	-477.3444	Hannan-Quinn criteria.		7.084830
F-statistic	4.438800	Durbin-Watson stat		1.013153
Prob(F-statistic)	0.002130			

Model, which provides preliminary insights into the relationship between economic sectors and stunting, indicating that the primary and secondary sectors significantly affect stunting levels, as evidenced by their prob. values being less than 0.05. This model explains 9.19% of the variation in stunting cases (adjusted R-squared).

Fixed effect model

Further analysis is conducted using the fixed effect model (Table 2), which accounts for unobserved variables that vary across provinces but are constant over time. This model shows that GRDP variables from the primary and secondary sectors significantly influence stunting, explaining a higher proportion of variation (27.14% adjusted R-squared) than the Common Effect Model.

Table 2. Fixed effect model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	397.7798	133.9298	2.970061	0.0037
GRDPP	14.16101	6.788945	2.085892	0.0393
GRDPS	-37.78145	19.26442	-1.961203	0.0524
GRDPT	3.905157	16.77549	0.232789	0.8164
PM	-1.888742	1.312427	-1.439122	0.1530
Effects Specification				
Cross-Section Fixed (Dummy Variables)				
R-squared	0.410663	Mean dependent var		25.26737
Adjusted R-squared	0.271365	S.D. dependent var		8.432472
S.E. of regression	7.197969	Akaike info criterion		6.960135
Sum squared resid	5699.184	Schwarz criterion		7.535606
Log-likelihood	-449.7692	Hannan-Quinn criteria.		7.193992
F-statistic	2.948089	Durbin-Watson stat		1.505220
Prob(F-statistic)	0.000046			

Random effect model

The random effect model (Table 3), which assumes that individual-specific effects are uncorrelated with the independent variables, is then examined. However, this model finds no variables significantly affecting stunting at the 0.05 level, explaining only 3.25% of the variation in stunting cases (adjusted R-squared).

Table 3. Random effect model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.62579	22.54147	0.471388	0.6381
GRDPP	2.944506	1.556613	1.891611	0.0607
GRDPS	-2.756210	1.722621	-1.600009	0.1120
GRDPT	0.444038	2.066544	0.214870	0.8302
PM	0.304941	0.225143	1.354432	0.1779
Effects Specification				
			S.D.	Rho
Cross-section random			3.639694	0.2036
Idiosyncratic random			7.197969	0.7964
Weighted Statistics				
R-squared	0.060984	Mean dependent var		15.89660
Adjusted R-squared	0.032529	S.D. dependent var		7.438615
S.E. of regression	7.331684	Sum squared resid		7095.474
F-statistic	2.143165	Durbin-Watson stat		1.217470
Prob(F-statistic)	0.078986			
Unweighted Statistics				
R-squared	0.117605	Mean dependent var		25.26737
Sum squared resid	8533.197	Durbin-Watson stat		1.012343

Diagnostic test

The results of the diagnostic tests for a specified dataset are summarized in Table 4, which provides a clear comparison between the models based on statistical significance and probability values.

Table 4. Diagnostic test

Chow Test			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.478217	(22,110)	0.0011
Cross-section Chi-square	55.150240	22	0.0001

Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.981701	4	0.0316

The Chow test compares the common effect and fixed effect models to determine which more accurately fits the data. The significant probability values, 0.0011 for the Cross-section F and 0.0001 for the Cross-section Chi-square, strongly indicate that the fixed effect model is preferable to the common effect model for this dataset. These low probability values signify a significant difference in the group effects across cross-sections, which the common effect model, assuming uniform effects across all entities, fails to capture. This evidence suggests that individual entity characteristics significantly influence the model. Consequently, the fixed effect model, accommodating varying intercepts to account for these differences, is deemed more suitable.

Similarly, the Hausman test compares the fixed effect and random effect models to identify the most suitable model for achieving the research objectives. The test results in a Chi-square statistic of 8.981701 with a probability value of 0.0316, indicating a significant difference between the estimators of the fixed and random effect models. This significant probability value suggests that the unique error components in the random effect model are correlated with the regressors, violating the model's

assumptions. Thus, the fixed effect model, accounting for unobserved heterogeneity by allowing individual effects to vary across entities, is more appropriate for the analysis.

Given the selection of the fixed effect model as the more suitable option in both the Chow and Hausman tests, further selection using the LM test is unnecessary. The significant probability values in both tests highlight the fixed effect model's capability to capture the nuances of the data more accurately by accounting for unobserved heterogeneity correlated with the explanatory variables. Therefore, the fixed effect model is identified as the optimal model for this research, ensuring a more precise and reliable analysis in alignment with the research objectives.

Discussion

The transformation of the economic structure is a key indicator in the economic development process of a region. A successful transition in the economic structure is beneficial for the region's economic development. The analysis reveals that only the Gross Regional Domestic Product (GRDP) variables for the primary and secondary sectors significantly impact stunting in Indonesia. In contrast, the tertiary sector and rural poverty do not significantly affect stunting (Table 2).

The primary sector is crucial in extracting natural resources directly from the earth. This sector is fundamentally involved in the process of harvesting or extracting materials from the ground, encompassing activities such as coal mining, rice farming, oil production (like extracting oil from the ground), fisheries (including fish farming), and forestry (such as tree cultivation). In many developing countries, the primary sector often dominates economic activity; however, as the secondary and tertiary sectors expand, the primary sector's contribution to the overall economic output typically diminishes.

The coefficient for the primary sector GRDP variable is 14.16101, indicating a positive relationship; this suggests that a 1% increase in the GRDP of the primary sector is associated with a 14.16% increase in stunting in Indonesia. Moreover, This finding aligns with research by Harttgen et al. (2013), which observed that despite significant GDP growth in many low- and middle-income countries over recent decades, stunting and undernutrition levels have seen minimal improvement, particularly in countries where the primary sector still plays a significant role and remains underdeveloped.

This discovery is somewhat consistent with the conclusions of Webb & Block (2012); however, the current study did not corroborate the notion that agricultural growth (within the primary sector) is twice as effective as non-agricultural growth in reducing stunting, possibly due to the utilization of a more extensive data set. Moreover, these findings contrast with those of Headey (2013), particularly concerning the impact of agricultural growth.

The secondary sector, which relies on the primary sector for the raw materials needed for production, plays a pivotal role in the economic development of a country. Nations that focus predominantly on agriculture and other primary sector activities often experience slower economic growth and remain classified as underdeveloped or developing economies. In contrast, transforming raw materials into finished products adds significant value and is a key driver of more developed economies' enhanced profitability and rapid economic advancement.

The coefficient for the secondary sector GRDP variable is -37.78145. This

indicates a negative relationship, suggesting that a 1% decrease in the GRDP of the secondary sector is associated with a 37.78% reduction in the stunting rate in Indonesia. This outcome underscores the critical influence of industrial and manufacturing growth within the secondary sector on improving health outcomes, such as reducing stunting rates, by fostering economic development and stability.

The GRDP in the tertiary sector, which encompasses services, does not exhibit a significant influence or relationship with the prevalence of stunting within the Indonesian population. These findings suggest that, despite variations in the GRDP of the tertiary sector reflecting changes in the economic quality of the service sector, they do not affect the incidence of stunting among Indonesians.

This conclusion further implies the presence of other factors that significantly impact stunting, indicating that indicators of economic development success are not the dominant influences on the incidence of stunting in Indonesia. Therefore, it is evident that factors beyond GRDP play a more substantial role in influencing the prevalence of stunting. Consequently, economic development efforts alone cannot be considered the primary policy measure for directly reducing the incidence of stunting in Indonesia, highlighting the need for a multifaceted approach to address this health issue.

Our analysis reveals that the connection between the prevalence of rural poverty and the incidence of stunting in Indonesia does not show a statistically significant correlation. This finding contrasts with the results presented by Fikadu et al. (2014), who identified a notable relationship between poverty levels and stunting rates. Despite this divergence, the Indonesian government is proactively implementing various interventions to reduce the prevalence of stunting, with a bold objective to decrease it to below 20% within the next five years.

Stunting is recognized not merely as a consequence of inadequate nutrition but also as a marker of the broader cycle of poverty affecting communities. The pivotal role of poverty in contributing to the elevated rates of stunting among children under five years old is well established. Families experiencing poverty encounter difficulties in securing enough nutritious food for their children often, leading to impaired growth and development, referred to as stunting. This situation highlights the complex link between socioeconomic status and nutritional outcomes, stressing the importance of holistic strategies that address the immediate nutritional requirements and the underlying socioeconomic factors.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The analysis of the Gross Regional Domestic Product (GRDP) across different sectors in Indonesia yields significant insights into the factors affecting stunting in the country. The GRDP of the primary sector has a positive and significant impact on stunting, likely due to the sector's relatively low productivity levels compared to those of the secondary and tertiary sectors. Conversely, the GRDP of the secondary sector demonstrates a negative and significant effect on stunting, indicating that industrial and manufacturing growth may contribute to reducing stunting rates. Additionally, although negative, the GRDP of the tertiary sector does not significantly influence stunting rates in Indonesia. The analysis further reveals that the percentage of rural poverty, with a

probabilistic value of 0.1530—exceeding the alpha threshold of 0.05—does not significantly affect stunting rates in the country. These findings highlight the complex interplay between economic development and health outcomes, specifically the prevalence of stunting.

Recommendations

Given these findings, it is crucial to develop inclusive and sustainable policies or programs to address stunting, considering poverty's significant role in contributing to this health issue. Since a poor household's inability to meet nutritional needs directly influences stunting in children under five, efforts to alleviate poverty should be prioritized alongside strategies specifically designed to reduce stunting rates. Additionally, considering the limitations of this research, such as its broad geographic scope, future studies are encouraged to conduct more focused investigations at the city or district level to provide more detailed insights and enable the formulation of targeted interventions.

The government's ongoing efforts to reduce the stunting rate to below 20% within the next five years must address nutritional status and the underlying poverty perpetuating this cycle. By prioritizing poverty reduction and implementing programs to improve nutrition and health outcomes, Indonesia can make significant progress toward mitigating the challenge of stunting among its youngest citizens.

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