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The Relationship Between Education Level and Population Structure on Labor Absorption in Gorontalo Province

Moh. Arif Novriansyah[1]*, Herwin Mopangga[1], Anggita Permata Yakup[2]
[1]State University of Gorontalo, Gorontalo City, Gorontalo 96128, Indonesia
[2]Universitas Gorontalo, Limboto, Gorontalo 96211, Indonesia
*Corresponding Email: moh.arif.novriansyah@gmail.com

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ABSTRACT

This study aims to analyze the influence of Educational Attainment and Population Structure on Labor Absorption in Gorontalo Province. A quantitative approach was employed using multiple linear regression analysis with secondary data derived from nine observations, covering variables such as education level, demographic structure, and labor absorption. The results indicate that both Educational Attainment and Population Structure have a positive and statistically significant impact on labor absorption, both partially and simultaneously. The regression model shows an R^2 value of 0.855, indicating that 85.5% of the variation in labor absorption can be explained by the two independent variables. These findings suggest that improving the quality of education and effectively managing the productive-age population are key factors in enhancing regional labor absorption. The study concludes that integrated policies between the education and employment sectors, along with optimal utilization of demographic bonuses, are essential. It is recommended that local governments focus on increasing the competence of the workforce through education aligned with labor market needs, and expanding inclusive and sustainable employment opportunities.

Keywords: Demographic Bonus; Educational Attainment; Labor Absorption; Multiple Linear Regression; Population Structure

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INTRODUCTION

The availability and absorption of labor is not only a statistical figure in economic reports, but also reflects the extent to which a region is able to bring hope and well-being to its inhabitants. When people have decent jobs, it means they have access to income, life stability, and opportunities to thrive. However, when employment is limited, not only is the economy hampered, but people's expectations are also forced to be delayed. In this context, the absorption of labor is a true mirror of the success of development that is directly felt by the community.

Indonesia, like other developing countries, faces a major challenge in creating enough jobs for its population. The promising economic growth has not been fully able to keep up with the rapid increase in the working-age population. Every year, millions of young people graduate from school and university with great hopes of getting into work soon. However, the reality on the ground is often not as beautiful as dreams in the jobs available are still far from enough, not to mention the problem of mismatch between graduate skills and the ever-evolving needs of the workforce.

The pressure on the labor market is felt heavier in areas with high unemployment rates and unequal access to education. Many regions still rely on the informal sector, which unfortunately does not always provide a guarantee of job security or stable income. In this situation, those who do not have adequate education or relevant skills will be left behind. This is not only an economic issue, but also a social justice issue: how to ensure that every individual, regardless of their regional origin and background, has an equal opportunity to live a decent life and contribute to nation-building.

Studies show that education level plays a significant role in determining an individual's ability to enter and survive in the job market. Research by Rahmah & Juliannisa (2022) in West Java and Rahayu (2019) in Jambi concluded that improving education has a direct impact on increasing labor absorption. Nevertheless, the effectiveness of vocational education is still a matter of debate due to challenges in the curriculum and incompatibility with industry needs (Zukna & Sassi, 2024). This indicates that there is a gap between educational output and real labour market needs.

In addition to education, demographic factors also play an important role. Population growth that is not balanced with job creation has the potential to increase the unemployment rate (Alisman et al., 2022). In fact, although economic growth (GDP) can increase labor absorption, this effect is highly dependent on the age structure and population density in a region (Bisai et al., 2024).

Economic factors such as minimum wage policies and investment levels also affect labor dynamics. Studies (Hartono et al., 2018) and (Gofur, R & Nafik U, 2024) show that these two factors have an impact on labor demand. However, there is still a gap between economic growth and the ability of economic sectors to absorb labor, as stated by (Maryanti & Rasyad, 2015).

Similar conditions also occurred in Gorontalo Province. Although the province has shown fairly stable economic growth, the unemployment rate has not shown a significant decline. Data from the Central Statistics Agency shows that the Open Unemployment Rate (TPT) in Gorontalo in the last five years has been relatively stagnant, as seen in the following table:

Table 1. Gorontalo Province Open Unemployment Rate Data Year 2019 – 2023

Year	Open Unemployment Rate (%)
2019	4.06
2020	4.28
2021	3.01
2022	2.58
2023	3.06

Data Source: Badan Pusat Statistik Province Gorontalo (2024)

The Open Unemployment Rate (TPT) in Gorontalo Province over the past five years shows dynamic changes that are important to analyze. In 2019, the TPT was 4.06%, then increased slightly to 4.28% in 2020. This increase was largely due to the impact of the COVID-19 pandemic, which disrupted various economic sectors—especially the informal sector and micro businesses that dominate the region. Many businesses had to cut their workforce, while the creation of new jobs also slowed down significantly. In 2021, the TPT dropped sharply to 3.01%, marking the beginning of economic recovery as social restrictions were eased and business activities resumed. This declining trend continued in 2022, when TPT fell further to 2.58%, indicating that more people were entering the workforce, supported by the recovery of key sectors such as agriculture, trade, and services.

Based on these conditions, this study aims to analyze the relationship between education level and demographic structure on labor absorption in Gorontalo Province. This research was conducted to fill the literature gap that is still limited in the Gorontalo regional context, as well as provide a more contextual understanding of employment dynamics in regions with distinctive economic and educational development characteristics.

The novelty of this study lies in its approach that combines educational and demographic variables simultaneously in analyzing labor absorption at the provincial level, which has not been widely examined in previous research. Thus, this research is expected to make both empirical and practical contributions in formulating more targeted economic and employment development policies in Gorontalo Province and other similar areas in Indonesia.

Accordingly, this study seeks to examine how education level influences labor absorption in Gorontalo Province, and how population structure contributes to this process. In addition, the research investigates the simultaneous relationship between educational attainment and demographic composition with labor absorption, providing a more comprehensive view of the regional labor market.

LITERATURE REVIEW

Human Capital Theory

The Human Capital Theory views education as a strategic, long-term investment in human resources. According to Schultz (1961, as cited in Adriani, 2019), education not only improves technical abilities but also shapes individual character, values, and work ethic. It enhances one's capacity to participate in productive economic activities and escape intergenerational poverty. Gañán et al. (2017) emphasize that quality, not just years of schooling, is essential for fostering critical thinking and job readiness. In this view, education transforms individuals into both job seekers and job creators, making it central to labor absorption.

Labor Demand and Supply Theory

The labor market is governed by the balance between labor supply and demand (Akhbar, 2018). Labor supply depends on factors such as education, training, and health, while labor demand stems from business needs and technological advancements. When labor qualifications do not match market demands, structural unemployment arises (Sembiring & Sasongko, 2019). The International Labour Organization (2022) confirms that skills mismatch is a major barrier to youth employment in developing countries. Population structure plays a role in this imbalance: a growing working-age population without parallel improvements in education and training can worsen unemployment. Therefore, aligning education policy with labor market needs is key to enhancing employment outcomes.

Demographic Bonus Theory and Demographic Transition

The demographic bonus refers to a period when a region has a high proportion of productive-age population. This demographic condition can support economic growth if complemented by sufficient education and job creation (Panggabean, 2022). Bappenas (2023) highlights the importance of vocational training in preparing youth for labor market entry. Bisai et al. (2024) explain that without quality human capital, the demographic advantage can become a liability. Thus, demographic structure must be matched with education to optimize labor absorption and minimize structural unemployment.

Regional Development Theory

Regional development is closely linked to the quality of human capital. Binwasnaker and K3 (2021) argue that regions with educated and skilled populations are more attractive to investors, more adaptive to economic changes, and more likely to sustain growth. However, disparities in education access remain a barrier. Mu'minah & Tjenreng (2025) found that inequality in education contributes to unequal regional development. Investment in human resources is therefore essential not only for regional competitiveness but also for equitable and inclusive growth.

Previous Research

Empirical studies reinforce these theoretical perspectives. Rahmah and Juliannisa (2022) observed that education positively influences labor absorption in West Java. Rahayu (2019) found that both education and minimum wage policies affect employment in Jambi Province. Arjuna et al. (2023) noted that vocational education often fails to meet industry needs due to skill mismatches. Alisman et al. (2022) warned that rapid population growth without adequate job creation increases unemployment risk. Hartono et al. (2018) emphasized that labor demand is shaped by regional wage regulations.

These theories and findings provide a strong conceptual basis for analyzing how education and population structure affect labor absorption in Gorontalo Province. They also highlight the importance of aligning human capital development with demographic advantages to formulate effective employment policies at the regional level.

Hypotheses Development

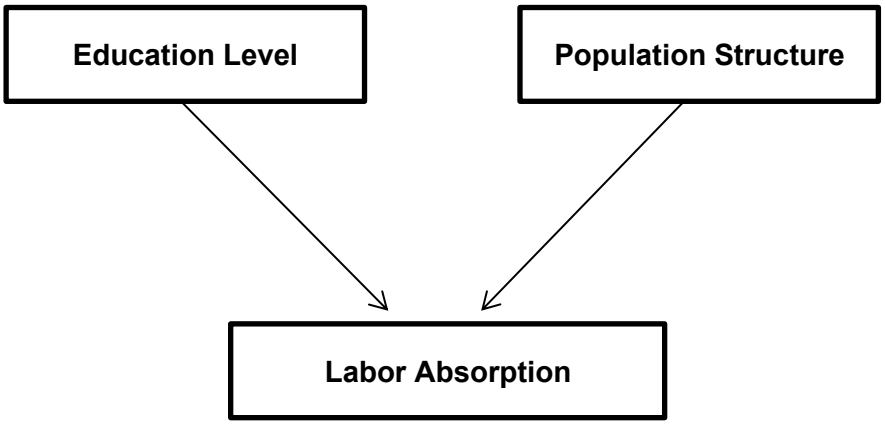
Education is a critical factor in shaping labor market outcomes, as proposed by Human Capital Theory (Schultz, 1961, as cited in Adriani, 2019). Quality education enhances skillsets and employability, contributing to better job prospects and economic participation. Gañán et al. (2017) confirmed that both quantity and quality of education significantly impact employment readiness. Regionally, Rahmah and Juliannisa (2022) found a positive link between education and labor absorption, while Rahayu (2019) emphasized the role of wage policy as a complementary factor.

Population structure is another essential determinant. A high proportion of working-age population can accelerate development if supported by education and employment infrastructure (Panggabean, 2022; Bappenas, 2023). However, without sufficient jobs or relevant skills, this demographic advantage can lead to unemployment (International Labour Organization, 2022; Sembiring & Sasongko, 2019). Thus, the interaction between education and demographic composition is key. Regions with a highly educated and productive-age population are more likely to achieve high labor absorption (Arjuna et al., 2023).
Based on this theoretical and empirical foundation, the hypotheses proposed are:

H1: Education level has a positive and significant effect on labor absorption in Gorontalo Province.
H2: Population structure has a significant effect on labor absorption in Gorontalo Province.
H3: There is a significant interaction between education level and population structure on labor absorption in Gorontalo Province.

Conceptual Framework
The study framework model is depicted in Figure 1.

Figure 1. Research Framework



RESEARCH METHOD

This study employs a quantitative approach using secondary time series data consisting of education level, population structure, and labor absorption in Gorontalo Province. The data, expressed in measurable numerical form, were obtained from official publications of the Central Statistics Agency (BPS) of Gorontalo Province, including annual reports, statistical documentation, and relevant literature such as journals and books.

The data collection technique used is documentation, which involves gathering data from published statistical records and government sources. All variables are defined operationally: education level (X_1) refers to the percentage of the working-age population (15 years and above) who have completed at least high school or its equivalent; population structure (X_2) is the proportion of the productive-age population (15–64 years) to the total population, based on projections such as SUPAS; and labor absorption (Y) is the percentage of the working-age population employed in formal or informal sectors, indicating the region's labor utilization.

Data analysis is conducted through three stages. First, descriptive analysis is used to describe the characteristics of each variable. Second, multiple linear regression analysis (Sugiyono, 2021) is applied to examine the effect of education level and population structure on labor absorption, using the equation $Y = a + b_1X_1 + b_2X_2 + e$, where *a* is the constant, b_1 and b_2 are regression coefficients, and *e* is the error term. Third, significance testing through F-test and t-test is used to determine the simultaneous and partial effects of the independent variables. All statistical processing is carried out using SPSS software.

RESULTS

Multiple Linear Regression Analysis

Multiple linear regression analysis is used to determine the extent to which independent variables (in this case Education Level and Population Structure) collectively or partially affect the dependent variable, namely Labor Absorption. This model not only measures the direction and strength of relationships, but also how much each variable contributes in explaining the variations that occur in bound variables.

Tabel 2. Results of Multiple Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.218	.851		2.607	.040
	Tingkat Pendidikan	1.507	.549	.466	2.746	.033
	Struktur Penduduk	.503	.134	.635	3.744	.010

a. Dependent Variable: Workforce
Source: Processed Data SPSS (2025)

Based on the regression equation $Y = 2.218 + 1.507X_1 + 0.503X_2 + e$, the analysis reveals the following findings. The constant value of 2.218 with a significance level of 0.040 (< 0.05) indicates that, theoretically, when both education level and population structure are zero, labor absorption would remain at a baseline of 2.218 percent. This constant is statistically significant.

The coefficient for education level (X_1) is 1.507 with a significance value of 0.033 (< 0.05), suggesting a positive and statistically significant relationship. This means that for every one-unit increase in education level, labor absorption increases by 1.507 units, assuming population structure remains constant. It confirms that higher education levels play a crucial role in enhancing labor market participation among the working-age population in Gorontalo Province.

Meanwhile, the coefficient for population structure (X_2) is 0.503 with a positive value, indicating that an increase in the proportion of the productive-age population also contributes to higher labor absorption. Specifically, a one-unit increase in population structure leads to a 0.503-unit increase in labor absorption, assuming the education level remains constant. This supports the notion that a productive demographic composition positively influences employment opportunities.

Analysis of the t-Test

The results of the t test from the multiple linear regression analysis indicate that both independent variables, Education Level and Population Structure, have a statistically

significant effect on Labor Absorption in Gorontalo Province. The following is a detailed interpretation of each variable's influence:

Influence of Education Level on Labor Absorption
The analysis shows that the education level variable has a regression coefficient of 1.507, with a t-value of 2.746 and a significance level of 0.033. Since the significance value is less than 0.05, it can be concluded that education level has a significant effect on labor absorption. The positive coefficient indicates that as the average education level of the working-age population increases, the number of individuals absorbed into the labor market also rises. This relationship supports the notion that higher educational attainment enhances individuals' skills and competencies, thereby increasing their employability, particularly in formal sectors that demand specific qualifications. These findings are aligned with Human Capital Theory, which posits that education improves the quality and productivity of labor, ultimately contributing to greater economic participation.

Influence of Population Structure on Labor Absorption
For the population structure variable, the regression coefficient is 0.503, with a t-value of 3.744 and a significance value of 0.010. This also meets the criteria for statistical significance at the 5% level, confirming that population structure significantly influences labor absorption. The positive coefficient suggests that a higher proportion of the productive-age population (ages 15–64) contributes to increased employment levels. This result indicates that demographic composition plays a crucial role in shaping labor market outcomes. A larger productive-age population can be a demographic advantage, provided it is accompanied by sufficient job creation and access to skill development programs. Otherwise, the potential benefits of this demographic bonus may not be fully realized.

F test
The F test in multiple linear regression is used to assess whether the independent variables jointly have a significant effect on the dependent variable. In this study, the F test is applied to determine whether the variables Education Level and Population Structure simultaneously influence Labor Absorption in Gorontalo Province. The test evaluates the overall fit of the regression model and whether the combination of predictors contributes meaningfully to explaining variations in the dependent variable. If the significance value from the F-test is less than 0.05, it indicates that the model is statistically significant and the independent variables, when taken together, have a significant impact on labor absorption. The detailed results of the F test are presented in Table 3.

Table 3. F test

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	2	.000	17.626	.003[b]
	Residual	.000	6	.000		
	Total	.001	8			

a. Dependent Variable: Workforce
b. Predictors: (Constant), Population Structure, Education Level

Based on the ANOVA (Analysis of Variance) output from the results of data processing using SPSS, an F value of 17.626 was obtained with a significance level (p-value) of 0.003. This number is very important to analyze, as the significance value is smaller than

the critical limit of 0.05. This means that, statistically, there is a significant simultaneous influence between the two independent variables on the bound variable.

In simple terms, these findings show that the combination of improving education levels and managing population structure has a real contribution in explaining the variation in the rate of labor absorption in the study area. This means that improving the quality of public education and the optimal proportion of the productive age population can simultaneously increase the chances of individuals to be absorbed into the world of work. The value of the determination coefficient (R Square) of 0.855 listed in the regression model results supports this finding. The figure shows that about 85.5% of the variation in labor absorption can be explained by a model consisting of these two independent variables, while the remaining 14.5% is explained by factors other than the model.

This F test is the basis that the regression model built is suitable for use as an analysis and prediction tool, because it can explain the relationship between variables in a strong and significant way. It also provides an important message for policymakers that it is not enough to pay attention to just one factor, but there must be synergistic efforts between improving access and quality of education and managing the demographics of the productive age so that labor absorption can be optimally increased.

DISCUSSION

The results of this study show that the level of education and population structure have a significant effect on the absorption of labor in Gorontalo Province. This is in line with a number of previous studies that emphasized the importance of the quality of human resources in strengthening the absorption of labor. Adequate education not only improves the skills of individuals, but also opens up wider opportunities for them to enter the workforce. As found by (Rahmah & Juliannisa, 2022) and (Rahayu, 2019), education accompanied by supportive employment policies, such as a living wage, has been proven to be effective in expanding employment opportunities.

Nevertheless, challenges remain, especially in terms of the mismatch between educational output and the needs of the industrial world, as conveyed by (Binwasnaker & K3, 2021). Vocational education, although designed to produce job-ready graduates, has not been fully able to answer the needs of the market. This emphasizes the importance of integration between the content of education and the direction of regional economic development. In addition, these findings are also strengthened by research (Surianto et al., 2022) which highlights that employee education contributes greatly to increasing productivity and labor absorption in the business sector.

In terms of demographics, population structure—especially the proportion of productive age—also has a significant influence on labor absorption. The study (Alisman et al., 2022) and (Mulya & Hudalah, 2024) emphasizes that the demographic bonus will only have a positive impact if it is balanced with job creation and strengthening human resource capacity. This result is also in line with the view (Nasution, 2021) that economic growth does not automatically increase labor absorption if it is not accompanied by proper education and demographic management. Therefore, increasing labour absorption requires a comprehensive strategy—combining strengthening education, inclusive employment policies, and productive management of population structures.

CONCLUSION

This study investigates the influence of education level and population structure on labor absorption in Gorontalo Province. The findings, based on multiple linear regression analysis, indicate that both variables have a positive and statistically significant effect on labor absorption. A higher level of education among the working-age population enhances their employability by equipping them with relevant skills and competencies, thus improving their chances of entering the job market. Similarly, a population structure dominated by the productive-age group presents a substantial opportunity for economic growth, provided it is accompanied by sufficient employment opportunities and skill development programs.

Together, education level and population structure explain over 85 percent of the variation in labor absorption, underscoring their critical role in shaping employment outcomes. These results highlight that successful employment development relies on the synergy between human capital improvement and strategic demographic management. Strengthening these foundations is essential for fostering an inclusive and competitive regional economy.

Based on these conclusions, several recommendations can be proposed. First, local governments should prioritize expanding access to quality education, particularly at the secondary and vocational levels, and align curricula with local labor market needs. Second, optimizing the demographic bonus must become a central development agenda through job creation initiatives, support for MSMEs, regional investment, and the advancement of key sectors such as agriculture, fisheries, and services. Lastly, an integrative labor policy is required to connect the education, population, and economic sectors. This includes synchronizing education and industry demands, mapping workforce potential by age and skill, and implementing long-term workforce planning to ensure sustainable and inclusive employment growth.

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DECLARATION OF CONFLICTING INTERESTS

The authors have declared no potential conflicts of interest concerning the study, authorship, and/or publication of this article.

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ABOUT THE AUTHOR(S)

1st Author
Moh. Arif Novriansyah is a doctoral student in the Economics Program at the Faculty of Economics, Universitas Negeri Gorontalo, Indonesia. He began his doctoral studies on August 19, 2024, and is currently an active student in the 2024/2025 even semester. His academic focus lies in regional economic development, labor market dynamics, and demographic economics. He holds a previous academic background in economics and continues to develop research in education, employment, and population structure. At present, he is affiliated with Universitas Negeri Gorontalo as a graduate student researcher. For academic correspondence, he can be reached at moh.arif.novriansyah@gmail.com. ORCID ID: https://orcid.org/0009-0009-5518-3311.

2nd Author
Dr. Herwin Mopangga is a Senior Lecturer (Lektor Kepala) in the Development Economics Program at the Faculty of Economics, Universitas Negeri Gorontalo, Indonesia. He earned his Doctorate in Economics from Universitas Brawijaya in 2022, a Master of Science from Institut Pertanian Bogor in 2010, and a Bachelor's degree in Economics from Universitas Sam Ratulangi in 2002. Currently, he serves as a full-time faculty member with active academic status. His research interests include regional economic development, public finance, blue and green economy, supply chain analysis, and technopreneurship in tourism areas. Dr. Mopangga has been involved in various regional development projects and policy studies in Gorontalo Province.

3rd Author
Anggita Permata Yakup is a Lecturer (Lektor) in the Development Economics Program at the Faculty of Economics, Universitas Gorontalo, Indonesia. She holds a Master of Science in Economics from Universitas Airlangga, earned in 2019, and a Bachelor's degree in Economics from Universitas Gorontalo in 2016. As a permanent faculty member with active academic status, she is actively engaged in teaching and research related to regional economic development, public health economics, and social welfare policies. Her recent research explores healthcare service utilization under regional health insurance programs. She is committed to contributing to evidence-based policy through academic research.