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SOCIOECONOMIC DRIVERS OF LABOR FORCE PARTICIPATION IN INDONESIA: EVIDENCE FROM MULTI-PROVINCE ANALYSIS

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ABSTRACT

This study aims to evaluate the macroeconomic determinants influencing the Labor Force Participation Rate (LFPR) across 34 provinces in Indonesia during the post-COVID-19 pandemic recovery period. Utilizing secondary data sourced from Statistics Indonesia (BPS) spanning 2018–2023, this research applies a panel data regression method to measure the partial and simultaneous significance of Gross Regional Domestic Product (GRDP), Mean Years of Schooling (MYS), and Provincial Minimum Wage (PMW). Following a rigorous model selection process, the Fixed Effect Model (FEM) was identified as the most robust specification. The estimation results indicate that the combination of GRDP, MYS, and PMW simultaneously explains 91.95% of regional LFPR fluctuations. However, only the MYS and PMW instruments demonstrate a positive, statistically significant impact on the increase in LFPR. Empirically, GRDP does not yield a significant direct effect, indicating the strong presence of a 'jobless growth' phenomenon within regional economic structures. These findings imply that unemployment alleviation policies cannot rely solely on GDP aggregates. Instead, they demand a dual synergy: enacting competitive minimum-wage regulations and revitalizing educational-sector spending (human capital investment) to mitigate skills-mismatch issues in the modern digital labor market.

Introduction

Labor force participation plays a fundamental role in shaping a country's economic development. The active involvement of the working-age population not only reflects the nation's productive capacity but also serves as an indicator of social welfare (Ramli et al., 2025). At the macro level, increasing female labor force participation has been shown to significantly drive economic growth, although fluctuations persist due to various demographic policies (Omran & Bilan, 2022; Sajid et al., 2024). In Indonesia, the Labor Force Participation Rate (LFPR) trend experienced a major shock due to the COVID-19 pandemic, which triggered a surge in national unemployment (Daud et al., 2024). This recovery period requires the government to stabilize the employment sector promptly so the wheels of the economy can move again (Ssenyonga, 2021). In response, the government implemented the strategic Pre-Employment Card program to enhance workers' adaptive skills and optimize full-time job opportunities by leveraging the digital ecosystem (Yunisvita et al., 2025).

Although labor force participation has improved, Indonesia still faces challenges related to disparities in Gross Regional Domestic Product (GRDP) across provinces. This GRDP disparity ultimately creates gaps in job creation, unemployment rates, and poverty levels across regions (Suparman et al., 2024). Uneven economic growth demands that the government conduct accurate regional mapping to formulate well-targeted public policies (Hidayat et al., 2024). On the island of Java, the presence of small business clusters and

industrial zones has been shown to create spatial spillover effects that reduce unemployment in surrounding areas (Prastiwi & Khoirunurrofik, 2025). Conversely, in archipelagic regions, the high transition to informal employment significantly affects poverty rates due to limited access to decent jobs (Putri et al., 2023). This regional disparity is also a global issue, making disproportionate analysis a frequently used tool for evaluating countries' quality of life and economic efficiency (Becker et al., 2025).

Indonesia's labor market dynamics are also influenced by the quality of education and Provincial Minimum Wage (UMP) policies. Education serves as a catalyst for worker competitiveness, but educated unemployment still hampers the economy due to a mismatch between graduates' competencies and industry needs (Syarifudin et al., 2025). This skills gap becomes more pronounced in the digital era, with a clear shortage of high-level skills among job seekers of productive age (Jaya I Gede et al., 2026). Theoretically, investment in technology-relevant education can significantly reduce wage disparities among workers (Hakro et al., 2021). On the other hand, minimum wage policies aimed at protecting workers often have heterogeneous effects on actual working hours and real wages (Agusalim et al., 2025). In labor-intensive industries, minimum wage regulations greatly influence company decisions to expand recruitment or cut labor (Wicaksono et al., 2025).

International literature consistently shows that labor force participation rates are heavily influenced by macroeconomic and socioeconomic variables and by demographic structural changes across countries. In developed countries, labor market dynamics are often driven by job insecurity and changes in demographic structures, with broad implications for employment policies (Fortin & Fortin, 1999; Smith, 1999). Meanwhile, in developing countries, labor force participation is more commonly linked to sustainable economic development, affecting the involvement of female workers in productive activities (Sajid et al., 2024). In the national context, the literature in Indonesia indicates that macroeconomic variables and global health crises have had a significant negative impact on labor absorption, especially for university graduates (Daud et al., 2024). Additionally, the empowerment of micro, small, and medium enterprises (MSMEs) and the distribution of investment loans have been proven to mediate labor absorption to spur domestic economic growth (Muliadi et al., 2020). These studies provide a strong analytical foundation, but most national labor research is still dominated by aggregate, macro-level observations that fail to comprehensively dissect spatial variation across regions.

Although previous literature has extensively examined labor market dynamics, a significant research gap remains in the lack of comparative, multi-province studies in Indonesia. Most empirical research at the regional level tends to focus on single-province or specific-area analyses, such as studies on formal-informal labor dynamics in the Mentawai Islands, which highlight local poverty characteristics in isolation (Putri et al., 2023). This partial approach often fails to capture the heterogeneity of economic policy impacts, given that minimum wage regulations have highly varied effects on working hours and real wages across regions (Agusalim et al., 2025). Therefore, multi-province analysis is crucial to enable the government to evaluate sectoral impacts on unemployment and inequality through more representative panel regression (Suparman et al., 2024). Moreover, cross-regional approaches have proven highly effective in mapping the spatial spillover effects of industrial areas on the equalization of regional unemployment rates (Prastiwi & Khoirunurrofik, 2025). By conducting regional mapping that simultaneously considers the significance of various local independent variables, this multi-province-based research is expected to fill the literature gap and support the formulation of inclusive public policies (Hidayat et al., 2024).

To address the limitations of partial studies, this research adopts a comprehensive multi-province approach, covering 34 provinces in Indonesia, using panel data analysis

methods. The use of national-scale panel data regression is essential because it can capture regional heterogeneity and evaluate the effects of economic policies more precisely across regions (Hidayat et al., 2024; Suparman et al., 2024). Furthermore, this study integrates a simultaneous analysis of macroeconomic factors, such as minimum wage dynamics, with the variable of labor force education quality. Empirically, simultaneous testing between real wage instruments and education quality is crucial, as both elements are closely linked in determining the full-time labor absorption rate in the industrial sector (Agusalim et al., 2025; Yunisvita et al., 2025). In addition, government spending interventions in the education sector have also been shown to be a determining variable in reducing educated unemployment, which has long hampered regional economic growth (Syarifudin et al., 2025). Therefore, integrating economic and educational variables within a single panel regression model is expected to provide a much more holistic employment projection framework.

In addition to methodological updates, this study specifically uses the latest post-pandemic empirical data to represent the most factual labor market conditions. Using the latest data is important to identify shifts in unemployment trends resulting from global health disruptions that have drastically altered the macroeconomic structure and national labor absorption capacity (Daud et al., 2024). This latest data-based analysis will later yield strategic policy implications aimed at resolving the increasingly urgent issue of digital skills gaps in the modern economy (Jaya I Gede et al., 2026). From a regulatory governance perspective, the results of this research are also expected to serve as a basis for local governments in formulating fair minimum wage policies to maintain operational stability in labor-intensive industries (Wicaksono et al., 2025; Yeti & Abdillah, 2025). Ultimately, the proposed policy recommendations do not focus solely on mitigating unemployment but also facilitate equitable economic development by optimizing the spatial spillover effects of industrial clusters across the nation (Prastiwi & Khoirunurrofik, 2025).

This research formulates the main problem of empirically evaluating the impact of Gross Regional Domestic Product (GRDP), Average Years of Schooling (RLS), and Provincial Minimum Wage (UMP) on the Labor Force Participation Rate (LFPR) in Indonesia. Specifically, the main objective of this research is to assess the significance of both simultaneous and partial effects of these three variables on labor absorption fluctuations in 34 provinces (Suparman et al., 2024). GRDP evaluation is very important to measure the capacity for sectoral job creation, given that economic disparities between regions remain a fundamental obstacle to the distribution of community welfare (Hidayat et al., 2024). Furthermore, RLS indicator analysis aims to assess the alignment between worker education quality and industrial skill demand, particularly in response to skill gaps in the digital transition era (Jaya I Gede et al., 2026). Testing the UMP variable is also focused on understanding how wage policy instruments influence the elasticity of real workforce recruitment at the regional level (Agusalim et al., 2025). Ultimately, this research is structured to produce measurable public policy recommendations to optimize labor force participation rates and reduce educated unemployment nationally (Syarifudin et al., 2025).

Academically, this study enriches the development economics literature by providing a comprehensive analytical model that maps labor force participation dynamics across regions (Ramli et al., 2025). The multi-province approach applied in this research makes a significant contribution to addressing gaps in previous research, which often overlooked spatial spillover effects and specific socioeconomic characteristics within each region (Prastiwi & Khoirunurrofik, 2025). From a practical perspective, the empirical findings of this study are projected to provide highly objective evaluation guidelines for local policymakers to design fair and pro-growth minimum wage regulations (Wicaksono et al.,

2025). Furthermore, the results of this analysis can be optimally utilized by the government as a basis for formulating skills-based education programs to minimize skills mismatch in the real labor market (Yunisvita et al., 2025). By synergizing wage regulation policies with improvements in human resource quality, this research provides essential policy guidance to accelerate the achievement of the macroeconomic recovery target (Daud et al., 2024).

Method

This study adopts a quantitative approach, using panel-data regression methods to examine the determinants of labor force participation at the regional level. The data used in this study are entirely secondary, obtained from publications of the Central Bureau of Statistics (BPS) of the Republic of Indonesia. Specifically, this research uses a panel data structure that integrates both time-series and cross-sectional data to produce more precise estimates (Suparman et al., 2024). The extracted time series data covers a six-year period from 2018 to 2023 to capture post-pandemic macroeconomic dynamics (Daud et al., 2024). Meanwhile, the cross-sectional dimension encompasses the entire administrative geographical area of Indonesia, comprising 34 provinces (Hidayat et al., 2024). The use of a multi-province panel model is believed to be highly effective at accommodating heterogeneity in regional characteristics and spatial spillover effects across regions (Prastiwi & Khoirunurrofik, 2025). Therefore, this analytical technique is ideal for evaluating labor absorption fluctuations comprehensively in developing countries (Muliadi et al., 2020).

In the operationalization of the research, this study involves one dependent variable and three independent variables that theoretically influence the dynamics of the labor market. The dependent variable analyzed is the Labor Force Participation Rate (LFPR), measured as the percentage of the working-age population by gender, to represent the availability of real labor in society (Ramli et al., 2025). The first independent variable is the Gross Regional Domestic Product (GRDP) at constant 2010 prices by province, which serves as the main proxy for a region's economic growth capacity (Yeboah, 2025). The second independent variable is the nominal Provincial Minimum Wage (UMP) set by the government, which plays a vital role in determining the elasticity of labor absorption in labor-intensive industrial sectors (Agusalim et al., 2025). The third independent variable is the new method of Average Years of Schooling (RLS), representing the accumulation of human capital investment and the basic competency level of workers (Syarifudin et al., 2025). These three independent variables are empirically shown to be capable of influencing community welfare levels and reducing skill gaps at the regional level (Jaya I Gede et al., 2026). Detailed measurements of each variable are systematically described in the following operational definition table.

Table 1. Variable Definitions

Variable	Operational Definition	Data Source
Labor Force Participation Rate (LFPR)	Percentage of the working-age population who are economically active by gender.	Statistics Indonesia (BPS)
Gross Regional Domestic Product (GRDP)	Total value added of goods and services at 2010 constant prices by province.	Statistics Indonesia (BPS)
Provincial Minimum Wage (UMP)	The nominal minimum wage standard applicable in each province annually.	Statistics Indonesia (BPS)

Mean Years of Schooling (RLS)	The number of years of formal education completed by the population aged 25 years and over.	Statistics Indonesia (BPS)

The systematic procedure for panel data regression analysis testing in this study begins with estimating three basic model approaches: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). To determine the most appropriate model specification that accurately represents the data characteristics, the researcher conducts a series of sequential econometric model selection tests (Suparman et al., 2024). This process includes the Chow Test to choose between the CEM and FEM approaches, the Hausman Test to compare the FEM and REM approaches, and the Lagrange Multiplier Test to confirm the feasibility of REM over CEM (Wicaksono et al., 2025). This series of tests is essential for controlling for unobserved heterogeneity between provinces, which often leads to estimation bias in regional analyses (Becker et al., 2025). After the most optimal model is selected through these specification tests, the final parameter estimates will be used to empirically validate the research hypotheses (Yunisvita et al., 2025). Mathematically, the panel data econometric equation in this study is formulated as follows:

$$\boldsymbol{TPAK_{it} = \beta_0 + \beta_1 PDRB_{it} + \beta_2 UMP_{it} + \beta_3 RLS_{it} + \varepsilon_{it}}$$

where $\mathbf{LFPR_{it}}$ is the dependent variable, $\boldsymbol{\beta_0}$ is the constant, $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, and $\boldsymbol{\beta_3}$ are the regression coefficients, **i** represents the 34 provinces, **t** indicates the time span from 2018 to 2023, and $\boldsymbol{\varepsilon_{it}}$ denotes the error term (Hakro et al., 2021).

Results and Discussion

Descriptive analysis of the research variables reveals that the average GRDP is 333,119.3, with a median of 141,776.6, a maximum of 2,050,466, a minimum of 25,034.08, and a standard deviation of 471,399.7, indicating substantial variation across regions. The Average Years of Schooling (RLS) has an average of 8.67 years, a median of 8.71 years, a maximum of 11.45 years, a minimum of 6.52 years, and a standard deviation of 0.936, indicating relatively small variation. Meanwhile, the Provincial Minimum Wage (UMP) has an average of 2,765.43, a median of 2,606.78, a maximum of 32,791.94, a minimum of 1,454.15, and a standard deviation of 2,189.57, indicating significant wage disparities across provinces. Complete descriptive statistics for these variables are presented in Table 2 below.

Table 2. Descriptive Statistics

	PDRB	RLS	UMP
Mean	333119.3	8.674559	2765.425
Median	141776.6	8.705000	2606.782
Maximum	2050466.	11.45000	32791.94
Minimum	25034.08	6.520000	1454.154
Std. Dev.	471399.7	0.935881	2189.570

The results of the correlation test show that all research variables have correlation coefficients below 0.8, indicating relatively low relationships and minimal risk of multicollinearity. This finding is important in the context of panel analysis because it ensures that model estimates, whether using the fixed-effect or random-effect approach, provide reliable results without distortion from excessively high inter-variable correlations. A

complete overview of the correlation coefficients between variables is shown in Table 3 below.

Table 3. Correlation Test

	PDRB	RLS	UMP
PDRB	1	0.20742	-0.01902
RLS	0.20746	1	0.22093
UMP	-0.01902	0.22093	1

After descriptive analysis and correlation testing, panel-data model estimation was conducted to evaluate the effects of GRDP, Average Years of Schooling (RLS), and Provincial Minimum Wage (UMP) on the Labor Force Participation Rate (LFPR) across provinces. In this analysis, three main approaches were used (common effect, fixed effect, and random effect), each accounting for interregional variation and temporal effects differently. The estimation results indicate that some variables exert a stronger influence than others, while others contribute less to the LFPR. These findings provide an initial overview of the factors that are more dominant in shaping labor force participation, while also emphasizing the importance of accounting for regional heterogeneity in panel analysis. All panel data estimation results, including coefficients, significance, R-squared, and F-statistic for each approach, are presented in full in Table 4 below.

Table 4. Panel Data Test Results

	Common Effect		**Fixed Effect**		**Random Effect**	
Variable	Coeff	Prob	Coeff	Prob	Coeff	Prob
PDRB	-0.151400	0.4476	1.710116	0.7340	0.145560	0.2529
RLS	-1.504194	0.0000	1.991766	0.0982	0.631595	0.0016
UMP	-1.263917	0.1302	0.392131	0.0192	1.131818	0.4442
_cons	92.91060	0.0000	27.20380	0.0000	51.98878	0.0664
Prob	0.0000		0.000		0.004	
R-squared	0.2107		0.9195		0.063	
F	17.804		53.009		4.547	

After estimating the panel data models, the next step is to determine the most appropriate model by conducting a series of model selection tests. All the results of these tests are presented in full in Table 5 below.

Table 5. Model Selection Tests

Panel Data Model Selection Test	Prob
Chow Test	0.000
Hausman Test	0.000
LM Test	0.000

Based on the results presented in Table 5, the appropriate panel data model was selected using the Chow test, the Hausman test, and the LM test. The Chow test produced a p-value of 0.000, indicating significance, so the fixed-effect model (FEM) was chosen over the common-effect model (CEM), as FEM can capture heterogeneity across provinces. Next, the Hausman test with a p-value of 0.000 indicates that the FEM is more consistent and efficient than the random-effect model (REM). This finding is further supported by the LM test, which is also significant at the 0.000 level, indicating that REM is not more suitable than FEM. Thus, based on these three tests, the fixed effect model was selected as the best model in this study.

The results of the Fixed Effect model estimation in Table 4 show that all independent variables are positively associated with the Labor Force Participation Rate (LFPR), though with varying levels of significance. Some variables are shown to have a significant partial effect on LFPR, while others do not. The goodness-of-fit test results show an R-squared value of 0.9195, indicating that 91.95% of the variation in LFPR is explained by the variation in the model's macroeconomic variables (GRDP, Average Years of Schooling, and Provincial Minimum Wage). The remaining 8.05% is influenced by other factors outside this model. The use of a combination of macroeconomic variables to explain labor market dynamics is consistent with the framework of Daud et al. (2024), who emphasize that macroeconomic indicators collectively play an essential role in shaping the labor market's conditions and vulnerabilities in Indonesia.

The estimation for the Gross Regional Domestic Product (GRDP) variable shows a positive coefficient of 1.710116 with a probability of 0.7340. Since this probability is greater than the standard significance level of 5% (0.05), the GRDP variable does not have a significant partial effect on the Labor Force Participation Rate (LFPR). Although statistically insignificant, the coefficient indicates a positive relationship: if GRDP increases by 1 unit, LFPR could increase by 1.710116 units, assuming the other variables are held constant (ceteris paribus). Theoretically, this insignificance suggests the possibility of a jobless-growth phenomenon, or economic growth that is not accompanied by inclusive job creation. Increases in aggregate regional output do not automatically draw the working-age population into the labor force, especially if economic growth is dominated by capital-intensive sectors. This finding is supported by Daud et al. (2024), who state that movements in macroeconomic indicators do not always directly affect labor absorption. Furthermore, research by Omran & Bilan (2022) underscores that the relationship between macroeconomic development and labor force participation is often complex and requires targeted structural policies to stimulate broader labor force participation.

The Average Years of Schooling (RLS) variable shows an estimated positive coefficient of 1.991766 and a probability of 0.0982. Because this probability is below the 10% (0.10) significance threshold, the RLS variable can be said to have a significant partial effect on the Labor Force Participation Rate (LFPR) at that level. This positive relationship empirically shows that an increase in educational attainment, i.e., an additional year in Average Years of Schooling, will lead to an increase in LFPR by 1.991766 units, all else being equal. Based on human capital theory, education is an essential long-term investment. The higher the literacy and educational attainment levels, the better the individual’s skills, thereby increasing their drive and motivation to enter the labor market to realize returns on their educational investment. This rationale aligns with the findings of Hakro et al. (2021), which documented that educational attainment significantly impacts prospects for labor force participation and wage earnings. The literature is also supported by Syarifudin et al. (2025), who emphasize that improving the quality and access to education is a key instrument for reducing employment problems and accelerating active participation.

The estimation results for the Provincial Minimum Wage (UMP) variable show a coefficient of 0.392131 with a very small p-value of 0.0192. This probability, which is far below the 0.05 (5%) significance level, strongly confirms that the UMP variable has a significant positive partial effect on the Labor Force Participation Rate (LFPR). The interpretation of this value indicates that every government-mandated increase of 1 unit in the UMP will result in an increase in LFPR by 0.392131 units, with all other factors held constant (ceteris paribus). From a labor economics perspective, the minimum wage standard serves as an attractive economic incentive signal (the wage effect). Minimum wage increase policies raise the opportunity cost of leisure, thereby rationally motivating a larger

proportion of the working-age population, including groups previously outside the labor force, to seek employment. This theoretical and empirical explanation is supported by research from Agusalim et al. (2025) and Wicaksono et al. (2025), which conclude that minimum wage policies in Indonesia provide an attractive effect and significantly stimulate labor supply to the formal labor market and labor-intensive industries.

Conclusion

This study concludes that, in aggregate, macroeconomic variables play a crucial role in determining the dynamics of the Labor Force Participation Rate (LFPR) in 34 provinces in Indonesia. Based on the Fixed Effect model estimates, it was found that the combination of Gross Regional Domestic Product (GRDP), Average Years of Schooling (RLS), and Provincial Minimum Wage (UMP) variables could explain 91.95% of the variation in labor absorption fluctuations. However, individually, the impact of each instrument varies in significance. The economic growth indicator (GRDP) does not have a direct significant effect on labor force participation, indicating the strong presence of jobless growth in Indonesia. Conversely, the human capital instrument, in the form of Average Years of Schooling (RLS), and economic policy, through the Provincial Minimum Wage (UMP), are empirically proven to have significant positive effects. Increases in the wage standard act as a highly attractive wage incentive to encourage the working-age group to enter the labor market, while improvements in education quality (RLS) are proven to be effective in motivating people to realize returns from accumulated skills.

The empirical findings of this study have fundamental public policy implications for central and regional governments. The insignificance of the GRDP effect demands that the government immediately reform regional investment structures not only to pursue capital-intensive aggregate growth but also to proactively expand inclusive and labor-intensive job creation. On the other hand, the findings regarding the strong influence of RLS and UMP imply that unemployment alleviation strategies must be aligned through a combination of two essential regulations: setting a fair minimum wage to maintain industrial operational stability and massively increasing spending on the education sector to address the digital-era skills gap. Attractive wage policies will not be optimally absorbed by the industrial market unless matched by the availability of a workforce with competencies relevant to current industry demands.

Although this study successfully mapped labor market dynamics comprehensively through a multi-province approach, it still has several limitations. The panel regression analysis focuses on evaluating macro variables without examining sectoral labor transitions in detail, such as the rate of movement from the informal to the formal sector or segmentation by vulnerable youth groups. Therefore, future research is strongly recommended to include sectoral dimensions and micro labor characteristics, such as the share of workers in the gig economy, in order to produce a more holistic and adaptive employment resolution framework in the face of future economic disruptions.

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