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Determinants Of Urbanization In Indonesia: A Push–Pull Factor Approach

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Abstract

Urbanization has become one of the most significant demographic processes influencing economic transformation and regional development in Indonesia. Guided by the Harris–Todaro migration model and Everett S. Lee's Push–Pull Theory, this study examines the determinants of urbanization by considering both push and pull factors. Using balanced panel data from 34 provinces in Indonesia during the 2020–2024 period, the study employs a Partial Adjustment Model (PAM) estimated through the Fixed Effects Model (FEM). The findings reveal that urbanization exhibits strong persistence over time. Rural income inequality, rural open unemployment, and rural educational attainment significantly influence the urbanization process, whereas the average wage of employees in urban areas and the labor force participation rate do not have significant direct effects. Furthermore, the interaction between rural open unemployment and education significantly affects urbanization, indicating that the relationship between labor market conditions and migration varies across educational attainment. These findings suggest that urbanization in Indonesia is driven by economic disparities, labor market conditions, and human capital. Therefore, improving rural education and expanding productive employment are essential for achieving balanced regional development and sustainable urbanization.

Keywords: Urbanization; push factors; pull factors; Harris–Todaro model; interaction effects; panel data.

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INTRODUCTION

Urbanization is a multidimensional process involving demographic, economic, and spatial transformation through the concentration of population in urban areas (Hadijah & Sadali, 2020). Globally, the urban population has increased from 36.6% in 1970 to approximately 57% in 2023 and is projected to reach 68% by 2050 (United Nations, 2019; World Bank, 2023). In Indonesia, the urbanization rate rose from 56.7% in 2020 to around 60% in 2024, reflecting rapid economic development and expanding urban activities (BPS, 2024). As one of the largest developing countries, Indonesia continues to experience rapid urbanization alongside persistent disparities in income, education, and employment across regions. These socioeconomic differences create both push and pull forces that influence rural–urban migration, making Indonesia an appropriate context for examining the determinants of urbanization.

The Harris–Todaro Migration Model argues that migration decisions are determined by expected income rather than wage differentials alone (Todaro & Smith, 2020). Accordingly, rural–urban migration is influenced by both push factors, such as rural income inequality and unemployment, and pull factors, including higher average wages of employees in urban areas, better employment opportunities, and higher educational returns (Lee, 1966; Busso et al., 2021). Nevertheless, previous studies have reported mixed findings regarding the effects of labor market conditions and labor force participation on urbanization (Busso et al., 2021; Chaplitskaya et al., 2024).

Although numerous studies have examined rural–urban migration, most focus on selected determinants using static panel models and rarely incorporate both push and pull factors within a dynamic framework. Moreover, limited evidence simultaneously investigates rural income inequality, average urban wages of employees, rural unemployment, rural education, labor force participation, and the interaction between education and labor market conditions. Since urbanization is a cumulative process characterized by persistence and path dependency, static models may not adequately capture its dynamics (Myrdal, 1957; Nerlove, 1958).

To address this gap, this study employs a Partial Adjustment Model (PAM) estimated using a cross-section weighted Fixed Effects Model (FEM) with provincial panel data from 34 provinces in Indonesia during 2020–2024. The model incorporates lagged urbanization and interaction terms between rural education and labor market variables to examine how human capital influences the relationship between labor market conditions and urbanization. This study contributes to the literature by providing a more

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comprehensive dynamic analysis of urbanization determinants and offers policy implications for promoting balanced and sustainable regional development in Indonesia.

LITERATURE REVIEW

Harris–Todaro Migration Model

The Harris–Todaro Migration Model explains that rural–urban migration is driven by expected income, which depends on urban wages and the probability of obtaining employment rather than wage differentials alone (Todaro & Smith, 2020). In this study, the average wage of employees in urban areas represents a pull factor, while rural income inequality and rural unemployment act as push factors that encourage migration. Human capital, measured by rural mean years of schooling, enhances workers' productivity and access to urban employment, whereas the labor force participation rate (LFPR) reflects local labor market conditions that may either encourage or reduce migration. Furthermore, interaction terms between education and labor market variables are included to examine how education alters the effects of unemployment and labor force participation on urbanization (Becker, 1993; de Haas, 2021).

Lee's Push–Pull Migration Theory

Lee's (1966) Push–Pull Migration Theory argues that migration decisions result from the interaction between unfavorable conditions in the place of origin and attractive opportunities in the destination. In this framework, rural income inequality and rural unemployment represent push factors, whereas higher average wages of employees in urban areas constitute a pull factor. Education further strengthens individuals' ability to respond to labor market opportunities, thereby influencing migration decisions.

Myrdal's Theory of Cumulative Causation

Myrdal's (1957) Theory of Cumulative Causation views urbanization as a self-reinforcing process in which previous urban growth generates economic agglomeration, employment opportunities, and migration networks that stimulate further urbanization. Accordingly, this study incorporates lagged urbanization within Nerlove's (1958) Partial Adjustment Model (PAM) to capture the dynamic and persistent nature of urbanization over time.

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METHODS

This study employs a quantitative approach using balanced panel data from 34 Indonesian provinces during 2020–2024. Secondary data were obtained from Statistics Indonesia (BPS). The dependent variable is the urbanization rate (UR), measured as the percentage of the urban population. The explanatory variables include the rural Gini ratio (GINI_R), the average wage of employees (wage workers, employees, and salaried workers) in urban areas (AWE), the rural open unemployment rate (UNEMPLOY_R), rural mean years of schooling (EDUC_R), the labor force participation rate (LFPR), and the interaction terms between UNEMPLOY_R × EDUC_R and LFPR × EDUC_R.

Table 1. Variables, symbols, Units, and Data Sources

Variable	Symbol	Unit	Data Source
Urbanization Rate	UR	Percent	BPS
Rural Gini Ratio	Gini_R	0-1Scale	BPS
Average Wage of Employe	AWE	Rupiah	BPS
Rural Open Unemployment Rate	Unemploy_R	Percent	BPS
Rural Mean Years of Schooling	Educ_R	Year	BPS
Labor Force Participation Rate	LFPR	Percent	BPS

Source: Data analysis results from Eviews 2026

To capture the dynamic nature of urbanization, this study employs the Partial Adjustment Model (PAM) proposed by Nerlove (1958), which assumes that urbanization adjusts gradually toward its long-run equilibrium. Accordingly, the lagged dependent variable is included in the model. The estimated equation is specified as :

$$UR_{it} = \beta_0 + \beta_1 UR_{it-1} + \beta_2 GINI_R_{,it} + \beta_3 AWE_{it} + \beta_4 UNEMPLOY_R_{,it} + \beta_5 EDUC_R_{,it} + \beta_6 LFPR_{it} + \beta_7 (UNEMPLOY_R \times EDUC_R)it + \beta_8 (LFPR \times EDUC_R)it + \varepsilon_{it}$$

Where UR denotes the urbanization rate; UR_{it-1} is the lagged urbanization rate; GINI_R is the rural Gini ratio; AWE is the average wage of employees in urban areas; UNEMPLOY_R is the rural open unemployment rate; EDUC_R is rural mean years of schooling; LFPR is the labor force participation rate; UNEMPLOY_R × EDUC_R and

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LFPR × EDUC_R represent the interaction terms; β denotes the estimated coefficients; and **ε** is the error term.

The appropriate panel estimation model was selected using the Chow and Hausman tests. The final model was evaluated through diagnostic tests for multicollinearity, heteroskedasticity, autocorrelation, and normality. Statistical significance was assessed using the t-test, F-test, and the coefficient of determination (R^2). All analyses were performed using EViews 12.

RESULTS

Model Testing

Table 2. Model Testing

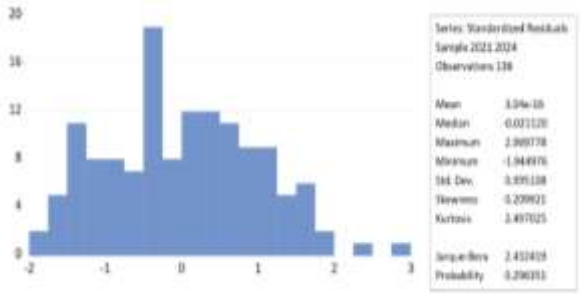
No	Test	Prob	H	Result
1.	Chow Tests	0.0000	Hα accepted	FEM
2.	Hausman Test	0.0007	Hα accepted	FEM

Source: Data analysis results from Eviews 2026

The Chow and Hausman tests indicate that the Fixed Effects Model (FEM) is the most appropriate estimation method, as both tests are significant at the 5% level ($p < 0.05$). Therefore, FEM is employed to analyze the determinants of urbanization across 34 Indonesian provinces during 2020–2024.

Classical Assumption Test

Normality test



Source: Data analysis results from Eviews 2026

The normality test produced a Jarque-Bera probability value of 0.072001 (> 0.05), indicating that the residuals are normally distributed.

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Multicollinearity Test Results

Table 3. Multicollinearity Test Result

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	215.9893	744.7574	NA
UR(-1)	0.001340	12.80383	1.624673
Gini_R	110.0315	34.15539	1.841440
AWE	1.01E-12	37.39797	1.481496
Unemploy_R	0.204187	10.65261	1.683302
Educ_R	0.264481	58.39279	2.214052
LFPR	0.037402	613.6056	1.525010

Source: Data analysis results from Eviews 2026

The multicollinearity test results showed that all independent variables had VIF values of < 10, indicating that the model is free from multicollinearity.

Heteroskedasticity Test Results

Table 4. Heteroskedasticity Test Results

Heteroscedasticity Test Before Cross-Section Weighting	
Variabel	Prob.
C	0.1530
TU(-1)	0.6776
Gini_R	0.8230
AWE	0.0055
UNEMPLOY_R	0.1382
EDUC_R	0.9623
TPAK	0.0019
Heteroscedasticity Test After Cross-Section Weighting	
Variabel	Prob
C	0.3861
TU(-1)	0.1533
Gini_R	0.2095
AWE	0.7961

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UNEMPLOY_R	0.1392
EDUC_R	0.1720
TPAK	0.2635

Source: Data analysis results from Eviews 2026

The initial Fixed Effects Model exhibited heteroskedasticity ($p < 0.05$). This issue was resolved by applying cross-section weights, and the resulting weighted Fixed Effects Model was selected as the final estimation model.

Autocorrelation Test Results

Table 5. Autocorrelation Test Results

n	K	Durbin-Watson Stat	Result
134	6	2.434353	No Autocorellation

Source: Data analysis results from Eviews 2026

Based on the estimation results, the Durbin-Watson (DW) statistic was found to be 2.434353. This value falls within the range of 2, indicating that the model shows no autocorrelation. According to Basuki & Prawoto (2016), testing for autocorrelation in panel data analysis is not required.

Estimation Results

The final estimation employed the cross-section weighted Fixed Effects Model (FEM) with the Partial Adjustment Model (PAM) proposed by Nerlove (1958), incorporating the lagged urbanization rate (UR_{t-1}). This approach was adopted because urbanization is a dynamic and persistent process influenced by its previous level. The lagged dependent variable captures the adjustment toward long-run equilibrium, while cross-section weighting corrects heteroskedasticity and improves the efficiency and reliability of the estimates (Basuki & Prawoto, 2016; Gujarati & Porter, 2009).

Table 6. Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.40283	13.232490	-1.693017	0.0938
UR(-1)	0.427771	0.023383	18.294430	0.0000
GINI_R	-19.56976	7.384843	-2.649990	0.0094

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AWE	5.28E−08	2.36E−07	0.223707	0.8235
UNEMPLOY_R	3.165368	1.579360	2.004210	0.0479
EDUC_R	10.100790	1.639322	6.161561	0.0000
LFPR	-0.061023	0.150582	-0.405245	0.6862
UNEMPLOY_R*EDUC_R	-0.412174	0.194479	-2.119375	0.0367
LFPR*EDUC_R	-0.033212	0.018937	-1.753772	0.0827

Source: Data analysis results from Eviews 2026

Based on the estimation results, the lagged urbanization variable (UR_{t-1}) has a positive and significant effect on urbanization, with a coefficient of 0.4278, indicating that a one-unit increase in the previous period's urbanization rate increases the current urbanization rate by 0.4278 units. The rural Gini ratio has a significant negative effect, suggesting that higher rural income inequality reduces urbanization. Rural open unemployment and rural mean years of schooling have positive and significant effects, with coefficients of 3.1654 and 10.1008, respectively. In contrast, the average wage of employees in urban areas and the labor force participation rate have no significant direct effects. The interaction between rural open unemployment and education has a significant negative coefficient (-0.4122), indicating that the effect of rural unemployment on urbanization weakens as educational attainment increases. Meanwhile, the interaction between the labor force participation rate and education is negative and significant at the 10% level, suggesting a limited interaction effect on urbanization.

Coefficient of Determination (R)

Table 7. Estimation Results

R-squared	0.999303
Adjusted R-squared	0.999019

Source: Data analysis results from Eviews 2026

The F-statistic (3,526.91; $p < 0.001$) indicates that the explanatory variables jointly have a significant effect on urbanization. The model explains 99.93% of the variation in urbanization ($R^2 = 0.9993$), with the remaining 0.07% attributed to factors not included in the model.

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DISCUSSION

Effect of Previous Urbanization on Current Urbanization

The lagged urbanization variable has a positive and statistically significant effect on current urbanization (β = 0.4286; p = 0.0000). This finding indicates that urbanization is a cumulative and persistent process, where previous urbanization levels contribute to current urban development. This result supports Myrdal's (1957) theory of cumulative causation, which explains that initial urban concentration generates self-reinforcing effects through improved infrastructure, employment opportunities, social networks, and economic agglomeration, thereby encouraging further urban growth. Furthermore, this finding is consistent with Nerlove's (1958) Partial Adjustment Model, which suggests that socioeconomic changes occur gradually due to adjustment costs and structural constraints. Therefore, the persistence of urbanization reflects path dependency, where past urban development continues to shape future urbanization patterns.

Effect of Rural Gini Ratio on Urbanization

The rural Gini ratio has a negative and statistically significant effect on urbanization (β = −19.56976; p = 0.0094), based on the panel regression estimation using data from 34 provinces in Indonesia during the 2020–2024 period. This finding indicates that a 1% increase in rural income inequality reduces the urbanization rate. Although this result contradicts the conventional assumption that higher inequality encourages rural–urban migration, it suggests that severe income disparities may limit the migration capacity of low-income households. In line with migration theory and previous empirical findings, economic inequality can act not only as a push factor but also as a structural constraint because poorer households often lack sufficient financial resources, migration networks, and access to information required for relocation (Cheng & Lin, 2022; Prima & Khoirunurrofik, 2019). Therefore, H1 is accepted, as the empirical evidence confirms that rural income inequality significantly affects urbanization, although the direction differs from the initial expectation.

Effect of the Average Wage of Employees in Urban Areas

The average wage of employees in urban areas has a positive but insignificant effect on urbanization (β = 5.28E−08; p > 0.05). This finding indicates that higher urban wages alone do not significantly encourage migration. Consistent with the Harris–Todaro Model, migration decisions depend on expected income rather than wage differentials

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alone, as employment uncertainty and urban living costs may reduce the attractiveness of higher wages (Imbert et al., 2020).

Effect of Rural Open Unemployment on Urbanization

The rural open unemployment rate has a positive and significant effect on urbanization ($\beta = 3.1654$; $p < 0.05$), indicating that limited rural employment opportunities encourage migration to urban areas. This finding supports the Harris–Todaro Migration Model and is consistent with Mangara et al. (2024) and Irawan et al. (2024), who found that weak rural labor markets increase labor migration to regions with better employment opportunities.

Rural mean years of schooling has a positive and statistically significant effect on urbanization ($\beta = 10.10079$; $p = 0.0000$). This finding indicates that improvements in rural educational attainment significantly increase urbanization. Consistent with Human Capital Theory proposed by Becker (1993), education enhances individual productivity, skills, and access to better employment opportunities. Since jobs that match higher educational qualifications remain concentrated in urban areas, educated rural populations tend to migrate to cities. This result is consistent with Hasan (2023) and Malamassam (2022), who highlighted the dominant role of educated young populations in urban migration. Therefore, the hypothesis is supported.

Effect of Labor Force Participation Rate on Urbanization

The labor force participation rate (LFPR) has a negative but statistically insignificant effect on urbanization ($\beta = -0.0610$; $p > 0.05$). This finding indicates that labor force participation alone does not significantly influence migration decisions. The result is consistent with Busso et al. (2021) and Simanjuntak (2023), who argue that migration is primarily driven by employment opportunities and expected income rather than labor force participation itself.

Interaction Effect of Rural Open Unemployment and Education

The interaction between rural open unemployment and education has a negative and significant effect ($\beta = -0.4122$; $p < 0.05$), indicating that higher educational attainment weakens the positive effect of rural unemployment on urbanization. Better-educated individuals have greater capabilities to adapt to changing labor market conditions and access broader employment opportunities, reducing migration driven solely by unemployment. This finding is consistent with de Haas (2021), who argued that migration

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depends on both aspirations and capabilities, and with Poutvaara (2010), who showed that education and unemployment jointly shape migration decisions by influencing individuals' expected labor market outcomes.

Interaction Effect of Labor Force Participation Rate and Education

The interaction between the labor force participation rate and education is negative and significant at the 10% level ($\beta = -0.0332$; $p < 0.10$), suggesting that education weakens the relationship between labor force participation and urbanization. Higher educational attainment improves labor market adaptability and enables workers to access employment opportunities without relying solely on labor force participation. This finding supports de Haas (2021), who emphasized the role of human capabilities in migration decisions, and Bernard and Bell (2018), who found that educational attainment is a key determinant of internal migration by enhancing labor mobility and employment opportunities

CONCLUSION

This study examines the determinants of urbanization across 34 provinces in Indonesia during the 2020–2024 period using a Partial Adjustment Model (PAM) estimated through a cross-section weighted Fixed Effects Model (FEM). The results reveal that urbanization is a dynamic and persistent process, as reflected by the positive and significant effect of lagged urbanization. Rural income inequality significantly reduces urbanization, whereas rural open unemployment and rural mean years of schooling significantly increase urbanization. In contrast, the average wage of employees in urban areas and the labor force participation rate have no significant direct effects on urbanization.

Furthermore, the interaction terms indicate that education weakens the positive effect of rural unemployment on urbanization and slightly reduces the relationship between labor force participation and urbanization. These findings highlight that migration decisions are shaped not only by labor market conditions but also by the interaction between human capital and economic factors. Overall, the results support the Harris–Todaro Migration Model, Lee's Push–Pull Migration Theory, and Myrdal's Theory of Cumulative Causation, emphasizing that urbanization in Indonesia is driven by a combination of push factors, pull factors, and cumulative development processes. Therefore, policies aimed at improving educational quality, expanding productive

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employment opportunities, and reducing rural inequality are essential to promote more balanced and sustainable urbanization.

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