

Determinants of Female Labour Force Participation in Indonesia: A Geographically Weighted Panel Regression Analysis

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ABSTRACT

This study examines how mean years of schooling (MYS), the provincial minimum wage (PMW), economic growth, domestic direct investment (DDI), and foreign direct investment (FDI) affect the female labour force participation rate (FLFPR) in Indonesia's 38 provinces during 2018–2024. Secondary panel data were analysed using panel regression and Geographically Weighted Panel Regression (GWPR). The Chow and Hausman tests selected the Fixed Effect Model (FEM), in which PMW, DDI, and FDI have positive and significant effects, whereas MYS and economic growth are not significant ($R^2 = 0.190$). Moran's I and Breusch–Pagan tests confirmed spatial dependence and heterogeneity. The GWPR model with an adaptive bisquare kernel raised R^2 to 0.861 and shows that MYS is significant in 29 provinces, PMW in 19, FDI in 17, and DDI in 7, while economic growth is insignificant everywhere; policies should be province-specific.

INTRODUCTION

Development is a multidimensional process that involves fundamental changes in social structures, attitudes, and national institutions while pursuing accelerated economic growth, reduced income inequality, and poverty alleviation. According to Todaro and Smith (2015), economic development has three core objectives: increasing the availability and widening the distribution of basic goods, raising living standards (including income, employment, and education), and expanding economic and social choices. Women's participation in the labour market is central to these objectives because it increases household income, consumption, savings, and investment, thereby supporting economic growth; in many households, women also act as secondary workers who help meet the family's economic needs.

Nevertheless, the female labour force participation rate (FLFPR; *Tingkat Partisipasi Angkatan Kerja perempuan*) in Indonesia remains relatively low and uneven across regions. One of the main causes is the strength of cultural and social norms that place women's primary responsibility on caring for the household, husband, and children, so that labour market

participation often becomes a second choice. Nuraeni (2021) notes that women's traditional roles still dominate their transitional roles as economic actors, while Azmi (2012) argues that some regions of Indonesia still value women who are housewives more highly than those who work outside the home. In general, FLFPR is influenced by internal factors, such as education, age, and motivation to work, and external factors, such as family support, the presence of children, the husband's income, wage levels, and marital status (Mufidah, 2020).

Between 2018 and 2024, FLFPR across Indonesia's 38 provinces fluctuated and showed considerable inequality. In 2018, FLFPR ranged from about 42 to 70 percent, with Bali, Papua, and Nusa Tenggara Timur recording relatively high participation, while several provinces in Java and Sumatra recorded lower rates. In 2020–2021, FLFPR declined in many provinces because the COVID-19 pandemic weakened economic activity and increased women's domestic burden, followed by a recovery in 2022–2024 at different speeds across provinces. Mean years of schooling also increased steadily, from a range of 5.70–10.63 years in 2018, with DKI Jakarta recording the highest level, yet disparities between advanced provinces and those with limited educational infrastructure persisted. Minimum wages rose in almost all provinces at different rates; DKI Jakarta consistently recorded the highest provincial minimum wage, rising from about IDR 3.65 million in 2018 to more than IDR 5.06 million in 2024, while several eastern provinces still had relatively low wages. Economic growth was negative in almost all provinces in 2020 before recovering in 2021–2024, whereas domestic and foreign investment increased over the long term but remained highly concentrated in provinces such as DKI Jakarta, Jawa Barat, and Jawa Timur.

Theoretically, human capital theory holds that education is an investment that increases productivity, employment opportunities, and earning potential, so that more educated individuals are more likely to participate in the labour market (Becker, 1964; Schultz, 1961). Labour supply theory and the labour–leisure trade-off explain that higher wages increase the benefits of working relative to the opportunity cost of domestic responsibilities and childcare, encouraging women whose reservation wage is exceeded to enter the labour market (Borjas, 2016). Economic growth is expected to expand employment opportunities (Todaro & Smith, 2015), particularly in the industrial and service sectors, which are relatively more open to female workers (Klasen & Pieters, 2015). In the Harrod–Domar framework, investment increases capital stock and productive capacity, thereby creating employment (Domar, 1946; Harrod, 1939), while the eclectic (OLI) paradigm emphasises that foreign investment also brings technology transfer, productivity gains, and modern management practices (Eden & Dai, 2010).

Empirical findings, however, remain mixed. Sasmitaningroh and Wasil (2025) found that women's mean years of schooling has a positive and significant effect on FLFPR in Indonesia, while the minimum wage and foreign investment are not significant. Hayya (2025) found that the minimum wage has only a marginal positive effect on FLFPR, and Kurniasari et al. (2025) found a positive relationship between economic growth and FLFPR, whereas Harjanti and Perwithosuci (2026) found that economic growth has a negative and insignificant effect on

FLFPR in Jawa Tengah. Masraniansyah and Muzdalifah (2024) showed that investment significantly affects labour force participation in Kalimantan Selatan, while Putra and Murialti (2025) found a positive effect of investment on labour force participation in Riau. Studies using spatial approaches, such as Andriani and Usman (2023) and Al Azies (2022), demonstrate that the determinants of female employment and participation differ across regions, implying spatial heterogeneity.

Indonesia, as an archipelagic country, has highly diverse social, economic, and demographic characteristics across regions. Provinces differ in development levels, economic structures, human resource quality, wage levels, and the ability to attract investment, so that the relationships between economic variables are unlikely to be uniform across the country. Global regression models, which assume identical coefficients for all regions, therefore risk generalising conditions and failing to capture local characteristics. Most previous studies on FLFPR in Indonesia have relied on global panel models, and studies that simultaneously examine education, minimum wages, economic growth, domestic investment, and foreign investment while accounting for spatial heterogeneity remain limited. This study addresses this gap by applying Geographically Weighted Panel Regression (GWPR), which allows each province to have its own coefficients. Its objective is to analyse the effects of mean years of schooling (MYS), the provincial minimum wage (PMW), economic growth (EG), domestic direct investment (DDI; *Penanaman Modal Dalam Negeri*, PMDN), and foreign direct investment (FDI; *Penanaman Modal Asing*, PMA) on FLFPR in Indonesia's 38 provinces during 2018–2024.

Accordingly, the hypotheses tested are as follows: **H1**: MYS has a significant effect on FLFPR; **H2**: PMW has a significant effect on FLFPR; **H3**: EG has a significant effect on FLFPR; **H4**: DDI has a significant effect on FLFPR; and **H5**: FDI has a significant effect on FLFPR.

RESEARCH METHOD

This study uses quantitative secondary panel data combining a cross-section of 38 provinces in Indonesia and a time series from 2018 to 2024. The data were obtained from publications of Statistics Indonesia (BPS) and the Ministry of Manpower of the Republic of Indonesia through documentation, literature study, and observation of official data from the relevant institutions. The operational definitions of the variables are presented in Table 1.

Table 1. Operational definitions of variables

Variable	Operational definition	Unit
FLFPR (Y)	Percentage of the female labour force (aged 15 years and over) who are working or seeking work relative to the total female working-age population	Percent
MYS (X1)	Average number of years of formal education completed by the population aged 15 years and over	Years
PMW (X2)	Minimum wage set annually by the government for each province	ln (IDR)
EG (X3)	Annual growth rate of real Gross Regional Domestic Product (GRDP)	Percent

Variable	Operational definition	Unit
DDI (X4)	Total approved and realised domestic direct investment (PMDN) in each province	ln (million IDR)
FDI (X5)	Foreign direct investment (PMA) approved by the government by location in each province	ln (million USD)

Source: Compiled by the authors (2026)

The analysis was carried out in RStudio in two stages. The first stage estimated a global panel regression model:

$$FLFPR_{it} = \alpha + \beta_1 MYS_{it} + \beta_2 PMW_{it} + \beta_3 EG_{it} + \beta_4 DDI_{it} + \beta_5 FDI_{it} + \varepsilon_{it} \quad (1)$$

where i denotes the province and t the year. The model was estimated using the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM), and the best model was selected using the Chow, Hausman, and Lagrange Multiplier tests (Gujarati, 2003). The selected model was then tested for classical assumptions, namely normality (Jarque–Bera), multicollinearity (variance inflation factor, $VIF < 10$), autocorrelation (Ljung–Box), and heteroscedasticity (Glejser). Spatial aspects were examined using Moran's I for spatial autocorrelation and the Breusch–Pagan test for spatial heterogeneity.

If spatial heterogeneity is present, the second stage estimates the GWPR model, which extends panel regression and geographically weighted regression by allowing the parameters to vary across locations (Fotheringham et al., 2002):

$$FLFPR_{it} = \beta_0(u_i, v_i) + \sum_k \beta_k(u_i, v_i) X_{kit} + \varepsilon_{it}, \quad k = 1, \dots, 5 \quad (2)$$

where (u_i, v_i) are the longitude and latitude coordinates of province i and $\beta_k(u_i, v_i)$ are the local coefficients. Parameters are estimated by weighted least squares, giving greater weight to nearby observations. The optimum bandwidth was selected by comparing the adaptive Gaussian, adaptive bisquare, and adaptive exponential kernels on the basis of the smallest cross-validation (CV) score. The significance of the local parameters was tested using local t -statistics at the 5 percent level ($|t| > 1.96$), and the global FEM and local GWPR models were compared using R^2 and adjusted R^2 . The analytical procedure is summarised in Figure 1.

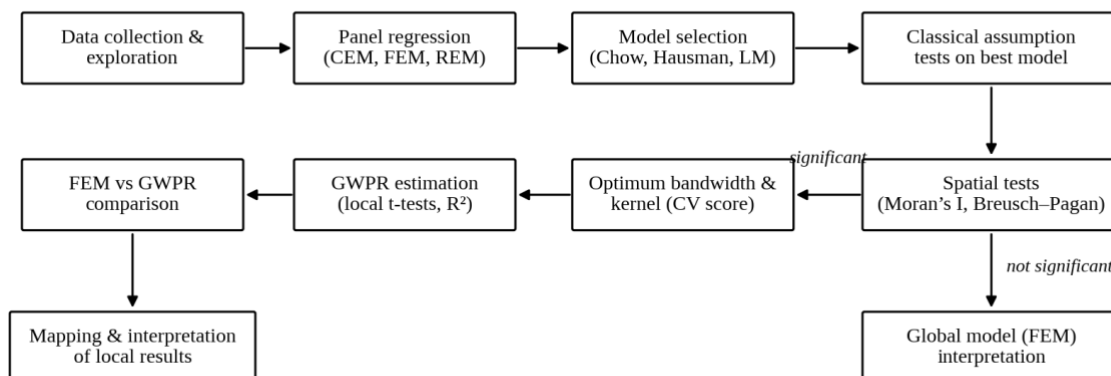


Figure 1. Analytical procedure of the study

RESULTS AND DISCUSSION

Descriptive Statistics

Figure 2 shows the average FLFPR of each province during the study period, and Table 2 presents the descriptive statistics of the research variables. Several provinces in Java, Bali, Nusa Tenggara, and Papua recorded relatively high average FLFPR, while several provinces in Sumatra, Kalimantan, and parts of eastern Indonesia recorded relatively low averages, indicating variation in female labour force participation across regions.

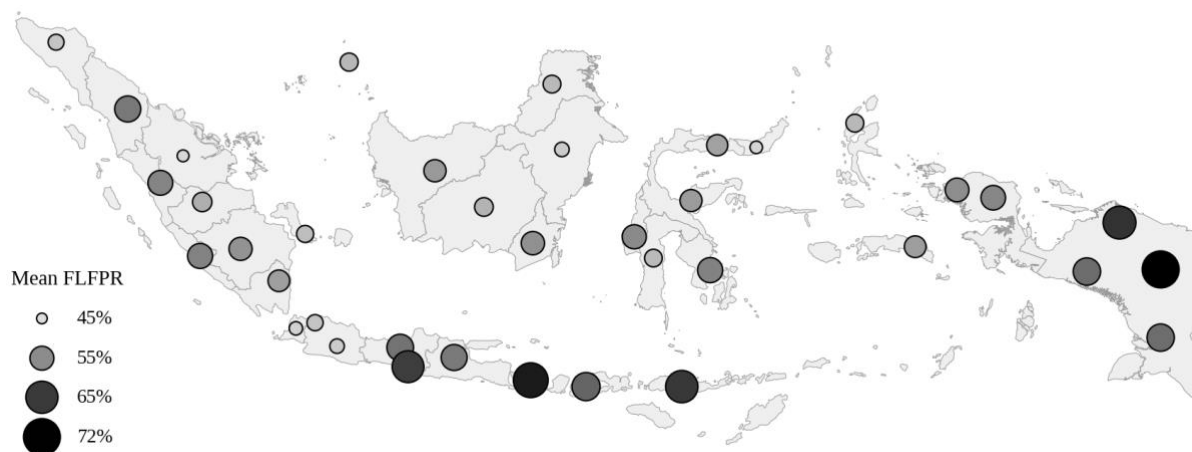


Figure 2. Average female labour force participation rate by province, 2018–2024

Table 2. Descriptive statistics of research variables

Variable	Minimum	Maximum	Mean	Std. deviation
FLFPR (%)	42.25	85.71	53.8939	6.5374
MYS (years)	2.92	11.19	8.3592	1.1477
PMW (ln)	14.19	15.82	14.8104	0.2390
EG (%)	−20.13	21.18	3.0368	4.4132
DDI (ln)	10.84	18.67	15.6567	1.4052
FDI (ln)	7.69	16.12	12.7959	1.7032

Source: Data processed using RStudio (2026)

FLFPR ranged from 42.25 to 85.71 percent with a mean of 53.89 percent and a standard deviation of 6.54, indicating substantial variation across provinces and years. MYS ranged from 2.92 to 11.19 years with a mean of 8.36 years. EG ranged from −20.13 to 21.18 percent with a mean of 3.04 percent; the negative minimum indicates that some provinces experienced economic contraction in certain periods. The logarithms of PMW, DDI, and FDI had means of 14.81, 15.66, and 12.80, respectively. Overall, the standard deviations of all variables indicate sufficient variation for panel regression and GWPR analysis.

Global Panel Regression Model

The results of the model selection tests are presented in Table 3. The p-value of the Chow test is below 0.05, so FEM is preferred to CEM, and the p-value of the Hausman test (0.023) is also below 0.05, so FEM is preferred to REM. The Lagrange Multiplier test was therefore not required, and FEM was selected as the best panel regression model.

Table 3. Results of panel regression model selection

Test	Statistic	p-value	Decision
Chow test	34.099	< 2.2e-16	Reject H0; FEM is preferred to CEM
Hausman test	12.989	0.02348	Reject H0; FEM is preferred to REM

Source: Data processed using RStudio (2026)

Table 4. Estimation results of the Fixed Effect Model

Variable	Coefficient	Std. error	t-value	p-value
MYS	-0.088045	0.590196	-0.1492	0.881560
PMW	4.717976	1.504579	3.1357	0.001969
EG	0.019679	0.042226	0.4660	0.641688
DDI	0.652189	0.301412	2.1638	0.031649
FDI	0.708021	0.232124	3.0502	0.002592
R ² = 0.18996; adjusted R ² = 0.022362; F-statistic = 9.52082 (p = 0.00000004)				

Source: Data processed using RStudio (2026)

As shown in Table 4, the estimated FEM equation is $FLFPR = -0.088 \text{ MYS} + 4.718 \text{ PMW} + 0.020 \text{ EG} + 0.652 \text{ DDI} + 0.708 \text{ FDI}$. The equation has no common constant because FEM is estimated using the within estimator, which removes individual effects through demeaning, so that the intercepts differ across provinces and are absorbed into the provincial fixed effects (Ferdiansyah et al., 2025). The F-statistic (9.52; $p < 0.001$) indicates that the independent variables jointly have a significant effect on FLFPR, and the R² of 0.190 indicates that the model explains 19.0 percent of the variation in FLFPR. Partially, PMW, DDI, and FDI have positive and significant effects ($p < 0.05$), while MYS and EG are not significant.

The results of the diagnostic and spatial tests are presented in Table 5. The Jarque–Bera test indicates that the residuals are not normally distributed; all VIF values are below 10, indicating no multicollinearity; the Ljung–Box test indicates no autocorrelation; and the Glejser test indicates no heteroscedasticity. Moran’s I (0.306; $p < 0.001$) shows significant positive spatial autocorrelation in FLFPR across provinces, and the Breusch–Pagan test (15.879; $p = 0.007$) confirms spatial heterogeneity. Hence, the assumption of spatial independence in the global panel model is not fully met, and the relationships between the variables are likely to differ across provinces, justifying the use of GWPR.

Table 5. Results of diagnostic and spatial tests

Test	Statistic	p-value	Conclusion
Normality (Jarque–Bera)	1137.6	< 2.2e-16	Residuals not normally distributed
Multicollinearity (VIF)	1.138–1.875	–	No multicollinearity (VIF < 10)
Autocorrelation (Ljung–Box)	0.56638	0.4517	No autocorrelation
Heteroscedasticity (Glejser)	F = 1.447	0.2081	No heteroscedasticity
Spatial autocorrelation (Moran’s I)	0.306372 (Z = 3.5118)	0.0002225	Significant positive spatial autocorrelation
Spatial heterogeneity (Breusch–Pagan)	15.879	0.007199	Spatial heterogeneity present

Source: Data processed using RStudio (2026)

Geographically Weighted Panel Regression Model

The results of the optimum bandwidth selection are presented in Table 6. The adaptive bisquare kernel yielded the smallest CV score (2,856.191) compared with the Gaussian

(4,034.933) and exponential (4,293.732) kernels, and was therefore used to estimate the GWPR model with an optimum bandwidth of 38 nearest neighbours.

Table 6. Selection of the optimum bandwidth

Adaptive kernel	Optimum bandwidth	CV score
Gaussian	21	4,034.933
Bisquare	38	2,856.191
Exponential	21	4,293.732

Source: Data processed using RStudio (2026)

Unlike FEM, which produces a single global coefficient for all provinces, GWPR produces local coefficients, so the effect of each variable can differ by province. The comparison in Table 7 shows that the local GWPR model has an R^2 of 0.861 and an adjusted R^2 of 0.795, compared with 0.190 and 0.022 for FEM, a difference of 0.671 in R^2 and 0.773 in adjusted R^2 . GWPR therefore explains 86.1 percent of the variation in FLFPR and fits the data considerably better than the global model because it captures spatial heterogeneity that cannot be explained by the global panel regression.

Table 7. Comparison of the FEM and GWPR models

Model	R^2	Adjusted R^2
GWPR (local model)	0.8614096	0.7951181
FEM (global model)	0.1899600	0.0223620
Difference	0.6714496	0.7727561

Source: Data processed using RStudio (2026)

The local partial tests ($|t| > 1.96$) show that MYS is significant in 29 provinces (76.3 percent), PMW in 19 provinces (50.0 percent), FDI in 17 provinces (44.7 percent), and DDI in 7 provinces (18.4 percent), whereas EG is not significant in any province. The spatial distribution of these results is shown in Figure 3, and the grouping of provinces by combination of significant variables is presented in Table 8. The differences in significance confirm that the relationships between the independent variables and FLFPR are spatially heterogeneous.

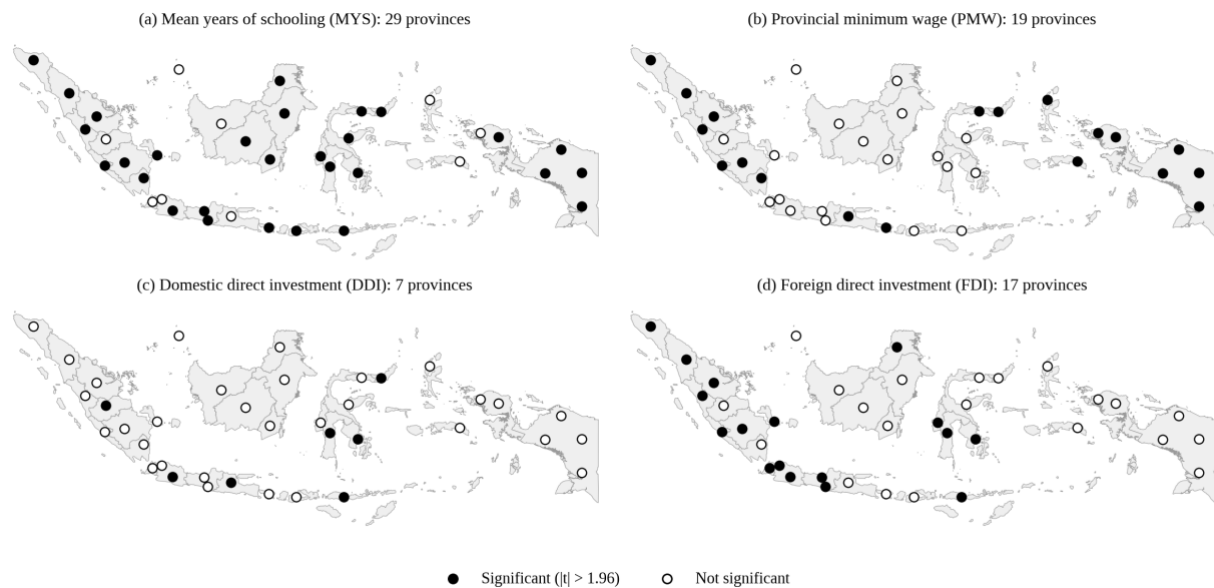


Figure 3. Provinces with significant local GWPR parameters (economic growth is not significant in any province)

Table 8. Grouping of provinces by significant variables in the GWPR model

Significant variables	Provinces	n
MYS, PMW, FDI	Aceh, Sumatera Utara, Sumatera Barat, Riau, Sumatera Selatan, Bengkulu	6
MYS, PMW	Lampung, Bali, Gorontalo, Papua Barat, Papua, Papua Selatan, Papua Tengah, Papua Pegunungan	8
MYS, FDI	Kep. Bangka Belitung, Jawa Tengah, D.I. Yogyakarta, Kalimantan Utara, Sulawesi Barat	5
MYS, DDI, FDI	Jawa Barat, Nusa Tenggara Timur, Sulawesi Selatan, Sulawesi Tenggara	4
MYS, PMW, DDI	Sulawesi Utara	1
MYS only	Nusa Tenggara Barat, Kalimantan Tengah, Kalimantan Selatan, Kalimantan Timur, Sulawesi Tengah	5
PMW, DDI	Jawa Timur	1
PMW only	Maluku, Maluku Utara, Papua Barat Daya	3
DDI only	Jambi	1
FDI only	DKI Jakarta, Banten	2
None	Kepulauan Riau, Kalimantan Barat	2

Source: Data processed using RStudio (2026)

The Effect of Mean Years of Schooling on FLFPR

Globally, MYS has a negative but insignificant effect on FLFPR ($\beta = -0.088$; $p = 0.882$), so H1 is not supported at the national level. Two explanations are possible. First, increased schooling does not directly raise women's labour market participation because education primarily improves the quality of the labour force rather than the number of women entering the labour market. According to human capital theory (Becker, 1964; Schultz, 1961), education increases productivity and skills, but its benefits materialise only when employment opportunities matching women's competencies are available. More educated women also tend to have higher reservation wages and are more selective in choosing jobs, so some prefer to wait for suitable employment rather than accept low-paid work. Second, the effect of education differs across provinces and cannot be captured by a single global coefficient.

The GWPR results confirm the second explanation: MYS is significant in 29 provinces, making it the variable with the widest spatial influence, spread across Sumatra, Java, Bali and Nusa Tenggara, Kalimantan, Sulawesi, and Papua. In provinces with more developed manufacturing, modern trade, and education, health, and financial services, higher schooling increases women's literacy, communication, technological, and professional skills and eases their access to formal employment. In contrast, in provinces where MYS is not significant, such as Kepulauan Riau, DKI Jakarta, Banten, Kalimantan Barat, Maluku, and Maluku Utara, women's participation appears to be driven more by the economic structure, available job opportunities, urbanisation, and socio-cultural conditions. Most female employment is still in the informal sector, such as small-scale trade, family businesses, agriculture, and informal services, so rising education has not yet translated into higher participation everywhere. These findings are in line with Fajrina (2025), who found that mean years of schooling is not significant for female labour force participation.

The Effect of the Provincial Minimum Wage on FLFPR

Globally, PMW has a positive and significant effect on FLFPR ($\beta = 4.718$; $p = 0.002$), so H2 is supported: increases in the minimum wage tend to be followed by higher female labour market participation. This finding is consistent with labour supply theory, which states that higher wages increase the number of workers willing to supply labour, and with Borjas (2016), who explains that women's decision to work depends on the comparison between the reservation wage and the market wage. When the minimum wage rises, the income from working increasingly exceeds the opportunity cost of household work, encouraging women outside the labour force to enter it.

Locally, however, PMW is significant in only 19 provinces, mainly in Sumatra, Bali, northern Sulawesi, Maluku, and Papua, while it is not significant in the other 19 provinces, including DKI Jakarta, Jawa Barat, Jawa Tengah, D.I. Yogyakarta, Banten, and most of Kalimantan. In these provinces, women's decisions to work depend not only on wages but also on available job opportunities, work flexibility, education, family conditions, and local culture. This result is consistent with Hayya (2025), who found that the minimum wage has a positive but only marginal effect on FLFPR because social norms, domestic burdens, and access to work facilities also shape women's labour market decisions. Minimum wage policies therefore do not have the same impact in all regions.

The Effect of Economic Growth on FLFPR

EG has a positive but insignificant effect on FLFPR at the national level ($\beta = 0.020$; $p = 0.642$) and is not significant in any of the 38 provinces in the GWPR model, so H3 is not supported. Economic growth during the study period has not created employment opportunities that are inclusive for women, as growth may originate from capital-intensive sectors such as mining, certain manufacturing industries, and construction, which absorb relatively few female workers. In the Harrod–Domar framework, growth increases employment only when investment expands productive capacity that requires additional labour, and in the Keynesian

view, higher output does not necessarily increase labour demand when firms raise productivity through technology or capital rather than additional workers.

This condition is supported by BPS (2025), which reports that the share of women working in the informal sector (around 43.72 percent) remains higher than in the formal sector (around 34.66 percent). Informal work offers more flexible hours but lower protection and wages, and women often choose it because of structural and cultural barriers and domestic responsibilities; such sectors are less responsive to economic growth. The finding is consistent with Harjanti and Perwithosuci (2026), who found that economic growth has an insignificant effect on FLFPR in Jawa Tengah. It indicates a gap between theory and empirical conditions: raising FLFPR depends not merely on the rate of growth but on the quality of growth, the economic structure, the creation of women-friendly jobs, and policies that expand women's access to formal employment.

The Effect of Domestic Direct Investment on FLFPR

Globally, DDI has a positive and significant effect on FLFPR ($\beta = 0.652$; $p = 0.032$), so H4 is supported. This result is consistent with the Harrod–Domar theory, in which investment drives economic growth through capital accumulation: as domestic investment increases, local firms expand their businesses and require additional workers, creating greater employment opportunities, including for women. The finding is in line with Putra and Murialti (2025), who found that investment has a positive effect on labour force participation, and An Nisa and Handayani (2021), who emphasise the role of investment in creating jobs.

Locally, however, DDI is significant in only 7 provinces, namely Jambi, Jawa Barat, Jawa Timur, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan, and Sulawesi Tenggara, and not significant in the remaining 31 provinces. In the significant provinces, domestic investment is presumed to flow into labour-intensive sectors with relatively high female employment, such as manufacturing, trade, accommodation and food services, and education and health services. In many other provinces, domestic investment remains concentrated in capital-intensive sectors such as mining, energy, large-scale plantations, and infrastructure; female employment is still dominated by the informal sector; and differences in women's human resource quality, together with cultural factors and domestic responsibilities, limit the response of FLFPR to domestic investment. The novelty of this finding lies in showing that, contrary to the uniform effect assumed by global models, the effect of DDI on FLFPR is spatially uneven and depends on the sectoral destination of investment.

The Effect of Foreign Direct Investment on FLFPR

Globally, FDI has a positive and significant effect on FLFPR ($\beta = 0.708$; $p = 0.003$), so H5 is supported: greater foreign investment expands economic activity and productive capacity and creates new jobs that can absorb female workers. Besides the Harrod–Domar mechanism, the eclectic (OLI) paradigm explains that FDI brings technology transfer, productivity improvements, innovation, and modern management practices (Eden & Dai, 2010), which foster manufacturing and service sectors that generally open more opportunities for women, particularly in jobs requiring precision, administrative skills, services, and processing. This is

consistent with Borensztein et al. (1998), who showed that FDI contributes to growth through technology transfer when supported by adequate human capital.

Locally, FDI is significant in 17 provinces, concentrated in Sumatra, Java, Sulawesi, and parts of Kalimantan, where foreign investment tends to flow into labour-intensive sectors such as manufacturing, wholesale and retail trade, accommodation and food services, finance, and education and health services. In the other 21 provinces, FDI is concentrated in capital-intensive and extractive sectors such as mining, energy, and large-scale plantations, which employ more male workers; skill mismatches between foreign firms' needs and local human resources persist; and differences in women's education, economic structure, urbanisation, and social norms lead to different responses. The effectiveness of FDI in raising FLFPR therefore depends not only on the amount of investment but also on its sectoral destination and each region's capacity to absorb female workers.

CONCLUSION AND SUGGESTIONS

This study concludes that, in the global Fixed Effect Model, the provincial minimum wage, domestic direct investment, and foreign direct investment have positive and significant effects on the female labour force participation rate in Indonesia, whereas mean years of schooling (negative) and economic growth (positive) are not significant. The GWPR model, which accounts for spatial heterogeneity, explains 86.1 percent of the variation in FLFPR, far exceeding the global model, and shows that mean years of schooling is significant in 29 provinces, the minimum wage in 19, foreign investment in 17, and domestic investment in 7 provinces, while economic growth is not significant in any province. The determinants of FLFPR in Indonesia are therefore not homogeneous across regions and depend on each province's economic structure, labour market conditions, and socio-cultural characteristics.

Central and regional governments are advised to formulate province-specific policies. Given that education has the widest spatial influence, women's human resource quality should be improved through wider access to education, vocational training, and upskilling and reskilling programmes aligned with labour market needs. Minimum wage policies should balance worker welfare and business capacity so that they motivate women to participate without reducing job opportunities. Governments should also direct both domestic and foreign investment towards labour-intensive sectors with high female absorption, such as manufacturing, textiles, food and beverages, trade, tourism, the creative economy, and services, rather than only capital-intensive sectors, while strengthening gender-responsive policies such as childcare facilities, protection of female workers, and inclusive work environments. Future research is recommended to include other variables affecting FLFPR, apply other spatial analysis methods, and update the data period as newer FLFPR data become available.

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