Determinants of the Women's Labor Force Participation Rate in Indonesia

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Abstract

Indonesia has an almost balanced population of women and men. As a developing country with a large population, it is vulnerable to problems in the large supply of labor. Women are often victims of gender inequality that restricts them from contributing to development and enjoying development. This can be seen in the participation rate of the female labor force in Indonesia which has stagnated at 50%. The purpose of this study is to analyze the factors that influence the female labor force participation rate in Indonesia in 2017-2023. The data used in this study was sourced from the Badan Pusat Statistik Indonesia. The analysis model used in this study is panel data regression with Fixed Effect Model (FEM). Based on the results of the analysis, it is known that women accessing the internet have a significant negative effect on the growth of women's labor force participation rates, the average length of girls' schooling and the provincial minimum wage have a significant positive effect on women's labor force participation rates. Then foreign investment has a negative effect insignificant and domestic investment has a positive effect insignificant.

Keyword: internet, wage, school, investment, women's labor force participation rate

1. Introduction

Labor is a resource that plays a role as the main element in the development of a country. Human resources are also said to be the role or actors of economic development. Labor in the economic development of the State of Indonesia has a problem with the large supply of labor. This is because Indonesia has a large population and is even the country with the fourth largest population among G20 countries (World Population Review, 2023). The number of Indonesia's population is based on gender; the number of female and male populations in Indonesia is almost equal every year. This shows that half of Indonesia's population is female, so the role and contribution of women are as important as men in driving economic development in Indonesia.

The role of women in the workforce is still discriminated against. Inequality has limited women from working, contributing to development, and enjoying development. In fact, the success of development should depend on the welfare of all its people, without exception, both women and men. This gender inequality is still an interesting issue from time to time. Women's participation in the labor force can be measured by the Women's Labor Force Participation Rate (LFPR).
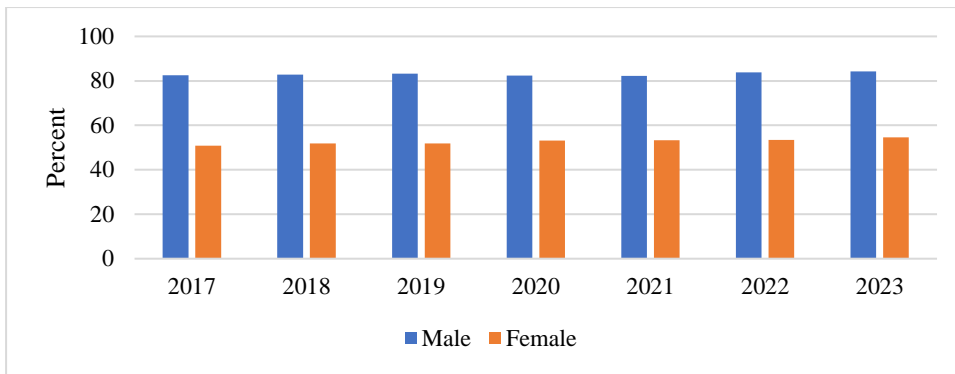
Figure 1. Indonesian Labor Force Participation Rate by Gender in 2017-2023 (in Percent)

The labor force participation rate in Indonesia, based on Figure 1, shows that the participation rate of women in the workforce during this period has stagnated at 50 percent. The figure shows that 50 percent of the total female population is in the labor market. Meanwhile, the participation rate of men in the workforce is 80 percent, which shows that as many as 80 percent of the male population is in the labor market. Based on this data, the difference between women and men is too far, where the LFPR of women is lower than the LFPR of men. The low female LFPR shows that there is still a very high gender gap between men and women. In addition, it shows that the welfare of the female population in Indonesia is still relatively low. This low welfare can trigger a new problem in the form of poverty.

Women and men should have equal opportunities and roles in the economy, where the participation of both women and men in economic activities is very important for the success of economic development in Indonesia. The McKinsey Global Institute (2018) stated in its research that by increasing women's participation in the world of work by 3 percent, it can add 135 billion US dollars to the Indonesian economy in 2025. So the problem of the female workforce is very interesting to study, especially the participation of the female labor force in the labor market.

The level of labor force participation can be affected by the use of information and communication technology. Indonesian Central Statistics Agency (2024) shows that until 2023, only 66.35 percent of the female population in Indonesia will have access to the internet. This figure is still relatively low and shows that Indonesian women tend not to be very active in accessing information through the internet. Women are also said to be still not proficient in following information and communication technology. Davani and Sulistyaningrum (2023) showed in their research that there was a positive influence of digitalization on the employment retention rate of 1.24%, which was proven to be statistically significant. With the internet, a person is able to find information and add as much knowledge as possible without limits. Of course, this will increase a person's skills so that they decide to work and participate in the workforce. So that the increase in the number of women accessing the internet can increase the Women's Labor Force Participation Rate.

Educational factors are thought to also influence a person's participation in work. The average length of schooling indicates the length of the educational level. A person's chances of landing a job increase with education level. This shows that education is a factor in increasing the participation rate of the labor force. The research by Haryanti (2022) found that the level of education for women who work with a high school diploma has a positive and significant effect on women's LFPR.

Another factor that can affect women's LFPR is the rising cost of living that forces a woman to participate in the workforce. When a woman chooses to work, they will earn income or wages that will be used to fulfill their daily lives. Thus, high wage levels will attract women to work and increase women's labor force participation.

A person's decision to enter the workforce is also impacted by job possibilities and the utilization of labor that already exists. According to Todaro (2000), the increase in output levels and job opportunities can be attributed to the accumulation of capital (investment) and savings. Investment and labor absorption demonstrate a positive correlation. More job opportunities can encourage more people to get into work.

Based on the context in the background, the researcher wants to analyze the influence of the internet on the level of labor force participation, which is still rarely discussed in Indonesia. Then this study also specifically discusses women's gender because the participation rate of women in the labor force is still low. Therefore, this study aims to examine the factors that affect the level of female labor force participation in Indonesia in 2017–2023.

2. Literature Review
2.1 Labor Force Participation Rate

The labor force participation rate is an indicator that explains the number of laborers compared to the working-age population. The level of labor force participation can also be said to be an indicator to measure the amount of active labor force participation in the economy. Borjas (2016) states that a person will participate in the labor force if he or she is employed or unemployed.

The factors that affect the level of labor force participation can be described through labor supply behavior. The framework that economists usually use to analyze labor supply behavior is called the neoclassical labor-leisure choice model, or leisure and labor choice model (Borjas, 2016). The labor supply curve shows how an individual's behavior decides to choose between working or enjoying leisure time in response to price changes. When the wage offer exceeds the predetermined wage level, one can enter the labor market until, at a certain point, the labor supply curve has a positive slope. However, when welfare increases along with higher wages, the number of hours worked decreases, so the labor supply curve has a negative slope. Therefore, the labor supply curve is represented as a backward-bending labor supply curve (Borjas, 2016).

The general measure of labor supply is the labor force and the Labor force Participation Rate. The labor force participation rate is one of the measuring tools to measure labor supply because it can show the size of the population in the working labor force (Santoso, 2012).

2.2 Access to Internet Technology

The Internet stands for international network and is defined as a very large computer network consisting of several small networks that are interconnected with each other (Oetomo, 2002). It was further explained that this huge computer network could cover the entire world. The development of internet-based information technology has had a positive impact. With the existence of internet technology, it has changed people's lifestyles from primitive to modern. The positive impact of internet technology in Indonesia is that it can make it easier to search for information, articles, job vacancies, and many more.

Access to the internet is the ability of each individual or group to connect to the internet network through electronic devices such as smartphones, computers, etc. The development of the internet is what makes more and more people access the internet. Bahia et al. (2020) found that access to the internet can open up new job opportunities. Viollaz and Winkler (2021) also found that the internet can increase access to job search information or job vacancy information. With the internet, women can also work from anywhere, thus encouraging women's decision to work due to security factors (Chakraborty & Bhat, 2018).

2.3 Education

Education is a form of investment in human resources. Education also plays a direct role in national income through improving skills and work productivity. In the human capital theory developed by Schultz (1961), it is stated that knowledge, skills, and health are forms of capital that can be used as investments to open up opportunities and options that should be available to all individuals or residents. Human capital, in the form of labor, physical capital, natural resources, and technology, is an important factor that is useful for determining productivity factors. Human capital is measured in the fields of health and education (Todaro & Smith, 2008). Formal education achieved by the community in an area can be measured by the average length of schooling. The longer the average length of schooling, the higher the level of education undertaken.

This education is one of the most cost-effective ways to improve local human resource standards or investment in human capital. The higher a person's education level, the more expensive the value of time. Individuals with relatively expensive time tend to replace their leisure time with work (substitution effect). This influence is stronger and more pronounced among women because the fact is that women with higher education generally do not stay at home to take care of the household but prefer to enter the job market.

2.4 Wage

Wages are payments for physical services provided by workers to entrepreneurs (Sukirno, 2003). Meanwhile, according to Law of the Republic of Indonesia Number 13 of 2003, wages are defined as the rights of workers/laborers received and expressed in the form of money in exchange from employers or employers to workers/laborers determined and paid according to a labor agreement, agreement, or laws and regulations, including allowances for workers/laborers and their families for a job and/or service that has been or will be performed.

This theory is also supported by the labor supply of women theory from Borjas (2016), which specifically states that, as wages rise, women who do not work choose to work because women may be more responsive to wage changes than the supply of male labor. Rising wages make household production relatively less valuable while at the same time increasing the price of leisure. Therefore, wage increases will push a person from household production to the labor

market. The increase in real wages will then attract many women out of the household production sector to enter the market sector. Therefore, the participation rate of women in the labor force is very responsive to wage changes.

2.4 Investment

An investment is a sum of money spent on purchasing production tools and capital goods with the intention of increasing or replacing these items in the economy so that they can produce products and services and turn a profit in the future. According to Keynesian theory, investment has an important role in determining the level of employment opportunities or labor force participation in the economy. Keynes argued that the level of employment opportunities is determined not only by the individual's desire to work but also by the aggregate level of effective demand in the economy.

Keynes stated that investment is one of the most important components of aggregate demand. A higher level of investment will lead to more demand for products and services, which will in turn push businesses to expand their workforces in order to keep up with demand. According to Peric and Filipovic (2021), the flow of investment has a positive and significant impact on the employment rate. This increasing employment can encourage women to enter the labor market. So that the increase in investment can increase women's LFPR.

3. Material and Method

3.1 Design Study

This study uses a quantitative research design with panel data regression. Quantitative research is a type of research that produces findings that can be achieved by statistical procedures or other methods of quantification or measurement (Sujarweni, 2015). The type of data used is secondary data obtained from the Central Statistics Agency (BPS) of Indonesia in 2017-2023.

3.2 Data Analysis

The data analysis method used to answer the purpose of this study is panel data regression analysis. The variables used in this study are the variable of the Women's Labor Force Participation Rate (WLFPR) as a bound variable and the independent variable in the form of Women Accessing the Internet (WAI), Women's Average Length of School (WALS), Provincial Minimum Wage (lnPMW), Foreign Investment (FI), and Domestic Investment (lnDI).
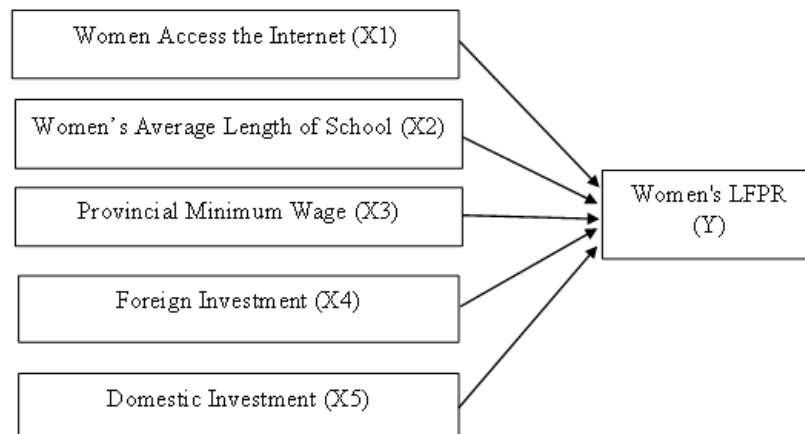
Figure 2. Research Model

The regression estimation model of panel data in this study is noted as follows:

$$WLFPR_{it} = \beta_0 + \beta_1 WAI_{it} + \beta_2 WALS_{it} + \beta_3 \ln PMW_{it} + \beta_4 FI_{it} + \beta_5 \ln DI_{it} + e_{it}$$

In the panel data regression model, there are three approach models to estimate the best model, namely the Common Effect Model, the Fixed Effect Model, and the Random Effect Model. Then conduct a model conformity test with the Classical Assumption. Then it was continued with a hypothesis test.

4. Result
Classical Assumption Test
The classical assumption test is a statistical test that is carried out to determine the research data is BLUE (Best Linear Unbiased Estimators).

1. Normality Test

   Table 1. Normality Test Results

Normality Test	Result	Conclusion	Information
Jarque-Bera	0.079499	>5%	Normally distributed data
Probability	0.961054		

   Based on Table 1, it shows that the data is distributed normally.

2. Multicollinearity Test

   Table 2. Multicollinearity Test Results

	WAI	WALS	LNPMW	FI	LNDI
WAI	1.000000	0.530322	0.521183	0.246119	0.463386
WALS	0.530322	1.000000	0.583775	0.175149	0.070115
LNPMW	0.521183	0.583775	1.000000	-0.033927	0.091532
FI	0.246119	0.175149	-0.033927	1.000000	0.534308
LNDI	0.463386	0.070115	0.091532	0.534308	1.000000

   Based on Table 2, the results of the multicollinearity test show that the value generated between variables is less than 0.80. Therefore, it can be concluded that the regression model passes the multicollinearity test.

3. Heteroscedasticity Test

   Table 3. Heteroscedasticity Test Results

Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	41.56168	21.74378	1.911429	0.0575
WAI	0.019436	0.016062	1.210076	0.2278
WALS	-0.463937	0.722668	-0.641978	0.5217
LNPMW	-2.613291	1.610590	-1.622568	0.1064
FI	0.000163	9.22E-05	1.764421	0.0793
LNDI	0.089461	0.121646	0.735421	0.4630

   Based on Table 3 above, it can be seen that the results of the heteroscedasticity test of this study show that the probability value of each independent variable is greater than the significance level of $\alpha = 0.05$. Thus, it can be concluded that there is no heteroscedasticity problem in the equation model used.

4. Autocorrelation Test

Tabel 4. Autocorrelation Test Result

Test	Value	Conditions	Conclusion
Durbin-Watson stat	1.556678	$0 < d < d_L$	Positive autocorrelation

Based on Table 4, it can be seen that there is a positive autocorrelation in the regression model.

Best Regression Results

The test in this study uses panel data regression analysis. The analysis of this test is useful to see the influence of the independent variable on the bound variable. The results of this test show that the Fixed Effect Model is the best model in this study.

Table 5. Fixed Effect Model Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	-77.04595	39.32557	-1.959182	0.0516
WAI	-0.061443	0.029050	-2.115105	0.0357
WALS	3.137625	1.307010	2.400613	0.0173
LNPMW	7.020244	2.912897	2.410056	0.0169
FI	-2.02E-05	0.000167	-0.121080	0.9038
LNDI	0.333971	0.220007	1.517998	0.1307
F-statistic	76.26850			
Prob. (F-statistic)	0.000000			
R-squared	0.936235			
Adjusted R-squared	0.923960			

Based on the results of the estimation in Table 5, the final equation can be written as follows:

$WLFPR_{it} = -77.04595 - 0.061443 WAI_{it} + 3.137625\ WALS_{it} + 7.020244\ LNPMW_{it} - 2.02E\text{-}05\ FI_{it} + 0.333971\ LNDI_{it}$

Hypothesis Test

After passing the classical assumption test, based on Table 1, the results of the statistical test can be seen as follows:

Partial Test (t-Test)

Based on the regression results of the fixed effect model in Table 1, it shows that:

1. Women accessing the Internet has a significant negative effect on the women's labor force participation rate, as evidenced by a coefficient of -0.061443 and a probability value of 0.0357, which is less than alpha 5%.
2. The women's average length of schooling has a significant positive effect on the women's labor force participation rate, as evidenced by a coefficient of 3.137625 and a probability value of 0.0173 less than alpha 5%.
3. The Provincial Minimum Wage has a significant positive effect on the women's labor force participation rate, as evidenced by a coefficient of 7.020244 and a probability value of 0.0169 less than alpha 5%.

4. Foreign Investment has a negative and insignificant effect on the women's labor force participation rate, as evidenced by a coefficient of -2.02E-05 and a probability value of 0.9038, which is more than alpha 5%.
5. Domestic Investment has a positive and insignificant effect on the women's labor force participation rate, as evidenced by a coefficient of 0.333971 and a probability value of 0.1307, which is more than alpha 5%.

Model Feasibility Test (Test F)

Based on the results of the fixed effect model test in Table 1, it was obtained that the prob value (F-statistic) was 0.000000, which means less than α (5%). This means that the trust of 95% of independent variables, including women's access to the internet, the average length of women's schooling, the provincial minimum wage, foreign investment, and domestic investment simultaneously or together, is dependent on the dependent variable in the form of the level of female labor force participation in Indonesia in 2017–2023.

Coefficient of Determination (R^2)

Based on Table 1 of the regression results of the fixed effect model, the value of the determinant coefficient (R2) was obtained as 0.923960. This means that 92.3% of women's access to the internet, the average length of women's schooling, the provincial minimum wage, foreign investment, and domestic investment have an effect on the level of female labor force participation in Indonesia in 2017–2023. While the remaining 7.7% of the dependent variable (Women's Labor Force Participation Level) was influenced by other independent variables that were not included in the research model.

5. Discussion

The Influence of Women's Access to the Internet on Women's Labor Force Participation Rate

Access to the internet can have a positive impact on the quality of human resources. Individuals who make the most of internet access to find information and increase knowledge will certainly add skills. Especially in today's all-digital era, the intelligence of using the internet is needed in the world of work.

The estimates in this study show the results in the form of a negative and significant influence between the number of women accessing the internet and the level of women's labor force participation rate in Indonesia. This shows that the more people who access the internet, the lower the participation rate of women in the labor force, and vice versa. Indonesia, as a large and developing country, allows for uneven internet networks in all corners of the region. Limited access to internet technology makes the number of women accessing the internet still have a negative impact on LFPR. Then the use of the internet is also not only to seek information, knowledge, and improve skills but also has other adverse impacts, so this is why the internet network has a negative effect.

The research of Samargandi et al. (2019) and the research by Wahyuni & Anis (2019) also showed the same results that information and communication technology have a negative and significant effect on the level of labor force participation in Indonesia. Then Limilia & Prihandini (2018) found that there are three motivations that most often encourage men and women to use the internet, namely social interaction, filling free time, and seeking

entertainment. Meanwhile, the motivation of seeking information, education, and relaxation does not play much in encouraging them to use the internet.

The Effect of Women's Average Length of School on Women's Labor Force Participation Rate

The women's average length of school held by women in this study has a positive and significant impact on the women's labor force participation rate in Indonesia. Having more education can improve one's chances of finding employment, particularly for women. When it comes to employment prospects, women with more education have more options than those who have never attended school. The attainment of this degree of education indicates an improvement in the caliber of human resources.

Cholifah & Sutrisno (2024) stated that women's average length of schooling has a positive and significant effect on the women's labor force participation rate. The study's findings are consistent with the theory of human capital, which holds that education is the most important factor that can improve a person's mentality and creativity, both of which can lead to more chances in the job market (Arifin, 2023).

The Effect of the Provincial Minimum Wage on Women's Labor Force Participation Rate

Every individual will decide to enter the labor market when their life needs have not been met. Wages in Indonesia tend to increase every year and are proportional to the increase in the labor force. The determination of the minimum wage is a form of protection provided by the government to workers. The minimum wage policy is implemented with the aim of protecting workers and laborers from the arbitrariness of employers in providing inappropriate wages. The results of this study estimate show that there is a positive and significant influence between the provincial minimum wage and the Women's Labor Force Participation Rate.

Sasongko et al. (2020), who showed that the provincial minimum wage has a significant positive influence on the Women's Labor Force Participation Rate in Indonesia. The results of this study are also in line with the labor supply of women theory from Borjas (2016), which says that, specifically, as wages increase, women who do not work choose to work because women are more responsive to wage changes than the supply of male labor. The increase in wages makes household production relatively less valuable, thus increasing the price of leisure time. Therefore, wage increases will push a person from household production to the labor market. The increase in real wages will then attract many women out of the household production sector to enter the market sector.

The Effect of Foreign Investment on Women's Labor Force Participation Rate

Foreign investment in this study shows a negative and insignificant influence on the women's labor force participation rate in Indonesia. Based on these results, FDI investment has not had a real impact on the workforce. The incoming foreign investment turned out to be a type of capital-intensive FDI. This capital-intensive sector places more emphasis on the use of machines compared to human labor. So that FDI does not absorb labor and is unable to prosper the community through the provision of jobs.

Foreign investment is a macroeconomic phenomenon that is indeed very volatile because it is caused by changes in the country's politics and exchange rates, so investors lack confidence in the political and economic conditions of the Indonesian state. Another reason is that Indonesia has not yet become a priority country as a place to invest capital for foreign

investors. Foreign investors tend to invest their capital in countries that have abundant natural resources and cheap labor so that they have the potential to make profits in the future. Kurniasari et al. (2018) stated that FDI did not have a significant effect on the number of workers in Central Java Province. Then the research of Hadi et al. (2022) also shows that investment has a negative and insignificant effect on the labor force participation rate.

The Effect of Domestic Investment on Women's Labor Force Participation Rate

The influence of domestic investment in this study shows a positive and insignificant influence on the level of female labor force participation in Indonesia. Because Indonesia's domestic investment is still unevenly distributed in all provinces in Indonesia. So that it allows uneven development both physically and non-physically in the form of human resource development.

The highest realization of domestic investment is in 3 provinces, namely DKI Jakarta, West Java, and East Java (Indonesian Central Statistics Agency, 2024). This shows that the concentration of domestic investment realization focuses on the island of Java only and is not evenly distributed in all provinces in Indonesia. Domestic investment which focuses on the island of Java indicates that there is still a lack of trust from domestic investors to invest their capital in several provinces in Indonesia outside the island of Java. The low capital market, which is also still only concentrated in a few big cities and on the island of Java, makes it difficult for investors. In fact, the owner of the capital is not only in the Java region, which is famous as the center of the country's economic growth. This socialization is less widespread and lacks information and in-depth education. The implementation is sometimes only a formality and there is no continuity.

In addition, it is also caused by infrastructure governance and communication between entrepreneurs and the government, which are still not good and need to be improved. Infrastructure is the main key to achieving higher economic growth. Good infrastructure, especially means of transportation, will reduce distribution costs and make the economy more effective. The results of this study are supported by the research of Ningrum et al. (2022), which found that domestic investment has no effect on the level of labor force participation. Then Maharani (2017) also found that domestic investment did not have a significant effect on the labor force participation rate.

The Effect of Women Accessing the Internet, Women's Average Length of Schooling, Provincial Minimum Wage, Foreign Investment, and Domestic Investment on Women's Labor Force Participation Rate

Based on the results of the estimate, it was shown that all independent variables, namely women's access to the internet, women's average length of schooling, the provincial minimum wage, foreign investment, and domestic investment together had a significant effect on the level of female labor force participation in Indonesia in 2017–2023. Indonesia is a developing country with a large population of 278,696.2 thousand people, with a female population of 137909.4 thousand people. This large population will certainly produce a large workforce as well. However, not all working-age residents are willing to enter the labor market. This labor force participation is influenced by various factors, including women's access to the internet, the average length of schooling for women, the provincial minimum wage, foreign investment, and domestic investment. All of these variables contribute to the increase in the women's labor force participation rate.

The results of this study are in line with research conducted by Wahyuni & Anis (2019), which shows that foreign investment, education, and information-communication technology simultaneously have a significant effect on the labor force participation rate in Indonesia. Bonerri et al. (2018) also found that the average variables of the length of education and the provincial minimum wage, simultaneously or together, were significant to the labor force participation rate.

6. Conclusion, Implication, and Recommendation

Conclusion

The Indonesian women's labor force participation rate tends to stagnate at 50%. This figure is caused by various factors proven in this study, as follows:

1. Women's access to the internet has a negative and significant effect on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.
2. Women's average length of schooling has a positive and significant influence on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.
3. Provincial Minimum Wage has a positive and significant influence on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.
4. Foreign Investment has a negative and insignificant influence on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.
5. Domestic Investment has a positive and insignificant influence on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.
6. All independent variables, namely women's access to the internet, women's average length of schooling, provincial minimum wage, foreign investment, and domestic investment together have been proven to have an influence on the Women's Labor Force Participation Rate in Indonesia in 2017-2023.

Implication

This research is expected to increase knowledge in the literature about factors that affect the women's labor force participation rate. This research is expected to be considered by the government to make policies related to labor in Indonesia through internet access, average length of schooling, provincial minimum wage and investment both domestically and abroad.

Recommendation

Recommendations that researchers can give to the government are:

1. The government needs to improve internet network facilities that are evenly distributed throughout Indonesia. So that it will attract internet providers to enter all regions of Indonesia and people can easily access the internet.
2. Equitable distribution of education is also needed in areas outside Java that are still largely left behind and need access to education. Quality education is expected to increase human resources, especially women.
3. The determination of the minimum wage is expected to prioritize the workforce, and its determination is outlined in the Regional Regulation. So that the House of Representatives can be involved in order to provide protection for workers.
4. The investment climate in Indonesia needs to be maintained with economic and political stability that must be improved and maintained. The Indonesian government needs to change its legal and bureaucratic regulations for investing in Indonesia.

5. Investment realization is more evenly distributed throughout Indonesia, which can be done by expanding the capital market outside big cities and outside the island of Java.

The recommendations that the researcher can give to the next researcher are that they are expected to be able to conduct research with different exogenous variables or add other variables that may be used as a reference as a determining factor for the results of the next research. Further research is also expected to expand the research object and not focus on researching women only, for example, by conducting research on the male gender or on the elderly workforce. Further research is also expected to be conducted using different data analysis techniques.

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