The Role of Education in Woman Labour Force Participation Rate: A Case Study of Eight ASEAN Countries

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Abstract
The advancement of women's labour force participation rate represents a prominent facet in the endeavour to achieve gender equality and eradicate gender disparities. Education, in particular, plays a pivotal role in affording women enhanced opportunities for securing respectable employment and financial self-sufficiency, thereby paving the way for women's empowerment, particularly within the professional sphere. This study is conducted to discern the extent of education's influence on the magnitude of female labour force participation. The investigation employs panel data analysis encompassing eight ASEAN countries, namely Indonesia, Cambodia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam. The study period spans from 2001 to 2019, with a random effect model utilized for analysis. The outcomes of this research underscore that education holds the most substantial impact on the female labour force participation rate. Specifically, each 1% escalation in women's educational attainment contributes to a 0.224-point increase in the female labour force participation rate. Furthermore, the analysis identifies another significant variable, the dependency ratio, which yields a positive impact. Conversely, adolescent fertility and life expectancy exert a negative and significant influence on the female labour force participation rate. Notably, this study also discerns that economic growth lacks a discernible influence on the female labour force participation rate. However, this study is limited by its focus on eight ASEAN countries, which may not fully capture the diverse experiences of women in other regions. Future research could explore additional variables or expand the geographic scope to include a broader range of countries for a more comprehensive understanding of the factors influencing female labour force participation.

Keywords: *Dependency ratio, education, economic growth, life expectancy, ASEAN*
JEL: *A11, A13*

A. INTRODUCTION

Women's labour force participation plays a critical role in achieving both gender equality and economic growth. Despite representing a significant portion of the global working-age population, women often face barriers that prevent their full inclusion in the workforce (World Bank, 2021). These barriers include unequal access to education, gender discrimination, and insufficient policies that support work-life balance, such as affordable childcare and maternity leave. These issues limit women's ability to actively engage in the labour market, thus impacting overall economic potential. The labour force consists of individuals aged 15 and above who possess the willingness and capability to work, with mental, physical, and functional readiness to perform tasks (Eliza, 2015).

However, many women remain excluded from official labour force participation counts, particularly those involved in unpaid labour, informal sectors, or family work. These exclusions hinder accurate assessments of women's true economic contributions and create challenges for implementing policies that could better support their integration into the formal labour market. Maximizing women's participation in the workforce is essential for national economic progress, particularly when efforts are made to enhance their education and professional skills.

Ayuningtyas & Islami (2022) emphasize that when the labour market effectively integrates women, the overall quality of human resources improves, driving economic growth. However, if this absorption does not occur, countries may experience a decline in female labour force participation rates, which can exacerbate unemployment and hinder economic development (Adriyanto et al., 2020). Addressing the challenges faced by women in the workforce, such as limited access to education, discriminatory workplace practices, and insufficient family support policies, is crucial for fostering inclusive economic growth. By improving access to employment and removing barriers, nations can better harness the economic potential of their female workforce and contribute to more equitable and sustainable development.

Berutu et al. (2022) characterize human resources as represented by the Labour Force Participation Rate, measured as the percentage of the population either working or seeking work within the labour market. In the realm of women's participation, as per the International Labour Organization (ILO), the Women's Labour Force Participation Rate (LFPR) encapsulates women engaged in both paid and unpaid work, actively or passively seeking employment. Each facet of labour force participation holds intrinsic significance and underscores the principle of gender equality. However, the reality indicates distinct disparities in labour force participation levels between men and women.

Evident gender disparity in Labour Force Participation Rate (LFPR) is also noticeable within the ASEAN region (Pimkina & de La Flor, 2020). While the LFPR of men tends to show relatively minor variations across ASEAN countries, the participation rate of women reveals significant differences.

According to the World Bank (2021), female LFPR varies widely across the region. For instance, Indonesia reports a female LFPR of 51.2% out of a female population of 134.2 million, while Vietnam shows a much higher rate at 72.9% with a female population of 49.4 million. Cambodia leads the region with the highest female LFPR of 79.0% from a female population of 8.6 million. In contrast, the Philippines has a lower rate of 46.4% out of 53.2 million women, while Thailand and Malaysia show LFPRs of 59.6% and 55.3%, respectively, with female populations of 34.7 million and 16.3 million. These figures highlight the diverse patterns of female participation in the workforce across ASEAN, shaped by varying socio-economic and cultural factors in each country.

The Association of Southeast Asian Nations (ASEAN) member countries are currently vigilantly monitoring population dynamics within the labour market. However, an imbalance in male and female LFPR within ASEAN nations is evident, where female LFPR lags behind male participation. According to Wibowo (2012), women's involvement is closely entwined with their dual roles - traditional and transitional. Traditional roles encompass women as mothers, spouses, and household managers, while transitional roles encompass community members, agents of human development, and labour participants.

Societal perceptions often confine women to a limited spectrum of lower-rewarding and lower-status jobs. In developing nations with inadequate education and skill levels, women often engage in informal sector work characterized by irregular hours, meagre wages, and a lack of comprehensive benefits (Wibowo, 2012). This places women in a subordinate position compared to men and limits their access to the public sphere, thereby acting as a form of constraint against women (Pristiwanti et al., 2022).

Concerning the efficient utilization of physical capital and labour, education plays a pivotal role in enhancing human resource quality (Hidayat et al., 2017). Enhanced educational attainment among women translates to increased skills desired by employers (Septiawan & Wijaya,

2020). The research by Septiawan & Wijaya (2020) demonstrates that education, measured by average schooling duration, positively and significantly influences female LFPR. Women with higher levels of education also exhibit higher labour force participation rates (Fatima & Sultana, 2009).

The involvement of women in the labour market diminishes dependency on dominant economic sectors within a nation, fostering overall economic resilience. This engenders economic development by generating diverse employment prospects and mitigating inequality (Sarsi et al., 2014). Additionally, economic growth, as indicated by national income, seeks to achieve macroeconomic objectives, and serves as the basis for an expanding population. Hence, a growing workforce positively influences LFPR (Sarsi et al., 2014).

A study by Vicens-Feliberty & Reyes (2015) uncovers varying outcomes between child dependency ratios and elderly dependency ratios. The former negatively affects women's LFPR due to the perpetual care demands of children, inhibiting women's engagement in the workforce. Conversely, the latter positively impacts women's LFPR, potentially encouraging women's participation in the labour market.

Furthermore, fertility and birth rates also intersect with women's LFPR. Mishra & Smyth (2010) identify two possible outcomes from increased fertility: it can enhance LFPR by increasing household needs, prompting more income generation and work desire, or reduce LFPR by intensifying household work such as childcare, thus diminishing the desire to work.

Life expectancy also emerges as a contributing factor. Adiansyah (2021) finds that higher women's life expectancy positively correlates with women's LFPR. Life expectancy serves as a gauge of health improvement and economic development success, allowing governments to gauge welfare improvement and health and economic progress.

Despite advancements in women's LFPR within the ASEAN region, women still confront obstacles in realizing their economic potential and entrepreneurship (Ellis et al., 2010). The dilemma between paid work and unpaid household responsibilities, particularly for mothers, remains a challenge. Research by Kusmayadi (2017) shows that working housewives often assume key decisions concerning children's education, basic needs, and family health, illustrating that working mothers exert greater decision-making influence within households. This is integral to resilience against household crises, and the absence of women's roles hinders economic progress and may even be perceived as a burden (Kusmayadi, 2017).

Considering the importance of women's LFPR in household economic welfare and national economic development, researchers are delving into the factors influencing this aspect. Moreover, efforts to rectify and eradicate gender disparities spotlight women's LFPR. As per existing literature, no comparable research exists in the ASEAN context, rendering this topic worthy of investigation. Consequently, this study aims to investigate the Influence of education on the level of labour force participation of women in eight ASEAN countries.

B. LITERATURE REVIEW

Women's Labour Force Participation

According to research by Harsoyo & Sulistyaningrum (2018), women's entry into the labour market is influenced by three overarching conditions. Firstly, enabling conditions play a role, encompassing factors like the number of children and the ages of those children. Secondly, facilitating conditions include local labour market dynamics, work experience, and education or training attained. Lastly, precipitating conditions involve factors like dissatisfaction with family income and personal discontent.

Women's engagement in the labour force equates to contributing to household and societal economic well-being and sustainability. While

they might not always be the primary breadwinners, their participation enhances family welfare by introducing supplementary income and even potentially becoming the primary economic support for the household (Hidayat et al., 2017).

As per Kaarib et al. (2019), there are two primary reasons driving women's participation in the workforce. Firstly, women with low socioeconomic status and insufficient income for the household's head feel compelled to work to meet family needs. Secondly, women from middle to upper socioeconomic backgrounds opt to work, not driven solely by economic pressure since their household requirements have been met. Instead, they might choose to work for other reasons, such as utilizing their free time productively.

Education

Education has consistently held a prominent role over time and serves as a foundational requirement for entering the labour market. Murialti et al. (2022), education serves not only to meet job qualifications but also as a medium for shaping individuals' character. Successful educational outcomes result in improved personal capabilities in both thought and action.

Two primary types of education are formal education (within school settings) and non-formal education (outside of formal institutions), as highlighted by Haerullah & Elihami (2020). Both are avenues for human development aimed at achieving accomplishments in various aspects through structured learning processes. The process of education, whether formal or non-formal, contributes to shaping the character of individuals. These character traits factor into individuals' decision-making, adhering to or diverging from societal norms and conventions.

Ningrum (2016) presents two directions in which education contributes to national development: individual orientation and community orientation. In the individual orientation of education, its role is to cultivate individuals into knowledgeable entities, fostering self-awareness and comprehension of the surroundings, thus becoming pivotal agents of change. On the other hand, education plays a role in societal orientation as a conserving element, an innovating agent, and a catalyst for transformation.

Previous Studies

The participation of women in the labour force has undergone significant transformations over the years, influenced by social, economic, and educational factors. Education, as a key determinant, has been recognized as a pivotal driver in shaping female labour force participation. This literature review delves into the multifaceted relationship between education and women's engagement in the workforce, drawing insights from a selection of scholarly journals.

Education is widely regarded as a means of empowering women and expanding their opportunities in various spheres, including the labour market. Higher levels of education have been associated with improved labour market outcomes for women. Goldin (2006) finds that education narrows the gender wage gap and opens doors to higher-paying and skilled occupations, thus boosting female labour force participation.

Gender norms play a significant role in shaping women's educational choices and subsequent labour force participation. Filmer et al. (1998) emphasize the importance of challenging societal norms that limit girls' access to education, which in turn affects their participation in the labour force.

Investments in early childhood education have been linked to higher levels of female labour force participation. Lundberg & Rose (2000) show that accessible and quality childcare services can enable mothers to balance work and family responsibilities more effectively.

Education also interacts with fertility decisions and labour force participation. Schultz (1994) explores the inverse relationship between

women's education and fertility rates, highlighting how education can contribute to delayed childbearing and increased work participation.

Education can help women break into traditionally male-dominated fields, reducing occupational segregation. Reskin & Padavic (1994) discuss the importance of educational credentials in challenging stereotypes and accessing non-traditional careers.

Education equips women with the skills necessary for the modern labour market. Blau & Kahn (2017) note that as the nature of jobs shifts towards knowledge-based sectors, education becomes increasingly crucial for women to secure employment.

The expansion of female education has been linked to the changing composition of the labour force. Percheski (2008) highlights that the increasing prevalence of highly educated women has led to shifts in work patterns and family dynamics.

Education can facilitate better work-life balance for women. Bittman et al. (2003) emphasize that educated women are more likely to negotiate flexible work arrangements, enabling them to manage their careers alongside caregiving responsibilities.

Policies focusing on education can play a pivotal role in enhancing women's participation in the labour force. Lundberg & Pollak (2007) discuss the importance of family-friendly policies, including paid parental leave and affordable childcare, in supporting educated women's work engagement.

The relationship between education and female labour force participation is intricate and dynamic. Education catalyzes expanding opportunities, narrowing gender disparities, and challenging traditional gender roles. Policy efforts to promote education and remove barriers to female educational attainment are essential for fostering women's increased and sustained engagement in the labour force.

The influence of various factors on women's labour force participation rate (LFPR) has been extensively studied, providing valuable insights for this research. Education, being a significant factor, has been explored in multiple studies. Faridi et al. (2009) investigated women's LFPR in Pakistan's Bahawalpur district and found that higher levels of education positively and significantly correlate with increased participation in the labour market. Similarly, Atasoy (2017) conducted a study in Turkey and demonstrated that education exerts the strongest positive impact on women's LFPR, with its effect gradually growing as education levels rise.

In addition to education, the relationship between GDP and women's LFPR has been examined. (Mirzaie, 2015) studied Iran, Turkey, and Egypt from 1991 to 2013 and found that GDP in Iran and Turkey had a negative impact on women's LFPR, implying that as GDP increases, women's labour force participation decreases. Shittu et al. (2019) compared fertility and female LFPR between Malaysia and Singapore, revealing a negative connection between female fertility and LFPR in both countries education

Further research explored the relationship between fertility and women's LFPR. Chapman (2015) found a significant negative effect of fertility on women's LFPR in the Middle East and North Africa, while Tasseven (2017) analyzed G8 countries and discovered a positive correlation between women's LFPR and average household income.

Furthermore Aksoy, Basso, Smith, and Grasl (2019) emphasized the importance of demographic structures, such as the dependency ratio and life expectancy, in shaping labor market outcomes. In a similar vein, education acts as a fundamental driver in expanding women’s opportunities in the labor market. Education not only empowers women but also opens doors to better-paying jobs and higher-skilled occupations.

These studies collectively highlight the complex interplay of various factors on women's LFPR, such as education, GDP, fertility, and

average household income, emphasizing the intricate nature of women's participation in the labour market.

C. RESEARCH METHODS

This research focuses on Southeast Asian countries that hold membership in the Association of Southeast Asian Nations (ASEAN). The selection of research subjects adheres to the criterion of utilizing comprehensive available data. Consequently, the chosen focus encompasses eight ASEAN nations, specifically Indonesia, Cambodia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. These countries have been selected due to their provision of comprehensive data aligning with the study's requirements.

The research methodology adopts a quantitative approach since the data is quantitatively represented and subjected to statistical analysis. The application of quantitative research seeks to elucidate the influence of independent variables on the dependent variable. The data employed is categorized as secondary data, acquired indirectly or sourced from external entities or institutions, rather than being directly managed by the researcher. Despite its indirect nature, such data remains valuable for research purposes. Information for the research was procured from reputable sources like the World Bank website and the United Nations Development Program (UNDP). The data encompassed the timeframe from 2001 to 2019, chosen due to its comprehensive availability for each variable under scrutiny.

For data analysis, this study employs panel data. Panel data combines cross-sectional and time series data, comprising repeated observations of the same entities at different points in time. The panel data regression model employed in this study is presented as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 log X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \varepsilon_{it} \ldots\ldots (1)$$

where:

Y : Female Labour Force Participation Rate (%)
α : Constant
β : Regression Coefficient
X_1 : Education (%)
X_2 : Gross Domestic Product per capita (2017 PPP international dollars)
X_3 : Dependence Ratio (ratio per 100 working-age population)
X_4 : Adolescent Fertility (ratio per 1000 young women)
X_5 : Life Expectancy (Years)
ε : Error terms.

The dependent variable under investigation in this study is the Labour Force Participation Rate (LFPR) of women. This variable encompasses women of productive age (15-64 years) who actively engage in the workforce, thereby reflecting the extent of female labour contribution to the production of goods and services. The study's primary variable of interest is Education, measured by the percentage of women aged 25 and above with at least a junior high school education, obtained from UNDP data.

Moreover, the study incorporates several control variables. Firstly, Gross Domestic Product (GDP) per capita serves as an indicator of economic growth. GDP per capita data, standardized through constant purchasing power parity with 2017 international dollars, are sourced from the World Bank. Secondly, the dependency ratio, representing the proportion of dependents (those under 15 years and over 64 years) to the working-age population (15-64 years), is included. This variable is obtained as the total proportion of dependents per 100 working-age individuals, from the World Bank.

Additionally, fertility, denoting the average number of children born to women, is considered. This study employs the number of births per 1,000

Table 1 . Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Female LFPR (%)	152	65.43	13.31	45.51	85.23
Education (%)	152	45.2	21.14	6.3	79.4
Constant Per Capita GDP, PPP 2017 (international dollars)	152	17,702.30	23,895.30	1,578.60	98,336.90
Dependency Ratio (ratio %)	152	51.26	12.7	27.31	84.41
Adolescent Fertility (ratio %)	152	39.89	20.71	3.49	79.81
Life Expectancy (years)	152	74.61	6.05	60.75	85.9

Source: World Bank (processed)

women aged 15-19 years, drawn from the World Bank. Lastly, female life expectancy, indicating the projected number of years a newborn girl will live under the prevailing mortality conditions, is factored in. The data for this variable is obtained from the World Bank, presented in year units.

To estimate the effect of education on the female workforce's participation rate, the research employs the random effect estimation method.

Table 2. Hausman test

Effect Test	*Prob*
Chi2(5)	10,57
Prob>chi2	0,061

Based on Table 1, the probability value is 0.061 > 0.05 so that the null hypothesis is accepted. So, based on the Hausman test, the random effect model is the best model to use.

The selection of this approach is justified by several factors, including addressing the limitations of Fixed Effect Models (FEM) and accounting for relationships between time and subjects. In the random effect model, the number of cross-sectional units surpasses the number of research variables, meeting a crucial requirement for this panel data analysis technique (Baltagi, 2008). In contrast to the FEM, which captures differences through intercepts, the random effect model encompasses variations between individuals and time through error terms, while also accounting for error-related relationships throughout time series and cross-sections (Wooldridge, 2010). As delineated by Silalahi et al. (2014), the equation for the Random Effect Model is as follows:

$$Y_{it} = \alpha + \beta_j X_{it}^{j} + \epsilon_{it} \; ; \; \epsilon_{it} = u_i + V_t + W_{it} \ldots (2)$$

The Ordinary Least Squares (OLS) method does not provide an efficient estimator for the Random Effect Model (REM). Therefore, in this study, the Generalized Least Square (GLS) method is employed for estimation. The GLS approach is utilized under the assumption of homoscedasticity and the absence of cross-sectional dependence.

D. RESULTS AND DISCUSSION

This study examines the impact of education, economic growth, dependency ratio, adolescent fertility, and life expectancy on women's LFPR in eight ASEAN countries from 2001 to 2019. The estimation outcomes adhere to the statistical, econometric, and economic criteria outlined in this chapter. These obtained estimation results are anticipated to provide insights into addressing the research hypotheses.

Descriptive statistics

Table 1 provides a summary of the descriptive statistics for each variable utilized in this research. A total of 152 observations were considered. Regarding the dependent variable, women's LFPR

across the studied countries displayed an average participation rate of 65.435%. Notably, Malaysia exhibited the highest participation rate at 45.51% in 2018, while the peak female LFPR was observed in Cambodia in 2011 at 85.23%.

Cambodia recorded the lowest percentage of women with junior high school education at only 6.3% in 2001, reflecting challenges in access to education and persistent gender gaps in certain countries.

Table 3. Panel data estimastion results

Female LFPR (%)	Common Effect	Fixed Effect	**Random Effect**
Education	-0.405***	0.233***	**0.224*** **
	-0.066	-0.052	**-0.052**
Log(GDP per capita)	-4.659**	3.107	**2.609**
	-1.911	-2.296	**-2.266**
Dependency Ratio	-0.159	0.188**	**0.164** **
	-0.18	-0.078	**-0.077**
Adolescent Fertility	0.072	-0.185**	**-0.148***
	-0.071	-0.088	**-0.085**
Life Expectancy	1.070***	-0.384*	**-0.352***
	-0.39	-0.202	**-0.201**
Constant	52	52.68***	**55.10*** **
	-43.17	-19.58	**-20.56**
Observations	152	152	**152**
R-squared	0.422	0.393	**0.412**
Number of countries	8	8	**8**

Notes: *** p<1%, ** p<5%, * p<10%, Standard errors are in parenthesis,
Source: World Bank (processed)

Based on the provided descriptive statistics and the additional context about women's education in ASEAN, the level of female education varies widely across the region. The independent variable in this study, which focuses on the percentage of women aged 25 and over with junior high school education, highlights some key trends. Across the ASEAN region, there is a significant disparity in educational attainment among women.

The data shows an average of 45.20% of women with junior high school education, indicating that nearly half of the women aged 25 and above in the studied countries have reached this level of education. However, this figure masks large differences between countries. For instance,

In contrast, more developed countries within ASEAN, such as Singapore, have seen much higher levels of educational attainment among women. Singapore reached the highest percentage of women with junior high school education in 2019, illustrating the country's robust educational system and policies aimed at promoting gender equality in education. This success highlights the correlation between national investment in education and gender parity in educational attainment.

Among the control variables considered, the constant GDP per capita based on 2017 purchasing power parity showcased an average of 17,702.3 international dollars. Cambodia in 2001 reported the lowest GDP, amounting to 1,578.628

international dollars, whereas Singapore stood out with the highest GDP at 98,336.96 international dollars.

Additionally, the control variable encompassing the dependency ratio, measured as dependents per 100 population, registered an average of 51.26% across the countries. Singapore in 2010 demonstrated the lowest dependent population ratio, with 27.311%, while Laos in 2001 exhibited the highest dependency ratio at 84.41%.

Moreover, the fertility variable, denoting births per 1,000 adolescents aged 15-19 years, maintained an average birth rate of 39.89% across the countries. Singapore recorded the lowest birth rate, standing at 3.49% in 2019, while Laos in 2001 experienced the highest adolescent birth rate of 79.81%.

Finally, the control variable reflecting life expectancy in years reported an average expectancy of 74.611 years. Laos in 2001 held the lowest life expectancy at 60.75 years, whereas Singapore displayed the highest life expectancy at 85.9 years.

Estimation results

After conducting the Chow test and Hausman test, both tests have indicated that the random effect model is the most suitable for this analysis. Subsequently, the estimation results derived from each model in the panel data are presented below. However, for interpretation, the subsequent discussion will be based on the outcomes obtained using the random effect model.

The Influence of Education on Women's LFPR

The education variable demonstrates a positive and significant impact on women's LFPR at a notable significance level of 1%. In practical terms, this suggests that for every 1% rise in the proportion of women with a high school education or higher, there is an associated increase of 0.224% in the women's LFPR, all other factors remaining constant. This outcome underscores the notion that an elevated level of education among women has a stimulating effect on their engagement in the labour force.

This conclusion aligns with the findings of previous research (Septiawan & Wijaya, 2020), which emphasizes education as a key gauge of human resource quality, thereby playing a pivotal role in determining women's involvement in economic pursuits. This occurs because the skills and expertise demanded by the labour market correlate with the educational attainment of women. Higher educational levels can create broader access to better job opportunities, breaking down barriers that have traditionally hindered women from entering certain fields of work. Furthermore, the existence of job opportunities that reward education establishes a feedback loop, reinforcing the significance of education in propelling women's labour force participation.

The positive relationship between women's education and their participation in the labour market also has a forward-looking aspect. As educated women enter the workforce and contribute their skills, this positive impact feeds into the broader perspective that investing in women's education yields even more benefits over time. Highly educated women who engage in the labour market possess specialized skills that can potentially drive economic progress at various scales, whether within small enterprises or on a larger societal level (World Bank, 2021).

Furthermore, the feedback loop created by the availability of job opportunities that reward education plays a pivotal role in reinforcing this dynamic. As women with education find greater success in the workforce, they create a precedent for future generations of women, incentivizing further educational attainment and expanding labor force participation. This virtuous cycle underscores the importance of policy interventions that support female education and labor market inclusion (Klasen & Lamanna, 2009).

Another dimension of the relationship between education and LFPR is the effect of

education on reducing gender wage gaps. Research consistently shows that education narrows the wage disparity between men and women. Educated women are more likely to access high-paying, skilled jobs, and they tend to experience smaller wage gaps compared to less-educated women. According to Goldin (2006), higher education helps women overcome the wage penalties traditionally associated with female-dominated or lower-paying jobs. This not only enhances individual economic outcomes but also contributes to broader economic equality and productivity.

The forward-looking aspect of the relationship between women's education and labor market participation cannot be understated. As noted by the World Bank (2021), investing in women's education has long-term benefits for national economies. Highly educated women contribute more than just labor—they bring specialized skills that drive innovation, efficiency, and economic growth. Whether in small enterprises or at larger societal levels, the economic participation of educated women creates a multiplier effect, fostering economic resilience and progress.

Countries that prioritize women's education see broader societal benefits, such as improved health outcomes, reduced poverty rates, and enhanced social cohesion. Educated women are also more likely to invest in the education of their children, perpetuating the cycle of economic and social development. This long-term view emphasizes that female education is not only a tool for individual empowerment but also a strategic investment for national prosperity (Schultz, 2002).

Effect of control variables on women's LFPR

Firstly, the results indicate that GDP does not exert a significant impact on women's LFPR. This outcome is consistent with the research conducted by Lahoti and Swaminathan (2013), which highlights that as economies progress and undergo structural shifts towards more capital-intensive sectors, such as technology and services, women's participation is affected due to the specialized skill requirements of these sectors. The service sector demands expertise that may not be readily possessed by a significant portion of women. Consequently, economic growth alone is insufficient to exert a meaningful influence on women's engagement in economic activities.

Secondly, the dependency ratio emerges as a significant factor, with a positive effect on women's LFPR at a notable significance level of 5%. This implies that a 1% increase in the dependency ratio correlates with a 0.164% rise in women's LFPR, assuming other factors remain unchanged. This finding aligns with the research conducted by Vicens-Feliberty and Reyes (2015), which underscores that the presence of dependents within the household, particularly those who are not actively productive, can encourage women to join the labour market. In cases where non-productive family members require care, women may seek employment in roles that offer such caregiving services, thus becoming a part of the workforce that caters to these needs.

Thirdly, adolescent fertility demonstrates a negative and significant influence on women's LFPR, with a significance level of 10%. This signifies that a 1% increase in adolescent fertility corresponds to a 0.148% decrease in female LFPR, holding other factors constant. This outcome resonates with the findings of Shittu et al. (2019), who suggest that the presence of children within the family, especially when they are numerous, can curtail women's involvement in paid work. The economic circumstances may permit other family members, such as the husband or other earning family members, to cater to the household's basic needs. Furthermore, the birth of children, particularly during the adolescent phase, demands women's time and care, leading to a temporary withdrawal from the labour market. Typically, women tend to re-enter the workforce after their children have reached the

age of three or are no longer reliant on breast milk.

Finally, the coefficient associated with the life expectancy variable presents a negative and significant effect on women's LFPR at a significance level of 10%. This implies that a 1% increase in life expectancy corresponds to a 0.352% decline in women's LFPR, under the assumption of other factors remaining constant. This indicates that an extended life expectancy contributes to reduced women's LFPR. Enhanced living standards, achieved through improved health and life expectancy for women at birth, can lead to the creation of more job opportunities for women (Alfaizah & Puspitasari, 2022). Moreover, as pointed out by Maulana et al. (2022), advancements in technology, spanning sectors like transportation and production, are pivotal factors that can lead to shifts in work. As companies transition towards more technology-intensive operations, labour becomes increasingly capital-intensive, leading to changing work participation patterns.

E. CONCLUSION

Education has demonstrated a positive and significant impact on women's LFPR across the eight ASEAN countries from 2001 to 2019. This finding underscores that an increase in the number of women attaining secondary education is associated with a corresponding rise in their LFPR. Additionally, the research indicates that economic growth did not exert a discernible effect on women's LFPR in these countries during the specified time frame.

Drawing from these research findings, several implications emerge. Firstly, investing in education is essential for nurturing a capable workforce and fostering quality human resources. Governments and educational ministries should consider implementing compulsory education with a focus on creating safe learning environments, particularly for female students who might be more susceptible to instances of violence and intolerance. By ensuring a strong educational foundation, women can access improved opportunities within the labour market, particularly within the formal sector.

Secondly, efforts to maintain women's engagement in the labour market should encompass provisions that facilitate work-family balance. Ministries of manpower across these ASEAN countries can play a pivotal role by introducing workplace-based childcare facilities. This approach not only provides a solution for women concerned about their children's well-being but also fosters a more equitable distribution of responsibilities between work and family obligations.

This research only analyzes the period before the pandemic occurred. For further research, you can compare the analysis results before and after the pandemic to see the influence of each variable and you can use different methods, for example using GMM method in analyzing.

F. REFERENCES

Adiansyah, N. 2021. Pengaruh PDB, Angka Harapan Hidup Perempuan, dan Tingkat Fertilitas terhadap Tingkat Partisipasi Angkatan Kerja Perempuan di Indonesia, Malaysia, Singapura, dan Brunei Darussalam Tahun 1990-2018. *Gastronomía Ecuatoriana y Turismo Local.*, *1*(69), 5–24.

Atasoy, B. S. (2017). Female labour force participation in Turkey: The role of traditionalism. *The European Journal of Development Research*, *29*(4), 675–706.

Adriyanto., Prasetyo, D., dan Khodijah, R. 2020. Angkatan Kerja dan Faktor yang Mempengaruhi Penganganggguran. *Jurnal Ilmu Ekonomi & Sosial*, *11*(2), 66–82.

Aksoy, Y., Basso, H. S., Smith, R. P., & Grasl, T. (2019). Demographic structure and macroeconomic trends. *American Economic Journal: Macroeconomics*, *11*(1), 193-222.

Alfaizah, S. A., dan Puspitasari, M. 2022. *Women ' s Health and Their Labor Force*

Participation : A Panel Data Analysis. BIRCI-Journal, *5*(3), 21147–21154.

Ayuningtyas, A., dan Islami, F. S. 2022. Analisis Perkembangan Penduduk Terhadap Tingkat Partisipasi Angkatan Kerja Di Indonesia. *Transekonomika: Akuntansi, Bisnis dan Keuangan*, *2*(6), 167188. htttps://doi.org/10.55047/transekonomika.v2i6.281

Berutu, B. A., Safuridar, Syahputra, R., Mahdi, & Permana, F. angelia. (2022). Analisis Pengaruh Pertumbuhan Ekonomi Dan Pendidikan Terhadap Tingkat Partisipasi Angkatan Kerja di Kabupaten Pakpak Bharat. *Jurnal Sosiohumaniora Kodepena Information Center for Indonesian Social Sciences 3(2)*. 199-210.

Bittman, M., England, P., Sayer, L., Folbre, N., & Matheson, G. (2003). When does gender trump money? Bargaining and time in household work. *American Journal of Sociology*, *109*(1), 186–214.

Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature*, *55*(3), 789–865.

Chapman, K. A. (2015). Economic development and female labor force participation in the Middle East and North Africa: A test of the U-shape hypothesis. *Gettysburg Economic Review*, *8*(1), 3.

Didu, S., dan Fauzi, F. 2016. Pengaruh Jumlah Penduduk, Pendidikan Dan Pertumbuhan Ekonomi Terhadap Kemiskinan Di Kabupaten Lebak. *Jurnal Ekonomi-Qu*, *6*(1), 102–117. https://doi.org/10.35448/jequ.v6i1.4199

Eliza, Y. 2015. Pengaruh Investasi, Angkatan Kerja Dan Pengeluaran Pemerintah Terhadap Pertumbuhan Ekonomi Di Provinsi Sumatera Barat. *Jurnal Pekbis*, *1*(1), 200–210.

Ellis, A., Kirkwood, D., dan Malhotra, D. 2010. *Economic Opportunities for Women in the East Asia and Pacific Region. Washington, DC: World Bank*. https://doi.org/10.1596/978-0-8213-8300-1

Faridi, M. Z., Malik, S., & Basit, A. B. (2009). Impact of education on female labour force participation in Pakistan: Empirical evidence from primary data analysis. *Pakistan Journal of Social Sciences*, *29*(1), 127–140.

Fatima, A., & Sultana, H. (2009). *Tracing out the U-shape relationship between female labor force participation rate and economic development for Pakistan. International Journal of Social Economics, 36*(1–2), 182–198.

Filmer, D., King, E. M., & Pritchett, L. (1998). *Gender disparity in South Asia: comparisons between and within countries* (Vol. 1867). World Bank Publications.

Goldin, C. (2006). The quiet revolution that transformed women's employment, education, and family. *American Economic Review*, *96*(2), 1–21.

Haerullah, dan Elihami. 2020. Dimensi Perkembangan Pendidikan Formal Dan Non Formal. *Dimensi Perkembangan Pendidikan Formal dan Non Formal*, *1*(1), 190–207.

Harsoyo, A., dan Sulistyaningrum, E. 2018. Pengaruh Fertilitas Terhadap Partisipasi Tenaga Kerja Perempuan. *Jurnal Ekonomi Kuantitatif Terapan*, 130.

Hidayat, M., Hadi, M. F., dan Sutrisno, S. 2017. Analisis Tingkat Partisipasi Angkatan Kerja (Tpak) Perempuan Antar Kabupaten Di Provinsi Riau. *Media Trend*, *12*(1), 76–89.

Kaarib, A., Kamarni, N., dan Purwasutrisno. 2019. Determinan Partisipasi Angkatan Kerja Perempuan di Sumatera Barat. *Jurnal Manajemen Dan Kewirausahaan*, *10*(3), 19.

Klasen, S., & Lamanna, F. (2009). The impact of gender inequality in education and employment on economic growth: new evidence for a panel of countries. *Feminist economics*, *15*(3), 91-132.

Kusmayadi, R.C.R. 2017. Proses pengambilan keputusan dalam keluarga (Studi mengenai pekerja wanita dalam industri pengolahan tembakau Pr. Tali Jagaddi desa Gondowangi kecamatan Wagir kabupaten Malang). *Gender Equality: International Journal of Child and Gender Studies*, *3*(1), 1–10.

Lahoti, R., dan Swaminathan, H. 2013. *Economic Growth and Female Labour Force Participation in India. SSRN Electronic Journal*, *June*, 1-42. https://doi.org/10.2139/ssrn.2284073

Lundberg, S., & Pollak, R. A. (2007). The American family and family economics. *Journal of Economic Perspectives*, *21*(2), 3–26.

Lundberg, S., & Rose, E. (2000). Parenthood and the earnings of married men and women. *Labour Economics*, *7*(6), 689–710.

Maulana, R., Sambodo, H., dan Binardjo, G. 2022. Faktor faktor yang mempengaruhi tingkat partisipasi angkatan kerja di Pulau Jawa. *Forum Ekonomi: Jurnal Ekonomi, Manajemen dan Akuntansi 24*(3), 530.https://doi.org/10.29264/jfor.v24i3.11499

Mirzaie, I. A. (2015). Females' labor force participation and job opportunities in the Middle East. *Allied Social Science Association Annual Meeting Papers, Boston, MA*.

Mishra, V., dan Smyth, R. 2010. F*emale labor force participation and total fertility rates in the OECD: New evidence from panel cointegration and Granger causality testing. Journal of Economics and Business*, *62*(1), 48–64. https://doi.org/10.1016/j.jeconbus.2009.07.006

Murialti, N., Hadi, M.F., dan Asnawi, M. 2022. Tingkat Partisipasi Angkatan Kerja Perempuan Di Kabupaten Rokan Hilir (2010-2021). *Jurnal Akuntansi Dan Ekonomika*, *12*(2), 229–237.

Ningrum, E. 2016. Pengembangan Sumber Daya Manusia Bidang Pendidikan. *Jurnal Geografi Gea*, *9*(1).

Percheski, C. (2008). Opting out? Cohort differences in professional women's employment rates from 1960 to 2005. *American Sociological Review*, *73*(3), 497–517.

Pimkina, S., dan Flor, L. 2020. *Promoting Female Labor Force Participation Review Note*. *Washington, DC: World Bank.*

Pristiwanti, D., Badariah, B., Hidayat, S., dan Dewi, R.S. (2022). Pengertian Pendidikan. *Jurnal Pendidikan Dan Konseling (JPDK) Universitas Pahlawan Tuanku Tambusai,* 4(6), 1707–1715.

Reskin, B. F., & Padavic, I. (1994). *Women and men at work*. Pine Forge Press Thousand Oaks, CA.

Sarsi, W., Putro, T.S., dan Sari, L. (2014). Pengaruh tingkat upah dan pertumbuhan ekonomi terhadap tingkat partisipasi angkatan kerja di Provinsi Riau. *Jom Fekon*, *1*(2), 1-15.

Schultz, T. P. (1994). Human capital, family planning, and their effects on population growth. *The American Economic Review*, *84*(2), 255–260.

Schultz, T. P. (2002). Why governments should invest more to educate girls. *World development*, *30*(2), 207-225.

Septiawan, A., dan Wijaya, S.H. 2020. Determinan Tingkat Partisipasi Angkatan Kerja Perempuan Di Indonesia Tahun 2015-2019 Menggunakan Model Regresi Data Panel. *Seminar Nasional Official Statistic,* 2020(1), 449-461.

Shittu, W. O., Abdullah, N., & Umar, H. M. B. (2019). Does Fertility Affect Female Labour Participation Differently in Malaysia and Singapore? *The Indian Journal of Labour Economics*, *62*, 201–217.

Silalahi, D., Sitepu, R., dan Tarigan, G. 2014. Analisis Ketahanan Pangan Provinsi Sumatera Utara. *Saintia Matematika*, *02*(03), 237–251.

Tasseven, O. (2017). The relationship between economic development and female labor force participation rate: a panel data analysis. *Global Financial Crisis and Its Ramifications on Capital Markets: Opportunities and Threats in Volatile Economic Conditions*, 555–568.

Togbe, V., Bassarsky, L., Gu, D., Spoorenberg, T., dan Zeifman, L. 2022. *World Population Prospects 2022: Summary of Result. UN DESA/POP/2022/TR/NO.3.*

United Nations (UN). 2022. World Population to Reach 8 Billion this Year, as Growth Rate Slows. https://news.un.org/en/story/2022/07/1122272

Vicens-Feliberty, M. A., & Reyes, F. (2015). Female labor force participation and dependency ratios in border states. *Journal of Borderlands Studies*, *30*(2), 137-150.

Wibowo, D. E. 2011. Peran Ganda Perempuan dan Kesetaraan Gender. *Muwazah: Jurnal Kajian Gender, 3 (1)* 356–364.

Word Bank. 2021. Middle East and North Africa. https://reporting.unhcr.org/operational/regions/middle-east-and-north-africa