

The Role of Gender Equality on Poverty Alleviation: Case of Indonesia

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Abstract

The Gender Development and Empowerment Index of Indonesia, which represents the equality between genders, has consistently fallen below the global average since 1990. This concerning trend gains significance given that half of the country's population is female. Relying on only half of the population for economic and developmental progress is suboptimal. Hence, fostering empowerment for all genders emerges as a potentially more effective strategy to catalyse economic growth and alleviate poverty across the nation. This study investigates how gender equality measures affect poverty at the regional level using dynamic panel data by system-generalised method of moments (system-GMM) technique on 514 districts in Indonesia spanning from 2014 to 2020. The result indicates that the Gender Development Index, characterized by a higher average score and lower standard deviation pronounces a more positive effect on poverty alleviation in comparison to the Gender Empowerment Measure. This can be attributed to the prevailing underrepresentation and limited participation of women in critical spheres such as the economy, higher-level management, parliamentary activities, and decision-making processes. Thus, there is a need to reinforce women's inclusion into formal positions and campaign for the participation of both genders in household chores and childcare to improve gender equality. Even small increases in the opportunities available to women and some release of cultural and political constraints can lead to significant economic and social benefits.

Keywords: equality; poverty; gender development; dynamic panel.

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1. Introduction

Gender consciousness has been soaring rapidly across the world in the last decade. It is predominantly because of the importance of gender equality in many aspects of economic development measures. More women in a relatively strong position in the family correlate to the well-being (Lubis et al., 2022; Rui & Feng Ying, 2021) and health (Abekah-Nkrumah, 2013) of the household. The higher participation of women in society relates to the greater interests of children in society, so the children can be expected to be less vulnerable to extreme deprivation (Ekbrand & Halleröd, 2018). Putting women on the same level as men in agriculture would increase 3% to 4% of GDP, simultaneously reducing hunger and food insecurity (USAID, 2022). Global Gender Gap Report (2006) even argues that gender equality led to nationwide prosperity and that countries not trailing gender equality would experience negative economic effects.

Unfortunately, until recently, women tend to be more highly represented in lower productivity sectors such as education and healthcare services (McKinsey Global Institute, 2016) or unpaid care and housework (Samtleben & Müller, 2022). Undeniably, women produce only about 37% of the global Gross Domestic Product (GDP), although they constitute almost half of the world population (Statista, 2022). A simulation by McKinsey Global institute (2016) states that increasing gender participation in the labour force can add up to 10% of GDP in 2025.

In Indonesia, the female labour force constituted 56% of its population in 2019, compared to the USA at around 67%, China at around 68%, and Thailand at 66% population in the same year (World Bank, 2020). Besides, 60.81% of the woman labour force in Indonesia is working in the informal sector, which demands lower technology, lower education attainment, and lower capital (Wandaweka & Purwanti, 2021). Low capital leads to a lower chance of attaining credit from a formal financial institution, correlates to lower physical asset ownership, and is one major cause of poverty (USAID, 2022). It then makes sense that woman is more liable to be poor than man (Espinoza-Delgado & Klasen, 2018; Ramos et al., 2020; Saediman et al., 2019) with a longer persistency (Bastos et al., 2009) and suffer more consequences of poverty (Petrova & Simcock, 2021). Vulnerability to poverty is strongly linked to particular events in a woman's life cycle, such as divorce, lone motherhood, widowhood, and old age (Bastos et al., 2009).

On the other hand, Indonesia always has a balanced proportion of men and women. Nonetheless, based on Third Billion Index constructed by Aquirre et al. (2012), Indonesia belongs to many countries that have not yet systematically approached the problem of gender empowerment at all. It is far under Malaysia, China, and Thailand, which are already on track or only need more investment in gender development. This reality is a challenge that needs to be overcome before the upcoming Indonesian demographic boom in 2030. Empowering half of the population to be the machine of the economy is quite a burden for the community. This balance proportion urges the importance of gender development in Indonesia to increase productivity and outcome. Over the past 50 years, Gross Domestic Product (GDP) growth in developed nations has tracked closely with a steady rise in female labour force participation (USAID, 2022). Accordingly, an increase in economic growth without an increase in equity does not impact poverty (Sihombing & Arsani, 2021). Thus, empowering both genders could be an alternative way to boost growth and increase the nation's well-being.

The previous study shows that empowering women positively affects poverty reduction and its extended impact. The empowered women have contributed to increasing the incomes and well-being of the family (Rui & Fen-Ying, 2021). It is also empirically proven that gender equality in education and employment decreases child malnutrition and that women's empowerment decreases health deprivation for children with unschooled mothers (Ekbrand & Halleröd, 2018). Empowering women also positively affect poverty reduction, and the women who were the beneficiaries have contributed to increasing household incomes and living standards. The results suggest that researchers and policymakers need to pay more attention to poverty issues from the perspective of gender (Rui & Feng Ying, 2021).

The previous study on the linkage of gender equality development measures including poverty in Indonesia are mostly in a limited or small region such as Amory (2019), Hastuti (2014), Rapii & Wahdatussopia (2020), and Triananda (2016). The wider scale study at a national or subnational level is mainly relating gender equality with economic growth or GDP, such as Arifin (2018), Ibnu-Shina (2019), and Made Astrama (2022). There is a lack of publications associating gender equality explicitly with poverty in the Indonesian setting. As a result, this study aims to capitalize on the relationship between those development elements. This study utilizes the Gender Development Index and the Gender Empowerment Measure to reflect gender equality at the district level. Even though the causal inference cannot be claimed, using the system GMM, this study expects to reduce the endogeneity that the coefficient will portray the link between gender equality and poverty indicator as accurately as possible.

This paper will be organized as follows: The state of gender equality in Indonesia is described in Section 2, the data and method in section 3, result and discussion in section 4. Lastly, to wrap up the study, the conclusion and recommendation are in section 5.

2. The State of Gender Equality in Indonesia

The world's Gender Development Index (GDI) in 2021 is at 95.8% (UNDP, 2023a), while Indonesia has a lower GDI at 94.1% and ranked 113 from 172 countries. This achievement is far lower than Malaysia, Thailand, and China, which ranked 59, 11, and 55, respectively. It is even lower than Sri Lanka and Myanmar. However, Indonesia's GDI is higher than the average of developing countries but still far lower than East Asia and Pacific countries, with a GDI of 97.8%.

GDI's components are education, life expectancy at birth, and power over economic decisions. Based on Gender Statistics 2019 issued by Statistics Indonesia and the Ministry of Woman Empowerment and Children 2020, the average woman aged 15 years old and above only experience schooling until grade 8 or the second year in junior high school, which is not much different from the mean of man's year of schooling. The low school attainment makes it logical that 55.72% of the labour force works in the informal sector, which does not require high education and higher skill and is most likely located in rural areas (Wandaweka & Purwanti, 2021). Further, the informal sector is dominated by women, and proportionately the worker in the informal sector is more than 65%.

Generally, the achievement of both genders in mean years of schooling is not significantly different but results in different outputs. UNDP (2020) records the estimated gross national income per capita for each gender and finds that the gross national income of

men is almost USD 15,000, nearly twice what women can gain, roughly USD 8,000. Aside from the different participants in the labour force, the difference in income can result from the imbalance in intrahousehold resource allocation (Braido et al., 2012; Fialová & Mysíková, 2021).

Women are more likely to stay alive by 69% on the life expectancy at birth, while men are only at 65%. Roffia et al. (2022) find that the determinant of life expectancy is: (1) health care expenditures, (2) health financing policies, (3) elements of medical care, (4) health habits and population health, (5) social determinants, (6) social spending, and (7) other external factors. External factors are related to hygienic conditions, the environment, the economic and social context, and innovation. Sanitation is vital for population health and longevity (Ranabhat et al., 2018). In OECD countries, access to safe sanitation prevented more than 700,000 deaths each year.

The next index is the Gender Empowerment Measure (GEM) which measures the inequalities between men's and women's participation in three major areas (Statistics Netherlands, 2009): Economic participation and decision-making, power over economic resources, and political participation and decision-making. Based on the last Gender Report, women's participation in parliament or politics naturally increased significantly. However, for others, employment, leadership, and the economy are still in a slump (Situmorang, 2022). Statistics Indonesia still publishes GEM on their website, although UNDP no longer uses it and changes the composite measure into Gender Inequality Index (GII). The index is built from 5 indicators: Maternal mortality ratio, adolescent birth rate, the share of seats in parliament, population with at least some secondary education, and labour force participation rate. A low GII value indicates high inequality between women and men and vice-versa (UNDP, 2020). Regional patterns reveal that reproductive health is the major contributor to gender inequality worldwide. Indonesia ranked 110 out of 170 countries with a score of 44.4%. This score means a percentage loss in achievement across the indicators due to gender inequality is 44.4%. Nevertheless, The Gender Inequality Index faces data limitations, constraining the choice of indicators (UNDP, 2023b).

3. Data and Methods

3.1. Data

This study uses Gender Development Index and Gender Empowerment as input variables and Poverty Head Count Index (P0) as the response variable. The three variables are presented at the district level. The data is elicited from Statistics Indonesia, spanning from 2014–2020, or 7 years long. For 2016 data, the GDI and GEM are only available at the province level. Consequently, the variable in 2016 is imputed by averaging the indexes of 2014 and 2015 to fill the missing value in the GDI and GEM in 2016 at the district level. Two of the control variables, Agriculture Sector GRDP and share of the Agriculture Sector in GRDP, are elicited from the same source with the same level and years. The current GRDP is used to investigate the district's economic structure change. Also, to develop a dummy variable that represents whether agriculture is the primary sector at the district level at the representative years or not. There is a dynamic in the structure, where 91 districts shift the structure from agriculture to other sectors as the main contributor to the regional economy or from other sectors to agriculture from 2014 to 2020. The other control variables are mortality rate, literacy rate of 15 years old and over, household access to electricity,

household expenditure in education, and proportion of birth attended by the skilled health worker, elicited from Indodapoer, which represents the value at the province level.

The Gender Development Index (GDI) represents gender inequalities in achievement in three composite basic dimensions of human development, health, education, and power in economic resources. Health is measured by female and male life expectancy at birth. The education is measured by female and male expected years of schooling for children, and also female and male average years of schooling for adults ages 25 years and older. Lastly, power in economic resources is measured by female and male estimated earned income. This index accounts for disparities between women and men in those three basic dimensions of human development (UNDP, 2023a). Since 2014, GDI can be analysed separately from Human Development Index (HDI).

The Gender Empowerment Measure (GEM) measures the inequalities between men's and women's participation in three major areas (Statistics Netherlands, 2009): Economic participation and decision-making, power over economic resources, and political participation and decision-making. In measuring the first dimension, two indicators are used: the share of women and men in senior professional and technical positions and senior officials and managers. The share of women and men in the earned income in a country measures the second indicator. Furthermore, the last indicator is calculated by the proportion of parliamentary seats held by each gender.

The main important distinction between GDI and GEM was to stress the importance of collecting and analyzing gender-disaggregated data and provoke debate about constructing a better and more complex gender index (Stachura & Śleszyński, 2016). UNDP is now using Gender Inequality Index (GII) to replace GEM. Regardless, due to the unavailability of GII data in Indonesia, some control variables are used in the absence of GII, such as morbidity rate, literacy rate, access to electricity, and birth attended by skilled health workers.

3.2. Methods

The previous literature converges on a clear conclusion that gender inequality is not a symptom of poverty but a fundamental cause (USAID, 2022). In that sense, the poverty headcount index is treated as a response variable, and gender indexes as input variables. Gender disparities are more consistently present in penniless societies and more extensive than most other factors. In addition, poverty is a dynamic process, which means poverty in the previous period can affect the poverty of the current period (Rahayu et al., 2020). Therefore, to explore the dynamic nature of poverty, following Leow & Tan (2019), the model is generated as below:

$$POV_{it} = \alpha + \beta_1 POV_{i,t-1} + \beta_2 GDI_{it} + \beta_3 GEM_{it} + B_4 X_{it} + U_{it} \quad (1)$$

POV_{it} represents the poverty headcount index in district i at time t . The index $t-1$ at the POV explains the same variable in the same district of a one-year lag. GDI is Gender Development Index, and GEM is Gender Empowerment Measure. Variable X describes the control variables, the value of the agriculture sector GRDP and the share of the agriculture sector in GRDP, agriculture dummy where 1 means the leading sector in the district level at the representative year and 0 otherwise, mortality rate, literacy rate of 15 years old and

over, household access to electricity, household expenditure in education, and proportion of birth attended by the skilled health worker.

Several econometric problems may occur from estimating equation (1): First, the gender indexes are assumed to be endogenous. Because causality may run in both directions – from gender indexes to poverty level and vice versa – these regressors probably correlated with the error term. Second, time-invariant regional characteristics (fixed effects), such as geography and demographics not included in the model, may correlate with the explanatory variables. The fixed effects are limited in the error term in equation (1), which consists of the unobserved regional-specific effects, v_i , and the observation-specific errors, e_{it} . So, the error term is $u_{it} = v_i + e_{it}$. Third, the existence of the lagged dependent variable $POV_{i,t-1}$ results in a rise in autocorrelation. Lastly, the panel dataset has a short time dimension ($T = 7$) and a larger district dimension ($N = 514$). Based on previous literature, a suitable n could be greater than 100, while the t should not exceed 15 periods, and ideally, it should be less than 10, if the target is to estimate dynamic models with panel data (Mileva, 2007)

The static model will not capture the short and long-run impacts of the regressors on the dependent variable. Thus, a dynamic model and the system GMM estimator are employed to capture the persistent nature of gender inequality and address the problems of omitted variables, measurement error, endogeneity, and regional-specific heterogeneity (Adeleye et al., 2017). The dynamic panel data model gives better results than the static panel data regression model when viewed from the r-square value and the number of variables significantly affecting it (Sihombing & Arsani, 2021). Two specification tests assess the consistency of the system-GMM estimator. The Sargan test of over-identifying restrictions tests for the overall validity of the instruments, and the second test examines the null hypothesis that the error term is not serially correlated by performing the Arellano-Bond test.

4. Result and Discussion

Before the analysis, the correlation between poverty and each GDI and GEM is graphically examined. Figure 1 shows that both Gender Empowerment Measure (GEM) and Gender Development Index (GDI) have the same direction in the relationship to the poverty level, Head Count Index (P0). It is roughly seen as evidence of each negative relationship with P0, and the GDI relationship shows a broader variation and a less steep relationship.

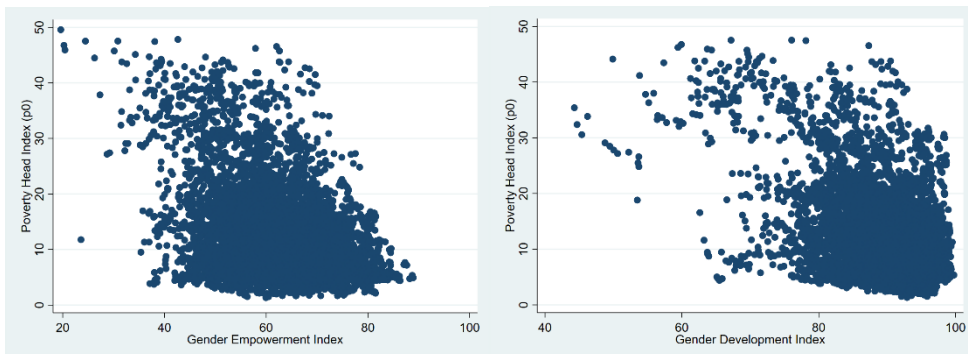


Figure 1. Scatter Plot between Gender Indexes and Poverty Level.

Source: Statistics Indonesia, processed by the author.

Table 1 shows that the average poverty level across districts in Indonesia during the study period is 12.69%, ranging from 1.67% at the minimum to 45.74 at the maximum. The more comprehensive the range could be the notion of inequality as something natural in Indonesia. Although nationally, the poverty level in Indonesia continuously declining over the years and hit a level under 10% in 2019, 20 districts suffered more than 30% impoverished population in 2020. All those districts are in the eastern part of Indonesia. For Gender Development Index, the average value during the study period is 89.42, which means that men's and women's development is unequal, where women are only 89.42% of men's development. In comparison, the Gender Empowerment Measure shows a much lower score. Compared to men, women are only 62.68% empowered.

Table 1. Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) SD	(4) min	(5) max
Poverty Head Index (Po)	3,578	12.69	7.937	1.670	45.74
Gender Development Index	3,598	89.42	6.346	48.77	99.75
Gender Empowerment Measure	3,596	62.68	9.442	26.25	88.91
Ln Agriculture Sector GRDP	3,598	7.509	1.230	3.415	10.32
Share of Agriculture Sector in GRDP	3,598	25.61	15.35	0.00691	78.13
Agriculture as Main Sector (=1 if agri is the dominant sector)	3,598	0.576	0.494	0	1
Morbidity Rate (in %)	3,593	28.01	5.478	15.20	44.39
Literacy Rate for Population age 15 and over (in % of the total population)	3,593	95.34	5.995	70.77	102.1
Household Access to Electricity: Total (in % of total household)	3,593	94.66	10.11	47.31	100
Ln Monthly Per Capita Household Education Expenditure (in IDR)	3,593	10.55	0.328	9.880	11.71
Birth attended by Skilled Health worker. (in % of total birth)	3,593	90.10	9.854	53.92	100

Source: Statistics Indonesia and Indodapoer, computed by author

The difference between Gender Development Index and Gender Empowerment measure is quite alarming. This argument could be valid because the Gender Development Index in Indonesia along the study period reaches more than 25 point higher than the Gender Empowerment Measure. The difference is led by the different implementation of each index at each region but with one consistent behaviour that the Gender Empowerment Measure is never higher than the Gender Development Index.

On the other hand, the standard deviation of Gender Empowerment Measure is also larger which means the variation is higher. Ranging within two standard deviations from the mean encompasses 75% of the values, and expanding to three standard deviations encompasses 88.9% of the values. Consequently, larger standard deviations indicate a greater span between the lowest 2 or 3 deviations, thereby reflecting a heightened degree of inequality in the execution of gender empowerment.

All other controls also depict a substantial gap between the maximum and minimum values. At maximum, the access to electricity and per cent of birth attended by skilled health workers are 100%, while the minimum value is around 50%. The infrastructure in energy and health still represents extensive inequality. Previous literature finds that energy and healthcare deficiency create deeper poverty than men and that women will be burdened more

than men (Petrova & Simcock, 2019). By seeing the descriptive, the brief insight revealed the state of poverty and the other factors used in this study from 2014 to 2020.

The correlation matrix (Table 2) informs the potential relationships between the poverty level and the rest of the variables, also among the variables it selves. All variables negatively correlate with poverty level but the share of agriculture GRDP and agri-dummy. There is an indication that the poverty level and share of agriculture GRDP have a positive correlation which represents the higher the share of agriculture GRDP is linked with the higher poverty level. It goes the same when a district's primary sector is agriculture, which correlates to the higher incidence of poverty in the region.

Table 2. Correlation Matrix

	P0	GDI	GEM	pdb_agri	shareagri	agri	morbid	literacy	hh_elec	hh_educ	birth
P0	1.000										
GDI	-0.358	1.000									
GEM	-0.422	0.347	1.000								
pdb_agri	-0.192	0.028	0.008	1.000							
shareagri	0.301	-0.200	-0.188	0.364	1.000						
agri	0.196	-0.129	-0.068	0.293	0.797	1.000					
morbid	-0.205	0.189	0.231	0.152	-0.057	0.051	1.000				
literacy	-0.536	0.210	0.336	0.211	0.005	0.003	0.122	1.000			
hh_elec	-0.593	0.300	0.393	0.339	-0.115	-0.067	0.258	0.786	1.000		
hh_educ	-0.432	0.280	0.284	0.245	-0.299	-0.216	0.159	0.388	0.582	1.000	
birth	-0.438	0.285	0.368	0.324	-0.151	-0.102	0.255	0.507	0.779	0.717	1.000

Source: author computation

This study performs Pooled least Square, Fixed Effect, and Random Effect estimations to see the relationship between the gender development and empowerment indexes in a static term. The estimation result is presented in Table 3. After Breusch-Pagan and Hausman test, the fixed effect estimation better models the relationship between gender indexes and poverty level than Pooled Least Square and Random Effect. In the fixed effect model, only GDI significantly affects the poverty level by a large magnitude. The increase of GDI at 1% can decrease the poverty level by 0.148%. Alternatively, an increase in GDI can decrease poverty by 1.16% at the mean level.

However, fixed effect and random effect models can only perform under the strict exogeneity assumption that there is no correlation between unobserved heterogeneity and assigned exogenous variables. In this study specification, there might be a common factor outside the model that affects the response and the predictor variable. On the other hand, the poverty level can also affect the achievement of GDI and GEM in general (reverse causality), where poverty can simultaneously decrease the life expectancy ratio, education enrolment, and expected income. Besides, due to the dynamic nature of poverty (Rahayu et al., 2020), I add a lag-dependent variable in the model and run the specification following Bond et al. (2001). The specification postulates the rule of thumb in choosing the GMM method. First, the autoregressive model is initially estimated by Pooled Least Square and Fixed Effect. Second, the coefficient of the lagged dependent variable in the Fixed Effect Model is

considered as a lower bound, and the coefficient of Pooled Least Square is the upper bound. Third, If the difference GMM estimate is close to or below the fixed effect estimate, it suggests that the former estimate suffers downward bias due to weak instrumentation. Lastly, use System GMM to overcome the problem.

Table 3. Pooled Least Square, Fixed Effect and Random Effect Estimation

Variable	PLS	FE	RE
GDI	-0.209***	-0.148***	-0.232***
GEM	-0.110***	-0.002	-0.003
Ln Agriculture Sector GRDP	-1.138***	-1.877***	-1.319***
Share of Agriculture Sector in GRDP	0.169***	0.057***	0.084***
Agriculture as Main Sector (=1 if agriculture is the dominant sector)	-1.073***	0.025	-0.028
Morbidity Rate (in %)	0.075***	-0.089***	-0.091***
Literacy Rate for Population age 15 and over (in % of the total population)	-0.210***	-0.088***	-0.131***
Household Access to Electricity: Total (in % of total household)	-0.241***	-0.005	-0.002
Ln Monthly Per Capita Household Education Expenditure (in IDR)	-2.814***	-1.970***	-2.114***
Birth attended by Skilled Health worker (in % of total birth)	0.054**	0.033***	0.032***
_cons	108.715***	67.903***	76.089***
N	3573	3573	3573
r2	0.510	0.386	
r2_a	0.509	0.281	

Standard error in parentheses: * p<0.05; ** p<0.01; *** p<0.001

After running for Pooled Least Square and Fixed Effect estimation with the lag dependent variable, under the same model specification, the upper bound is 0.969, and the lower bound is 0.512. Both coefficients are significant under a 1% significance level. The coefficient of First Difference GMM is also valid under a 1% significance level, but the value is under the lower bound. Refers to Bond et al. (2001), this condition means the coefficient is downward biased. Following the rule of thumb, the analysis needs to be shifted to System GMM. Table 4 shows the coefficients of the upper bound, lower bound, first difference GMM, and system GMM. Employing System GMM, the coefficient of lagged dependent variable falls between the lower and upper bound. Based on the rule of thumb by Bond et al. (2001), this result of System GMM can be used because it avoids upper bias and lower bias. The specification test with one year lag and AR (2) exposes that the models do not suffer from second-order serial correlation. Still, the Sargan test does not result in any output under a robust model.

The system GMM estimation result infers that poverty is quite persistent and that the past poverty level strongly predicts its current level, which denotes that poverty tends

to be path dependent. It suggests that a country's poverty level in the current year strongly influences its poverty level of the following year. Likewise, the Gender Development Index affects poverty in a significant measure but in a different direction. The coefficient of Gender Development Index tells us that 1% increase in GDI associates to 12.8% decrease in poverty level.

For Gender Empowerment Measure, the coefficient is insignificant, although under the system GMM specification, the magnitude increases with the same negative direction across all models tested. It is a sign that the gender empowerment index positively correlates to poverty alleviation. The negative but insignificant coefficient of the Gender Empowerment Index across all model specifications is likely an indication of the underdeveloped state of gender representation in economic participation and decision making in economy, political, and power over economic resources, to the extent that the representative has not been able to resonate a female's voice in the poverty alleviation of society. This issue gains further significance considering existing literature asserts that women's societal roles profoundly impact both familial and broader social contexts (Malhotra & Schuler, 2002).

An explanation based on logical decision-making processes is not genuinely gender-sensitive since it undervalues how gender ideology (as a component of the gender system) is deep-rooted in decision-making processes, individual identities, orientations, and choices (Bastos et al., 2009). Managers frequently believe that women's participation in the professional activity is secondary to their primary responsibilities in the home and that intra-household gender interaction also entails power dynamics (Iversen, 2003). The money people make in the labour market is typically not distributed, regulated, and divided evenly among family members. Women frequently have a noticeable disadvantage when establishing effective control over domestic matters (Findlay & Wright, 1996). Also, they are more likely to give up their interests for their kids and family (Klasen, 2004). The power imbalances inside the household are even greater when women are economically dependent on their partners (Bastos et al., 2009).

The previous study elaborates on how to enhance gender equality in society. It is prominently by promoting gender empowerment and upgrading women's skills in any sector by improving access to social services, healthcare, and education (Aquirre et al., 2012). Since there is a negative association between gender gap in access to credit and financial solidity, enhancing access to credit for women relative to men is beneficial for financial stability (Perrin & Weill, 2022). On a household level, alleviating the collective load of household chores and caregiving responsibilities, while fostering a more balanced distribution of these tasks within couples, serves to enhance the seamless integration of women into the labour market. (Samtleben & Müller, 2022). While at the macroeconomic level, reductions in the price of domestic goods and increases in female wages positively affect female participation (Pintea, 2009).

Further, improve women's leadership and decision-making in food systems, promote equal and positive gender norms, improve access to resources, and build cross-contextual research evidence on gender and food systems (Njuki et al., 2022). Empowered women not only enhance the quality of life within impoverished households but also contribute to lifting them out of the cycle of poverty (Rui & Feng Ying, 2021). Solely developing women's education to be equal to men is insufficient because the gap between women and men in

education attainment is not substantial. However, the enrolment in the labour force and expected income creates an enormous gap between genders.

Table 4. Lagged PLS, Fixed Effect, First Difference GMM, and System GMM Estimation

Variable	PLS	FEM	FDGMM	SYSGMM
p0				
L1.	0.969***	0.513***	0.424***	0.841***
GDI	0.001	-0.085**	-0.068	-0.128*
GEM	-0.002	-0.001	0.000	-0.004
Ln Agriculture Sector GRDP	-0.032**	-0.538*	-1.002*	0.490
Share of Agriculture Sector in GRDP	0.003*	0.035**	0.101***	0.064**
Agriculture as Main Sector (=1 if agriculture is the dominant sector)	-0.046	-0.138	-0.220	-0.266
Morbidity Rate (in %)	0.008	-0.039***	-0.039***	-0.035***
Literacy Rate for Population age 15 and over (in % of the total population)	0.022***	0.049**	-0.003	0.040
Household Access to Electricity: Total (in % of total household)	-0.020***	-0.025***	-0.018	-0.039**
Ln Monthly Per Capita Household Education Expenditure (in IDR)	-0.314***	-2.285***	-1.675***	-1.787***
Birth attended by Skilled Health worker (in % of total birth)	0.011***	0.031***	0.033***	0.034***
_cons	2.124***	37.028***	35.299***	24.948***
N	3556	3556	3534	3556
r2	0.991	0.589		
r2_a	0.991	0.587		

Standard error in parentheses: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Moreover, if we move to the access and participation of women in society and parliament, equality is far from what is depicted by reality nowadays. Previous literature shows that the women's position in the society can affect more people's lives (Malhotra & Schuler, 2002). It is because; First, women are not just one group among various disempowered subsets of society (the poor, ethnic minorities, and so on); they are a cross-cutting category of individuals that overlap with all these other groups. Second, household and interfamilial relations are the central cause of women's disempowerment (Ekbrand & Halleröd, 2018) in a way that the empowerment can also started from this smallest society system. There is a need of cultural shift that support woman to share the burden and opportunity equally in household and professional work.

As for other control variables, although not significant, the coefficient of the agriculture sector GRDP value correspondences to its positive association with the poverty level. The positive coefficient can be interpreted that the agriculture policy may result in higher productivity and output but fails to address poverty among farmers or those working in the agriculture sector. The share of agriculture GRDP coefficient is also positive but has a more substantial significance. It indicates that the higher the share of the agriculture sector GRDP in the regional economic structure, the more poverty there will be. It aligns with the fact that 62.75% of poor people live in villages and are primarily farmers (Rosyadi, 2017), making agriculture the sector where poor people work mostly (TNP2K, 2015).

Morbidity rate, household access to electricity, and monthly per capita household expenditure for education also express negative associations. The morbidity rate represents the health sector availability in the region, and access to electricity represents the

infrastructure of energy and reflects energy poverty. In contrast, expenditure on education reflects the household's willingness to pay more, which is more likely in higher education because primary and secondary education in Indonesia is widely available for free. The negative sign of those coefficients means the three variables affecting poverty in opposite directions from the poverty level. Enhancing the development of those three variables can also alleviate poverty and increase gender equality.

5. Conclusion and Recommendation

This study investigates the association between gender equality and poverty level. Gender equality is represented by Gender Development Index (GDI) and Gender Empowerment Measure (GEM) while the poverty level is represented by Poverty Headcount Index (Po). The findings reveal a robust negative correlation between GDI and poverty level. This finding yields two significant insights. Firstly, it underscores the positive relationship between gender development in Indonesia and poverty alleviation. This linkage can be attributed to the fact that two components of the index – education attainment and life expectancy at birth – exhibit a lack of gender disparities. Consequently, both genders experience equitable growth trajectories, creating an environment of equal opportunity for enhanced achievements. Secondly, this association implies that a rapid advancement in the GDI corresponds to improved poverty alleviation outcomes. However, the significance of this link is impeded by the presence of the third GDI component, which represents power in economic resources, measured by the estimated earned income between genders. Despite advancements in life expectancy and education, a substantial gender gap persists in terms of earnings. This disparity is responsible for Indonesia's GDI falling short of the global average, consequently hampering the optimal implementation of poverty alleviation measures.

On the other hand, the finding also reveals that the association between GEM and poverty remains uncertain in terms of its statistical significance. The low enrolment of woman in economic activities and decision-making, power over economic resources, and political participation and decision-making could be the probable causes. Although women's participation in parliament or politics naturally increased significantly, the proportion is still not comparable to man. Moreover, in employment, leadership, and the economy, woman's participation is still in a slump. Thus, increasing the opportunity for less involving gender can increase their empowerment and lift the economic development in the nation.

Implicitly, the results also underscore that inadequate circumstances for women and girls are a source of poverty and hardship in Indonesia. Thus, prioritizing gender empowerment initiatives, while simultaneously enhancing women's access to credit, and reinforcing their skill sets across various sectors through improved provisions of social services, healthcare, and education, holds the potential to significantly enhance collective well-being of society. Hence, even small increases in the opportunities available to women and some release of the cultural and political constraints that hold them back, can lead to dramatic economic and social benefits.

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