Analysing the effect of gender inequality on labor productivity in West Java province

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ABSTRACT

This study aims to analyze the effect of the Gender Ratio on Life Expectancy (GLE), Gender Ratio on Mean Years of Schooling (GMYS), Gender Ratio on Labor Force Participation Rate (GLFPR), and Gender Ratio on Per Capita Expenditure (GPE) on labor productivity in all Regency/cities of West Java Province. The sampling in this study used a saturated sampling technique in 27 Regency/cities of West Java Province during 2015-2020 so that a total sample of 162 data was obtained from the Central Statistics Agency (BPS) of West Java. This study uses panel data analysis by combining time series data and cross section data. The results partially show that RLE and RLFPR have a significant positive effect on labor productivity, while RPE has a significant negative effect on labor productivity, and GMYS has no effect on labor productivity. The results of the study simultaneously showed that RLE, GMYS, RLFPR, and RPE had an effect on labor productivity.

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Introduction

Economic development aims to improve welfare and improve people’s quality of life. These development purposes are intended for the entire population regardless of gender, ethnicity, and religion. In reality, the implementation of these development efforts still ignores the issue of gender equality. Where there is still an imbalance between the roles of men and women as actors and recipients of development outcomes. The role of women in the implementation of development programs has not been fully utilized. Women labor have an essential role in economic development which is an indicator of enhancing the welfare (Yuhan, R. J., & Monika, 2020). In carrying out economic activities, women often encounter challenging conditions. Whether engaged in paid work or running a business, women often face problems such as discrimination, barriers to the division of labor, wage discrimination, inadequate work, freedom of expression in decision-making, access to information and technology, and access to law enforcement agencies. This view that deems women can perpetuate gender inequality and discriminatory practices in the form of limiting or eliminating women’s basic rights as citizens (Dini et al., 2020).

Gender inequality is not only a national problem, but gender inequality is one of the global problems. This is one of the global commitments contained in the Sustainable Development Goals (SDGs), which include goals for gender equality and the empowerment of women and all girls. As one of the United Nations (UN) projects, the United Nations Development Programme (UNDP) has developed computational indicators to measure human development, including calculations that reveal gender inequalities, known as the Gender Development Index (GDI). If the GDI is close to 100, it means that the gender development gap...
in a region is small. West Java, one of the provinces on the island of Java, has the lowest GDI compared to the other five provinces. According to Central Bureau of Statistics, The GDI fluctuates significantly in West Java at 89, which shows that West Java has the largest gender inequality gap compared to other provinces on the island of Java. Based on data obtained from the Central Bureau of Statistics (BPS) the number of residents in the province on the island of Java has increased every year, both male and female. Especially in West Java Province which is ranked first with the largest population, the total male population is 25,111,000 people and the total female population 24,454,000 people. Adam Smith said that the population (human resources) and capital stock are the determinants of the large or small population output from year to year (Chalid, 2015).

Compared to the theory, the highest labor productivity in 2015-2020 is DKI Jakarta Province, which has a smaller population than West Java. So that this can indicate that the labor productivity generated by the Province of West Java has not been maximized, one of the factors is that there is still a high level of gender inequality. Long life and healthy life are important indicators. Health is positively correlated with productivity for both experienced and untrained labor. labor with adequate health can earn more as they have a lengthier time to work. While, employees with low condition of health result in lower productivity, and causing a reduction in the supply of employees (Ullah & Malik, 2019). The high level of health of the female population in West Java Province every year should be able to provide opportunities for the female population to perform productivity and maximize their welfare, but the high-level health of women as proxies using life expectancy cannot fully reflect social concerns in women. This is because women's quality of life depends on the treatment of women's policies, social and culture (Gaib Hakiki et al., 2019).

Improvement of labor productivity is inseparable from the increase of education and health level (Arham & Junus, 2020). Improvements in health not only have a positive effect on labor force participation, but health is the main determinant (Narayan et al., 2021). In addition to the role of health, education also has an important role. Gender inequality in education lowered per capita income in South Asian Countries (Alamanda, 2021). Women are still bound to depend on existing social and cultural policies, which is reflected in the lower average length of education for women compared to men. Factors that cause gender inequality in mean years of schooling (MYS) are due to the inherent culture in society that considers girls not obliged to go to high school, the myth that education causes women to become spinsters, lack of education about sexuality, and even due to the low social and economic conditions of girls' families forced to marry at school age (Dini et al., 2020).

Physical capital is the instrument with which workers work. It contains not only plant, machinery and tools that a firm use but also the transportation network, roads, and other infrastructure that contribute to the development of an economy. Both the quantity and quality of physical capital impact productivity. Improved investment in capital, results in higher productivity (Muhammad et al., 2020). Another factor is that women are faced with gender discrimination. Among them is discrimination in the wages of female workers that still occurs. Disparities in the economy, especially in the number of wages received by women, are a tangible manifestation of gender inequality that has an impact on per capita expenditure on women.

**Literature Review**

**Conceptual Background and Theoretical Review**

**Adam Smith's Theory of Output Growth**

Adam Smith in "An Inquiry into the Nature and Causes of the Wealth of Nations" to increase labor productivity were emphasized on the specialization of each individual who is an economic actor (Hasan & Azis, 2018). Regarding labor productivity through specialization and division of labor where:

\[ Q = f(K, L) \]

\[ Q = \text{Productivity per worker} \]

\[ K = \text{Capital} \]

This mathematical function explains that the increase in productivity resulting from capital and labor will lead to an increase in the attractiveness of capital accumulation and increase specialization. The maximum market potential can be achieved if every individual in society is given the freedom to carry out their economic activities.

**Life Expectancy**

Schultz explained that a high level of health will increase labor productivity (Bado et al., 2017). Life expectancy at birth is an indicator of women's health level, which obtains adequate human capital required for economic growth and has a positive effect on the economy (Mishra et al., 2020). The measurement of the health index uses the Life Expectancy Rate as the level of health measurement. Life expectancy at birth is obtained through the average number of births and deaths per year. Comparison of these variables is expected to reflect the average length of life expected by the community in an area.

The gender ratio in life expectancy is the ratio of the life expectancy of women to life expectancy of men. This calculation is intended to see the inequality in health levels between genders. Individuals with a lengthier life are predicted to save better than people with unwell health. A descent in life expectancy and unwell health will retard economic development by diminishing the productivity of labor (Ullah & Malik, 2019).
Mean Years of Schooling

The idea of Adam Smith underlies Theodore Schultz's thinking about investing in human capital (Hasan & Azis, 2018). Theodore Schultz explains that development in the education sector with humans as the focus of the goal has given a direct role to economic growth in a country, through increasing the ability and production skills of the workforce (Hasan & Azis, 2018). The philosopher Amartya Sen pinpointed education as conceivably the most transparent path to “economic growth, political steadiness, and peace”. Peace education aims to empower students with a peaceful consciousness that condemns discrimination by respecting all human beings equally (Yazdani, 2021). Increasing numbers of well-educated women broaden the nationwide talent pool, permitting lessened dependency (Saqib et al., 2016). Gender disparities in education were thought to guide automatically to gender differences in work, especially in the formal sector, where the employers would favor employees with adequate training and, thus, would not consider applications from women without education (Cabeza-García et al., 2018). The gender ratio on the mean years of schooling is the ratio of the mean years of schooling for women to mean years of schooling for man. This calculation is intended to see the inequality in the level of education between genders.

Labor Force Participation Rate

According to Adam Smith if human resource investment is an allocation of costs that can increase economic growth. After the economy increases, physical capital expansion is needed to maintain the economy rising, investment in human resources is a condition for economic growth. Smith believes that welfare will be realized from how much investment which is referred to as a sacrifice contributed has a positive impact on work and specialization (Bado et al., 2017). Marshall attempted to place women in employment and its relationship to gender issues. Neoclassicism believing that productivity largely determines employee output production process that determines the income level of workers. Under these circumstances, Neoclassical emphasizes differences in productivity among men workers and women workers. Where women tend to have lower human capital than men, such as skill level, education level, physical strength compared to men. Even women tend to dual roles are more dominant than males (Morally, 2020). Women's task is to take care of family needs of families while they are maintaining career as a worker. Therefore, the productivity of women is much lower than male workers (Camila, 2021). LFPR is an indicator used to determine the percentage of the population who have an active age in the economy economically in a certain area. The higher the LFPR, the greater the stock of labor available to produce goods and services in the economy. The gender ratio in LFPR is the ratio between female LFPR to male LFPR. This calculation is intended to see the inequality in employment between genders.

Per Capita Expenditure

The third dimension of gender development is the achievement of economic indicators based on a decent standard of living. UNDP uses data on Gross National Income (GNI) per capita as an indicator of this dimension. Considering that if the data is not available at the Regency and City level, the adjusted per capita expenditure is chosen as another alternative. Nurske explained a large population without being accompanied by the purchasing power of the population resulted in production not being absorbed by the market and the population's productivity is low (Hasan & Azis, 2018). Based on the theory of discrimination, even if exclusion by employers or consumers excludes women from “male” jobs, it affects women's salaries and careers, but men and women are equally productive workers (Koyuncu et al., 2015). Although working women’s compulsive buying behavior makes them expend moderately more than men, further causes are creating working women particularly consume larger ratios of their revenue such as laundry and take-out meals because working women's have lesser time than non-working women (Jun et al., 2020).

Empirical Review

Putri & Kuserin (2017) show that health is effective in increasing labor productivity, this is because health is proven to encourage workers to be more productive, Rahman & Erni (2020), Nahar et al (2015), found that life expectancy has a positive and significant effect on workforce productivity. They asserted that healthier people are more productive and efficient, and they do not try to skip work because of the sickness. However, in achieving healthy human capital, improvements in health facilities and lifestyle are needed. Ullah & Malik (2019) found that education and experience are the keys to human capital in achieving labor productivity.

Research conducted by Julide et al (2015) The results of this study indicate that female labor force participation has a positive and significant effect on labor productivity in 111 countries in 1985-2010 with the finding that by increasing the participation of women workers can reduce the inequality gap between the workforce and men and women, thereby creating an increase in labor productivity. Research conducted by Muhammad Amir Arham & Stella Junus (2020). The results of this study indicate that expenditure per capita has a negative and significant effect on 34 Indonesian provinces in 2014-2019, this is because real wages and working hours are the main determining factors.

Research and Methodology

This study uses quantitative methods, which are methods created to test theories, show relationships between variables, and analyze results. The purpose of this study was to analyze the effect of gender ratio on life expectancy, gender ratio of mean years schooling, gender ratio of labor force participation rate, and gender ratio of per capita expenditure on labor productivity. West Java Province in
2015-2020 where all of the data was obtained from Central Bureau of Statistics (BPS) of the Republic of Indonesia & BPS of West Java Province. As for the measurement of variables and the size of each indicator as shown in table 1:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator</th>
<th>Calculation Formula</th>
<th>Measuring Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Productivity (Y)</td>
<td>The total value of all goods and services produced in an area in a certain period of time (usually one year).</td>
<td>Log Natural of Gross Domestic Regional Product</td>
<td>Ratio</td>
</tr>
</tbody>
</table>
| Gender Ratio of Life Expectancy (X1)  | The approximate average of the number of years a person has taken from birth. | GLE = \( \frac{a}{b} \times 100 \text{ Percent} \)  

\[ a = \text{LE of female} \]
\[ b = \text{LE of male} \] | Ratio |
| Gender Ratio of Mean Years School (X2) | The number of years used by the population in undergoing a period of formal education | GMYS = \( \frac{a}{b} \times 100 \text{ Percent} \)  

\[ a = \text{MYS of female} \]
\[ b = \text{MYS of male} \] | Ratio |
| Gender Ratio of Labor Force Participation Rate (X3) | Percentage of population aged 15 years and over who are in the labor force | GLFPR = \( \frac{a}{b} \times 100 \text{ Percent} \)  

\[ a = \text{LFPR of female} \]
\[ b = \text{LFPR of male} \] | Ratio |
| Gender Ratio of Per Capita Expenditure (X4) | Proportion of expenditure on food and non-food | GPE = \( \frac{a}{b} \times 100 \text{ Percent} \)  

\[ a = \text{PE of female} \]
\[ b = \text{PE of male} \] | Ratio |

Data Analysis Technique

In this study, the analysis used is panel data analysis which is a combination of time series and cross-section data. Where time series data is data that has been accumulated from time to time for an individual. Meanwhile, cross-section data is data that has been accumulated from time to time on the number of individual (Ghozali & Ratmono, 2020). The panel data regression model in this study is described as follows:

\[
LP_{LN_{it}} = \alpha + \beta_1 \text{GLE}_{it} + \beta_2 \text{GMYS}_{it} + \beta_3 \text{GLFPR}_{it} + \beta_4 \text{GPE}_{it} + c_t
\]

Where :

\[ LP \] = Labor Productivity
\[ GLE \] = Gender Ratio of Life Expectancy
\[ GMYS \] = Gender Ratio of Mean Years School
\[ GLFPR \] = Gender Ratio of Labor Force Participation Rate
\[ GPE \] = Gender Ratio of Per Capita Expenditure
\[ \alpha \] = Constant
\[ \beta_1, \beta_2, \beta_3, \beta_4 \] = Coefficient
\[ i \] = Regency/City in West Java Province
\[ t \] = 2015-2020
\[ c \] = error Term

Findings and Discussion

Result

Chow Test

This test is conducted to select the most suitable model to be used between common effect and fixed effect. The results of data processing from the Chow test proceed by EViews Program as shown in the following table:
Chow test shows that the best model for regressing panel data is the fixed effect model because the p-value is 0.00000 < (0.05).

### Hausman Test

This test is conducted to select the best model to be used between random effect and fixed effect. The results of data processing from Hausman test proceed by EViews Program as shown in the following table:

**Table 3: Hausman Test Result**

| Cross-section random | 0.0163 |

Hausman test shows that the best model for regressing panel data is the fixed effect model because the p-value is 0.0163 < (0.05).

### Fixed Effect Model

The regression equation formed from the data on the above table is as follows:

\[
LP_{LN} = -294.3076 + 3.267164GLE - 0.132110GMYS + 0.041316GLFPR - 0.371947GPE
\]

**Table 4: FEM Result**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-294.3076</td>
<td>101.2326</td>
<td>-2.907242</td>
<td>0.0043</td>
</tr>
<tr>
<td>RAHH</td>
<td>3.267164</td>
<td>0.939880</td>
<td>3.476149</td>
<td>0.0007</td>
</tr>
<tr>
<td>RRLS</td>
<td>-0.132110</td>
<td>0.082860</td>
<td>-1.594368</td>
<td>0.1133</td>
</tr>
<tr>
<td>RTPAK</td>
<td>0.041316</td>
<td>0.017779</td>
<td>2.323842</td>
<td>0.0217</td>
</tr>
<tr>
<td>RPP</td>
<td>-0.371947</td>
<td>0.137520</td>
<td>-2.704666</td>
<td>0.0077</td>
</tr>
</tbody>
</table>

Dependent Variable: PTK_LN; Method: Panel Least Squares

Fixed Effect Model results:

i. The regression coefficient in the regression equation above is -294.3076, so every change in one unit of the variables of GLE, GMYS, GLFPR, and GPE will reduce GLP by 294.3076.

ii. The regression coefficient for the GLE variable is 3.267164, this means that each change of one unit of the GLE variable will cause an increase in GLP of 3.267164.

iii. The regression coefficient for the GMYS variable is -0.132110, this means that every change of one unit of the GMYS variable will cause a decrease in GLP by 0.132110.

iv. The regression coefficient for the GLFPR variable is 0.041316. This means that every change of one unit of the GLFPR variable will cause an increase in GLP by 0.041316.

v. GEP coefficient is -0.371947. This means that every change of one unit of the RPP variable will cause a decrease in GLP by 0.371947.

### T-test (Partial)

This test is intended to partially show the effect of the independent variable used on the dependent variable proceed by Eviews Program:

**Table 5: T-test Result**

<table>
<thead>
<tr>
<th>Variable</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.907242</td>
<td>0.0043</td>
</tr>
<tr>
<td>RAHH</td>
<td>3.476149</td>
<td>0.0007</td>
</tr>
<tr>
<td>RRLS</td>
<td>-1.594368</td>
<td>0.1133</td>
</tr>
<tr>
<td>RTPAK</td>
<td>2.323842</td>
<td>0.0217</td>
</tr>
<tr>
<td>RPP</td>
<td>-2.704666</td>
<td>0.0077</td>
</tr>
</tbody>
</table>

The value of t-table is 1.9750921.

**Testing on the GLE Variable**
Based on the regression results above, GLE has \( t_{\text{count}} > t_{\text{table}} \) (3.476149 > 1.9750921) and a probability of 0.0000 < 0.05 so statistically that \( H_0 \) is rejected, so it can be concluded that GLE has an effect on labor productivity.

**Testing on GMYS Variable**

GMYS has \( t_{\text{count}} > t_{\text{table}} \) (1.594368 < 1.9750921) and probability 0.1133 > 0.05, so statistically the GMYS variable has no effect on the labor productivity variable. So, it can be concluded that \( H_0 \) is accepted, which means that GMYS has no effect on labor productivity.

**Testing on GLFPR Variable**

GLFPR has \( t_{\text{count}} > t_{\text{table}} \) (2.323842 > 1.9750921) and probability 0.0217 < 0.05, indicating statistically \( H_0 \) is rejected, it can be concluded that GLFPR has an effect on labor productivity.

**Testing on GPE Variable**

GPE has \( t_{\text{count}} > t_{\text{table}} \) (2.704666 > 1.978239) and a probability of 0.0077 < 0.05 indicating statistically \( H_0 \) is rejected, so it can be said that GPE has an effect on labor productivity.

**F Test (Simultaneous)**

This test is used to measure the independent variables simultaneously affect the dependent variable proceed by Eviews Program:

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>273.2905</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
</tr>
</tbody>
</table>

F table value is 2.661829

Thus, the value of \( F_{\text{count}} > F_{\text{table}} \) (273.2905 > 2.66) and the probability of 0.0000 < 0.05 so that it can be said that GLE, GMYS, GLFPR, and GPE simultaneously affect labor productivity.

**Coefficient of Determination**

Below are the results of coefficient determination with help of EViews program:

<table>
<thead>
<tr>
<th>R-Squared</th>
<th>0.984273</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-Squared</td>
<td>0.980672</td>
</tr>
</tbody>
</table>

Based on the results of data processing, it is known that the R-Squared value is 0.984273 which means the dependent variable of labor productivity can be described by the independent variables (GLE, GMYS, GLFPR, and GEP) of 98.42 percent while the remaining 1.58 percent is explained by the variable others outside of research. The Adjusted R-Squared value is 0.980672 which indicates the dependent variable of labor productivity can be explained by the independent variables (GLE, GMYS, GLFPR, and GEP) of 98.06 percent while the remaining 1.94 percent is explained by other variables or other causes outside the research.

**Discussions**

This study analyzes 4 variables such as gender ratio on life expectancy as proxies of health, gender ratio on mean years of schooling as proxies of education, gender ratio on labor force participation, and gender ratio on expenditure per capita as proxies of purchasing power. The gender ratio on life expectancy has a positive effect on labor productivity, which means that if the gender ratio on life expectancy increases, it will increase labor productivity. This study is align with the theory from Schultz that explained a good level of health will increase productivity and change behavior towards more business activities or be more productive (Bado et al., 2017).

The gender ratio on mean years of schooling has no effect on labor productivity, one of the main contributing factors is that the province of West Java is one of the biggest contributors to the number of child marriages. So that education that should create a qualified workforce is not achieved.

The gender ratio on labor force participation has a positive and significant effect. The results of this study are in accordance with research conducted by Koyuncu et al (2015) with the increase in labor participation by women proving that there is an increase in human capital investment which makes women no longer limited to job selection which is usually only limited to men.

The gender ratio on expenditure per capita has a negative and significant effect. The results of this study are in accordance with research conducted by Amir Arham & Stella Junus (2020) This is because the working hours of female workers are less than that of male workers. With fewer working hours, female workers receive less wages than male workers. Women who are faced with dual
roles, has to take care of domestic sphere and also their role as workers, this makes women often experience a dilemma, especially in dividing their time. (Dini et al., 2020).

Conclusions

Based on the results of the analysis and discussion in this study, it can be concluded that gender inequality at the level of health, employment, and purchasing power has a significant effect on labor productivity in the Regency/City of West Java Province. These results indicate that gender inequality has a role that can affect labor productivity. The high level of women's health will be the initial capital for human resources, especially for the female population in creating labor productivity. Furthermore, the decrease in gender inequality on the quantity of labor is proven to increase labor productivity, this is because women are no longer limited to job choices which are usually only limited to the male population. Reducing gender inequality in purchasing power as measured by per capita expenditure can stimulate investment and employment, especially for the female population, so that this can create an increase in consumption and purchasing power of the female population. The decrease in gender inequality at the level of education has no significant effect on labor productivity, these results indicate that the need for attention to the system and the stigma of society regarding phenomena that occur such as cases of child marriage. So, that efforts to improve the quality of the workforce through education are able to have a good impact on the labor productivity of the province of West Java.

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Institutional Review Board Statement: Ethical review and approval were waived for this study, due to that the research does not deal with vulnerable groups or sensitive issues.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

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