Analysis of the Minimum Wage and Production Effect on Employment of Oil Palm Plantation Sector in Sumatra

Ainul Mardhiyah[1], Sya'ad Afifuddin[2], Irsad[3], Dede Ruslan[4]

{18ainul@gmail.com}

[1,2,3]Doctor Program, Faculty of Economics and Business, Universitas Negeri Medan, Medan, Indonesia
[1,4]Departement of Economics, Faculty of Economics, Universitas Negeri Medan, Medan, Indonesia

Abstract. Oil palm is a commodity that its role is important in the Indonesian economy as a leading commodity, its role tends to increase year by year. This study aimed to examine Pappas and Mark Hirshey's demand theory derivation in the sector of oil palm plantation in Sumatra Island, employment in the oil palm plantation sector is a derived demand for labor, because the demand is based on the plantation sector developments in Sumatra. This study looked at the minimum wage and production variables effect on employment in the sector of oil palm plantation in Sumatra Island. This study used time series data from 2011 to 2020 per 10 provinces in Sumatra Island. The technique of data analysis used is multiple linear regression with the EViews application. After the examination was carried out, the result showed that the Minimum Wage (MW) negatively and insignificantly affects employment so that the hypothesis is accepted. Production has positive and significant effect towards employment so that the hypothesis is accepted. Simultaneously the Minimum Wage (MW) and production affect employment so that the hypothesis is accepted.

Keyword: Labor Absorption, Minimum Wage, Production.

1 Introduction

Human resources are constantly involved in development of economic and other fields as one of the agents of development, therefore the main development element in a country is population. The success of development is not constantly guaranteed by a large population. A large population can even become a burden for the sustainability of development. A large population and disproportionate to the employment availability will result in part of the working age population not getting a job. Adam Smith, David Ricardo and Thomas Robert Malthus stated that there constantly be a competition between output and population development level of which is eventually won by the development population. Since the population also works as a labor, struggles in providing jobs will be occurred. If the population is able to get a job, this will make a progression in the nation welfare. Nevertheless, if the people don't obtain a job, they will be unemployed, and it will indeed lower the standard living of the nation [1].

In labor economics, it is assumed that labor goal is utility maximization that people are assumed to try to achieve the goal of making themselves as pleased as possible at the limited resources level [2]. Eemployment is still one of the problems that has beenunresolved, this is due to the fact that the high number of unemployed people has not balanced the employment opportunities. The increasing number of labor force certainly requires decent employment, but in reality, employments are not always available. The increasing number of population, labor

ICONSEIR 2022, November 24, Medan, Indonesia

DOI 10.4108/eai.24-11-2022.2332718

force, and women taking part in work make employment opportunities and competition more stringent. Good resources and good skills are the main asset for the labor force to get decent jobs, while people who are unable to compete in the work life will be eliminated and become unemployed. This is a problem that must be resolved in order to attain equal distribution of prosperity and achieve the goals of development.

Sumatra is an island located in the western part of the Aarchipelago. The area of Sumatra is approximately 473,481 square kilometers. The geographical conditions of Sumatra based on the map of the island's area are further divided into ten provinces, including: Aceh Province, North Sumatra Province, Riau Province, West Sumatra Province, Riau Islands Province, Jambi Province, Bengkulu Province, South Sumatra Province, Lampung Province, Bangka Belitung Islands Province. Sumatra is also one of the areas that has the largest population. Population is one of the problems in the development of an area. This is one of the obstacles in national development because it increases the labor force that will enter the labor market, while on average they have very low level of education and skills or are uneducated workers, while the available job opportunities are relatively small [3].

Oil palm in the Sumatra Island has been famous for a long time because this area was the first place for oil palm development and plantation in Indonesia. This is supported by the geographical location of North Sumatra which complies with the requirements for oil palm plantations. Besides, many people in Sumatra are working in the oil palm sector. Therefore, since the beginning Sumatra has become the largest oil palm producer in Indonesia.

Sumatra has quite unique characteristic and has the biggest contribution to plantation development in Indonesia. Indonesia ranks 1st in the world for oil palm, with a 54 percent share, second in the world for rubber commodities with a 26 percent share, third for cocoa commodities with an 8 percent share and fourth for coffee commodities with a 7 percent share. Of the four commodities, oil palm, rubber and coffee are dominanting Sumatra with respective shares of 63%, 71% and 63% of the total area of these commodities in Indonesia. Thus, it can be seen that Sumatra has played a role in feeding the world. This is shown in the table below:

Table 1. List of Sumatra Provinces Producing Oil Palm

Province	Plantation Plant Production (Thousand Tonnes) Oil palm					
	2020	2019	2018	2017	2016	2015
ACEH	1134.60	1133.30	1037.40	867.30	732.70	896.30
NORTH SUMATERA	5776.80	5647.30	5737.30	4852.00	3983.70	5193.10
WEST SUMATERA	1312.30	1253.40	1248.30	1209.20	1183.10	926.60
RIAU	9984.30	9512.90	8496.00	7591.20	7668.10	8059.80
JAMBI	3022.60	2884.40	2691.30	1783.00	1435.10	1794.90
SOUTH SUMATERA	4267.00	4049.20	3793.60	2987.00	2929.50	2821.90
BENGKULU	1063.40	1032.10	1047.70	849.70	750.20	747.50
LAMPUNG	384.90	414.20	487.20	456.00	425.90	434.30
BANGKA BELITUNG	843.00	815.70	900.30	756.10	726.60	523.10
RIAU ISLANDS	20.00	22.80	28.90	25.10	21.40	45.10

One of the plantation sectors that absorbs quite a lot of labor today is the sector of oil palm plantation. The following data is the percentage of the labor working in the oil palm plantation sector in Sumatra.

Table 2. Number of Labors Working in the Sector of Oil Palm Plantation (2019-2020)

Province	**2019**	**2020**
Aceh	710.617	2.359.905
North Sumatra	2.180.421	6.842.252
West Sumatra	791.856	2.581.524
Riau	1.048.643	3.022.988
Riau Islands	28.681	370.694
Jambi	739.188	773.426
Bengkulu	415.146	1.031.881
South Sumatra	1.756.248	4.091.383
Bangka Belitung Islands	174.807	699.881
Lampung	1.587.714	4.280.109

The number of labors working in Aceh oil palm plantation sector in 2019 was 710.617, while in 2020 it reached 2.359.905. North Sumatra in 2019 amounted to 2.180.421, while in 2020 it was 6.842.252. West Sumatra in 2019 was 791.856, while in 2020 it was 2.581.525. With the result that seen from the table above, the largest number of labors working in the sector of oil palm plantation is in North Sumatra.

In development in an area, policies regarding development related to the potential use of local (regional) physical resources, human resources, and institutions are the main issues that continue to be voiced. This becomes the basis for policy makers in carrying out the development process and creating new jobs to encourage economic activity [4].

The labor market, similar to other markets in the economy is managed by the supply and demand forces, but the labor market is dissimilar from most other markets since the demand for labor is a derived demand which the demand for labor is highly dependent on the demand for the output it produces [5]. Labor is one of the production factors applied in the production process to provide goods and services. By examining the relationship between the goods production and the demand for labor, it will be possible to identify the factors that determine the equilibrium wage. The minimum wage also has a close relationship that can affect employment, this means that the minimum wage on employment effect is not unidirectional, if there is an increase in the minimum wage, it has the potential to reduce employment [6].

Another variable that also influences employment in North Sumatra is oil palm production. The cultivation of oil palm production in North Sumatra when viewed from the status of its concessions which consists of community plantations, state plantations and private plantations are as follows:

Table 3. Total Amount of Oil Palm Production in Sumatra (Thousand Tonnes)

Province	2019	2020
Aceh	1133.30	1134.60
North Sumatera	5647.30	5776.80
West Sumatera	1253.40	1312.30
Riau	9512.90	9984.30
Jambi	2884.40	3022.60
South Sumatera	4049.20	4267.00
Bengkulu	1032.10	1063.40
Lampung	414.20	384.90
Bangka Belitung Islands	815.70	843.00
Riau Islands	22.80	20.00

The development of oil palm production in Sumatra in 2020. It can be seen in the province of Aceh that oil palm production was 1134.60 thousand tons, while Riau had oil palm production of 9984.30 thousand tons.

The above data is supported by research from Syahza [7] who stated that oil palm plantation actions have had positive or beneficial external impacts on the surrounding environment. The advantages of plantation actions on socio-economic aspects cover: 1) Increasing the surrounding society welfare; 2) Enlarging the opportunities of employment and business; 3) Supporting the development of region.

2 Research Methods

This study sought to examine the minimum wages and production effect on the employment of oil palm plantation sector in Sumatra. The data used in this research is secondary data which is quantitative time series from 2011-2020. The data processing was carried out using the help of Eviews Software with reference to various economic literature.

2.1 Ordinary Least Square (OLS) Methods

In this study, the analysis was carried out using the Ordinary Least Square (OLS) method. As for the data processing technique in the research, the model used was first tested with the statistical criteria formula in model selection based on the Akaike Information Criterion (AIC) developed by Akaike (2000), that finding the smallest Residual Sum of Squares (RSS) of the models which will be used using the equation:

AIC=[RSS/T]xe^((2k/T))..... (1)

Which :

AIC = Akaike Information Criterion
RSS = Residual Sum of Square
T = The amount of data in observation
K = The number of non-constant explanatory variables

The results of AIC tests were then compared with the estimated results with the Final Prediction Error (FPE) and the FPE equation is as follows:

FPE=[RSS/T]x(T+k)/(T-k)..... (2)

To determine the form of empirical model function, in this research the Mackinnon test was carried out, White and Davidson (MWD test), to choose whether the model will be used is linear or in the form of the log-linear.

Goodness of Fit test; where this test consisted of a t test to see the significance of each independent variable, then an F test was carried out which was seen from the overall significance test of the independent variables in affecting the dependent variable, then an assessment of the coefficient of determination (R2) was carried out which aimed to see whether the independent variable sufficient to provide meaning in influencing the dependent variable.

The R2 value produced by the empirical model is very high if the level of significance of the independent variables based on the t-statistic test is very small and there are no significant independent variables (high R2 but few significant t ratios). If the R2 value is high, the F test value will reject the null hypothesis that the simultaneous partial slope coefficient value is

actually equal to zero [8].

T-test (partial test); namely a test that intends to discover whether the regression coefficient is partially significant or not. Factor test (all over test) is a test that aims to determine whether the regression coefficient is simultaneously significant or not.

To find out the factors that affect the employment in the sector of oil palm plantation in Sumatra, the research used multiple linear regression techniques with the econometric model approach as follows:

$PTN = a + \beta_1 Up_t + \beta_2 Pr_t + e$..... (1)

Which:

PTN = Penyerapan Tenaga Kerja (Employment)
Up = Upah Minimum (Minimum Wage)
Pr = Production
εt = error term
α = constanta
β = coefficient

In this study, the analysis was carried out using the Ordinary Least Square (OLS) method. The data processing technique in this research was testing the model using the statistical criteria formula in model selection based on the Akaike Information Criterion (AIC) developed by Akaike [9], which is to find the smallest Residual Sum of Squares (RSS) of the models used will be used.

2.2. Classic Assumption Test

In general, there are several issues that commonly happen in linear regression models where statistically these issues can interrupt with the predetermined model. It can even delude the conclusions obtained from the equations formed. Therefore, it is significant to test the classical assumption deviation [10] that includes:

2.3 Multicollinearity Test

A regression model is considered to face multicollinearity issues if there is a perfect or exact linear relation among some or all of the independent variables of a regression model. As a result, it will be inconvenient to see the explanatory variables impact on the explained variables. Several rules (rules of thumb) that are commonly used to find the presence or absence of multicollinearity in empirical model values include:

a. The R2 value resulting from the empirical model estimation is very high, but the level of significance of the independent variables based on the t-statistic test is very small and there are not even significant independent variables (high R2 but few significant t ratios). If the R2 value is high, the F test value will reject the null hypothesis that the simultaneous partial slope coefficient value is actually equal to zero.
b. Using partial correlations (examination of partial correlations) or subsidiary regression (subsidiary of auxiliary regression).

2.4 Heteroscedasticity Test

This test is to discover whether the variance of the model is not constant over time or between observations studied using the White-heteroskedasticity test, by comparing the value of df $\chi 2$-table with df$\chi 2$-count. If $\chi 2$ count > $\chi 2$ table then there is heteroscedasticity and vice versa if $\chi 2$ count < $\chi 2$ table then there is no heteroscedasticity [9].

2.5 Autocorrelation Test

Autocorrelation can be interpreted as the correlation between part of observations series that are sorted according to time as in time series data so that there is interdependence between disturbing factors related to observations that are influenced by elements of interference related to other observations. Therefore, autocorrelation problems usually arise in time series data, although it is also possible that this can also occur in cross-sectional data. To find out whether the model has autocorrelation problems, the test can be done using Durbin-Watson Test (DW Test), using the guidelines below:

a. Reject Ho which says there is no positive autocorrelation, if the statistical DW value lies between $0 < d < dL$.
b. Reject Ho which says there is no negative autocorrelation, if the statistical DW value lies between $4 – dL < d < 4$.
c. Accept Ho which says there is no negative autocorrelation, nor positive autocorrelation, if the statistical DW value lies between $dU - d < 4 – dU$.
d. Inconclusive there isn't positive autocorrelation if $dL \leq d \leq dU$.
e. Inconclusive there isn't negative autocorrelation if $dU \leq d \leq 4 – dL$.

3 Result and Discussion

The discussion of the econometric test in this study discusses 3 (three) parts, namely multicollinearity, autocorrelation and normality test. The discussion of the econometric test in this study is as follows.

3.1 Result

3.1.1 Multicollinearity Test

In accordance with the research method, multicollinearity in this study was tested using VIF to detect the presence of multicollinearity, as follows:

Correlations		
	Minimum Wage	Production
Minimum Wage	1	,549
Production	,549	1
VIF		
	Minimum Wage	Production

Upah Minimum	1	2,218
Production	2,218	1

As seen on the table above with the criteria that if the VIF value <10 means that there is no multicollinearity in the model, it can be concluded that in general there are no multicollinearity problems in this research data.

3.1.2 Autocorrelation Test

Furthermore, as seen on the calculation results, the calculated Durbin Watson (DW) value is 1.405. Because the value of d is between 1.10 and 1.54, it is assumed that autocorrelation in this study cannot be decided, so to be more certain whether autocorrelation symptoms occur in this research model or not, it can be done using the Test of Breusch-Godfrey Serial Correlation LM with the criteria if prob. Obs*R-squared value > 0.05, so there was no autocorrelation in this study.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.785971	Prob. F(2,15)	0.4736
Obs*R-squared	2.086823	Prob. Chi-Square(2)	**0.3523**

Based on Table 4.7. prob. Obs*R-squared value obtained is 0.3523 > 0.05, so it can be deduced that there are no autocorrelation symptoms in this study.

Normality testTesting the normality test by obtaining the results of the Prob. Jacque Berra (JB) value > 0.05 means that Ho is rejected, meaning that there is no deviation from the assumption of normality or the disturbance/residual is distributed normally. Based on the test, the following results were obtained:

Based on Figure 4.6. Prob. JB value obtained is 0.8466 > 0.05, it can be concluded that there was no violation of the normality test in this study.

The regression results from the Eviews data processing program are then put into the multiple regression equation as given below.

$\hat{Y}$ = 1490132 + 0,311034 X1 + 0,368165 X2.....(2)

Based on the formula, it can be interpreted as follows:

The constant value of 1490132 means that if X1 and X2 are equal to 0 then the value of employment is equal to 1490132. If X1 increases by one unit, the value of employment will increase by 0.311034 and vice versa, if the value of X1 decreases by one unit then the value of absorption labor decreased by 0.311034. Furthermore, if X2 increases by one unit, the value of employment will increase by 0.368165 and vice versa, if X2 decreases by one unit, the value of employment will decrease by 0.368165. The results of the analysis are shown in the table below:

Table 4. Analysis of Multiple Linear Regression Results

Dependent Variable	Independent Variable	Regression Coefficient	Prob. t

Employment (Y)	Minimum Wage (X1)	-1,311034	0,1186
	Production (X2)	0,368165	0,0140
Constant	1490132		
R-Squared	0,870		

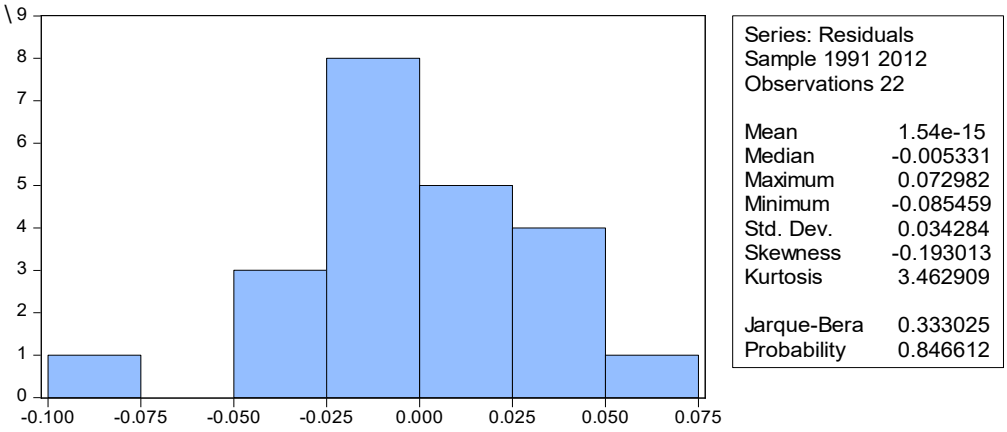

Fig. 1. Results of Multiple Linear Regression Analysis

3.2 Discussion

3.2.1 Effect of Minimum Wage on Employment

The new Keynesian theory states that increasing wages increases productivity. Efficiency wage theory mentions that the average quality of a company labor relies on the wages paid to its employees. This means that high wages will reduce labor rotation. Research [11] indicates that the minimum wage has a positive effect on employment in Austria. Research [12] indicates that increasing the minimum wage in most businesses has not been proven to significantly affect job losses for workers. This implies that the minimum wage positively affects the employment in the United States. Research [13] concluded that the minimum wage positively and insignificantly affects employment in Riau Province. The results of the study [14] shows that the minimum wage positively and significantly affects employment in Bali Province. Research [15] shows that wages positively affect employment of MSE workers in Jambi Province.

Research [16] shows that raising the minimum wage can cause job losses in the Korean labor market. Research [17] shows a negative effect of the minimum wage on total employment. The effect of the minimum wage has a greater employment effect on small micro enterprises in Vietnam. Research [18] shows that the minimum wage is a factor that reduces the demand for labor in Poland, especially in the case of certain segments of the labor market. Research [19] stated that Regency/City minimum wages in East Java have an effect on reducing the number of employment.

Based on the empirical analysis it can be seen that there are negative and insignificant results, this shows that it can support the theory of wage efficiency. The results of this study are relevant to studies [12], [13], and [15] which state that the minimum wage has a negative effect on labor absorption, so it can be concluded that the minimum wage is not significant for employment.

3.2.2 Effect of Production on Employment

In the theory of production with two changing factors, this can be analyzed by assuming that there are two factors of production that can be replaced, for example labor and capital and these two factors can be interchanged. This means that if the labor and capital price per unit are discovered, then an analysis of how a producer will be able to lessen costs in his efforts to achieve a certain level of production.

Sulfiana's research, Production positively and significantly affects employment, Rosalia and Wulansari's research production value has a significant influence on employment in small industries and household crafts in Tuban Regency, these results are in accordance with research of Putu and Alawiyah, show that production positively and significantly affects employment. This research is not in accordance with the research of Melia, the test results show that there is no effect of production values on employment, where the production value does not have an impact on employment of a person's workforce in small and micro industrial companies. The results of this study are in accordance with research according to Fadliilah & Atmanti which indicates that production values significantly impact the employment of small-scale industry and will not change. According to Pasaribu, production value itself is the production level or the total number of goods produced in the industry. Rising and falling market demand for the company production concerned will affect if the company's goods production demand increases, then producers tend to add production capacity. For this purpose, producers will increase the use of labor. Decreasing the total value of production will affect the employment. If the production value decreases, the production capacity will decrease and the company will automatically reduce the number of workers. The empirical findings of this study show positive and significant results, which means that they support the Assauri theory. The findings of this study are in accordance with the research of Sulfiana, Rosalia and Wulansari, Putu and Alawiyah which concludes that production positively and insignificantly affects the employment.

4 Conclusion

In accordance with the research title which intends to analyze the effect of wages and production on employment absorption in Sumatra, the conclusion obtained from this study is that:

a. The MinimumWage (MW) negatively and insignificantly affects employment so that the hypothesis is accepted.
b. Production positively and significantly affects employment so that the hypothesis is accepted.
c. Simultaneously the Minimum Wage (MW), and production affect employment so that the hypothesis is accepted.

References

[1] Adil, A. (2017). Analisis Faktor-Faktor Yang Mempengaruhi Penyerapan Tenaga Kerja Pada Sektor IndustriPengolahan Di Provinsi Sulawesi Selatan Periode 2006-2015. (Doctoral Dissertation, Universitas Islam Negeri Alauddin Makassar).

[2] Yani, A. (2002). *Hubungan Keuangan antara Pemerintah Pusat dan Daerah di Indonesia*. Jakarta: Raja Grofindo.

[3] Alfiantoni, P. (2018). Pengaruh Pendapatan Asli Daerah, Dana Bagi Hasil, Dana Alokasi Umum dan Dana Alokasi Khusus terhadap Belanja Modal di Provinsi Jawa Tengah Tahun 2013-2016.
[4] Anisa, B. F. (2022). Pengaruh Upah Minimum Kabupaten/Kota, Produk Domestik Regional Bruto, Investasi, Dan Anggaran Pendapatan Dan Belanja Daerah Terhadap Penyerapan Tenaga Kerja Di Provinsi Jawa Timur Periode Tahun 2016-2020
[5] Anzari, D. A. (2022). Pengaruh Produk Domestik Regional Bruto (Pdrb), Jumlah Penduduk, Indeks Pembangunan Manusia (IPM), Dan Upah Minimum Terhadap Penyerapan Tenaga Kerja Di Provinsi Jawa Tengah Tahun 2010–2020. (Doctoral Dissertation, Universitas Islam Indonesia).
[6] Arsyad, AR. Junaedi, H., dan Farni, Y. (2012). Pemupukan Kelapa Sawit Berdasarkan Potensi Produksi Untuk Meningkatkan Hasil Tandan Buah Segar (TBS) Pada Lahan Marginal Kumpeh. *Jurnal Penelitian Universitas Jambi*. Vol 14 No. 1. Januari – Juni 2012. Hal 29-36. Diakses 16 Oktober 2019
[7] Arsyad, L. (1999). Ekonomi Pembangunan. Universitas Gajah Mada. Yogyakarta: STIM YKPN
[8] Aulia, R. (2020). Pengaruh PDRB, Upah Minimum Kabupaten/Kota, Dan Indeks Pembangunan Manusia Terhadap Jumlah Tenaga Kerja Kabupaten/Kota Di Provinsi Riau Tahun 2013-2019 (Bachelor's Thesis, Fakultas Ekonomi Dan Bisnis UIN Jakarta).
[9] BPS Sumatera Utara. (2017). Daftar Upah Minimum Propinsi Tahun 2015 – 2017, Medan.
[10] Gianie. (2009). *Pengaruh Upah Minimum Terhadap Penyerapan Tenaga Kerja Berpendidikan Rendah Di Sektor Industri Dan Perdagangan.* Jakarta: Universitas Indonesia.
[11] Mankiw, N. G. (2006). *Teori Makro Ekonomi*, Terjemahan, Edisi Ketiga. Jakarta: Erlangga.
[12] Prayogo, I., and Hasmarini, M. I. (2022). Analisis Pengaruh IPM, Upah Minimum, PDRB Dan Jumlah Penduduk Terhadap Penyerapan Tenaga Kerja Di Yogyakarta Tahun 2018-2021. *Seiko: Journal Of Management & Business*, *5*(2), 77-85.
[13] Rachim, A. (2015). *Barometer Keuangan Negara/Daerah*.
[14] Todaro, M.P. (2000). Pembangunan Ekonomi Di Dunia Ketiga. Jakarta: Erlangga.
[15] UNDP. (2009). *Human Right And Human Devolopment*. New York: Oxford University Press.
[16] Wiratmoko, D., Winarna, Rahutomo, S., Santoso, H. (2008). *Karakteristik Gambut Topogen Dan Ombrogen Di Kabupaten Labuhan Batu Sumatera Utara Untuk Budidaya Tanaman Kelapa Sawit*. Jurnal Penelitian Kelapa Sawit, 16(3), 119-126.
[17] Woodhall, M. (2009). Human Capital Concepts. *Education, Culture, Economy And Society*, 219-223
[18] Yanda, F. A., Saleh, S. E., & Dai, S. I. S. (2022). Pengaruh Pertumbuhan Ekonomi Dan Upah Minimum Terhadap Penyerapan Tenaga Kerja Di Sulawesi. *POINT: Jurnal Ekonomi Dan Manajemen*, *4*(2), 101-111.
[19] Yudha, P. A. Y. I., & Purbadharmaja, I. B. P. (2019). Pengaruh Kontribusi Pariwisata Dan Nilai Produksi UMKM Terhadap Penyerapan Tenaga Kerja Melalui Pertumbuhan Ekonomi. *E-Jurnal EP Unud*, *8*(9), 2040-2071.