Effect of minimum wages on labor, welfare and economic growth: Evidence from East Java province

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ABSTRACT

Wage issues are still a major concern, especially in Indonesia. The fact that wages constitute the most significant part of a person's income makes it an important indicator that reflects the level of welfare of a country. The minimum wage policy also serves as a protective tool for companies to maintain labor productivity. This research analyze the relationship between minimum wages and the number of labor, welfare, and economic growth in East Java. East Java has a significant role in the number of labor, prosperity, and economic growth, making a major contribution to the national economy with a substantial workforce. This research uses a quantitative approach. The data analysis technique uses canonical correlation statistical techniques. The data used taken from the annual reports of each city/district for 2018-2022 or 38 regions. The number of labor, welfare, and economic growth can be predicted through the city/district minimum wage. Meanwhile, individually, the minimum wage has the relationship with the number of labor because wages are the primary motivation of workers. In addition, the minimum wage is related to the welfare of workers in East Java, and the minimum wage is related to economic growth.

1. Introduction

The minimum wage is a policy variable or intervention in the market economy mechanism by setting a basic value above the balance value. The minimum wage, as stated in the theory of efficiency wages, aims to increase the productivity of the workforce so that it has an impact on increasing the production output of a company, which will then be followed by an increase in demand for labor and economic growth (Dewi & Bendesa, 2020). This efficiency wage theory is also supported by research results OECD (2022) that minimum wages can increase employment opportunities and economic growth. The minimum wage will keep wages for entry-level labor at bay too low because a minimum wage that is too low will endanger labor (Campos Vázquez et al., 2018). In addition, the minimum wage can also coordinate development at a high-wage equilibrium (Giotis & Mylonas, 2022). The wage system widely applied in several countries is the minimum wage policy, which has two observable sides. The first side, the minimum wage policy, is a means of protection for labor to maintain the value of their wages so that they do not decrease in meeting their daily needs. On the other hand, the minimum wage policy also serves as a protective tool for companies to maintain labor productivity (Dube, 2019). Study from Putra & Yasa (2020) states that city/regency minimum wages positively and significantly affect economic growth. Contrary study from Windayana & Darsana (2020) states that an increase in the MSE will cause an increase in the company's production costs so that the company will reduce its workforce, which will affect the quality and quantity of the products produced will decrease due to the reduced workforce—used to reduce economic growth.

The minimum wage is detrimental to high-growth industries and undermines homegrown small businesses with many customers (Pratama et al., 2020). Minimum wages can also hinder the establishment of new enterprises in the region, especially in industries that rely on low-skilled labors (Gregory & Zierahn, 2022). The minimum wage policy every year has the potential to cause disputes and waste a lot of money and time. The fact that there is a minimum wage is ineffective for sustainable business (Dube, 2019). The minimum wage policy is a wage system that has been widely implemented in several countries, which basically can be seen from two sides. First, the minimum wage is a means of protection for labor to maintain that the value of the wages received does not decrease in meeting their daily needs. Second, it is a means of protection for companies to sustain labor productivity (Putri, 2022). Research on wages in East Java is important because East Java is a significant region in the context of the number of workers, welfare, or economic growth; this region significantly contributes to the national economy or has a substantial number of workers (Sabrina & Suhartono, 2023).

Appendix I shows that each city/regency in East Java has a different minimum wage. The consideration for setting the 2022 Minimum Wage is Government Regulation Number 36 of 2021 concerning Wages. There is no stipulation of the Minimum Wage for the Province of East Java in 2015 and 2016. The Minimum Wage for East Java 2022 is determined through the Decree of the Governor of East Java Number 188/803/Kpts/013/2021 concerning Regency/city Minimum Wage in East Java for 2022. The population aged 15 years and over is essential in measuring a region's labor force participation rate. In East Java Province, in 2022, data on the population aged 15 years and over by city/regency and type of labor force activity has been released by the Central Bureau of Statistics. This information is essential to provide an overview of the distribution of the workforce in the East Java region, as well as the patterns and characteristics of activities carried out by the community in each city/regency. Appendix II shows that the highest total working population is in Surabaya, amount 1.518.038 people, while the lowest is in Mojokerto is 68.705 people. The highest number of unemployed in East Java in 2022 is in Surabaya, total amount of 125.276 people, while the least is in Mojokerto, around 3.657 people. The highest number of workers was also in Surabaya, with 1.643.314 people, and the lowest was in the city of Mojokerto, with a total of 72.362 people.
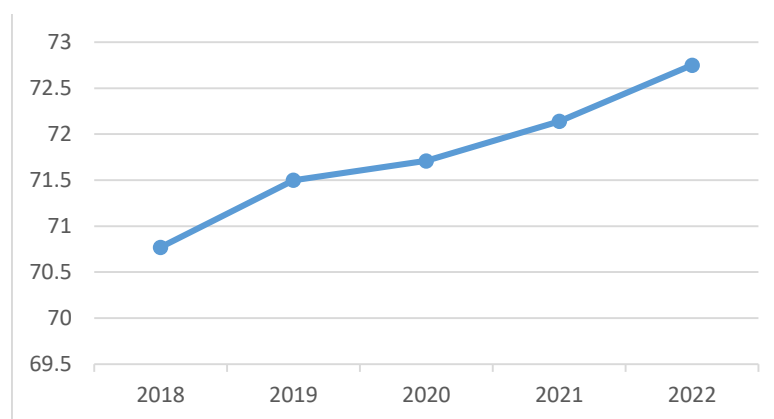
Figure 1. Graph of the Human Development Index in East Java from 2018 to 2022

The term welfare has a broad meaning and includes various viewpoints or measurements (Joshanloo et al., 2019). The term welfare has a general meaning and includes multiple viewpoints or measurements. A welfare measure is abstract and relative, but that does not mean it cannot be measured (Moore & Woodcraft, 2019). The calculation of the Human Development Index (HDI) as an indicator of human development has essential objectives, including: first, to develop indicators that measure the basic dimensions of human development and the expansion of freedom of choice; secondly, making use of several indicators to keep the measure simple; third, forming a composite index instead of using several basic indexes; and fourth, create a measure that includes social and economic aspects (Dasic et al., 2020). Figure 1 shows that HDI in East Java has a trend to increase. Economic growth is an important indicator in assessing the performance of an economy, especially for analyzing the results of economic development carried out by a country or a region (Simionescu et al., 2017). The economic growth of a region is a crucial indicator in measuring the health and dynamics of the regional economy (Rochmatullah et al., 2020). Economic growth is a concept that describes positive changes in the economic value of a region over a certain period. Economic growth can be achieved through increased production of goods and services, investment, consumption, and other economic activities (Ishak, 2018).
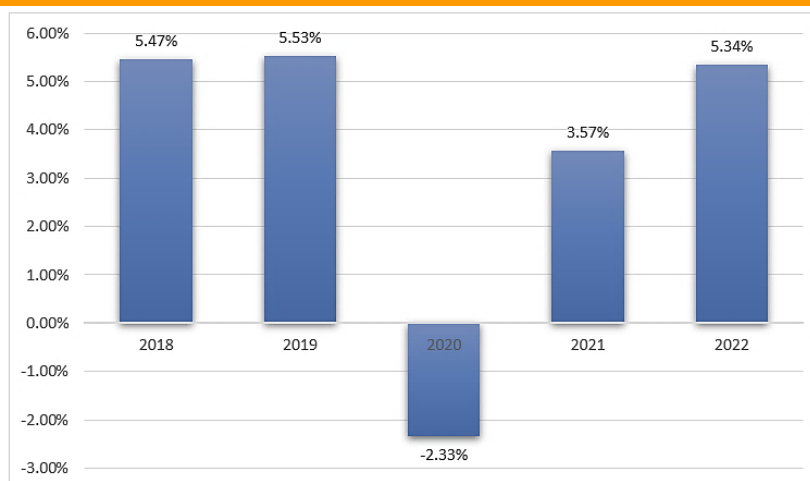
Figure 2. Economic Growth of East Java Province

Figure 2 shows East Java's economic growth from 2018 - 2022; in 2018, economic growth was at 5.47% from the production side; the highest growth occurred in the Processing Industry Business Field at 8.87% while from the expenditure side, the highest growth on Expenditures of Non-Profit Institutions Serving Households of 8.23%. In 2019, it was at 5.53%. From the production side, the highest growth occurred in the Health Services and Social Activities Business Field at 7.88%; from the expenditure side, it happened in the Consumption Expenditure Component, which grew by 7.36%. In 2020, economic growth contracted to -2.33% because most business fields experienced negative growth due to the COVID-19 pandemic. In 2021, From the production side, the highest growth will occur in the Health Services and Social Activities Business Field, which will grow by 8.33%. From the expenditure side, the highest growth occurred in the Consumption Expenditure Component, which grew by 2.27%. In 2022, it will increase by 5.34%. From the production side, the highest growth will occur in the Transportation and Warehousing Business Field, which will grow by 22.97%. From the expenditure side, the highest growth occurred in the Foreign Export Component, which grew by 13.53%.

Becker (1994) emphasize that human capital play important role for economic growth and stated that the higher the formal education obtained, the higher labor productivity. In line with the human capital theory that education influences economic growth because it increases labor productivity. If the wage rate increases, the demand for labor will decrease, which means that the quantity of labor demanded will decrease, but the labor supply will increase. On the other hand, if the wage rate decreases, the demand for labor will increase (Hamermesh, 2021). In Keynesian theory, it is also emphasized that there is an imbalance in the economy. It argues that the minimum wage can increase workers' purchasing power, supporting economic growth (Keynes, 1936). This can create wage inequality in each province. Labor is a significant factor in production and has a major influence on managing and controlling economic systems, such as production, distribution, consumption, and investment (Hwang & Vu, 2022). The overall demand for labor can be explained in terms of the relationship between various wage rates and the number of people needed to work. However, the amount of labor demanded refers to the quantity or demand for labor at a certain wage level (Pramusinto & Daerobi, 2019). Accordance with Keynes (1936) theory, explains that minimum wages can increase workers' purchasing power. Research on the analysis of the effect of minimum wage on the number of labor, welfare, and economic growth aims to determine the extent of the impact of city/regency minimum wage on these aspects. minimum wage is an essential concern because the wage rate set by the government will affect the employment sector, labor prosperity, and economic growth. Therefore, this research will help provide information regarding the impact of city/regency minimum wage on economic growth and labor welfare and provide recommendations for relevant parties in formulating appropriate policies. This research is more recent than previous researchers, namely that the data analysis technique used in this study is canonical correlation analysis. Thus, the results of this study will be helpful in decision-making in the field of employment and the economy for the government, businesspeople, and the general public.

2. Method

This research uses a quantitative approach because numbers explain this research. Quantitative research mainly uses numbers, starting from grouping the data, predicting the data, and presenting the output results (Arikunto, 2011). The data used in this study is combined from time-series data from 2018-2022 and cross-section for each 38 regions from East Java Province. The data analysis technique used in this study is canonical correlation analysis (CCA). Canonical correlation is a statistical model used to test the correlation between one set of variables or more than one set of dependent variables with one set of variables or more than one set of independent variables (Vasylieva et al., 2023). The results of the canonical analysis will form the two dependent variables into a composite set of the dependent and two independent canonical variables. Canonical correlation can measure how strong the correlation is between two sets of multiple variables (canonical variation). The canonical variable can explain the optimal linear combination between the dependent and independent variables, while the canonical correlation can describe how strong the correlation is between the two variables. This method is in accordance with the research direction because canonical correlation is used when a complex relationship or interrelationship exists between two sets of variables. This research has a complex relationship between the minimum wage in the City/Regency of East Java and the number of labor, welfare, and economic growth. The equation of CCA based on Vasylieva et al (2023) as follows:

$$\begin{cases} H = p_1 a_1 + p_2 a_2 + \cdots + p_x a_x \\ F = q_1 b_1 + q_2 b_2 + \cdots + q_y b_y \end{cases} \qquad (1)$$

The estimation of the relationship between canonical variables H and F is where p_1, $(i = \overline{1, x})$, $q_j, (j = \overline{1, y})$ are the corresponding weight of coefficient calculated when solving a problem with eigenvalues. CCA has special attention and analyse how the minimum wages affect to the number of labor, welfare and economic growth in East Java province.

3. Results and Discussion

Conducting the eigenvalues analysis of the canonical correlation of the input data for analyzing the effect of minimum wages on labor, welfare and economic growth in East Java province. The Canonical correlation analysis (CCA) accompanied by a discussion according to the analysis steps that have been described, namely obtaining one or more canonical functions by looking at the level of significance (multivariate test of significance) below 0.05 and the magnitude canonical correlation value above 0.5. Multiple units of variables are determined by the factor analysis of variables separately for each group.

Table 1. Result of Canonical Function

Eigenvalues and Canonical Correlations					
Root	No Eigenvalue	Pct	Cum. Pct.	Canon Corr	Sq. Cor
1	2.642	93.078	93.078	0.843	0.725
2	0.195	6.868	99.946	0.411	0.163
3	0.002	0.054	100.000	0.036	0.002
Dimension Reduction Analysis					
Roots	Wilks L.	F Hypoth.	df	Error df	Prob
1 to 3	0.22945	18.56323	12.00	299.26	0.000
2 to 3	0.83559	3.57062	6.00	228.00	0.002
3 to 3	0.99847	0.08823	2.00	115.00	0.916

Source: data processed

Table 1 shows that roots (dimension reduction analysis) of three canonical functions, namely function 1, as canonical correlation of 0.843 has value of F-stat 18.56 and with a significance of 0.000, function 2, a canonical correlation of 0.411 has value of F-stat 3.57 with a significance of 0.002, and function 3, a canonical correlation of 0.039 has value of F-stat 0.09 with a significance of 0.916. From these results, it can be seen that functions 1 and 2 < 0.05 are significant partially. While function 3 > 0.05, it is not significant individually. Therefore, functions 1 and 2 can be processed. Meanwhile, function 3 cannot be processed individually. Canonical correlation root 1 and 2 (0.843 and 0.411) is higher than canonical correlation of root 3 (0.002). Based on the magnitude of canonical correlation only root 1 has value above 0.5 or 0.843 > 0.5 for the canonical correlation.

Table 2. Result of CCA with Four Procedures

Name	Value	Approx. F	Hypoth. df	Error df	Prob
Pillais	0.87027	11.92399	12.00	255.00	0.000
Hotellings	3.13844	25.81795	12.00	318.00	0.000
Wilks	0.23117	17.97359	12.00	302.24	0.000
Roys	0.71943	12.47821	12.00	297.00	0.000

Noted: Multivariate Test of Significance (S=3, M=0, N=38)

Table 2 explains based four procedures from Pillais, Hotellings, Wilks, and Roys all are significant because the probability of F-stat is less than 5 percent. Thus, canonical functions 1, 2, and 3 can be processed further if combined. From the results of individual and joint (collective) tests, there are differences in canonical correlation, which can be seen in Table 3, with the canonical correlation of function 1 = 0.843, canonical correlation of function 2 = 0.411, and canonical correlation of function 3 = 0.036, because function 1 has a high and significant canonical correlation number individually and collectively, the following analysis only focuses on function 1.

Table 3. The Canonical Weights of Dependent and Independent Variables

Standardized Canonical	Coefficient for Dependent Variables		
	1	2	3
Labor	0.746	0.460	0.262
Welfare	0.260	0.472	0.846
Economic growth	0.225	0.374	0.963
Canonical Coefficient for Covariate	**Coefficient for Independent Variables**		
	1	2	3
Minimum wages	0.076	0.064	0.008
Standardized of Covariate	**Coefficient for Covariates**		
	1	2	3
Minimum wages	0.963	0.841	0.053

Source: data processed

Table 3 shows that high correlation number for the dependent variable is 0.746 (labor) to minimum wages and for the independent variable, there is one high correlation number is 0.963 for minimum wages to number of labor. Effect of minimum wages has the high correlation only to number of labor than to welfare and economic growth in East Java province.

Table 4. The Canonical Loading Calculation of Dependent and Independent Variables

Variables	Correlation Between Dependent and Canonical Variables		
	1	2	3
Labor	0.882	0.498	0.264
Welfare	0.341	0.571	-0.710
Economic growth	0.375	-0.124	0.513
Covariate	**Correlation Between Covariate and Canonical Variables**		
	1		
Minimum Wages	0.871		

Source: data processed

Table 4 shows the results of the canonical loading calculation by only looking at function 1 show a row of correlation loading numbers for each variable and its variate variables. For the dependent variable, there is one high-loading canonical number, namely 0.882 (number of labor). The independent variable canonical loading is 0.871 (minimum wages). Based on the calculation results above with three dependent variables and one independent variable, it was found that the independent variables individually have different levels of closeness, and the one with the highest correlation is the minimum wage. When tested in groups, the three dependent variables have a significant correlation. In other words, there is a correlation between the number of labor, welfare, and economic growth with city/regency minimum wages. The highest is obtained from the number of labor, which means that cities/regencies in East Java with an increased number of labor have a low minimum wage because wages are the primary motivation for labor. The results supported by previous research from Nafiah (2020) which found that a high number of labor correlates with the minimum wage. In addition, the minimum wage is related to the welfare of labor in East Java, if there is a change in minimum wage,

the welfare of labor in East Java will also change. In line with the research from Berger et al (2022) found that the minimum wage has correlated with the welfare of labor. The minimum wage is related to economic growth, if there is a alteration of minimum wage, economic growth in East Java will also change. This aligns with research from Ansari et al (2022) found that the minimum wage correlates with economic growth.

The correlation between the independent variable and the dependent variable has strong correlation. In this study, the variable number of labor has an interesting correlation. This is by several theories that have been put forward in the theoretical analysis of the wage by David Ricardo, which explains that wages depend on the demand and supply of labor, which means that the role of the minimum wage is to attract labor (Cremaschi, 2021). The minimum wage policy is a wage system that has been widely implemented in several countries (Tung, 2021). The minimum wage is a means of protection for labor, the level of minimum wage protection depends on the scope of collective bargaining, stability in many countries occurs due to the extension of collective agreements (Susanti et al., 2019). On the other hand, employers want constant labor wages so cost of production do not increase and product prices can be competitive.

4. Conclusion

The minimum wage implemented for increasing the productivity of the workers so that it has an impact on increasing the production output of a company, and led to demand for labor and economic growth. Wage issues are still a major concern, especially in developing countries such as Indonesia. Research on wages in East Java is important because East Java is a significant region in the context of the number of workers, welfare, or economic growth; this region significantly contributes to the national economy or has a substantial number of workers. The result shows that the variable number of labor, welfare, and economic growth can be predicted through the minimum wage. Meanwhile, individually, the minimum wage has the closest relationship to the number of labor. This is because wages are the primary motivation for labor. In addition, minimum wages are related to the welfare of labor in East Java, and minimum wages are related to economic growth.

Next, the government needs to carry out of the minimum wage policy that applies in every city/regency in East Java. This aims to ensure that the minimum wage set is in accordance with the level of living needs and labor welfare. The government should involve stakeholders, such as representatives of labors, employers, trade unions, and civil society organizations, in the process of paying the minimum wage policy. The last government regularly monitors and evaluates the impact of the implemented minimum wage policy. This will assist in assessing whether the policy effectively achieves poverty reduction, worker welfare, and sustainable economic growth.

Declarations

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Appendix I

Regency	Regency/City Minimum Wage in East Java (Rupiah)		
	2021	2022	2023
East Java	1868777.08	1891567.12	2040244.30
Pacitan	1961154.77	1961154.77	2157270.25
Ponorogo	1938321.73	1954281.32	2149709.45
Trenggalek	1938321.73	1944932.74	2139426.01
Tulungagung	2010000.00	2029358.67	2229358.67
Blitar	2004705.75	2015071.18	2215071.18
Kediri	2033504.99	2043422.93	2243422.93
Malang	3068275.36	3068275.36	3268275.36
Lumajang	1982295.10	2000607.20	2200607.20
Jember	2355662.91	2355662.91	2555662.91
Banyuwangi	2314278.87	2328899.12	2528899.12
Bondowoso	1954705.75	1958640.12	2154504.13
Situbondo	1938321.73	1942750.77	2137025.85
Probolinggo	2553265.95	2553265.95	2753265.95
Pasuruan	4290133.19	4365133.19	4515133.19
Sidoarjo	4293581.85	4368581.85	4518581.85
Mojokerto	4279787.17	4354787.17	4504787.17
Jombang	2654095.88	2654095.88	2854095.88
Nganjuk	1954705.75	1970006.41	2167007.05
Madiun	1951588.16	1958410.31	2154251.34
Magetan	1938321.73	1957329.43	2153062.37
Ngawi	1960510.00	1962585.99	2158844.59
Bojonegoro	2066781.80	2079568.07	2279568.07
Tuban	2532234.77	2539224.88	2739224.88
Lamongan	2488724.77	2501977.27	2701977.27
Gresik	4297030.51	4372030.51	4522030.51
Bangkalan	1954705.75	1956773.48	2152450.83
Sampang	1938321.73	1922122.97	2114335.27
Pamekasan	1938321.73	1939686.39	2133655.03
Sumenep	1954705.75	1978927.22	2176819.94
Kediri	2085924.76	2118116.63	2318116.63
Blitar	2004705.75	2039024.44	2239024.44
Malang	2970502.73	2994143.98	3194143.98
Probolinggo	2350000.00	2376240.63	2576240.63
Pasuruan	2819801.59	2838837.64	3038837.64
Mojokerto	2481302.97	2510452.36	NA
Madiun	1954705.75	1991105.79	2190216.37
Surabaya	4300479.19	4375479.19	4525479.19
Batu	2819801.59	2830367.09	3030367.09

Appendix II

Regency/ Municipality	Economic Condition				
		Unemployment			Total of Economically Active
	Working	Ever Worked	Never Worked	Total	
Pacitan	367.353	NA	2.951	NA	381.276
Ponorogo	498.849	19.184	9.881	29.065	527.914
Trenggalek	389.711	16.109	6.000	22.109	411.820
Tulungagung	563.849	23.592	16.556	40.148	603.997
Blitar	645.739	25.701	11.518	37.219	682.958
Kediri	806.121	47.440	11.645	59.085	865.206
Malang	1.384.005	58.940	38.379	97.319	1.481.324
Lumajang	557.378	3.862	25.296	29.158	586.536
Jember	1.305.101	34.145	21.115	55.260	1.360.361
Banyuwangi	885.113	27.583	21.546	49.129	934.242
Bondowoso	454.395	8.216	12.317	20.533	474.928
Situbondo	393.804	10.974	2.810	13.784	407.588
Probolinggo	649.736	4.669	17.159	21.828	671.564
Pasuruan	862.062	10.643	43.470	54.113	916.175
Sidoarjo	1.224.015	35.037	83.022	118.059	1.342.074
Mojokerto	615.557	14.160	17.061	31.221	646.778
Jombang	633.153	24.194	12.451	36.645	669.798
Nganjuk	539.243	16.875	9.977	26.852	566.095
Madiun	383.280	15.419	8.338	23.757	407.037
Magetan	372.496	9.848	7.004	16.852	389.348
Ngawi	526.988	7.944	5.475	13.419	540.407
Bojonegoro	699.239	23.220	11.194	34.414	733.653
Tuban	670.721	20.074	11.805	31.879	702.600
Lamongan	631.611	18.226	22.452	40.678	672.289
Gresik	664.371	22.108	34.393	56.501	720.872
Bangkalan	517.564	15.323	29.982	45.305	562.869
Sampang	535.636	5.854	11.327	17.181	552.817
Pamekasan	510.717	NA	NA	7.253	517.970
Sumenep	665.221	2.480	6.673	9.153	674.374
Kediri	156.641	3.514	3.666	7.180	163.821
Blitar	73.616	3.054	1.138	4.192	77.808
Malang	418.158	17.769	16.909	34.678	452.836
Probolinggo	123.364	2.194	3.714	5.908	129.272
Pasuruan	100.520	3.682	2.941	6.623	107.143
Mojokerto	68.705	1.914	1.743	3.657	72.362
Madiun	90.627	1.997	4.191	6.188	96.815
Surabaya	1.518.038	44.558	80.718	125.276	1.643.314
Batu	110.596	7.449	2.726	10.175	120.771
East Java	**21.613.293**	**622.543**	**633.176**	**1.255.719**	**22.869.012**