The 2nd International Students Conference on Economics and Business Excellence (ISCEBE) 2025
e-ISSN: 3090-4811
Vol. 2 No.1/EC-ISCEBE (2025)

DYNAMICS OF LABOR ABSORPTION FACTORS IN CENTRAL JAVA

Siti Elisa Nur Faizah Amin[1)], Shanty Oktavilia[2)], Fafurida[3)]

[1)2)3)] Economics, Semarang State University, Indonesia

Corresponding author: elisafaizah1@gmail.com

Abstract

Regional economic growth is reflected in its ability to optimally absorb labor. Central Java, as a province with a large population, faces various dynamics in the labor absorption process. This study aims to analyze the effect of household consumption, human development index (HDI), population, and investment on labor absorption in Central Java Province in the period 2022–2024. This study uses a quantitative approach and the method used is panel data regression. The data used is a combination of time series and cross-section data for the period 2022-2024 obtained from the Central Statistics Agency. Based on the test results, the Fixed Effect Model (FEM) approach model is the most appropriate model to use in this study. The results of the study show that partially the human development index (HDI) and population variables have a significant effect on labor absorption, while the household consumption and investment variables do not have a significant effect. However, simultaneously all variables have a significant effect on labor absorption in both the formal and informal sectors. Therefore, local governments need to continue to encourage economic policies that support the increase in both variables in order to create an inclusive and competitive labor market.

Keywords: *labor absorption, human development index (hdi), total population , household consumption, investment*

INTRODUCTION

Because it directly affects community welfare and poverty reduction, labor absorption is one of the key metrics used to evaluate the effectiveness of economic growth (Todaro & Smith, 2020). Although there are still structural issues, the trend of workforce absorption in Central Java Province indicates an increase in 2022–2024. The recovery following the COVID-19 pandemic is seen in the Open Unemployment Rate (TPT), which decreased from 5.57% in 2022 to 4.78% in August 2024, according to BPS statistics.

However, there is a risk of hidden poverty and regional inequality because the increase in workers brought on by population expansion is not always offset by sufficient labor market absorption (Sakernas, 2024). Central Java's economy is recovering in 2022–2024, as evidenced by the growth of MSMEs and the labor-intensive industry. However, the development of an adaptive labor market is still hampered by regional inequality and unequal investment distribution.

Since the epidemic, the number of employed individuals in the country has increased steadily, reaching 144.64 million in 2024. From 19.57 million in 2022 to 20.41 million in 2024, the employed population in Central Java has likewise grown, demonstrating a consistent development in the employment sector.

Household consumption, the human development index (HDI), population, and investment are the four independent variables used in this study. The demand for products and services is driven by household consumption, which is a reflection of people's spending power. The HDI uses measures of standard of living, health, and education to demonstrate the caliber of the labor force. Although the population shows the potential labor supply, the decline may worsen if no jobs are produced. In the meantime, both domestic and international investment contribute to employment creation by expanding the economy.

These four factors were selected due to their relevance in elucidating Central Java's employment dynamics. The findings of this study are expected to contribute to science and serve as a guide for future investigations.

RESEARCH METHODS

With secondary data gathered from BPS and official local government records, this study employs a quantitative methodology. Panel data regression was used to examine the data, combining cross-sectional data from 35 Central Javan districts and cities with time series data from 2022–2024 (Gujarati & Porter, 2020). Sample selection was carried out using purposive sampling based on the availability of complete data on the variables: household consumption, HDI, population, and investment. The time span of 2022–2024 was chosen because it reflects the post-pandemic economic recovery period. The Random Effect Model (REM), Fixed Effect Model (FEM), and Common Effect Model (CEM) are the estimating models that are employed. The Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test are used to choose the best model (Sihombing et al., 2024). Before the regression analysis, a classical assumption test was carried out to ensure the validity of the model: normality, multicollinearity, heteroscedasticity, and autocorrelation (Ghozali, 2021). To evaluate the model's strength and relevance in describing the labor absorption variable, panel regression was examined using the t-test, F-test, and coefficient of determination (R^2).

RESULTS AND DISCUSSIONS

Panel Regression Model Estimation

Carried out to calculate the correlation between labor absorption and independent factors. The Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) are the three methods used in the panel data estimate process. Regression findings using the three models are as follows:

Table 1 ***Common Effect Model Results***

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	565181.6	319992.0	1.766237	0.0804
X1	-54340.42	104575.6	-0.519628	0.6045
X2	-3991.992	3921.246	-1.018042	0.3111
X3	275.4680	39.49575	6.974625	0.0000
X4	0.003942	0.005650	0.697746	0.4870

R-squared	0.456166	Mean dependent var	549720.9
Adjusted R-squared	0.434413	S.D. dependent var	210203.5
S.E. of regression	158084.7	Akaike info criterion	26.82610
Sum squared resid	2.50E+12	Schwarz criterion	26.95248
Log likelihood	-1403.370	Hannan-Quinn criter.	26.87731
F-statistic	20.96991	Durbin-Watson stat	0.055829
Prob(F-statistic)	0.000000		

Source: Results of processing using eviews 13

Table 2 ***Fixed Effect Model Results***

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1800834.	232506.7	-7.745297	0.0000
X1	-10866.87	20983.25	-0.517883	0.6063
X2	16837.08	5805.773	2.900058	0.0051
X3	1031.627	310.5766	3.321651	0.0015
X4	-0.000282	0.000739	-0.381021	0.7044

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.996348	Mean dependent var	549720.9
Adjusted R-squared	0.994245	S.D. dependent var	210203.5
S.E. of regression	15946.57	Akaike info criterion	22.47043
Sum squared resid	1.68E+10	Schwarz criterion	23.45618
Log likelihood	-1140.697	Hannan-Quinn criter.	22.86987
F-statistic	473.8118	Durbin-Watson stat	3.736926
Prob(F-statistic)	0.000000		

Source: Results of processing using eviews 13

e-ISSN: 3090-4811
Vol. 2 No.1/EC-ISCEBE (2025)

Table 3 ***Random effect Model Results***

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1518488.	213316.0	-7.118491	0.0000
X1	-5316.837	20603.01	-0.258061	0.7969
X2	21554.59	2817.834	7.649345	0.0000
X3	440.4873	56.45975	7.801793	0.0000
X4	-0.000339	0.000738	-0.459002	0.6472

Effects Specification	S.D.	Rho
Cross-section random	163929.3	0.9906
Idiosyncratic random	15946.57	0.0094

Weighted Statistics			
R-squared	0.533635	Mean dependent var	30825.37
Adjusted R-squared	0.514981	S.D. dependent var	24691.46
S.E. of regression	17195.95	Sum squared resid	2.96E+10
F-statistic	28.60611	Durbin-Watson stat	2.222510
Prob(F-statistic)	0.000000		

Source: Results of processing using eviews 13

Panel Data Regression Selection

In panel data analysis, there are three important tests to determine the most appropriate estimation model, namely the Chow Test, the Hausman Test, and the Lagrange Multiplier (LM) Test. First, the Chow Test is conducted to choose between the Pooled Least Squares (PLS) model and the Fixed Effect Model (FEM). Here are the tests:

Table 4 ***Chow Test***

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	287.104150	(34,66)	0.0000
Cross-section Chi-square	525.345376	34	0.0000

Source: Results of processing using eviews 13

The Fixed Effect model is more appropriate, according to the Chow test results, because the F-statistic value is significant (p-value < 0.05).

Table 5 ***Hausman Test***

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.283451	4	0.0004

Source: Results of processing using eviews 13

Because the differences between cross-section units are fixed and statistically significant, the Fixed Effect is more appropriate, according to the Hausman test results.

The LM test is not the foundation for the final choice because the chosen model is Fixed Effect. Therefore, the Fixed Effect Model (FEM) is the best suitable estimate model utilized in this work, according to the three tests.

Classical Assumption Test

This test is conducted to ensure that the resulting regression model has unbiased, consistent, and efficient estimates**.**

Table 6 ***Prerequisites for the Classical Assumption Test***

PREREQUISITES	OLS (FEM & CEM)	GLS (REM)
Normality	No	Yes
Heteroscedasticity	Yes	No
Multicollinearity	Yes, if the independent variable is more than 1	Yes, if the independent variable is more than 1
Autocorrelation	No	No

Source: Adapted by the author from various sources.

Multicollinearity Test. multicollinearity test is used to detect whether the independent variables in the model are highly correlated with each other.

Multicollinearity Test

Table 7 *Multicollinearity Test*

	Correlation			
	X1	X2	X3	X4
X1	1.000000	0.005316	-0.249924	-0.004345
X2	0.005316	1.000000	-0.442167	-0.057187
X3	-0.249924	-0.442167	1.000000	0.209398
X4	-0.004345	-0.057187	0.209398	1.000000

Source: Results of processing using eviews 13

Based on the correlation matrix between independent variables, it was found that there was no very strong relationship between the independent variables. All correlation values were far below 0.80. Therefore, it can be concluded that there is no indication of multicollinearity in the regression model used.

Heterocedasticity Test

Table 8 *Heteroscedasticity Test*

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	25.35724	Prob. F(4,100)	0.0000
Obs*R-squared	52.87244	Prob. Chi-Square(4)	0.0000
Scaled explained SS	80.95249	Prob. Chi-Square(4)	0.0000

Source: Results of processing using eviews 13

Heteroscedasticity has occurred in the regression model, as indicated by the results of the Breusch-Pagan-Godfrey Heteroscedasticity Test in the output above. Since all probability values are less than 0.05, H0 (homoscedasticity) is rejected, indicating that the model contains heteroscedasticity, specifically that the residual variance is not constant. Thus, the researcher employs a regression approach with a strong standard error to get around this.

Rubust Standard Error Regression

The model had heteroscedasticity, according to the Breusch-Pagan-Godfrey test results. In order to generate more robust findings against breaches of classical assumptions, the model estimation process was thus continued using the Robust Least Squares (RLS) method employing M-estimation. This approach is based on the theory developed by Huber (1981) which states that the M-estimator is able to produce robust parameter estimates against violations of classical assumptions in linear regression. By using the Huber loss function, this method reduces the influence of outliers and non-constant variance, resulting in a more reliable and valid regression model for statistical decision making.

Table 9 *Robust Standard Error Regression*

Dependent Variable: Y
Method: Robust Least Squares
Date: 05/26/25 Time: 23:17
Sample: 1 105
Included observations: 105
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1084308.	255660.1	4.241210	0.0000
X1	-124658.5	83551.53	-1.491996	0.1357
X2	-9183.429	3132.910	-2.931277	0.0034
X3	159.9576	31.55544	5.069097	0.0000
X4	-0.007811	0.004514	-1.730278	0.0836

Robust Statistics

R-squared	0.217028	Adjusted R-squared	0.185709
Rw-squared	0.454890	Adjust Rw-squared	0.454890
Akaike info criterion	127.2335	Schwarz criterion	143.0424
Deviance	1.71E+12	Scale	119325.0
Rn-squared statistic	69.74961	Prob(Rn-squared stat.)	0.000000

Non-robust Statistics

Mean dependent var	549720.9	S.D. dependent var	210203.5
S.E. of regression	172772.2	Sum squared resid	2.99E+12

Source: Results of processing using eviews 13

Panel Regression Test

The model used is Robust Least Squares (M-estimation) with Huber Type I approach, to overcome the problem of heteroscedasticity that was previously detected.

Table 10 ***Robust Least Squares Panel Data Regression***

Dependent Variable: Y
Method: Robust Least Squares
Date: 05/26/25 Time: 23:17
Sample: 1 105
Included observations: 105
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1084308.	255660.1	4.241210	0.0000
X1	-124658.5	83551.53	-1.491996	0.1357
X2	-9183.429	3132.910	-2.931277	0.0034
X3	159.9576	31.55544	5.069097	0.0000
X4	-0.007811	0.004514	-1.730278	0.0836

Source: Results of processing using eviews 13

T Test (Partial Significane Test)

The Human Development Index (X2) and Population (X3) variables have a significant effect on Labor Force Participation (Y) because the p value < 0.05. While the Household Consumption (X1) and Investment (X4) variables are not significant.

F Test (Simultaneous Significane Test)

Simultaneously, all independent variables (household consumption, human development index, population, and investment) have a significant effect on labor force participation (Y) (because p < 0.05).

Coefficient of determination (R-squared)

According to the estimation results of the Robust Least Squares model, the independent variables X1, X2, X3, and X4 can account for about 21.70% of the variation in the dependent variable (Y), as indicated by the coefficient of determination (R-squared) value of 0.2170. A more accurate view of the model's capacity to explain the dependent variable is provided by the Adjusted R-squared value of 0.1857, which corrects this figure by taking the number of variables in the model into account. After heteroscedasticity correction with the robust approach, the Robust Rw-squared value increased to 0.4549, which means that the model with robust weights is more able to explain around 45.49% of the variation in Y more accurately. This shows that the use of the robust model provides more stable and reliable estimation results.

Discussions

At the same time, labor absorption is significantly impacted by all independent variables. According to the F test results, labor absorption in Central Java over the 2022–2024 timeframe is significantly impacted by household consumption, HDI, population, and investment taken combined. This demonstrates that the four factors taken together are significant in elucidating the regional labor market dynamics.

The only factors that significantly affect labor absorption are population and HDI.

a) The Human Development Index (HDI) has a significant but negative effect on labor absorption. This finding is in line with the research of Sari and Wibowo (2021), which explains that improvements in the quality of education and health have not been balanced by the creation of appropriate jobs, especially in areas dominated by labor-intensive industrial sectors such as Central Java. Increasing HDI without support for the development of labor-intensive sectors has the potential to cause a mismatch in the workforce.
b) Population has a positive and significant effect on labor absorption. This supports the findings of Astuti (2020) that the growth of the productive age population can be the main driver of increasing the workforce absorbed, especially in the informal sector and MSMEs which are developing in Central Java.
c) Household consumption. Household consumption does not have a significant effect on labor absorption. Although household consumption plays an important role in driving demand for goods and services, the findings of this study indicate that increased consumption has not been able to directly drive an increase in labor absorption. This is in accordance with the results of Nugroho's research (2022), which states that consumption in Central Java flows more to the informal sector and consumption of goods from outside the region, so it does not have a direct impact on formal job creation.
d) Investment. Investment does not have a significant effect on labor absorption. Investment during the 2022–2024 period in Central Java tends to enter capital-intensive sectors such as automotive and manufacturing technology. This causes the job creation effect to be limited. Prasetyo (2023) found

that large capital-intensive investments are unable to absorb large numbers of workers, especially in the short term due to the use of automation and high technology.

CONCLUSIONS AND SUGGESTIONS

Based on the analysis and discussion findings, it can be said that two key factors—the Human Development Index (HDI) and population—have a major impact on labor absorption in Central Java Province during the 2022–2024 era. The HDI is proven to have a significant negative effect, indicating that improvements in the quality of education and health have not been fully accompanied by the creation of appropriate jobs, thus potentially causing a mismatch between workforce qualifications and the needs of the world of work. However, population has a strong positive impact on labor absorption, suggesting that the primary driver of labor absorption is still population expansion in the productive age range.

In the meanwhile, labor absorption is not significantly impacted by factors related to household spending or investment. This demonstrates that rising public consumption has not been able to immediately promote job creation, and as inbound investment is often capital-intensive, it has little effect on the number of workers hired in the near future.

The four variables of household spending, HDI, population, and investment all significantly impact labor absorption at the same time, suggesting that intricate relationships between demographic and economic factors shape the dynamics of the labor market in Central Java. In order to meet the demands of the labor market, local governments must develop policies that enhance the quality of human resources and promote investment in labor-intensive industries. As the economy recovers from the pandemic, this tactic is crucial to fostering a more competitive, flexible, and inclusive labor market.

I express my gratitude to the presence of God Almighty for all His grace and gifts so that I can complete this thesis well.

With respect and gratitude, I express my appreciation and gratitude to:

- Shanty Oktavilia, S.E., M.Sc., as the main supervisor who with great patience, sincerity, and professionalism has guided, provided direction, and provided very meaningful motivation during the process of compiling this thesis.
- Fafurida, S.E., M.Sc., lecturer of the Economics Seminar course who has provided knowledge, guidance, and constructive input that has enriched my understanding during my studies.
- My beloved parents, who tirelessly always provide prayers, moral support, and affection, are a source of strength and inspiration for me to complete this study.
- The entire academic community of Semarang State University, especially the Faculty of Economics and Business and the Department of Economics, for all the knowledge, facilities, and support given during my education.
- Family, friends, and all parties who have provided support, motivation, and assistance in any form during my academic journey.

It is hoped that this effort would help advance research, particularly in the area of economics, and bring about favorable changes.

REFERENCES

Astuti, N. (2020). Pengaruh pertumbuhan penduduk usia produktif terhadap penyerapan tenaga kerja di sektor informal dan UMKM di Jawa Tengah (*The influence of productive age population growth on labor absorption in informal sector and MSMEs in Central Java*). *Jurnal Ekonomi Regional*, 12(1), 45–59.

Badan Pusat Statistik (BPS). (2024). *Statistik ketenagakerjaan Jawa Tengah 2022–2024* (*Employment statistics of Central Java 2022–2024*). BPS Jawa Tengah.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). University of Chicago Press.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Ghozali, I. (2021). *Aplikasi analisis multivariate dengan program IBM SPSS 26* (10th ed.). Universitas Diponegoro Publishing.

Gujarati, D. N., & Porter, D. C. (2020). *Basic econometrics* (6th ed.). McGraw-Hill Education.

Huber, P. J. (1981). *Robust statistics*. John Wiley & Sons.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, 107(2), 407–437. https://doi.org/10.2307/2118477

Nugroho, A. (2022). Dampak konsumsi rumah tangga terhadap sektor informal di Jawa Tengah (*The impact of household consumption on informal sector in Central Java*). *Jurnal Ekonomi dan Pembangunan*, 15(2), 123–136.

Prasetyo, H. (2023). Investasi padat modal dan dampaknya terhadap penyerapan tenaga kerja di sektor manufaktur Jawa Tengah (*Capital-intensive investment and its impact on labor absorption in manufacturing sector of Central Java*). *Jurnal Manajemen dan Bisnis*, 18(1), 67–79.

Raghavan, M. A., Silvapulle, P. B., & Athanasopoulos, G. B. (2012). Structural VAR models for Malaysian monetary policy analysis during the pre-and-post 1997 Asian crisis period. *Applied Economics*, 44(29), 3841–3856.

Sakernas. (2024). *Laporan tenaga kerja nasional 2022–2024* (*National labor report 2022–2024*). Ministry of Manpower, Republic of Indonesia.

Sari, R., & Wibowo, T. (2021). Pengaruh Indeks Pembangunan Manusia terhadap ketenagakerjaan di daerah padat karya (*The influence of Human Development Index on employment in labor-intensive regions*). *Jurnal Ilmu Ekonomi dan Pembangunan*, 11(3), 201–215.

Sihombing, J., Lestari, D., & Rahman, F. (2024). Metode analisis data panel untuk ekonomi regional (*Panel data analysis methods for regional economics*). *Jurnal Statistik dan Ekonometrika*, 9(1), 33–47.

Todaro, M. P., & Smith, S. C. (2020). *Economic development* (13th ed.). Pearson.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

AUTHORS' BIBLIOGRAPHY

Siti Elisa Nur Faizah Amin, S.M. The author is an active student of the Master of Economics Program (S2) at Semarang State University (UNNES), Indonesia.

Shanty Oktavilia, S.E., M.Si. was born in Semarang, Central Java. She is a Senior Lecturer in the Economics Study Program (S2), Faculty of Economics and Business, Semarang State University (UNNES), Indonesia.

Fafurida, S.E., M.Si. was born in Pekalongan, Central Java. She is a permanent lecturer in the Development Economics Study Program, Faculty of Economics and Business, Semarang State University (UNNES), Indonesia.