Journal Of Economics, Technology, and Business (JETBIS)
Volume 3, Number 9, September 2024
p-ISSN 2964-903X; e-ISSN 2962-9330

DYNAMICS OF ECONOMIC GROWTH AND QUALITY OF HUMAN RESOURCES IN THE ARCHIPELAGO NORTH MALUKU PROVINCE

Irawan Abae[1], Abdul Chalid Ahmad[2], Aziz Hasyim[3]
Khairun University Postgraduate, Indonesia
Email: irawanabae46@gmail.com

KEYWORDS:
Economic growth; human development index; simultaneous data panel

ABSTRACT

This study examines the relationship between the Gross Regional Domestic Product (GRDP) and the Human Development Index (HDI) in North Maluku Province. The research aims to analyze the influence of HDI, Government Expenditure, Investment, and Labor Force on Economic Growth and the impact of life expectancy, school life expectancy, and per capita expenditure on HDI. The study employs the Two Stage Least Square analysis method using panel data processed through the Eviews application. The results indicate that the HDI, Government Expenditure, and Investment variables significantl y affect GRDP, while the Labor Force variable is optional. Meanwhile, the GRDP variable does not substantially affect HDI, but the Life Expectancy, School Life Expectancy, and Per Capita Expenditurea variables significantly impact HDI. The conclusion suggests that economic growth does not necessarily guarantee an improvement in the quality of human resources in North Maluku. The study recommends including additional variables related to GRDP and HDI to better understand their impact in each region.

INTRODUCTION

Economic growth is widely considered a key driver of national development. The relationship between economic growth and the quality of human resources has long been recognized as mutually reinforcing. As economies expand, there is a higher demand for a well-educated and skilled workforce, which in turn drives productivity and innovation. This cycle is particularly significant for developing regions, where resource extraction and economic expansion must be balanced with human capital development to ensure long-term sustainability (Ismail, 2021; Chen, 2020). The global economy is witnessing rapid changes in technological advancement, trade dynamics, and labor market requirements. Human capital, defined by the workforce's skills, education, and health, has become a critical determinant of competitive advantage in the global market. For developing regions like North Maluku, Indonesia, the challenges of fostering economic growth while enhancing human resources quality are particularly acute (Rahman, 2019). North Maluku, a province rich in natural resources, has experienced fluctuations in economic growth, heavily influenced by global market conditions, infrastructure development, and workforce readiness (Sudirman, 2020).

Previous studies highlight the intricate relationship between economic growth and human resource quality. (Barro, 2019) emphasize that human capital accumulation—through education and vocational training—profoundly impacts long-term economic growth. Similarly, (Becker, 2020) work on human capital theory underlines the importance of investments in health, education, and skills development as critical for enhancing productivity. Research on Indonesia's rural regions, particularly archipelagic settings like North Maluku, has demonstrated workforce development challenges. Regional disparities in education, infrastructure, and healthcare access contribute to uneven human resource quality across provinces (Firmansyah, 2022). A study (Santoso, 2021) points to the need for tailored policies that address archipelagic regions' unique geographical and socio-economic contexts. In the case of North Maluku, investments in human capital remain suboptimal, leading to a workforce that is less equipped to meet the demands of a diversifying economy (Jaya, 2018).

The relationship between economic growth and human resource development can be understood through various economic theories. One of the most influential is the endogenous growth theory, which posits that economic growth is primarily driven by internal factors, particularly technological innovation and human capital development (Romer, 2020). This theory suggests that Investment in education, training, and healthcare improves workforce productivity and innovation, thereby contributing to sustainable economic growth. Solow’s growth model, which distinguishes between capital accumulation and technological progress as sources of growth, also has implications for understanding the role of human resources in economic expansion (Solow, 2019). In regions like North Maluku, where physical infrastructure may lag, human capital development becomes an even more critical growth driver. A well-educated, healthy, and skilled workforce can better adapt to and harness technological advancements, contributing to long-term economic resilience (Nasution, 2020).

Despite the wealth of literature on economic growth and human resources, a significant gap exists in understanding the specific dynamics of archipelagic regions like North Maluku. Most existing studies focus on urbanized or resource-rich regions but overlook the particular challenges of remote provinces where geographical barriers limit access to education, healthcare, and vocational training (Garcia, 2020). This research aims to fill this gap by focusing on the interplay between economic growth and human resource quality in North Maluku, exploring how these two variables interact within the province’s unique context. While previous research has addressed economic growth trends in Indonesia, very few studies have examined the impact of human resource development in archipelagic settings (Sudirman, 2020). Furthermore, most studies on Indonesia's economic growth treat human resource quality as a static variable. In contrast, this research seeks to understand its dynamic role in promoting or hindering economic progress. This study contributes to the theoretical and practical understanding of how economic growth can be sustained in regions with significant human resource development challenges by investigating these dynamics.

The main objective of this research is to analyze the dynamics between economic growth and human resource development in North Maluku. The specific objectives are To identify the factors influencing economic growth in North Maluku, with particular emphasis on the role of human resources, To assess the current state of human resource development in the province and its impact on economic growth, To analyze how educational and vocational training policies affect the quality of the labor force in North Maluku, To provide recommendations for improving human resource quality as a strategy for sustainable economic growth in North Maluku.

RESEARCH METHOD

This quantitative study uses secondary data with the data panel method, covering ten districts/cities in North Maluku Province as a unit cross-section. The ten regencies/cities are West Halmahera Regency (Halbar), Central Halmahera Regency (Halteng), Sula Islands Regency, South Halmahera Regency (Halsel), East Halmahera Regency (Haltim), North Halmahera Regency (Halut), Taliabu Regency, Morotai Regency, Tidore Islands City and Ternate City (Ternate). As for the unit Time Series, it is an observation period from 2014 to 2023. All research data is sourced from the Central Statistics Agency (BPS) publication of 10 districts/cities of North Maluku Province obtained through the official BPS. This study applies a simultaneous equation model, mangacu, to the empirical model developed by Evy Sulistianingsih (2019) and Arba, Muhammad Rasyid, Supriyanto (2021). The model was then modified and adjusted to the variables according to the purpose of this study. The specifications of this research model are presented as follows:

$$Ln(PDRBless) = \beta 0 + \beta 1Ln(IPMless) + \beta 2Ln(GEless) + \beta 3Ln(INVless) + \beta 4Ln(AKless) + \varepsilon less \quad (1)$$

$$Ln(IPMless) = \alpha 0 + \alpha 1Ln(GDPless) + \alpha 2Ln(AHH)less) + \alpha 3Ln(HLSless) + \alpha 4Ln(PPKless) + \square less \quad (2)$$

For Ln is the notation of natural logarithms; i = 1, 2, 3, ..., 10 is the cross-section unit of 10 districts/cities in North Maluku Province; t = 2014, 2015, ..., 2023 is the time series unit; GDPit is the Gross Regional Domestic Product based on constant prices, as a variable of economic growth in the ith and the periods; IPMit is the Human Development Index as an indicator of the quality of human resources in the ith district/city and the tenth period; GEit is Government Expenditure in the ith district/city and the tenth period; INVit Investment in the ith and the districts/cities; AKit labor force in the ith district/city and the tenth period; AHHit life expectancy in the first district/city and the tenth period; HLSit expects school length in the ith district/city and the tenth period; PPKit is the per capita expenditure of the ith and the period; εit and □it are fault terms.

Equations (1) and (2) are structural equations. Estimating these two equations uses the Two Stage Least Square through the model identification stage. Two methods used in model identification are using the Order Condition and Rank condition. The criteria for determining identification are based on several notations, namely: M = number of endogenous variables in the model; m = the number of endogenous variables in an equation; K = number of exogenous variables in the model; and k = the number of exogenous variables in an equation. Three possibilities occur to the results of the identification of the structural equation model, namely: (1) if: $K – k = m – 1$, then the equation is called precisely identified (adequately identified); (2) if: $K – k < m – 1$, then the equation is called underidentified (unidentified); and (3) if $K – M > m – 1$, then the equation is called overidentified (too identified) Evy Sulistianingsih, (2019) In this case, it is possible (1) to be a condition that the structural equation model can be estimated using the Indirect Least Square (ILS) or OLS and also TSLS; Possibility (2) shows that the model of structural equations cannot be estimated as structural equations. On the other hand, possibility (3) shows that the structural equation model can only be estimated using the TSLS method. Before the identification and estimation stage of the model with the TSLS method, the testing stage begins with the selection of the appropriate data panel model shape, namely through the Chow Test, Test Lagrange Multiplier (LM), and the Hausman Test Hidayat et al., (2018) The goal is to determine whether Fixed Effect Model (FEM) or Random Effect Model (FEM) is appropriately used. Then, it continued with the stages of classical assumption testing through autocorrelation, multicollinearity, and heteroscedasticity testing (Winarno, 2017).

RESULTS AND DISCUSSION

The Chow test was conducted to determine whether the regression technique of panel data with the fixed effects model is better than the common effects model. The Chow test is a test to compare the standard effect model with the fixed effect (Widarjono, 2021). The Hausman test aims to determine the best model between the random effect approach and the fixed effect method that should be carried out in panel data modeling (Widarjono, 2021). The hypotheses formed in the Hausman Test are as follows: This study's panel data regression test uses Eviews 9 software. The first step in panel data regression analysis is to estimate the panel data regression using the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches (Sitorus & Yuliana, 2018).

Table 1. of Chow Test Results of Absolute Convergence Model and Conditional Convergence Model

Test Type	Model-01			Model-02		
Chow Test	**F-Statistic**	**Prob.**	**Type Featured hotels**	**F-Statistic**	**Prob.**	**Type Featured hotels**
Cross-section F	0.2627	0.0000*	FEM	0.2262	0.0000*	FEM

Based on the results of the Chow Test in Table 1, the cross-section probability value F in model 01 is smaller than 0.05, namely 0.0000 < 0.05, and the cross-section probability value F in model 02 is smaller than 0.05, which is 0.0000 < 0.05. It can be concluded that H0 is rejected and Ha is accepted. The interpretation of the results of the Chow Test is that the fixed effect model is better than the standard effect model, so the Hausman Test can be carried out further.

Table 2. of Hausman Test Results of Absolute Convergence Model and Conditional Convergence Model

Test Type	Model-01			Model-02		
Hausman Test	**Chi-Sq. Statistics**	**Prob.**	**Selected Models**	**Chi-Sq. Statistics**	**Prob.**	**Selected Models**
Cross-section random	4.5368	0.3382*	BRAKE	42.0693	0.0000*	FEM

The results of the Hausman Test in model-01 Table 2 show that the random cross-section probability value is more significant than 0.05, namely 0.3382 > 0.05, so it can be concluded that H0 is accepted and Ha is rejected. The results of the Hausman Test in model-02 show that the random cross-section probability value is less than 0.05, namely 0.0000 < 0.05, so it can be concluded that Ha is accepted and Ho is rejected. Based on the results of the Hausman Test in model-01, it is obtained that the random effect model is better when compared to the fixed effect model; because the REM is selected, it can be said that the regression model does not have Omitted Variable Bias, and Based on the results of the Hausman Test in model-02, it is obtained that the fixed effect model is better when compared to the random effect model because the FEM is selected. This test is carried out to find out that the data processed is valid (there are no deviations), then the data will be filled in through a classical assumption test, namely:

Table 3. Multicollinearity test results of model-01 Conditional Convection Model through *Variance Inflation Factors*

Variable	Coefficient Variance	Uncentered VIF	Centered VIF*
C	10.36994	4884.719	NA
HDI	0.436423	3601.518	1.280492
PP	0.014051	187.3629	1.167566
PMTB	0.000258	18.29652	1.371502
AK	0.093351	772.0006	1.081331

The results of the VIF test above show that there is no VIF value greater than 10. Where the VIF value for the HDI variable is (1,280<10), the VIF value for the Government Expenditure (PP) variable is (1,167<10), the VIF value for the Investment variable (PMTB) is (1,371<10), and the VIF value for the labor force variable (AK) is (1,081<10), thus means that the independent variables used in the study do not show any symptoms of multicollinearity, In other words, all of these variables can be used as interrelated variables.

Table 4. Multicollinearity test results of model-02 Conditional Convection Model through *Variance Inflation Factors*

Variable	Coefficient Variance	Uncentered VIF	Centered VIF*
C	0.006707	14830.39	NA
GDP	1.79E-06	235.1155	1.986603
HLS	0.000449	6548.171	5.985570
AHH	0.000485	18867.92	2.084125
PPC	6.44E-05	11400.61	5.810149

The results of the VIF test above show that there is no VIF value greater than 10. Where the VIF value for the GDP variable is (1,986<10), the VIF value for the school life expectancy variable (HLS) is (5,985<10), the VIF value for the life expectancy variable (AHH) is (2,084<10) and the VIF value for the per capita expenditure variable (PPK) is (5,810<10)), thus means that the independent variables used in the study do not show any symptoms of multicollinearity, in other meaning that all of these variables can be used as interrelated variables. Durbin-Watson Autocorrelation Test Results.

Table 5. of Absolute Convergence Model and Conditional Convergence Model

Model-01			
Conditions	**k = 4 and α = 5%**		
N	**100**	**Ho District**	**DW(*d*)-Stat (0.402388)**
Dl	1.592	*d* < *dL*	1.592< 0.402
Du	1.758	*d*<*dU*	1.758< 0.402
Information	0 < d < dL; = there is an autocorrelation		
Model-02			
Conditions	**k = 4 and ◎ = 5%**		
N	**100**	**Ho District**	**DW (*d*)-Stat (0.226267)**
Dl	1.592	*d* < *dL*	1.592< 0.226
Du	1.758	*d* < *dU*	1.758 < 0.226
Information	0 < d < dL; = there is an autocorrelation		

After we choose the Fixed Effect Model, which is known that the number of n=100 and K=4 (free variables and intercepts) α=5% shows that the results of the Durbin-Watson test obtained the value of DW=0.402388 and the value of dL=1.592<0.402 and the value of dL=1.758<0.402, then the test results on model-01 can be concluded that there is autocorrelation in model-02, the results of the Durbin-Watson test obtained the value of DW=0.226267 and the value of dL=1.592<0.226 and dL=1,758<0.226 It can be concluded that there is an autocorrelation in the model-02.

Heteroscedasticity Test

The Heteroscedasticity test is used to test whether there is a variant inequality in the regression model from the residual of one observation to another. To determine the residual classification of heteroscedasticity in this study, the Breusch-Pagan LM test, the scaled LM test, and the CD test were used (Winarno, 2017).

Table 6. of Results of Heteroscedasticity Test through Residual Cross-Section Dependence Test

Test Criteria	**Mode-01**		**Mode-02**	
	Statistics	**Prob.**	**Statistics**	**Prob.**
Breusch-Pagan LM	92.53740	0.0000*	121.7516	0.0000*
Scaled LM marketing	3.956789	0.0001*	7.036233	0.0000*
CD Marketing	5.020223	0.0000*	5.015382	0.0000*

Based on the output results of Eviews 9 in Table 4.6, it shows that the probabilities in the Breusch-Pagan LM test, the scaled LM Pesaran test, and the CD Pesaran test in model-01 show consecutive numbers of 0.0000, 0.0001, and 0.0000 which means a significance of 0.05. In the model-02 test, the results of the Breusch-Pagan LM test, the scaled LM Pesaran test, and the CD Pesaran test showed consecutive numbers of 0.0000, 0.0000, and 0.0000, meaning a significance of 0.05. So it can be said that residual is said to be affected by heteroscedasticity

Table 7. of Equation Estimation Results 1 Absolute Beta Convergence Model and Conditional Convergence with EGLS (Cross-section Random Effects) Panel Method

Variable	Model-01		
	Coefficient	t-Stat	Prob.
C	-24.08721	-38.35448	0.0000
LIAM	7.489026	50.00475	0.0000
LPP	0.062477	2.923405	0.0044
LPMTB	0.013972	2.157539	0.0338
LAK	-0.016452	-0.803107	0.4241
R-squared		0.992020	
Adjusted R-squared		0.990814	
F-statistic		822.4081	
Prob(F-statistic)		0.000000	
Durbin-Watson stat		0.302273	

From the results of processing the Gross Domestic Product (GDP) equation data, it can be seen that the HDI variable has a significant effect on GDP because the probability value of HDI (0.0000)<0.05, then the variable Government Expenditure (PP) has a significant impact on GDP, because the probability value of government expenditure (0.0044)<0.05, then the variable Investment (PMTB) has a significant effect on GDP because the probability value of Investment (0.0338)<0.05, and the labor force variable (AK) did not have a substantial impact on GDP because the probability value of the labor force (0.4241) >0.05. The R-squared value of this equation is 0.992020. This means that the contribution of HDI, PP, PMTB, and AK variables to GDP is 99.20%, while other variables outside the GDP equation determine the remainder of 0.80%.

Human development can drive economic growth, an essential indicator of the future. The concept of human capital, also known as the Human Development Index (HDI) or HDI, was introduced by the United Nations Development Programme (UNDP) to evaluate the level of human capital. Based on three indicators—literacy level, birth expectations, average years spent in school, and purchasing power parity. The Human Development Index measures the level of development of a region or country. Ikram (2021). If the Human Development Index plays a vital role in modern economic growth, producing production factors that can be maximized is necessary to have quality human development. Quality residents will be able to develop existing production factors and innovate. Susanto & Lucky (2002). To promote economic growth in certain regions, creating a quality human resource source is necessary. With a high level of economic development, income equity will soon be achieved and is expected to increase with income distribution.(Mustain et al., 2023)

Based on the theoretical foundation put forward by Professor Kuznet, one of the characteristics of modern economic growth is the high growth of output per capita (Mirza, 2012: 13). The intended output growth is GDP per capita, the high growth of production makes a change in consumption patterns in meeting needs.

This means that the increasing economic growth in North Maluku Province will result in higher per capita output growth and change in consumption patterns; in this case, people's purchasing power will also be higher. The high purchasing power of the people will increase the Human Development Index because the purchasing power of the people is one of the composite indicators in the HDI called the income indicator; it can be concluded that the higher the economic growth, the higher the Human Development Index will increase.

Table 8. of Equation Estimation Results 2 Absolute Beta Convergence Model and Conditional Convergence with EGLS (Cross-section Random Effects) Panel Method

Variable	Model-02		
	Coefficient	t-Stat	Prob.
C	-2.028722	-14.05596	0.0000
LPDRB	0.000817	0.605461	0.5465
LAHH	1.024997	20.72493	0.0000
LHLS	0.228542	21.51646	0.0000
LPPK	0.147607	16.25467	0.0000
R-squared		0.999235	
Adjusted R-squared		0.999120	
F-statistic		8645.336	
Prob(F-statistic)		0.000000	
Durbin-Watson stat		0.620318	

From the results of processing the Human Development Index (HDI) equation data, it can be seen that the GDP variable does not have a significant effect on HDI because the probability value of GDP (0.5465)>0.05, then the variable Life Expectancy (AHH) is having a substantial impact on HDI. After all, if the probability value of the Life Expectancy Number (0.0000)<0.05, then the variable School Life Expectancy (HLS) has a significant effect on HDI because the probability value of School Life Expectancy (0.0000)<0.05, and the Expenditure Per Capita (PPK) variable has a significant impact on HDI because the probability value of Expenditure Per Capita (0.0000)<0.05. The R-squared value of this equation is 0.999235. The contribution of PDRB, AHH, HLS, and PPK to the HDI is 99.92%, while other variables outside the HDI equation determine the remainder of 0.08%. In theory, HDI is a composite index that is calculated as a simple average of three indices consisting of a health index measured by life expectancy at birth, an education index measured by a combination of school life expectancy and average school duration, and a per capita expenditure index measured by adjusted per capita expenditure or purchasing power parity.

This research is in line with the research (Andri Irawan, 2022) The Influence of Economic Growth on the Human Development Index in South Sumatra Province in 2016-2020; based on the results of the analysis, it can be explained that the economic growth variable (X) has a positive and insignificant effect with a positive coefficient value of 0.520883 and a prob value (0.6038) > 0.05 (insignificant) on the Human Development Index in South Sumatra in 2016-2020. This shows that if economic growth increases by 1%, the Human Development Index in South Sumatra will be reduced by 5.20%. These results do not align with the research hypothesis that economic growth positively and significantly affects the Human Development Index in North Maluku Province in 2014-2023. This is because economic growth in North Maluku has fluctuated so that in several years, there has been a very sharp decline due to the impact of the Covid-19 pandemic and a decline from various sectors; because there is a decline in these multiple sectors, it affects labor productivity, which ultimately affects income and increases poverty so that it affects human development in North Maluku Province. Thus, although there is a similarity in the research findings that economic growth does not always have a positive and significant impact on the Human Development Index (HDI), factors such as monetary fluctuations, the impact of the pandemic, and dependence on specific sectors (such as mining and quarrying in North Maluku) provide a different context for the research outcomes in each region. This study reinforces the findings of Irawan (2022) by demonstrating that specific local economic conditions, including financial instability and responses to external crises, greatly influence the relationship between economic growth and human development.

CONCLUSION

The simultaneous equation model of dynamic panel data for the Gross Domestic Product (GDP) equation shows that the variables HDI, Government Expenditure (PP), then the Investment variable (PMTB) have a significant effect on GDP, and the labor force variable (AK) has no significant impact on GDP. The contribution of the variables HDI, PP, PMTB, and AK to the GDP of North Maluku Province from 2014-2023 is 99.20%, while other variables outside the GDP equation determine the remainder of 0.80%. The simultaneous equation model of panel data from the Human Development Index (HDI) equation shows that the GDP variable does not have a significant effect on HDI, then the Life Expectancy (AHH) variable, the School Length Expectancy (HLS) variable, and the Per Capita Expenditure (PPK) variable have a significant effect on HDI. The contribution of PDRB, AHH, HLS, and PPK to the HDI is 99.92%, while other variables outside the HDI equation determine the remainder of 0.08%. /For the subsequent research on the application of the GMM-AB method, it is hoped that the limitations of this research can be re-analyzed, such as adding variables related to GDP and HDI so that the influence of GDP and HDI can be seen in more detail and relevant in each region.

BIBLIOGRAPHY

Andri Irawan, A. A. (2022). Pengaruh Pertumbuhan Ekonomi Terhadap Indeks Pembangunan Manusia Di Provinsi Sumatera Selatan Tahun 2016-2020. Jurnal Riset Rumpun Ilmu Sosial, 2(1), 48–56.

Barro, R. , & L. J. (2019). Human Capital And Economic Growth: A Global Perspective. Journal Of Economic Development, 125–140.

Becker, G. (2020). Human Capital: A Theoretical And Empirical Analysis, With Special Reference To Education. Journal Of Political Economy, pp. 175–196.

Chen, Y. , & Z. Z. (2020). The Role Of Human Capital In Economic Growth: Evidence From Developing Countries. Economic Modeling, 145–160.

Firmansyah, D. , & W. A. (2022). Regional Disparities In Human Resource Development And Economic Growth In Indonesia. Journal Of Regional Economic Studies, 75–98.

Garcia, J., Et Al. (2020). Human Resource Development In Archipelagic Economies: Insights From Southeast Asia. Asia Pacific Journal Of Economics, pp. 367–384.

Ismail, A., Et Al. (2021). Economic Growth And Human Resource Development In Indonesia's Outer Islands. Journal Of Development Economics, pp. 122–139.

Jaya, H. , & S. D. (2018). The Role Of Education And Vocational Training In North Maluku's Economic Development. Indonesian Journal Of Economic Studies, 88–103.

Mustain, A., Patra, I. K., & Maming, R. (2023). Pengaruh Human Development Index (Hdi) Terhadap Pertumbuhan Ekonomi Luwu Raya. Efektor, 10(1), 54–62. Https://Doi.Org/10.29407/E.V10i1.19359

Nasution, D. , & R. S. (2020). Economic Sustainability And Human Capital In Indonesia's Archipelagic

Provinces. Sustainability Studies Journal, 205–220.

Rahman, S. , & N. A. (2019). The Challenges Of Economic Growth In Resource-Dependent Provinces: A Case Study Of North Maluku. Journal Of Resource Economics, 213–229.

Romer, P. (2020). Endogenous Technological Change And Economic Growth. Journal Of Economic Growth, pp. 99–117.

Santoso, T. , & N. T. (2021). The Impact Of Global Market Fluctuations On North Maluku's Economic Growth. Global Economics Journal, 156–178.

Solow, R. (2019). Capital Accumulation And Technological Progress In Economic Growth Models. Quarterly Journal Of Economics, pp. 450–472.

Sudirman, R. , Et Al. (2020). Human Resource Development In Indonesia's Rural And Remote Provinces. Development Policy Review, 99–116.

Widarjono. (2021). Memahami Uji Chow Test Dalam Eviews Ekonometrika Pengantar Dan Aplikasinya, Edisi Ketiga. Yogyakarta: Ekonesia. Accounting.Binus.Ac.Id. Https://Accounting.Binus.Ac.Id/2021/08/13/Memahami-Uji-Chow-Test-Dalam-Eviews/

Winarno. (2017). Uji Heteroskedastisitas Melalui Residual Cross-Section Dependence Test. Angewandte Chemie International Edition, 6(11), 951–952., 1(April), 60–90.