



EFFECTS OF ECONOMIC GROWTH, MINIMUM WAGE & HUMAN DEVELOPMENT INDEX ON UNEMPLOYMENT DURING POST-REFORM PERIOD IN INDIA

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Received: 22 April 2023; Revised: 14 May 2023;

Accepted 28 May 2023; Publication: 29 June 2023

Abstract: The effect of the variables of Economic Growth, Minimum Wage, and Human Development Index on the Unemployment Rate in India in the short and long term has been studied using quantitative techniques and secondary data during the post-reform period 1990-2021. The study was conducted with unemployment as the dependent variable, while economic growth, minimum wage, and Human Development Index were considered as the independent variables. The Vector Error Correction Model (VECM) was used for analytical purposes. The results showed that economic growth had a positive and significant impact on the unemployment rate in the short and long term. The minimum wage variable and the human development index variable in the short and long term respectively have a negative and insignificant impact. Moreover, this study provides good and appropriate information for the government to be able to reduce the problem of unemployment in India by using an economic and social approach.

Keywords: unemployment rate, economic growth; minimum wage; human development index; vector error correction model.

JEL Classification: C22; C32; J64.

1. INTRODUCTION

1.1. Development & Economic Reform

India is still undergoing a process of economic development and aims to achieve society's welfare through job opportunities that support equal distribution

To cite this paper:

Jitendra Kumar Sinha (2023). Effects of Economic Growth, Minimum Wage & Human Development Index on Unemployment during Post-Reform Period in India. *Indian Journal of Applied Business and Economic Research*. 4(1), 101-123. <https://DOI:10.47509/IJABER.2023.v04i01.06>

of income in society. There is a gap between job opportunities that are not balanced as it increases slower than the increase in the workforce leading to unemployment that can affect directly survival. Unemployment in India is attributed to the negative development of economic activities; the substitution of labor for capital; and an increase in workforce supply. The country was facing the challenge as early as the 1980s when it was operating under a 'one-sector growth model. India took the initiative in the 1990s in the form of Economic Reforms that characterized pro-market orientation that includes: (i) fiscal policy reforms, aimed at rationalization of the tax structure, and reduction of subsidies & fiscal deficit; (ii) financial sector reforms that included liberalization of interest rates, relaxation of controls on capital issues, freer entry for domestic and private foreign banks, and opening up of insurance sector; (iii) liberalization of industrial policies and abolition of industrial licenses; (iv) reforms in foreign trade and investment, liberalizing foreign trade in goods, services, and technology, eliminating import licensing, reducing non-tariff barriers and liberalizing foreign direct and portfolio investment; (v) infrastructure sector reforms, encouraging private investment in infrastructure and telecommunication; and (vi) reforms in agriculture, relating mainly to both internal and external trade in agricultural commodities. Thus, the thrust of the reforms had been to open the Indian market to international competition, reduce government control, encourage private investment & participation, liberalize access to foreign capital and attract foreign capital. These reforms were aimed to curb the problem of capital inadequacy in the country for the stagnant growth, but the implication of these policies lagged behind the economic and employment growth leading to more unemployment, which economists are more concerned to portray the recent experience of one of the jobless growth (Padder, 2018)(1). Michael, Emeka, & Emmanuel (2016)(2) provides results regarding Granger causality between economic growth and unemployment in Nigeria. However, it has been found that the unidirectional relationship between unemployment and economic growth with causality runs from the real gross domestic product (RGDP) to unemployment. Rosin & Rosin (2014)(3) examined that unemployment and economic growth have strong negative relations in the U.S.A over the period 1977-2011.

1.2. Unemployment & Economy

Unemployment is the condition of not having a job or being unemployed or the fraction of the population that is both able to work and actively seeking

work, but is unable to do so for whatever reason. The prominent reasons for unemployment in emerging countries include technological development, the involvement of females in the labor force, demographic, income status, and migration from rural to urban owing to rising demand for power products. The negative effect of unemployment in developing countries like India has created the greatest problem for the people and society and adversely affects consumption, purchasing power, and the capability of production for the economy. A lack of jobs will lower the standard of living for the community. Unemployment can hurt the person himself as well as society or the surrounding environment. Reduction of the unemployment rate remained the prime concern for the planners from the beginning of the planning process in India. Research evidence has shown that several labor market barriers exist that prevent people from overcoming unemployment and earning a living – most of which affect mainly the poor and arise from a pool of poverty leading to marginalization, inequality, and further poverty. More importantly, however, is the overall impact of India's unemployment situation on the economy from a macroeconomic perspective which is accentuated by the influence of labor market fluctuations on monetary policy, changes in the gross domestic product (GDP) as accounted for by unemployment, as well as the relationship between unemployment and inflation in India {Sinha & Sinha (2022), Sinha (2022) (4-6)}.

1.3. Economic uncertainty & unemployment

Economic uncertainty is a business cycle driver, and its leading features make it a significantly advanced indicator for assessing the impact of socioeconomic factors on suicide prevention (Claveria, 2022)(7). This is due to reduced job opportunities which can be caused by a slow economy, reduced individual potential, loss of work skills, decreased income taxes, and low levels of community welfare (Podi et al., 2020)(8). Unemployment has become an economic problem in many countries and not only in India. Due to unemployment, the level of productivity and income of the community is reduced, resulting in poverty and social problems (Hartanto & Masjkuri, 2017)(9). The government's role in the economy is debatable for a long time. One school of economists believes that government actions and participations are essential to steer the economy to save it from prolonged recessions and massive rates of unemployment, while others argue against the larger role of the government. All these have made the public expenditure for unemployment eradication and economic growth debatable. These are:

Classical Approach

The classical economists explain the concept of employment and unemployment on the Walrasian general equilibrium model {Sodipo & Ogunrinola, 2011 (10)} based on the two broad features: i) the assumption of full employment of labor and other productive resources; and ii) the flexibility of prices and wages to bring about the full employment {Islam, 2002(11)} in the event of any deviations from the original deviations. Classical economists see that labor and other resources are always fully employed and thereby ruling out overproduction and general unemployment. However, if there is unemployment, it is assumed as a temporary or abnormal phase, which is not persistable for a long period as the other economic factors work towards bringing about equilibrium. Therefore, classical economists assume that the major reason for unemployment is intervention by the government or private monopoly, wrong calculation, artificial resistance, and inaccurate decision [Walterskirchen, 1999(12)]. The economy is self-adjusting and would work its way back to full employment equilibrium in a perfectly competitive economy where the relative values of goods and services are determined by the general relation of demand and supply. The pricing system, therefore, serves as the planning mechanism. The second assumption of full employment by classical economists is the flexibility of prices and wages, which automatically brings full employment. Consequently, if there is overproduction resulting in low demand and unemployment, prices would fall as a result of which demand would increase, prices would rise and production activity will be stimulated and unemployment would tend to disappear (Islam, 2002(11)). The belief of the classical economists that unemployment would be cured by cutting down wages to increase the demand for labor and to stimulate economic activities and employment was rejected by the Keynesian School and supported by the inability of the market forces to normalize employment and output level during the period of Great Depression of the 1930s.

Keynesian Approach

The Keynesian School suggested that the government should, whenever necessary, intervene in the management of the economy using appropriate policies. Government policies can influence aggregate demand in the form of increased government expenditure on public works. Accordingly, taxation should be devised to promote and sustain consumption and investment; the budget should be in deficit spending to raise the level of effective demand

and overcome depression. Public expenditure should be planned to finance public work programs and provide social security measures; direct taxes should be lowered to encourage savings and investments to further create more employment opportunities, and large-scale productive borrowings to finance productive public expenditure {Somashekhhar, 2003(13)}. Once full employment is achieved, it has to be constantly maintained by adopting appropriate fiscal policy from time to time. Iii) **Friedman Approach:** Friedman (1969) (14) criticized Keynes's analysis on two points: a) Keynes's theory does not consider the influence of money supply on spending and the government fiscal policy alone cannot affect the aggregate demand if the money supply is low to encourage private investment through the high-interest rates. Friedman felt that the use of fiscal policy to control the economy may be alleviated through the use of monetary policy, i.e., to keep an eye on the money supply and let the market take care of itself. This implies that markets without government interference through fiscal policy are more efficient in dealing with unemployment. b) Keynesian theory of unemployment assumes a centrality of planned economy, i.e., the government is expected to spend funds to reverse recession, which implies what is best for the economy as a whole. This is far from the truth and may even be misleading as recessions are caused by micro-economic factors. Besides, centralized planning is fraught with inefficiencies of capital allocation and is prone to capital volatility. In practice, the temporary government interventions became permanent which ends up suppressing the private sector and civil society.

2. LITERATURE REVIEW

Economic growth is an increase in the ability of the economy to produce goods and services over a certain period. In other words, economic growth refers to changes that are quantitative and are usually measured using data on the gross domestic product (GDP) or output income per capita. The economy of a country can be said to be growing if the economic activities of its people directly affect the increase in the production of goods and services. By knowing the level of economic growth, the government can make plans regarding state revenues and future development. The problem of unemployment can be influenced by several indicators, including economic growth, minimum wages, and the human development index. If a country's economic growth increases, it is expected to affect a decrease in the unemployment rate. Efforts to increase economic growth are one of the important indicators in overcoming the problem

of unemployment (Baba, 2021)(15). Okun's law states that when there is an increase in economic growth it will hurt the unemployment rate. Economic growth is usually measured using data on the gross domestic product (GDP) or per capita output income. Gross Domestic Product (GDP) data based on current prices and constant prices is one of the important indicators to determine the economic condition of a country in a certain period. Moreover, countries in the global north and south have been developing service employment, much of it is poor wages, for several decades to attain more economic stability and secure a dynamic labor market (Antipova, 2021)(16). Based on the unemployment rate in 2020 reached 7.70%, and this figure increased rapidly from previous years. This is due to the COVID-19 pandemic. One of the main causes of the rising unemployment rate during this pandemic is layoffs. India's economic growth in 2020 contracted minus 2.07 percent with the deepest growth contraction in the transportation and warehousing sector at 15.04 percent. The realization of this Gross Domestic Product (GDP) decreased compared to 2019 which grew 5.02 percent, as well as the worst since the 1998 crisis which grew minus 13.16 percent. The Indian economy experienced a growth contraction in 2020, mainly due to the Covid-19 pandemic that had occurred since early 2020.

The Minimum Wage is also one of the indicators to overcome the unemployment rate (Panjawa & Soebagiyo, 2014)(17). If the minimum wage in an area is low, then the population has a low standard of living and a low level of consumption (Gorry, 2013)(18). On the other hand, districts/cities with high regional minimum wages have a high standard of living and consumption levels.

In addition to economic growth and the minimum wage, the human development index is also an important indicator in overcoming the problem of unemployment. The human development index is an acceptable measure to describe the quality of human life in a certain period. Increased human development through the development of human capital which is reflected in the level of education and health can increase human productivity will increase the demand for labor and decrease the unemployment rate (Kurnia & Septiani, 2021)(19). India's HDI value of 0.633 places the country in the medium human development category, lower than its value of 0.645 in the 2020 report. This condition is caused by the COVID-19 pandemic that hit India. Like global trends, in India's case, the drop in HDI from 0.645 in 2019 to 0.633 in 2021 can be attributed to falling life expectancy - 69.7 to 67.2 years. India's expected years of schooling stand at 11.9 years, and the mean years of schooling are

at 6.7 years. The GNI per capita level is \$6,590. But, India is bridging the human development gap between men and women faster than the world. This development has come at a smaller cost to the environment. India's growth story reflects the country's investments in inclusive growth, social protection, gender-responsive policies, and push towards renewables to ensure no one is left behind," says Shoko Noda, UNDP Resident Representative in India. Based on the explanation of economic growth, minimum wage, and human development index, a problem arises that must be investigated regarding economic growth, minimum wage, and human development index in India.

Amrullah et al. (2019)(20) analyze the determinants of the open unemployment rate in Java from 2007-2016. This study uses the variables of minimum wage, GDP growth rate, and inflation rate on open unemployment. In this study, the panel data regression model was used using the fixed effect model (FEM) Approach. The results of this study simultaneously show that the independent variables of GRDP, Provincial Minimum Wage, and Inflation have a significant effect on the dependent variable of the open unemployment rate. The results of the partial test analysis show that GRDP has a significant effect while the Provincial Minimum Wage and Inflation have an insignificant effect on the open unemployment rate for the period 2007-2016.

Mahihody et al. (2018)(21) analyze the effect of wages and the Human Development Index (HDI) on unemployment in Manado. This study uses a variable wage and human development index on unemployment. The analytical method used is multiple regression analysis. Based on the results of the study, the minimum wage level in Manado City has a significant negative effect on unemployment and the human development index has a significant negative effect on unemployment in Manado City.

Baba (2021)(15) analyzes the economic determinants of unemployment in Malaysia, the research variables Unemployment, GRDP, Investment, Inflation, and Population, using the VECM approach. The results show that there is short-term causality between variables as well as long-term. GDP has a significant negative impact while investment has a significant positive impact on unemployment.

Tsaurai (2020)(22) analyzes Macroeconomic Determinants of Unemployment in Africa, the variables used are Information and communication technology, Unemployment Human resources, and infrastructure. The method used was Panel data analysis (fixed effects, random effects, pooled ordinary least squares, dynamic generalized methods of moments). Random effects

and OLS show that economic development has a significant positive effect on population unemployment and open trade has a significant positive impact on unemployment. Information and communication technology and human resources have a significant negative effect on unemployment. Fixed effects and pooled OLS method show that economic growth has a significant negative effect on unemployment. Meanwhile, this research took place in India at a time when the COVID-19 pandemic condition occurred, using the VECM approach.

3. METHOD

3.A. Data and sources

The secondary quantitative time series annual data from 2001-2021 is used in this study. Data sourced in this study were taken from the MoSPI or other related Departments of the Government of India. This data was taken from the MoSPI due to the completeness of the data published.

3.B. Operational Definition:

Operational definitions used in this study were :

- a. **Unemployment:** The number of people of working age who are not working or have not worked in the study period. [Percentage of Unemployment Rate in India in 1990-2021].
- b. **Minimum Wage:** The lowest monthly wage set annually as a safety net in an area.[Minimum Wage Data in India for 2001-2021 in rupee].
- c. **Economic growth:** An increase in the value and amount of production of goods or services in India within a certain period proxied with India's GRDP in the period 1990 – 2021.
- d. **Human Development Index:** Human development achievement is based on several basic components of quality of life. As a measure of the quality of life in India with three main indicators, namely, health indicators, education levels, and economic indicators in 1990 - 2021.

3.C. Data Collection

Data were collected from data published by the MoSPI or other relevant Departments of the Government of India.

3.D. Analysis

The Vector Error Correction Model (VECM) a method derived from VAR is used for analysis in this study.

3.D.1. Data Stationarity Test

The method used to test the stationarity of the data is the ADF (Augmented Dickey-Fuller) test, using a significance level of 5 percent. If the t-ADF value is less than the critical value, it can be concluded that the data used is stationary (does not contain unit roots). The unit root test is carried out at the level up to the second difference. Stationary data tend to be close to the average value, fluctuating around the mean value. Non-stationary data can result in quasi-regression, which is a regression that describes the relationship between two or more variables that looks statistically significant when in fact it is not.

3.D.2. Optimal Lag Determination

Too small a lag length will make the model unusable because the relationship cannot be explained. Besides, if the length of the lag used is too large, the degrees of freedom will be greater so that it is no longer effective. So, determining the optimal lag is important since in the VAR method, the optimal lag of the endogenous variable is the independent variable used in the model. Long test lag will also help eliminate the problem of autocorrelation in the VAR system, which is used as a VAR stability analysis. Thus, by using the optimal lag, it is expected that auto-correlation will no longer appear.

3.D.3. Cointegration Test

The cointegration test is used to determine whether the group of non-stationary variables at these levels meets the requirements of the integration process, that is if all variables are stationary to the same degree. This test is used to determine whether there is a long-term effect on the variables studied. If cointegration is proven to exist, then the VECM step can be continued. However, if it cannot be proven, then VECM cannot be continued.

3.D.4. Granger Causality Test

This test is conducted to determine whether an endogenous variable can be considered an exogenous variable. This stems from a lack of understanding of the influence between variables. If there are two variables y and z , then whether y causes z or z causes y or applies both or there is no relationship between the two variables.

3.D.5. Vector Error Correction Model (VECM)

The VECM is used in a non-structural VAR model if the time series data is not stationary at the levels but is stationary at the differential data and is cointegration so that it shows a theoretical relationship between variables. In VECM, there is a speed of adjustment from short to long-term. VECM is a limited form of VAR due to the non-stationary form stationary series that has a cointegration relationship. The general VECM model is:

$$y_t = \mu_{0x} + \mu_{1xt} + \alpha\beta y_{t-1} + \sum_1^{k-1} \tau_k y_{t-1} + \varepsilon_t \quad (1)$$

In equation (1),

y_t : Vector containing the variables analyzed in the study,

μ_{0x} : Vector intercept, μ_{1x} : regression coefficient vector,

t : time trend, α : Coefficient speed of adjustment,

β : Cointegration vector, y_{t-1} : Variable in-level,

τ_k : regression coefficient matrix, $k-1$: VECM order of VAR,

k : lag, ε_t : error term.

3.D.6. Impulse Response Function (IRF)

Impulse Response Function (IRF) is a method used to determine the response of an endogenous variable to shocks of certain variables and to see the shock of another variable & how long the effect lasts. If a variable cannot be affected by shocks, then the specific shock cannot be known but the shock in general.

3.D.7. Variance Decomposition (VD)

Variance Decomposition is a method to describe the dynamic system contained in VAR and is used to compile an estimate of the error variance of a variable, namely how big the difference between the variance before and after the shock, both from the shock that comes from oneself or other variables. Forecast Error Variance Decomposition (FEVD) describes the innovation of a variable against the components of other variables in the VAR. The information conveyed in the FEVD is the proportion of sequential movements caused by the shock itself and other variables.

4. RESULTS

4.1. Stationary Test

The ADF (Augmented Dickey-Fuller) test was used to test the stationarity of the data, using a significance level of 5 percent. If the t-ADF value is less than

the critical value, it can be concluded that the data used is stationary (does not contain unit roots). The unit root test is carried out at the level up to the second difference. Results are indicated in Table 1.

Table 1: ADF Stationary Test At Level

<i>Variable</i>	<i>ADF statistics</i>		
	<i>t -Statistics</i>	<i>Critical value</i>	<i>Prob.</i>
Unemployment Rate	0.949	3.024	0.750
Economic growth	0.833	3.027	0.765
Minimum wage	1.234	3.042	0.634
HDI	2.404	3.027	0.156

Source: Author's calculation.

It appears from Table 1 that (the stationary test at the level), the ADF statistic value on the variables of unemployment, economic growth, minimum wage, and human development index is greater than the ADF t-statistic value and so they are not stationary. Therefore, it is necessary to process 1st difference to find out if all the variables are stationary or not. The results of the stationarity test at the first difference level are presented in Table 2:

Table 2: ADF Stationary Test at Level 1st difference

<i>Variable</i>	<i>ADF statistics</i>		
	<i>t -Statistics</i>	<i>critical value</i>	<i>Prob.</i>
Unemployment Rate	3.108	3.040	0.045
Economic growth	-1.527	3.040	0.502
Minimum wage	6.075	3.040	0.001
HDI	4.477	3.040	0.002

Source: Author's calculation

The results of data processing for 1st difference indicate that the variables of the unemployment rate, minimum wage, and the human development index are stationary at level 1st difference where the ADF t-statistic value is greater than the critical value. On the other hand, the economic growth variable is not stationary where the critical value of -3.040 is still higher than the ADF t-statistic which is -1.527. Therefore, it is necessary to carry out a 2nd difference process to see whether all variables are stationary or not. The ADF stationary test results at level 2nd differences are indicated in Table 3:

Table 3: ADF Stationary Test at Level 2nd difference

<i>Variable</i>	<i>ADF statistics</i>		
	<i>t -Statistics</i>	<i>Critical value</i>	<i>Prob.</i>
Unemployment Rate	6.229	3.052	0.000
Economic growth	3.119	3.052	0.044
Minimum wage	9.575	3.052	0.000
HDI	7.598	3.052	0.000

Source: Author's calculation

The results of data processing in Table 3 indicate that all data are stationary (based on the results of the 2nd difference unit root), as the ADF t-statistic value is greater than the critical value. The probability of ADF t-statistics of the unemployment rate variable is -6.229 which is greater than the critical value of -3.052. The economic growth variable has stationary data at the second difference, where the probability of the ADF t-statistic of the economic growth variable is -3.119 which is greater than the critical value of -3.052. The minimum wage variable has stationary data at the 2 difference level because the probability of the ADF t-statistic is -9.575, greater than the critical value, which is -3.052. The Human Development Index (HDI) variable also has stationary data at the 2nd difference level, because the probability of the ADF t-statistic is -7.598 which is greater than the critical value, which is -3.052. Thus, it can be concluded that the data on all the variables unemployment rate, minimum wage, economic growth, and human development index are stationary at the second difference level.

4.2. Optimal Lag Test Result

Determining the optimal lag is important because, in the VAR method, the optimal lag of the endogenous variable is the independent variable used in the model. Long test lag will be very helpful in eliminating the problem of autocorrelation in the VAR system which is used as a VAR stability analysis. Optimal lag test results are mentioned in Table 4.

Table 4: Optimal Lag Test Results

<i>Lag</i>	<i>Log L</i>	<i>LR</i>	<i>FPE</i>	<i>AIC</i>	<i>SC</i>	<i>HQ</i>
0	-77.3659	NA	0.3072	10.1707	10.3638	10.1806
1	-51.2181	35.9532*	0.0941*	8.9022	9.8680*	8.9517*
2	-35.1895	14.0249	0.1555	8.8986*	10.6370	8.9877

* indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level); FPE: final prediction error; AIC: Akaike information criterion; SC: Shewarz information criterion; HQ: Hannan information criterion. Source: Author's calculation

Table 4 shows the amount of lag in this study is based on the smallest or minimum value. Apart from being seen from the smallest or minimum value, it can also be seen from the number of stars in the lag. In the table, it can be seen that the optimal lag length lies in lag 1. Thus, the recommended optimal lag is lag 1.

4.3. Cointegration Test

The Cointegration test is intended to determine the long-term effect on the variables studied. The VECM step can be continued only if cointegration is proven to exist, otherwise, the VECM cannot be continued.

Table 5: Johansen Cointegration Test Results

<i>Hypothesized No. of CE(s)</i>	<i>Eigenvalue</i>	<i>Trace Statistics</i>	<i>0.05 Critical Value</i>	<i>Prob. **</i>
None*	0.9073	71.8018	47.8561	0.0001
At most 1*	0.6549	33.7386	29.7970	0.0167
At most 2*	0.5247	16.7156	15.4947	0.0376
At most 3*	0.2598	4.8140	3.8414	0.0282

Source: Author's calculation.

Table 5 shows the trace statistic at none, at most 1, at most 2, and at most 3 is greater than the critical value with a significance level of 5 percent. Based on the results of the cointegration test, a significant sign (*) was found on none, at most 1, at most 2, and at most 3, then the equation must be solved using the VECM method. Thus, among the variables of the unemployment rate, economic growth, minimum wage, and HDI, there is stability and movement in the long term. Meanwhile, in the short run, all variables adjust to each other to achieve balance in the long run.

4.4. Granger Causality Test

The Granger causality test is conducted to determine whether an endogenous variable can be considered an exogenous variable. This stems from a lack of understanding of the influence between variables. If there are two variables y and z , then whether y causes z or z causes y or applies both or there is no relationship between the two variables. The results of the Granger causality test are presented in Table 6.

Table 6: Granger Causality Test Result

<i>Null Hypothesis</i>	<i>Observations</i>	<i>F-Statistics</i>	<i>Prob.</i>
i) GDP does not Granger cause Unemployment. ii) Unemployment does not Granger cause GDP	31	5.058 2.800	0.038 0.113
i) Logminimumwage does not granger cause unemployment. ii) Unemployment does not Granger cause Log minimum wage	31	4.116 1.141	0.059 0.301
i) HDI does not Granger cause Unemployment. ii) Unemployment does not Granger cause HDI	31	4.701 0.011	0.045 0.915
i) Logminimumwage does not granger cause GDP. ii) GDP does not Granger cause Log minimum wage	31	2.673 0.001	0.121 0.976
i) HDI does not Granger cause GDP. ii) GDP does not Granger cause HDI	31	0.874 2.463	0.363 0.136

Source: Author's calculation.

In Table 6, if the probability value in the fourth column is below 0.05, then the variables have an influence. On the other hand, if the probability value is above 0.05, then the variables do not influence each other. The variables of economic growth and HDI have a statistically significant effect on the unemployment rate as their probability value is less than 0.05. But, vice-versa is not true as unemployment does not have a statistically significant effect on economic growth and HDI.

4.5. Vector Error Correction Model (VECM) Test

The Vector Error Correction Model(VECM) is used in a non-structural VAR model if the time series data is not stationary at the levels but is stationary at the differential data and is cointegration so that it shows a theoretical relationship between variables. Results of long-term and short-term VECM estimates are presented in Table 7.

Economic growth has a positive and significant effect on the unemployment rate in the long term as the t-statistic value is greater than the t-table value. But minimum wage and HDI variables show negative and insignificant results as seen from the t-statistic value which is smaller than the t-table value. In the

Table 7: Long-Term and Short-Term VECM Estimates

<i>Variable</i>	<i>Coefficient</i>	<i>t stat</i>	<i>t table</i>
Long -term			
Economic growth	59.3479	6.1471	1.7458
Minimum wage	-593.6873	-3.9882	
HDI	-40.0123	-7.6757	
Short- term			
CointEq1	0.0051	-1.6186	1.7458
Economic growth	0.4979	2.2171	
Minimum wage	-6.7352	-2.8113	
HDI	-0.3425	-2.5268	

Source: Author's calculation.

short-term VECM estimation results, economic growth shows positive and significant results with a t-statistic value of 2.2171 which is greater than the t-table value of 1.7458. Meanwhile, the minimum wage and HDI variables showed negative results and did not have significant pairwise Granger Causality Tests result on the unemployment rate

4.6. Impulse Response Function (IRF)

This analysis was done to study the response of an endogenous variable to shocks of certain variables and to see the shock of another variable and how long the effect lasts. If a variable cannot be affected by shocks, then the specific shock cannot be known but the shock in general. The results of the analysis are indicated in Table 8.

Table 8: Impulse Response Function (IRF) result.

Response of D(Unemployment):

<i>Period.</i>	<i>D(Unemployment)</i>	<i>D(GDP).</i>	<i>D(LogMW)</i>	<i>D(HDI)</i>
	0.7153	0.0000	0.0000	0.0000
	0.4324	-0.0598	-0.1853	-0.0128
	0.7386	-0.0962	0.2441	0.3226
	0.5742	-0.5861	-0.6889	-0.0700
	0.5225	-0.3030	0.3561	0.1522
	0.6767	-0.4772	-0.3299	0.1152
	0.5564	-0.0996	-0.1201	0.0578
	0.5912	-0.1264	-0.0367	0.1128
	0.6167	-0.2424	-0.1762	0.0984
	0.5777	-0.1494	-0.1111	0.0814

Source: Author's calculation

Table 8 shows the unemployment rate variable responds to the shock given the variables of economic growth, minimum wage, and human development index are changing every period. Both respond positively and negatively to the unemployment rate variable.

Response of i) $D(\text{Unemployment})$ to $D(\text{Unemployment})$; ii) $D(\text{Unemployment})$ to $D(\text{GDP})$; iii) $D(\text{Unemployment})$ to $D(\text{LogMW})$; iv) $D(\text{Unemployment})$ to $D(\text{HDI})$ are indicated below in Figure (1)- (4)

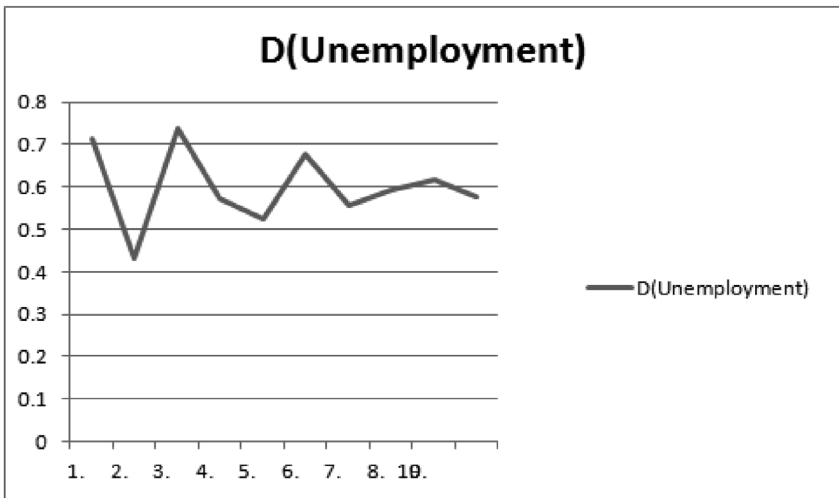


Figure 1

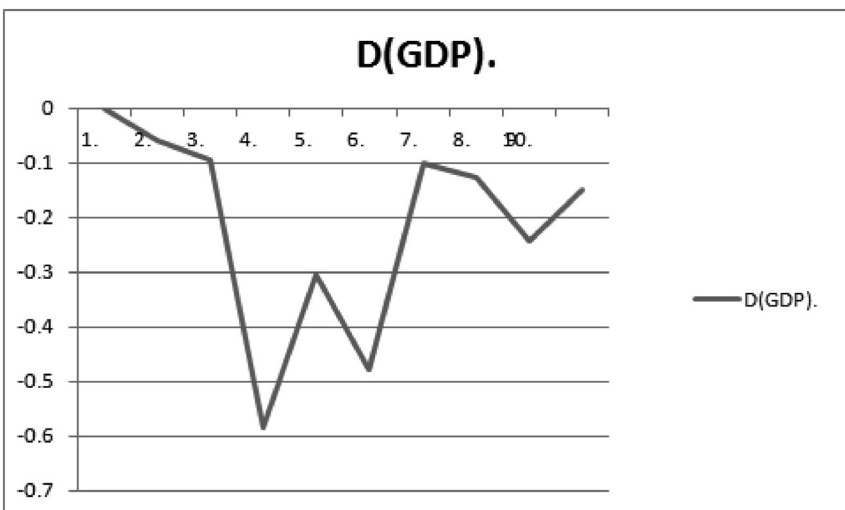


Figure 2

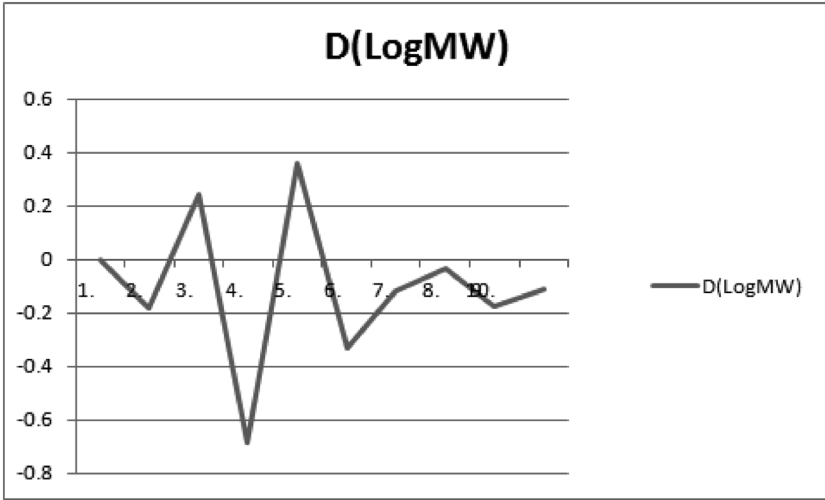


Figure 3

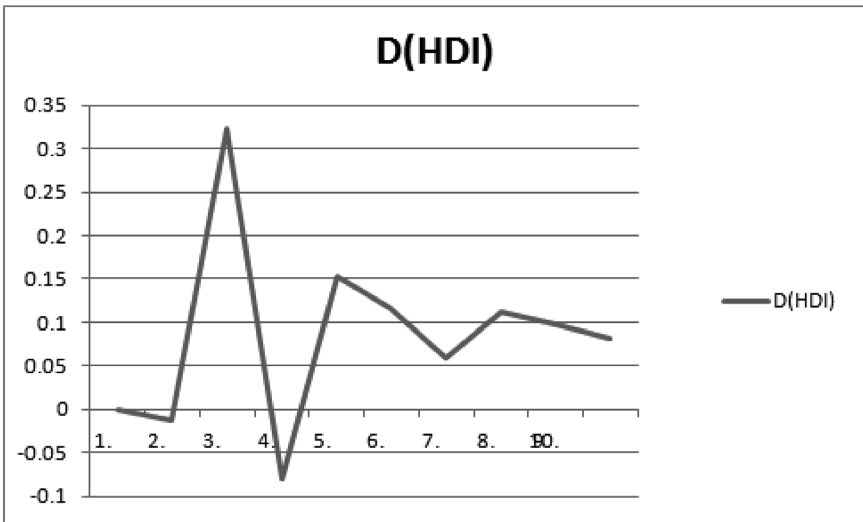


Figure 4

(i) **Response of D(Unemployment) to D(Unemployment)** : Figure 1 indicates the tendency of the unemployment variable above the horizontal line indicating that this variable has a positive impact. This is because the unemployment rate affects itself so that it can control its impact. The tendency of the variable economic growth below and above the horizontal line means that the variable economic growth has a negative impact as well as a positive impact according to each period.

(ii) D(Unemployment) to D(GDP): Figure 2 shows the impulse response of economic growth to unemployment. The trend of the variable economic growth is below and above the horizontal line, which means that the variable economic growth has a negative impact as well as a positive impact according to each period. The shock given by -0.1494 in the 10th period means that if there is an increase in economic growth, it will reduce the unemployment rate.

(iii) D(Unemployment) to D(LogMW): Figure 3 shows the trend of the variable economic growth below and above the horizontal line, which means that the variable economic growth has a negative impact as well as a positive impact according to each period. The shock given was -0.1111 in the 10th period.

(iv) D(Unemployment) to D(HDI): Figure 4 shows the tendency of the variable economic growth below and above the horizontal line, which means that the variable economic growth has a negative impact as well as a positive impact according to each period.

4.6. Variance Decomposition (VD)

Variance decomposition is used to compile an estimate of the error variance of a variable. That is, how big is the difference between the variance before and after the shock, both from the shock that comes from oneself or other variables? Forecast Error Variance Decomposition (FEVD) describes the innovation of a variable against the components of other variables in the VAR. The information conveyed in the FEVD is the proportion of sequential movements caused by the shock itself and other variables. The results of the analysis are summarised in Table 9.

Table 9 Variance Decomposition (VD) Results

Variance Decomposition of D(Unemployment)

<i>Period.</i>	<i>SE.</i>	<i>D(Unemployment)</i>	<i>D(GDP)</i>	<i>D(LogMW)</i>	<i>D(HDI)</i>
1	0.7153	100.0000	0.0000	0.0000	0.0000
2	0.8583	94.8313	0.4853	4.6610	0.0224
3	1.2063	85.5017	0.8814	6.4542	7.1627
4	1.6152	60.3202	13.6583	21.7854	4.2361
5	1.7674	59.1306	14.3314	22.2576	4.2803
6	1.9827	58.6282	17.1793	20.4537	3.7386
7	2.0660	61.2486	16.0516	19.1752	3.5216
8	2.1559	63.7665	15.0867	17.6383	3.5078
9	2.2646	65.2138	14.8257	16.5922	3.3683
10	2.3459	66.8342	14.2210	15.6856	3.2592

Source: Author's calculation.

The results of the variance decomposition test in Table 9 indicate that in the first period, the unemployment rate is influenced by the unemployment rate itself. However, as the period increases, other variables begin to influence, although the magnitude is not as large as the influence of the unemployment rate itself. The minimum wage has the second largest influence after the unemployment rate variable, where the effect at the beginning of the period is 4.66 and continues to increase for 3 periods, and after that, it decreases until the end of the period, when the effect is 15.6 on the unemployment rate. The smallest effect is given by the human development index variable on the unemployment rate of 3.26 percent at the end of the period, as for the economic growth variable seen from the variance decomposition test, which is in the 3rd place, its effect on the unemployment rate is 14.2 percent at the end of the period.

5. DISCUSSION

The results presented in the previous section lead to the following discussion:

- (1) **Economic Growth & Unemployment:** The economic growth variable shows positive and significant results on the unemployment rate based on the short-term and long-term test results. This condition is not following the theory of Okun's Law and the hypothesis of this study which states that when there is an increase in economic growth, it will hurt the unemployment rate. Rather this condition is in line with the results from Anggoro (2015) (23) which states that positive economic growth is due to economic growth not being accompanied by an increase in production capacity, so unemployment continues to increase in line with economic growth.
- (2) **Minimum Wage & Unemployment:** The minimum wage variable shows negative results and does not have a significant effect on the unemployment rate, based on the short-term and long-term test results. This means that if wages rise, the unemployment rate will decrease. If wages are set too low it will result in high levels of unemployment. This condition is following Keynes's theory which states that if the wage rate increases, it will affect the decrease in the unemployment rate. When wages increase, the income also increases. The impact that occurs if income increases are that purchasing power will also increase and public spending will increase, so the production capacity will be increased by the demand for goods and services so that the company will increase its workforce to meet community

demand and the use of full employment will increase. The results of this study also show the relationship between the minimum wage and the unemployment rate which is not significant. Amrullah et al. (2019) (20) estimated the determinants of the Open Unemployment Rate in Java in 2007-2016 and stated that whatever the minimum wage increases, it will not affect the unemployment rate. An increase in the minimum wage is not always accompanied by a decrease in the unemployment rate. This means that the increase in the minimum wage that occurs does not absorb the existing workforce so the unemployment rate does not decrease.

- (3) **Human Development Index & Unemployment:** The human development index variable shows negative results and does not have a significant effect on the unemployment rate. (Sanitra, 2021)(24) based on the short-term and long-term test results and stated that if the human development index increases, the unemployment rate will decrease. On the other hand, if the human development index decreases, the unemployment rate will increase. It may be noticed that HDI includes three dimensions: i) a long and healthy life; ii) knowledge; and iii) a decent life.
- (i) The first dimension, a long and healthy life as measured by a higher life expectancy at birth, indicates that public health is classified as good, and in the long term, it will increase work productivity. When working productivity increases, income will increase, so this will have an impact on decreasing the unemployment rate.
 - (ii) The second dimension of knowledge is measured by the expectation of long schooling and the high average length of the school, which will increase the quality of self in the community. When the quality of human resources increases, they are quickly absorbed in the world of work because they have expertise. This has an impact on job absorption and reduces the unemployment rate.
 - (iii) The third dimension is a decent life as measured by the average amount of per capita expenditure. If the people of an area have a high average per capita expenditure, this illustrates the high purchasing power of the people. This indicates a high community income and a low unemployment rate.

If all these three dimensions increase every year, then human development is considered successful. Thus the government has to successfully implement policies that result in increasing human development and making people quickly absorbed into the world of work. This is in line with Mahihody et

al. (2018)(21). The results of this study show the relationship between the minimum wage and the unemployment rate which is not significant. This means that the human development index does not have a significant effect on the unemployment rate. According to Latifah (2017)(25), it is said that the occurrence of unemployment is not only caused by the quality of human resources, but by the number of unemployed graduates who are not finding job opportunities.

6. CONCLUSION

Economic growth positively affects the unemployment rate in India in the short and long term during the period 2001-2021. Economic growth has a positive and significant effect on the unemployment rate in the long term. The minimum wage does not have a significant effect on the unemployment rate in the long run. The human development index does not have a significant effect on the unemployment rate in the long run. In the short-term VECM estimation test results, only economic growth has a positive and significant effect on the unemployment rate, while the minimum wage and the human development index have no significant effect on the unemployment rate in the short run.

This study provides appropriate information for the government to be able to reduce the problem of unemployment in India by using an economic and social approach. The study, however, suffers from the weakness that the data may be partially biased due to covid 19, and not reflect a real picture of unemployment in India.

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