MITIGATION OF UNEMPLOYMENT IN THE WORLD ECONOMY

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ABSTRACT

Unemployment rate and its mitigation is a major challenge for most economies. The present work attempts to study the determinants of unemployment and its mitigation in the world economy. The independent variables Gross Domestic Product (GDP), Inflation, Population, Foreign Direct Investment (FDI), Trade openness, Labour Force Participation Rate (LFPR), Gross Fixed Capital Formation (GFCF), Life expectancy, Secondary school enrolment and Interest rates were considered for the study. Panel data analysis was carried out on the secondary data for 74 economies. Data was taken from World Development Indicators of World Bank and International Financial Statistics. Random Effects Model and Fixed Effects Model were applied on the data. Fixed Effects (Robust) Model was chosen for analysis. Panel data analysis where FEM was used showed that GDP, inflation rate, population, GFCF and interest rates influenced unemployment significantly. Results confirmed the existence of Okun's law and Philip's curve in the world economy. Based on the results, boosting economic growth, maintaining moderate inflation rates and interest rate, increasing domestic savings so as to increase GFCF and ensuring that there are adequate resources and continuous innovation is taking place in the economy will reduce unemployment.

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Keywords: *Unemployment, GDP, Philp's Curve, World Economy.*

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Introduction

Sustainable Development Goal (SDG) 8 "Decent Work and Economic Growth" proposes countries to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" (United Nations). Only when an economy can achieve low unemployment and poverty levels can Sustainable Development Goal be achieved. Low unemployment rate is important because when a person is employed, he/she earns an income which can be used to improve the standard of living of himself/herself and their family. This reduces poverty levels also. The future generations will be able access better health care and educational facilities. Thus, future generations will be skilled for the labour market. This will help in development.

According to the World Employment and Social Outlook: Trends 2019 published by International Labour Organisation; the global population was around 7.6 billion people. In 2018, the global unemployment rate was 5 percent, that is approximately 172 million people were unemployed. Out of the working age population which was approximately 5.7 billion only 58.4 percent was employed. The global Labour Force Participation Rate (LFPR) was accounted as 61.4 percent. Economies are slowly progressing towards the SDG8. The challenges economies face in achieving the SDG require more attention. Careful analysis of the challenges will help economies to tackle them. A study of the determinants of unemployment would help in formulating policies that mitigate the unemployment problem and thereby achieve the sustainable development goal.

The present study aims to explore the relationship between unemployment and independent variables- Gross Domestic Product, Inflation, Population, Foreign Direct Investment, Trade openness, Labour Force Participation Rate, Gross Fixed Capital Formation, Life expectancy, Secondary school enrolment and Interest rates among 74 countries and to suggest and propose policy implications based on the results.

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Review of Literature

Unemployment can be defined as "a state where people are not working but are willing to work and are seeking work during the period of reference"(Prakash, 2002). Unemployment rate measures unemployment. "The unemployed people by the total labour force expressed as a percentage" gives the unemployment rate(S, Victoria Kenny, 2019).

Unemployment has social and economic consequences that make it a major concern. Social consequences include human capital skill erosion (Katarzyna Nagel, 2015), increases poverty (Atta & Cheema, 2014), results in brain drain (Maqbool, Mahmood, Sattar, & Bhalli, 2013), leads to social disharmony, health issues and psychological issues(Singh & Siahpush, 2015). Economic consequences are hampered growth and development(Mehra, 2018), increased burden on government in the form of reduced tax (Clas Eriksson, 1997) and exploitation of labour (K. Maithily & Dr. R. Sheeba, 2020). Unemployment might force families to cut down expenses. They do this by reducing expenses for the education of children or reducing medical attention to family members. This compromises future of children and pushes the economy further down resulting in a vicious cycle (Atta & Cheema, 2014). Hence, it is important that low unemployment levels prevail in an economy.

Determinants of Unemployment

- **Gross Domestic Product and Unemployment**

In 1962, Arthur Okun put forward the Okun's Law which states that "cyclical unemployment and GDP (Gross Domestic Product) growth has an inverse relation". The study was conducted in United States and found that a one percent decline in the unemployment rate resulted in three percent increase in GDP growth(Mehra, 2018)(Fuad M. Kreishan, 2011)(Harris & Silverstone, 2001). The study done in Nigeria covering a period of 1981 to 2016 showed a causal relationship between the unemployment and GDP growth. It was concluded that a unidirectional causality which flows from unemployment to real GDP existed in the economy(S, Victoria Kenny, 2019).

A study was conducted in India for the time period from 1991 to 2017 using Granger causality test observed an unidirectional flow from real GDP to unemployment (Sahoo & Sahoo, 2019). In Malaysia, Granger Causality test was applied and a coefficient of -1.75 was observed. Thus, a one percent decline in unemployment resulted in a 1.75 percent increase in GDP growth (Noor, Norb, & Ghanic, 2007). In Australia, Canada, Germany, Japan, New Zealand, the United Kingdom and the United States, the Okun's coefficient was found using the Cointegration and Asymmetric Dickey-Fuller test. Asymmetric Error-Correction Model was also applied. The coefficient was between -0.39 and -0.5 for all the countries, except for UK and Japan (Harris & Silverstone, 2001).

On the other hand, in Jordon structural unemployment existed. High economic growth couldn't solve the persistently high unemployment problem. Opportunities were taken by foreign workers even when the strong GDP growth created new jobs. The high expectations regarding wages and preferences for public sector jobs for the people of Jordan resulted in them not taking the newly created jobs. For this study, annual data for the period 1970 to 2008 - unemployment rate and GDP growth were collected. Results couldn't confirm the strong relation between these variables(Fuad M. Kreishan, 2011). In another research, unemployment rate was forecasted in U.S. economy and European economy post the 1990-92 and 2001 recessions. Results showed that it underpredicted the unemployment levels and hence, it was not a reliable indicator (Linda Levine, 2012). Thus, studies showed that there were exceptions to the existence of Okun's law.

- **Inflation Rate and Unemployment**

An inverse relation was observed by A. W. Philips in 1958 called Philip's curve. He proposed that when an economy experiences growth, inflation comes along with it which would lead to creation of more jobs and result in a decline in unemployment rate. Thus, there is trade off theory between unemployment and inflation (Kirandeep Kaur, 2014) (Dholakia & Sapre, 2011). In Pakistan, existence of Philip's curve was identified in both short run and long run. It was found that if inflation increased by one percent, then unemployment declined by 0.34 percent (Maqbool, Mahmood, Sattar, & Bhalli, 2013).In a study conducted in India, negative relationship between inflation and unemployment existed (Dholakia & Sapre, 2011). Another research conducted in India observed an inverse and significant relation between inflation and unemployment during 1990 to 2013 (Kirandeep Kaur, 2014). Data from Nigeria was analysed using Autoregressive Distributed Lag (ARDL) Model and Error Correction Adjustment. Significant negative correlation was observed between inflation and unemployment in both short run and long run (Saad Buba & Ibrahim Aljadi, 2017). Another study confirmed the macroeconomic inverse relationship in Nigeria (Oluwabunmi, 2017).

The variables under consideration were related positively in Bahrain with an insignificant coefficient - 0.02. The relationship did not exist in the economy due to stagflation. With an R squared of 76 percent, the model with independent variables GDP, inflation, government expenditure and GFCF explained 76 percent of the variation in the dependant variable - unemployment rate (Alrayes & Abu Wadi, 2018). In Ghana, higher inflation meant higher unemployment. That is, one percent increase in inflation resulted in unemployment rate to increase by 0.075 percent. (Lewis, Veronica, Francis, & Isaac, 2019). Inflation rate and unemployment were inversely related. However, depending upon the time period studied (short run or long run) and stage of development the economy is in, the relationship varied.

- **Trade Openness, Foreign Direct Investment and Unemployment**

The world is becoming more globalised and liberalised. Openness of the economy increased. This implied that the variables like exchange rate, foreign direct investment (FDI) and export-import have a larger impact on growth and unemployment. In Turkey, export led economic growth was not reducing unemployment problem. A positive insignificant relationship was found between exports and unemployment. Hence, the focus should be to increase skill of the labour force (Aktar, Demirci, & Ozturk, 2009).

In ten Asian countries- Pakistan, India, China, Japan, Bangladesh, Argentina, Algeria, Brazil, Colombia and Sri Lanka the impact of net exports and exchange rate on unemployment was analysed using Multiple Regression. Net exports were negatively related to unemployment. The results were significant (Chimnani, Bhutto, Butt, Shaikh, & Devi, 2012).

Independent variables - openness of trade, economic uncertainty (equilibrium exchange rate/ actual exchange rate) and Gross Fixed Investment (GFI (public sector+ private sector)) were considered in a study conducted in Pakistan. An inverse relationship between openness of trade and unemployment and between GFI and unemployment was observed (Atta & Cheema, 2014).

For the developing Asian countries positive relationship and for developed Asian countries negative relationship were found between FDI and unemployment. Thus, it was concluded that in developing countries, it was important that the entry mode of FDI made production labour intensive. Only then will the economy create more jobs (Hilom-Polinon & Hakim, 2019). Bi-directional causality was found between FDI and unemployment in the analysis done in Russian Federation. Quarterly data from 1992 to 2015 was taken for the study(Sadikovaa, Faisala, & Resa, 2017). A study conducted for the G10 countries for the period 1995 to 2014 showed that openness to trade and FDI have negative impact on unemployment (Ozcelebi & Ozkan, 2017).

Openness to trade can be captured through net exports or can be calculated as total sum of exports and imports by GDP. FDI measures openness in the financial market. In most studies FDI reduced unemployment. But in developing countries, a positive or no relationship between FDI and unemployment was found. Past empirical research shows that these variables are important determinants of the unemployment rate prevailing in a country.

- **Gross Fixed Capital Formation, Interest Rates and Unemployment**

Fixed capital formation can be defined as "the rate at which the capital stock of an economy changes". This change can be positive or negative.

A significant negative relationship existed between GFCF and unemployment in Bahrain. A coefficient of -5.45 was obtained which meant that as GFCF increased by one percent, unemployment levels declined by 5.4 percent (Alrayes & Abu Wadi, 2018).

Panel data analysis was used for Asian countries. The study period was 2006 to 2015. Three groups were made for the analysis - all Asian countries, developing Asian countries, developed Asian countries. Gross capital formation had a negative coefficient in all three cases(Hilom-Polinon & Hakim, 2019).Panel data analysis was conducted on 117 countries using the GLS method. The result showed that an inverse insignificant relationship existed between Gross Capital Formation and unemployment (Abdalali Monsef & Mohammadi Mehrjardi, 2017).On the other hand, for the period 1991 to 2017, in India, a positive coefficient was obtained for short run and long run (Sahoo & Sahoo, 2019).

As interest rates increased difficulty in borrowing loans also increased. This made it difficult for expansion activities and new businesses to function. So, a hike in interest rates resulted in increase in unemployment levels. Quarterly data of Pakistan from 1991 to 2011 was tested to find the relationship between interest rates and unemployment. Variance decomposition showed that approximately 10 percent of variation in unemployment was explained by interest rates which meant that interest rate did not significantly influence unemployment (Mahmood, Bokhari, & Aslam, 2013).

Granger Causality test revealed that real interest rates granger causes unemployment in Turkey in the long run. However, the reverse was not true. Monthly data from 2005 to 2009 was analysed. The Treasury Bill rate was taken as a proxy for interest rate (H. Gunsel Dogrul & Ugur Soytas, 2010).

Very few studies explored the relationship between interest rate and GFCF with unemployment. When the relationship was empirically tested the direction and magnitude could not be generalised to all countries.

- **Population, Labour Force Participation Rate and Unemployment**

As population growth increased in an economy, the labour force also increased. If the economy is unsuccessful in creating jobs for this increased labour force, then unemployment levels increase. However, an increase in population need not mean increase in labour force. For example, when more youth is pursuing education, the addition to labour force may not increase. Hence, variables population and LFPR have a significant impact on unemployment.

In the long run, population growth has a positive effect on unemployment. This was confirmed in a research done in Pakistan. (Maqbool, Mahmood, Sattar, & Bhalli, 2013). In short run and long run, Pakistan exhibited a positive relationship between the variables under consideration. Auto Regressive Distributive Lag (ARDL) test and Error Correction Model (ECM) was applied on data from 1990 to 2015 (Riaz & Zafar, 2018).

In Russia, results showed that a 1 percent increase in population growth resulted in 52.3 percent increase in unemployment levels (Sadikovaa, Faisala, & Resa, 2017).

A study compared the relationship of LFPR and unemployment between group of 22 OECD countries (1993-2008) and a selected group of 13 developing countries (1995-2006). It was seen that an increase in LFPR resulted in an increase in unemployment for both the groups. However, the increase was much higher in case of developing countries (Lee & Parasnis, 2014). Labour force had a negative coefficient in a study in India. Granger Causality test revealed a bi-directional causality between labour force participation and unemployment (Sahoo & Sahoo, 2019).

- **Health Status, Educational Status and Unemployment**

Human resource is a form of capital. The educational status and health status of the people impact how productive they are. Their participation in labour market is also dependant on this. Health status and educational status were measured using different proxies in different studies.

Data from 1990 to 2015, was studied in Pakistan using ARDL approach. Independent variables used to measure education were technical and vocational education, enrolment in degree college and enrolment in universities. In both short run and long run, technical and vocational education was positively related to unemployment. It was found that an insignificant relationship existed between unemployment rate and enrolment in degree colleges and universities with positive and negative coefficients respectively (Riaz & Zafar, 2018).

Panel data analysis results revealed a significant negative impact of life expectancy at birth on unemployment. That is, when life expectancy increased by one unit, unemployment decreased by 0.12 units (Abdalali Monsef & Mohammadi Mehrjardi, 2017). A similar inverse relationship was found between life expectancy and unemployment in United States (Singh & Siahpush, 2015).

In India, short run significant causality between literacy rate and unemployment was observed. In the long run, a negative coefficient was obtained. Here literacy rate was taken as a proxy for gross secondary school enrolment ratio(Sahoo & Sahoo, 2019).

In Nigeria, Auto Regressive Distributed Lag (ARDL) approach was applied in a study for the period 1970 to 2014. To capture the educational attainment in the country, secondary school enrolment was used as the proxy. Results of the study showed that in the current period as educational enrolment increased unemployment also increased. This positive relationship highlighted that there were other factors like lack of skills in the labour force, mismatch between training and job's requirement etc. that prevailed in the economy. This was a common feature of most developing countries. The impact of health status of the population on unemployment was also looked into in the study. Life expectancy was taken as the proxy. The results found an inverse relationship in the short run. However, in the long run, there was a positive relationship. "The economy must be highly productive, and continuous innovation should happen for improvement in health to be transformed into new employment opportunities. In many of the developing countries like Nigeria, the economy lacks such characteristics. In this situation health care development, which results in higher life expectancy was a burden to the economy" (Oluwabunmi, 2017).

Through review of literature independent variables- Gross Domestic Product, Inflation, Population, Foreign Direct Investment, Trade openness, Labour Force Participation Rate, Gross Fixed Capital Formation, Life expectancy, Secondary school enrolment and Interest rates were identified for the study. The use of panel data to explore the determinants of unemployment was relatively less in the past. Examining the world economy using the panel data was also limited. In the previous studies the combined effect of the variables was not looked into. The studies where relationship between interest rates, life expectancy, secondary school enrolment ratio, labour participation rate and unemployment rate were explored was also limited. Hence, in the present study panel data analysis was conducted.

Variables and Data Sources

The study identified 10 independent variables based on literature review. The data was taken from World Development Indicators of World Bank and International Financial Statistics (IFS). Unemployment rate is taken as the percentage of total labour force (modelled ILO estimate). Gross Domestic Product (GDP) and population is taken as percentage growth (annual). Net inflows as a percentage of GDP is Foreign Direct Investment. Inflation rate is based on consumer prices (annual) in percentage. Trade openness is calculated as exports plus imports divided by GDP. Labour Force Participation Rate (LFPR) is the total percentage of population age group 15-64 (modelled ILO estimate). Lending Rate of interest taken as percentage of principal. Life Expectancy at birth (in years) and Gross Enrolment Ratio for secondary school education was also included. Gross Fixed Capital Formation (GFCF) is a percentage of GDP.

Stata 13.0 software was used for the tests. The time period chosen for the study is 2001, 2011, 2012, 2013, 2014, 2015, 2016, 2017 of 74 countries. The data is complete for all the variables except for secondary school enrolment and interest rates. Imputed values were not taken because it may lead to the problem of underestimated population standard deviation. It also limits the tests and tools that can be applied on data.

Research Methodology

Hypothesis of the study can be given as;

H_o: The independent variables do not significantly explain the variations in unemployment.

H_a: The independent variables significantly explain the variations in unemployment.

Two types of models that can be used for panel data- Random Effects Model and Fixed Effects Model. Both the models are based on certain assumptions.

For each i, the model is given as.

$$Y_{it} = \beta_0 + \beta_1 x_{it1} + \ldots + \beta_k x_{itk} + a_i + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$t = 1, 2, \ldots, T$. Y= dependant variable, X= independent variable, a_i = unobserved effect, u_{it}= idiosyncratic error term.

In case of REM, a_i is assumed to be independent of the independent variables. That is, Cov (x_{itj}, a_i) = 0, t = 1,2,3,……, T; j = 1,2,3,….,k. The model utilises the between-groups information also.

In case of FEM, a_i is assumed to be correlated to the independent variables. This leads to endogeneity problem. To take care of this problem FEM uses Fixed Effects transformation or 'within' transformation. Using the Fixed Effects transformation, ai (and intercept) has been removed to get time-demeaned data.

FEM observes the cross-sectional component to be fixed, whereas REM observes it to be random. FEM fits better when all variables are time variant because FEM eliminates time constant data. If regressors are assumed to be correlated with error term, then FEM is suitable and vice versa.

Based on the literature review the regression model for the panel data and the signs of coefficients expected is specified below:

Unemployment= f (GDP+ Inflation + Population + FDI + Trade openness + LFPR + GFCF

$\qquad\qquad$ -   -   +   -   -   +   -

+ Life expectancy + School enrolment +Interest rate)

$\qquad$ +/-   +/-   +

Results and Analysis

Table 1: Results of Harris Tzavalis				
Name of The Variable	**Statistic**	**z**	**p Value**	**Inference**
Unemployment	0.2562	-10.5924	0.0000	Reject
GDP	0.1484	-13.3738	0.0000	Reject
Inflation	0.0882	-14.9293	0.0000	Reject
Population	0.4106	-6.6079	0.0000	Reject
FDI	0.0353	-16.2939	0.0000	Reject
Trade Openness	0.3434	-8.3416	0.0000	Reject
LFPR	0.3776	-7.4592	0.0000	Reject
GFCF	0.2589	-10.5221	0.0000	Reject
Life Expectancy	0.3521	-8.1188	0.0000	Reject
Secondary School Enrolment	Harris-Tzavalis test requires strongly balanced data			
Interest Rates				

Source: Author's Calculation.

Harris Tzavalis test was used to check stationarity of data. The test is most appropriate for the type of data in hand where N is large and t is small. As can be seen in table 1, it was found that all variables were stationary at level.

Table 2: Gives the Descriptive Statistics of the Data

Table 2: Descriptive Statistics						
Name of the Variable	**Mean**	**Standard Deviation (Overall)**	**Min (Overall)**	**Max (Overall)**	**N**	**t or t bar**
Unemployment	7.06949	5.29973	0.285	30.896	592	8
GDP	3.50793	3.05036	-21.594	25.1625	592	8
Inflation	3.95056	4.81226	-1.9862	54.4002	592	8
Population	1.41164	1.06608	-1.9906	5.43159	592	8
FDI	4.31589	7.34909	-28.583	82.114	592	8
Trade Openness	0.82465	0.52814	0.19798	3.79099	592	8
LFPR	68.6934	9.99072	41.568	89.984	592	8
GFCF	23.0776	6.72259	8.64097	58.826	592	8
Life Expectancy	73.1006	8.66767	45.204	84.0998	592	8
Secondary School Enrolment	86.1991	29.7883	6.487	157.168	485	6.64
Interest Rate	11.4885	10.6062	.5 60	60	420	7.5

Source: Author's calculation
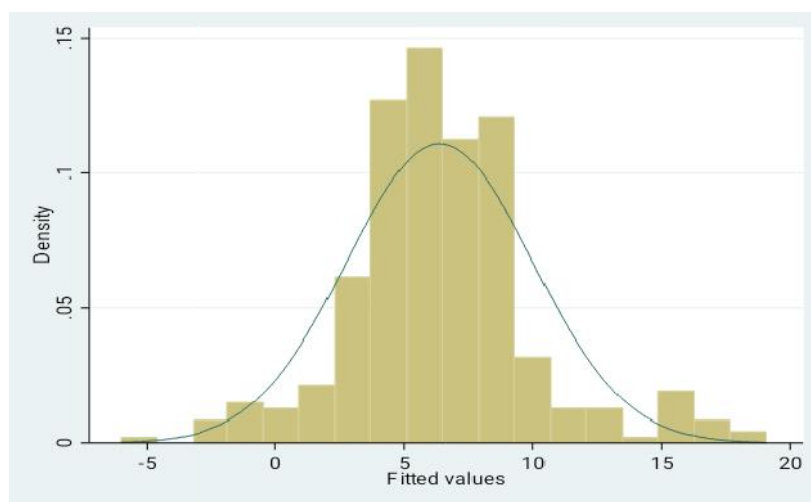
Figure 1: Histogram
Source: Author's calculation.

Assumptions of regression were tested. Normality was tested using Histogram (Figure 1) and Doornik-Hansen test. The chi square and p value of the Doornik-Hansen test were chi2(2) = 4.108 and Prob>chi2 = 0.1282. Results showed that the assumption is met.

White's test for homoskedasticity was applied to check the second assumption. The results were chi2(65)   =   224.14 and Prob > chi2 =   0.0000. Therefore, the null hypothesis cannot be accepted. So, the inference is that there is heteroskedasticity in the data. The assumption of autocorrelation was checked using Wooldridge test for autocorrelation. Results were obtained as F (1,   48) =   185.238 and Prob > F =   0.0000. It showed that data violates the assumption of no autocorrelation.

Variance Inflating Factor (VIF) and Tolerance (TOL) were used to detect problem of multicollinearity. The low VIF and high TOL showed that there is very low to medium multicollinearity in the data which was desirable.

Table 3: Results of VIF		
Variable	VIF	1/ VIF
Secondary School Enrolment	3.55	0.281720
Life Expectancy	2.72	0.367024
Interest Rates	1.98	0.504132
Inflation	1.84	0.543516
Population	1.79	0.560168
Trade Openness	1.49	0.670809
FDI	1.42	0.705748
LFPR	1.28	0.778419
GFCF	1.21	0.824388
GDP	1.16	0.859752
Mean VIF = 1.85		

Source: Author's calculation.

The scatter plot of residual vs fitted values, scatter plot that presents the graphical relationship between the variables in panel data analysis and panel data line plots for the significant variables is given in the appendix.

Random Effects Model and Fixed Effects Model was applied on the data. Hausman test was run on the data to choose between the models.

chi2(10)   = (b-B)'[(V_b-V_B)^(-1)](b-B)

                   = 3.18

 Prob>chi2   = 0.9768

From the results, the null hypothesis is accepted which implies that between Fixed Effects Model and Random Effects Model, the formal test suggests that Random Effects Model fits the data better.

However, Fixed Effects Model was chosen for the data because of the following reasons:

- The data includes time variant variables. Fixed effects model more suitable when impact of variables that vary over time is analysed.
- The within variation of all variables is large and significant which can be seen in table 4 given below.

Table 4: Withiin Variation	
Variable Name	Within Variation
Unemployment	1.412161
GDP	2.51878
Inflation	3.309793
Population	.3428677
FDI	4.731186
Trade Openness	.1088365
LFPR	1.637014
GFCF	3.112883
Life Expectancy	1.886498
Secondary School Enrolment	7.879659
Interest Rates	3.886137

Source: Author's calculation.

It can thus be concluded that Fixed Effect Model is more appropriate for the data at hand. The data violates the assumption of autocorrelation and homoskedasticity. Hence, it should be corrected in the model. Thus, a robust model is applied. The results are presented in table 5.

Table 5: Fixed Effects (Within) Regression (Robust)			
Dependant variable	**Coefficient**	**z**	**p Value**
Unemployment			
Constant	20.17173	2.63**	**0.011**
Independent variables			
GDP	-.0649641	-1.77*	0.083
Inflation	-.0889025	-2.46**	**0.017**
Population	-.9681849	-2.73**	**0.009**
FDI	.0022075	0.17	0.867
Trade Openness	-.5626483	-0.54	0.591
LFPR	-.0781467	-0.89	0.378
GFCF	-.0863956	-2.49**	**0.016**
Life Expectancy	-.0626955	-0.96	0.341
Secondary School Enrolment	.0020418	0.14	0.892
Interest Rate	.0664994	1.99*	0.051
Years	-.0960031	-1.38	0.174
R-sq. within = 0.2562 between = 0.3108	overall = 0.2820		
F(11,54) = 4.34 Prob > F = 0.0001			

Note: Robust standard errors (Std. Err. adjusted for 55 clusters in countrynum)
Note: ** Significant at 5%, * Significant at 10%.
Source: Author's calculation.

Inferences

The intercept was significant for the model. Among the independent variables, at 95 percent confidence level, inflation, population and GFCF have a significant impact on the dependant variable. Independent variables GDP, inflation, population, GFCF and interest rate have a significant impact on unemployment at 90 percent confidence level.

When Okun's law was empirically tested in world economy it was found that Okun's Law exists. That is, a negative relationship between GDP growth and cyclical unemployment was observed. As GDP increased by one percent, unemployment decreased by 6.5 percent. However, the p value becomes significant only at 10 percent significance level. Existence of Philp's curve in the world economy was also confirmed through the study. An inverse relationship, with a coefficient -0.089 was observed. Thus, the trade-off between these variables can be utilised in policy making.

Population had a significant negative impact on unemployment. This suggests that economies are not failing to create new jobs corresponding to the increase in population or that the increased population is not seeking jobs. People may not seek jobs when they are pursuing higher education. Though the p value is not significant, LFPR also has a negative coefficient. the inverse relation confirms that economies are successful in creating jobs as the labour force increases.

Results showed that FDI and unemployment is positively related. So, the nature of FDI that flows into a country and the entry mode would determine the impact on employment growth. With no restrictions on FDI in an economy, it increases capital movement. When this capital is invested in capital intensive techniques and technologies it reduced the need of labour. Then, FDI do not accelerate employment growth. Hence, policies that reduce restrictions on FDI should be carefully implemented. Trade openness had an inverse relationship with unemployment. As seen in past literature, increase in openness to trade reduced unemployment. Liberalisation of trade increased global demand. This increased the demand for labour.

GFCF has a significant inverse relationship with unemployment. As GFCF increased by one percent, unemployment decreased by 8.6 percent. This implied that increasing capital investments increased production and thereby increased requirement of labour. Hence, encouragement of capital investment in these countries would help economies to achieve low unemployment levels.

According to the results, improvement in health care resulted in decline in unemployment rate. As life expectancy increased, the people became more productive which means that a greater number of people engage in economic activities that can create new jobs. Thus, there will be an acceleration in employment growth. Improvement in education resulted in a rise in unemployment. Positive coefficient

was obtained for secondary school enrolment. When a greater number of people pursue higher education, there will be more skilled labour force. But economies fail to create jobs that match their skill-set leading to educated unemployment. Interest rates has a significant coefficient at 90 percent confidence level. This implied that an increase in interest burden increased unemployment. When borrowing became difficult, it led to reduced entrepreneurial activities and expansion which further increased unemployment. Time did not have a significant impact on unemployment. It was observed that with time, unemployment decreased.

The overall R-sq. is 0.2820 and between R-sq. is 0.2562. The Prob > F = 0.0001 signifies that the model is significant.

Regression equation is given as:

Unemployment = 20.17173 + -.0649641 GDP + -.0889025 inflation + -.9681849 population + .0022075 FDI + -.5626483 trade openness + -.0781467 LFPR + -.0863956 GFCF + -.0626955 life expectancy + .0020418 secondary school enrolment + .0664994 interest rates + -.0960031 years +

Where, = error term.

Policy Implications

The analysis reveals that policies that are effective for boosting economic growth will result in reduction of unemployment rate. However, it is important that the type of unemployment that exists in the economy should be cyclical unemployment. Maintaining inflation rate and interest rate at moderate levels will also help in achieving low unemployment levels. Adequate resources to cater the increased demand that comes from increased population growth will result in employment growth. Hence, policies should aim at encouraging the creation of opportunities. This can be done through entrepreneurship.

Modernisation of health care infrastructure and more research and development in health care is important. It is also important to improve the access to good health care by subsidising medicines and procedures. The acceleration of employment growth for skilled and qualified people of the economy is required which can be achieved by encouraging more Multinational Corporations to operate in the country. FDI inflows can result in a reduction of unemployment if a balance between labour-intensive and capital-intensive jobs in the economy is achieved.

Conclusion

Results showed that GDP, inflation rate, population, GFCF and interest rates influenced unemployment significantly. Results confirmed the existences of Okun's law and Philip's curve in the world economy. Understanding determinants of unemployment not only adds to the theories but also helps in mitigating unemployment problem. Though policies cannot result in a zero-unemployment rate situation, a coordinated effort of the government of the country, policy making institution, central bank, human resource department and educational system can reduce the inherent problems of the labour market. This will help in achieving the goal of low levels of unemployment. As unemployment rate reduces, the poorer and deprived section will also be uplifted. Eventually this will help in transforming the economy and achieving the Sustainable Development Goal.

**Limitations and Future Avenues of Study**

The study uses only 74 countries and limited number of years for the panel data analysis. This was due to the data unavailability issue. In future, the determinants of unemployment can be studied taking into consideration a greater number of countries and years. The effectiveness of the policies to reduce unemployment can be studied.

Appendix

The following countries were included for the analysis:

Australia, United Kingdom, Austria, Ghana, Burkina Faso, Guatemala, Bangladesh, Honduras, Bulgaria, Indonesia, Bahrain, India, Bolivia, Ireland, Brazil, Iceland, Botswana, Israel, Canada, Italy, Switzerland, Jamaica, Chile, Jordan, China, Japan, Cote d'Ivoire, Kenya, Cameroon, Korea Rep. ,Colombia, Sri Lanka, Costa Rica, Macao SAR, China, Germany, Morocco, Denmark, Madagascar, Dominican Republic, Mexico, Ecuador, Malta, Spain, Mauritania, Finland, Mauritius, France, Malawi, Gabon, Malaysia, Niger, Singapore, Nigeria, El Salvador, Netherlands, Sweden, Norway, Eswatini, Pakistan, Togo, Panama, Thailand, Peru, Tunisia, Philippines, Turkey, Portugal, Tanzania, Romania, Uruguay, Saudi Arabia, United States, Senegal, South Africa.

Source: World Development Indicators of World Bank.
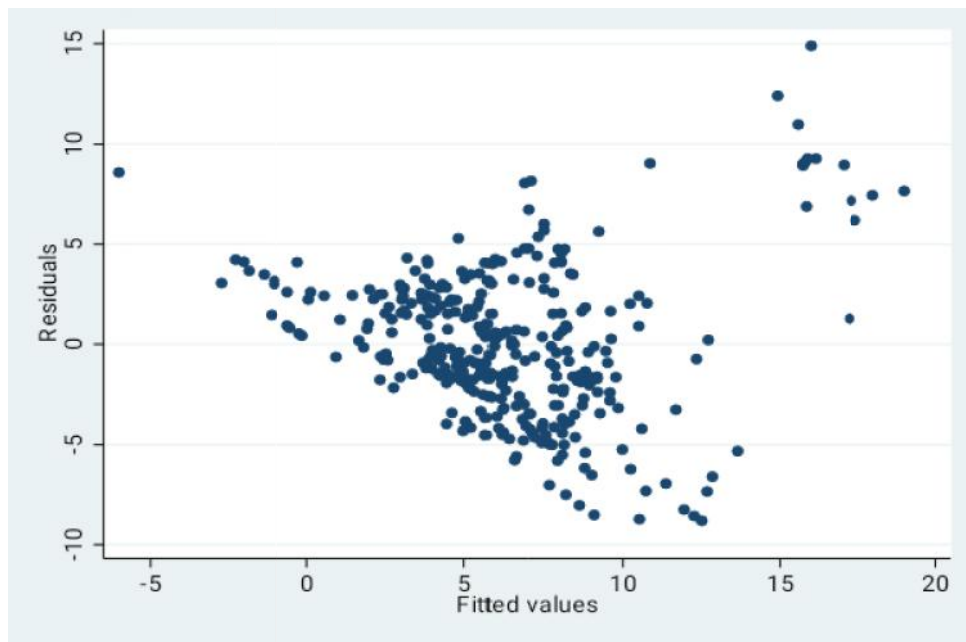
Figure: A1 - Residuals vs Fitted Value Showing Independence of Errors in Panel Data

Source: Author's calculation
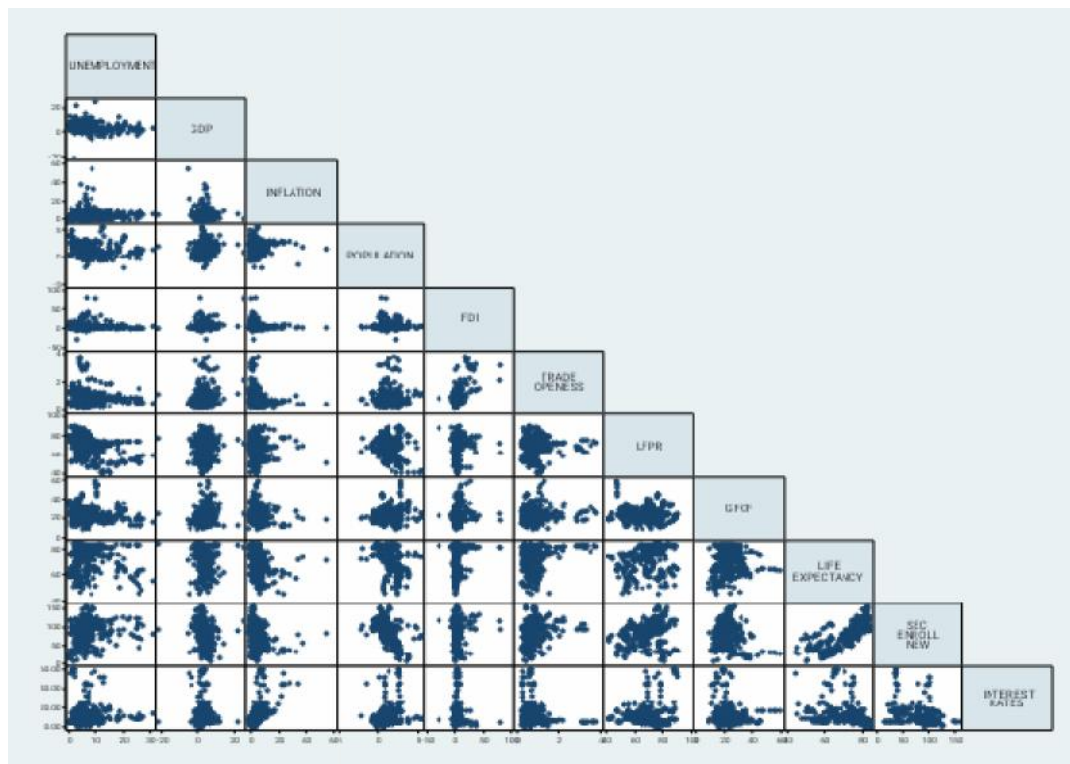
Figure: A2 -Scatter Plot that Presents the Graphical Relationship between the Variables in Panel Data Analysis

Source: Author's calculation

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