# MACROECONOMIC UNDERLYING FACTORS OF UNEMPLOYMENT IN PAKISTAN

Muhammad Ahmad Mazher[1]; Prof. Dr. Jauhari Dahalan[2]

[1]Doctoral Candidate, Business School, University Kuala Lumpur, Malaysia. Email: muhammad.mazher@s.unikl.edu.my
2Professor of Economics, Business School, University Kuala Lumpur, Malaysia. Email: jauhari@unikl.edu.my

**ABSTRACT**

Unemployment is one of the challenges facing today's world. The impartial of the study was to examine the long-run and short-run relationships between unemployment and its macro-economic determinants comprising energy usage, FDI, GDP growth, inflation deflator, and population over 1970-2018. After using the Augmented Dickey-Fuller (ADF) tests through Schwarz Info Criterion (SIC), Akaike Info Criterion (AIC) and Phillips-Perron (PP) for unit-root, this study employed Auto-Regressive Distributed Lag (ARDL) bounds testing approach. The regression result proposes that under short-run and long-run energy usage, FDI and Population have together been domineering in amplification of the long-run unemployment rate. The significant and negative coefficient of error correction term indicates to the high speed of adjustment to achieve the long-run equilibrium. In conclusion, the study proposes the government should increase the level of aggregate supply, economic growth along with job formation, form an encouraging environment that induces much foreign direct investments (FDI) and control the population pressure, consolidate the existing entrepreneurship activity with new entrepreneurial entrants to create more employment and fascinate a huge pool of unemployed population.

## 1. Introduction

To test the strength and growth of a given country's economy, unemployment is a foremost macroeconomic indicator consulted by Aurangzeb (2013a). According to Hamza & Kaushik (2015), unemployment deprives the obligatory resources of government that desired to develop the economy. It also distresses the rank of a nation in contrast to other nations. Unemployment is an obstacle for both developing and developed countries. Nevertheless, the impact and intensity might differ.

According to Refik et al. (2010), unemployment has been the steadiest problem in both developed and developing countries. According to CIA World Factbook (2018), the world unemployment percentage rate (as % of labor force) overall from 2009-2017 remains 8.7%, 8.8%, 9.1%, 9%, 8.4%, 7.3% and 7.9% respectively. Currently, in world ranking, Zimbabwe is on the top with 95%, Iran is on 58th position with 12.4%, India is on 96th rank with 8.8%, China is on 167th rank with 4% and Afghanistan is on 10th rank with 35% while specifically, Pakistan is on 132nd rank with 6% of unemployment rate. This critical high unemployment rate problem of each country, direct us to explore the macroeconomic determinants of unemployment in Pakistan. One of the robust facts of the labor market in Pakistan is the rapid growth of the labor supply. As of the young dominated demographic profile, the labor force is growing much more rapidly than the population as a whole.

Henceforward studying macroeconomic determinants of unemployment has been given many ranks in the policy preparation of many LDCs, observing it as a vehicle to alter the economic concert of these nations. Various studies have been steered on LDCs to perceive whether macroeconomic variables do contribute to reducing unemployment or not. The outcomes of these studies are substantial and significant and to forward relevant policy recommendations that would enable these countries to enjoy the benefits of knowing the foremost macroeconomic determinants of unemployment.

The conclusions of this study are held to make available a valuable contribution to the empirical source required for the appropriate considerate of the preceding routes and stretch stress for the impending process on unemployment matter. The study also enhances value to the stock of knowledge by showing the relationship between unemployment, Inflation deflator, GDP growth, FDI, and POP in the Pakistan economy. Solitary insufficient researchers did research particularly towards it, so far, it may only consider as an introduction towards the real unemployment rate of Pakistan. A lot has been done concerning macroeconomic determinants of unemployment throughout the world, but Pakistan's portion in the literature is small. Therefore, this study may provide particularized ideas and important guidance for policymakers, economists and researches those who are a great deal of interest in unemployment.

It is, consequently, required for Pakistani government to report the matter and a closer aspect into the policies that were once tracked by these governments in the direction of reducing unemployment and an empirical investigation to find out the macroeconomic determinants of unemployment is decisive and key to sustenance the country preparation for aching the ultimate goal of sustainable economic development and growth.

## 2. Literature Review

As indicated by Keynes (1936), unemployment happens if there isn't unrestricted aggregate demand in the economy to extend employment opportunities for everyone who wants and ready to work. The demand for most goods and services contracts, less manufacture is required and subsequently leading to a reduction in production and as a consequence fewer workers are required, then wages are sticky and do not drop to meet up the equilibrium level, and mass unemployment consequences. By methods for cyclical unemployment, the number of jobless laborers is over the figure for work opportunities, regardless of whether full employment was cultivated and every single uncovered employment was engaged, a few labors would, in any case, persevere jobless. Some partner cyclical unemployment from frictional unemployment as the components that reason the friction are respectably brought about by cyclical factors.

Marx (1863) presents his unemployment hypothesis and clarifies the idea of the industrialist method of production to over-burden a few laborers through assurance the rest as a save armed force of the jobless destitute individual. Marxists share the Keynesian thought regarding the connection between demand and employment, yet with the consideration that the market framework's inclination to cut wages and diminishing labor influence which on an endeavor level causes or roots a compulsory lessening in aggregate demand in the economy, all in all, causing misfortunes of joblessness and periods of low economic development before the capital aggregation period of economic development can remain. As indicated by Marx (1863), joblessness is inherent inside the insubstantial and uneven capitalistic system and intermittent tragedies of mass unemployment are to be unsurprising. The motivation behind the regular workers inside the capitalistic system is to offer a reserve labor force' that structures dropping weight on compensation. Marx (2008) contended that this reserve labor force challenges among themselves for helpless and undermines employments at lower and lower compensation.

Okun's theory (1962) depicts the demand sides have to raise sufficiently rapidly to fascinate and engage not only the rising labor force but also the workers made jobless by increased labor productivity. Okun (1962) examined connection amid the employment rate and the economic growth for post-war years in the United States of America (USA). During his assessment, he exhibited that a 3% increase in RGDP was linked with a 1%-point lessening in the rate of unemployment. According to Sarkar et al. (2018), this study suggests that, in South Asian countries, the growth rate of population, literacy rate, and birth attended by skill health staff affect much for the infant deathrate rate (mortality rate) instead of dependency ratio, mother's mean age initially birth and poverty. From the study is it vibrant that overpopulation creates most of the issues comprising unemployment etc.

As per the hypothesis of full employment, it is plausible to dispose of cyclical unemployment by expanding the aggregate demand for goods and laborers in the demand-based hypothesis. However, finally the economy knockouts an inflation hindrance constrained by different sorts of unemployment to the degree that they happen. Hossfeld (2010) contended that, through past realities, low unemployment troubles inflation for the time being however not in the long period. In the long term, the speed (velocity) of the Money Supply (Ms) measures, for example, the money zero development instead of money and comparable demand deposits, speed (velocity) is unmistakably more anticipating of inflation than low unemployment. Fernandez-Villaverde (2001) opposed Malthus's (1803) hypothesis of population growth, the expansion in total efficiency purposes behind the higher population through higher fertility and lower mortality. In the presence of a fixed contribution as land, this higher population guides or prompts lower marginal productivities that declining per capita income back to the stationary level past to the innovative improvement. Malthus' model is reasonably fruitful to represent the primary realities that attained until the nineteenth (19th) century, however, its desertions to explain the conjunction of growth in per capita income and low fertility.

Muhammad, Tahir Mahmood, & Bhalli (2013) revealed that unemployment was forcefully positively related to population and external borrowings. Yet, it has a negative relationship from the gross domestic product and FDI. The Research additionally demonstrated the opposite and massive connection among unemployment and inflation both in the short and long-run. An experimental examination made by Eita & Ashipala (2010), explored the reasons for unemployment in Namibia for the period 1971 to 2007. The examination expected to research the determinants of unemployment through inferring productivity efficiency, real wages, consumer price index (CPI), total investment, and output gap (Ya and Yp are real and potential output) as independent or unrestricted factors. The unemployment model (with macroeconomic factors) was evaluated utilizing the Engle-Granger two-step econometric methodology. The outcomes exposed a negative connection between unemployment and inflation. Increment in investment makes unemployment reduces fundamentally. The results affirm that the Phillips curve holds for Namibia and unemployment can be diminished by expanding aggregate demand.

Referring to Folawewo & Adeboje (2017) explored macroeconomic determinants of unemployment: empirical evidence from the economic community of West African states, using fixed and random effects, and fully modified ordinary least squares (FMOLS) panel data estimation techniques for annual data from 1991 to 2014. An empirical analysis was performed at both aggregate ECOWAS data level and sub-regional levels, that is Francophone and Anglophone country levels. The conclusion reveals that GDP growth deteriorating but the unrelated effect on the unemployment rate, which directs low employment elasticity of growth in the region. Inflation has a desirable positive impact on unemployment, indicating invalidity of the Phillips curve hypothesis. More, the imperative result of the study was the positive impact of labor productivity on the unemployment rate, reflecting a trade-off between labor productivity and employment. Further, FDI and external debt employ a weak negative influence on unemployment, whereas population growth has an increasing outcome. According to Mukhtar et al. (2018), one of the main drivers of a good economy is the banking system. Without

an efficient banking system, there is a risk for the whole failure in the economy with the resultant consequences of the high cost of living, unemployment, inflation, the falling value of currencies, etc. The findings in these studies indicate a different result at different times within the same jurisdictions. The findings of the study show contrary results from the anticipated, but sort of living, inflation and unemployment influence significantly in the Malaysian economy as well as its banking system.

Kajo (2018) described that the Syrian economy has been suffering from this war. The numbers are evidence of the deterioration of the Syrian economy and therefore the loss of billions of dollars since the start of the war, especially the energy, industrial and agricultural sectors, FDI, etc. Syria also suffered mass exodus and emigration. Have very serious indications and indicators. However, the research shows that the Syrian economy has all the weather to return to the higher than it had been within the field of agriculture, it's the required infrastructure of dams and land and agricultural expertise acceptable but needs to develop to return to what it was. To achieve the best and to upgrade to better than it was in the introduction of some things that are considered sophisticated and the country needs foreign expertise to do so. It has been found that the main factor of development (employment, FDI, GDP, etc.) and reconstruction is the elimination of terrorism and internal reconciliation among the components of the Syrian people and the return of lost stability, which is critical for any development process. According to Das (2019), the study aims to understand the significance of providing financial literacy knowledge and to identify the factors which affect stock market participation (Foreign Direct Investment). Besides, the study concentrates to identify the financial knowledge indicators (FDI, Growth, etc.) and analyze the relationship between investment and financial knowledge. The study reveals that all financial factors having a significant relationship with stock market participation and enhancing market and FDI make the cause of the reduction in unemployment and an increase in GDP as well as FDI in any country.

Xuen et al. (2017) steered a study to macroeconomic factors distressing the unemployment rate in China. The study engrossed macroeconomic aspects distressing the unemployment rate in China by studying the long-run relationship between 1982 to 2014. The anticipated independent variables comprised Inflation, GDP growth, population and foreign direct investment (FDI) that distresses the unemployment rate in China. The researchers employ the Augmented Dickey-Fuller (ADF) unit root test and Auto-regressive Distributed Lag (ARDL) approach. The outcome specifies GDP growth and population are significant to the unemployment rate which confirmed that long-run relationship occurs between them whereas inflation and foreign direct investment show insignificant relationship towards the unemployment rate.

## 3. Motives and Hypotheses

The overall motive of our research study is to perceive and examine the macroeconomic causes of unemployment in Pakistan from 1970-2018. In-perspective of the general impartial this research study efforts to conquer the succeeding unambiguous objects:

i. To extract the short-run relationship between macroeconomic determinants and unemployment.
ii. To extract the long-run relationship between macroeconomic determinants and Research Hypothesis

Based on overall research motives, we establish the null and alternative hypotheses for our research.

$H_0$: Selected macroeconomic variables have no relationship with unemployment in the short-run and long run.
$H_1$: Selected macroeconomic variables have a relationship with unemployment in the short-run and long run.

## 4. Research Methodology and Econometric Model

The unit of study in our research analysis is the economy of Pakistan. The annual time-series secondary data were obtained from the World Development Indicators (WDI) from 1970 to 2018. The data from WDI reliable because many studies have collected the data published by this institution.

The econometric model established for answering the research problem is as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Here,

Y representing as a dependent variable named in our model is unemployment,

$\beta_0$ is constant,

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are coefficients of independent variables.

While X1, X2, X3, X4, and X5 representing energy usage, FDI, GDP-Growth, Inflation deflator, and Population respectively.

More, $\varepsilon$ representing the error term in our model.

Hence our model will as;

$$\text{Unemployment} = \beta_0 + \beta_1(\text{Energy usage}) + \beta_2(\text{FDI}) + \beta_3(\text{GDP Growth}) + \beta_4(\text{Inflation Deflator}) + \beta_5(\text{Population}) + \varepsilon$$

The linking amid unemployment and energy usage, FDI, GDP growth, inflation deflator, and population combined in our research study restrained through empirically comprises;

i. unit-root test,
ii. the Johansen co-integration test,
iii. error correction model,
iv. ARDL short-run and long-run analysis.
v. Diagnostic tests that comprise normality, serial correlation, heteroskedasticity, and CUSUM assessments.

## 5. Data Analysis and Results

### 5.1. Unit-root Test

The following table showing the unit-root analysis through Augmented Dickey-Fuller (ADF) tests through Schwarz Info Criterion (SIC), Akaike Info Criterion (AIC) and Phillips-Perron (PP).

| Unit-root Tests | | | | | | |
|---|---|---|---|---|---|---|
| Variables | ADF-SIC | | ADF-AIC | | PP | |
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| Energy usage | 0.2415 | 0.0001 | 0.2415 | 0.0001 | 0.2916 | 0.0001 |
| FDI | 0.0000 | - | 0.0000 | - | 0.0000 | - |
| GDP Growth | 0.0000 | - | 0.0000 | - | 0.0000 | - |
| Inflation Deflator | 0.0004 | - | 0.0004 | - | 0.0004 | - |
| Population | 0.0242 | - | 0.0376 | - | 0.0007 | - |
| Unemployment | 0.1786 | 0.0000 | 0.1786 | 0.0000 | 0.1463 | 0.0000 |

The above all three tests revealing that variables are stationary at the level I(0), and the first difference I(1). The outcome directs the application of the ARDL bound test.

### 5.2. Lag-Length Criteria

| Lag | AIC | SC |
|---|---|---|
| 0 | 11.66555 | 11.91888 |
| 1 | -1.724726 | 0.048598 |
| 2 | -4.522132 | -1.228817 |
| 3 | -6.296199 | -1.482893 |
| 4. | -8.473622* | -2.140324* |

Where * indicates lag-order selected by the criterion. The above table revealing that leg-length will be four (4) as per both criterion AIC and SC.

### 5.3. Johansen Co-integration Test

| Unrestricted cointegration rank test (trace – test) | Unrestricted cointegration rank test (maximum eigenvalue – test) |
|---|---|
| Trace test indicates four (4) cointegration(s) at 5% level. | Maximum eigen value indicates four (4) cointegration(s) at 5% level. |

The above table confirms through trace-test and maximum eigenvalue that four (4) cointegrations at a 5% level of significance.

### 5.4. F-Bounds Test

| F-Bounds Test | | $H_0$: No. Levels Relationship | | |
|---|---|---|---|---|
| Test Statistic | Value | Significance | I(0) | I(1) |
| F-Statistic | 4.440161 | 10% | 2.08 | 3.00 |
| K | 5 | 5% | 2.39 | 3.38 |
| | | 1% | 3.06 | 4.15 |

More, the above table confirms that the F-statistic value (4.440161) is greater than the upper limit of significance at 5%. It leads that there are cointegrations that exist among the values.

### 5.5. ECM Regression

| Error Correction (ECM) Regression - Restricted Constant and No Trend Sample Period: 1970 - 2018 | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Standard Error | t-Statistic | Probability |
| CointEq(-1)* | -0.542159 | 0.086981 | -6.233090 | 0.0000 |

The significant and negative coefficient of error correction (ECM) term indicates to the high speed of adjustment to accomplish the long-run equilibrium.

### 5.6. ARDL – Short-run Analysis

| Conditional Error Correction (ECM) Regression | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Standard Error | t-Statistic | Probability |
| C | 101.8543 | 46.16508 | 2.206306 | 0.0372 |
| Energy Usage (-1) | 89.59820 | 22.38831 | 4.002008 | 0.0005 |
| FDI (-1) | 0.889535 | 0.374643 | 2.374352 | 0.0259 |
| Population (-1) | -42.73482 | 11.95604 | -3.574331 | 0.0015 |

Through ARDL short-run analysis, we initiate that population having a negative but significant relationship while energy usage and FDI exposing positive significant relation with unemployment in Pakistan.

### 5.7. ARDL – Long-run Analysis

| Leves Equations – Restricted Constant and No-Trend | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Standard Error | t-Statistic | Probability |
| C | 187.8678 | 89.61687 | 2.096344 | 0.0468 |
| FDI | 1.640726 | 0.536200 | 3.059915 | 0.0054 |
| Energy usage | 165.2618 | 40.16771 | 4.114294 | 0.0004 |
| Population | -78.82338 | 22.53948 | -3.497124 | 0.0019 |

EC = Unemployment - (0. 165.2618*Energy usage + 1.6407*FDI + 0.4665*GDP Growth -0.1196*Inflation Deflator - 78.8234*Population + 187.8678)

The above long-run ARDL estimation outcomes revealing that FDI and energy usage having a positive significant relationship with unemployment while the population showing a negative and significant relationship with unemployment in Pakistan.

### 5.8. Normality Test
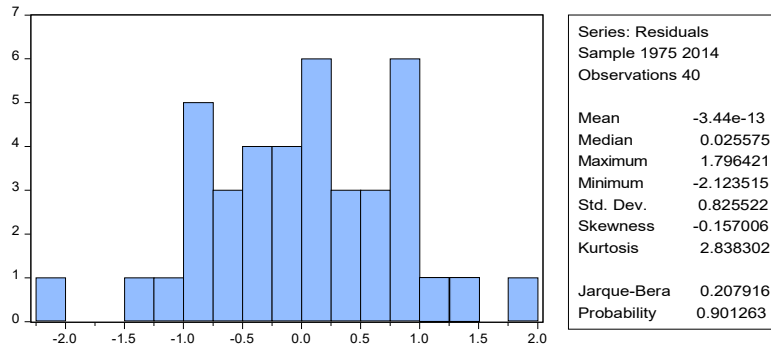


The probability value is more than 5% which indicate about data is normally distributed and fit for econometric analysis.

### 5.9. Serial Correlation Test

| Breusch-Godfrey Serial Correlation LM Test | | | |
|---|---|---|---|
| F-statistic | 1.458988 | Prob. F (4,20) | 0.2518 |
| Obs*R-squared | 9.035397 | Prob. Chi-Square (4) | 0.0602 |

As the probability Chi-square value is more than 5%, it leads to the non-existence of serial correlation problems in the data.

### 5.10. Heteroskedasticity Test

| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | |
|---|---|---|---|
| | | | |
| F-statistic | 1.204009 | Prob. F (15,24) | 0.3328 |
| Obs*R-squared | 17.17553 | Prob. Chi-Square (15) | 0.0085 |
| Scaled explained SS | 5.683289 | Prob. Chi-Square (15) | 0.9846 |

The above estimations of Probability chi-square are also more than 5%, leads to the absence of heteroskedasticity problems in the data.

### 5.11. CUSUM and CUSUM Square Test
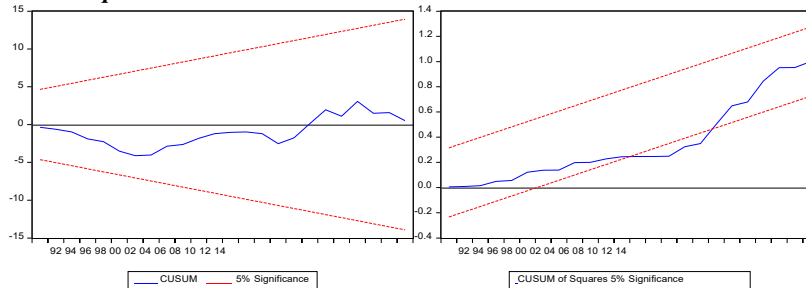


The CUSUM test confirms the fitness of our estimated econometric model as the fitted line remains inside both upper and lower limits. Hence, our estimated model if fit and provide robust outcomes.

## 6.  Conclusion and Implications

The unemployment is a socio-economic wonder, in which portion of the labor force is not involved in the production of goods & services. In actual economic life, unemployment appears as an excess of supply of labor over demand on it explained by Malika et al. (2017).

ARDL Bounds testing approach demonstrates that there is a long-run relationship amid the unemployment rate and foreign direct investment (FDI), energy usage, and population. Our study performed diagnostic checks, the results show that there is no serial correlation, no conditional heteroscedasticity, and no specification error and there is a normal distribution in the ARDL model. The CUSUM and CUSUM Square statistics are well within the 5% critical bounds. Finally, the study suggests the government should increase the level of aggregate supply, economic growth along with job creation, create a conducive environment that entices much foreign direct investment (FDI), consolidate the existing entrepreneurship activity with new entrepreneurial entrants so as to create more employment and absorb a large pool of an unemployed population.

The results obtained here could be improved in many ways. Future researches can extend including other variables as well as microeconomic and non-economic determinants of unemployment in Pakistan and causality. At this juncture, the sample size is only forty-eight years (1970-2018). But if we use longer data periods than that, we would be able to get more comprehensive results.

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