The Persistent Challenge of Unemployment in Pakistan: A Quantitative Analysis of its Determinants

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Abstract

Unemployment, a global issue affects most of the countries and Pakistan is no exception. Unemployment in Pakistan is a major and long lasting problem that has an impact on people's lives, the economy, and society. The persistence and severity of the issue motivates to investigate the potential macroeconomic factors that affect Pakistan's unemployment rate. The main factors analyzed in this study are GDP, trade, technical cooperation grants (TCG) and inflation. TCG is included in the model of unemployment for the first time. Inclusion of inflation and GDP in the model helped to revisit the implications of Okun's Law and Phillips curve. ARDL is used to account for long-term and short-term effects over the period 1980 to 2022. The findings reveal that GDP and trade have a significant and negative impact in long run as, a 1% raise in GDP results in 17 points decrease in unemployment and a 0.81% decrease in unemployment occurs when trade is raised by 1%. TCG and inflation found to have an insignificant effect on unemployment in the long run but TCG shows significantly negative effect in short run. The results imply that reassessing and enhancing the efficacy of TCG programs, trade liberalization, economic expansion and generating employment opportunities should be given priority to bring down Pakistan's unemployment rate.

Keywords: Unemployment, Inflation, Technical Cooperation, Okun's Law, Phillips Curve.

Introduction

Employment is considered as a prime goal for attaining targeted economic growth and prosperity hence a nation thrives to create more and more jobs however, regardless of a nation's level of economic development, unemployment has always been a problem. Unemployment being a global issue affects a great proportion of people across the globe. There are 207 million people who are unemployed worldwide and the rate of global unemployment was 6.2% in 2021 which is decreased to 5.9% in 2022. The unemployment rate for low-income countries and high-income countries are 6.0% and 4.9% respectively. A total of 39.3 million people are unemployed in South Asia with rate of 5.6% (ILO, 2022). Unemployment lowers down the income level and induce bad impression on programs targeted at poverty reduction. In Pakistan, unemployment is a major and long lasting problem that has an impact on people's lives, the economy, and society. According to the World Bank (2022), Pakistan's unemployment rate has been rising steadily, reaching to 8.5% in 2022, with youth unemployment being a major concern.

International Labor Organization(ILO) defined an unemployed person as an individual who is 15 years of age or older and fulfills three requirements: being jobless for a specific week; being available to start a job within two weeks; and actively seeking employment during the previous

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four weeks. Keynes (1936) defined unemployment as "an excess supply of labor resulting from a failure in the market economy". Reserve Bank of Australia, explains the three types of unemployment as, people experience frictional unemployment when they enter and exit the labor force as well as when they move between jobs in the labor market. Changes in economic activity cause cyclical unemployment throughout the business cycle, while a mismatch between the number of job seekers and the available jobs result in structural unemployment.

Over the years, Pakistan's economy has gone through phases of expansion and contraction impacting job market and employment prospects. The population of the nation is expanding quickly, United Nation (2022) estimated 235.83 million as of 2022 with 1.91% increase from 2021. Pakistan shares 2.83% in world population and is ranked fifth among the most populous nations and a sizable portion of its youth are joining the workforce annually. Pakistan's economy and labor market face both opportunities and challenges as a result of this demographic shift. Pakistan's economic growth, social stability, and human development are all seriously impacted by unemployment because it can result in poverty and lower household incomes.

Various factors affect unemployment in Pakistan like the educational system in Pakistan has not been able to generate skilled laborers who meet market demands. Only 15% of the workforce, obtained vocational training, which resulted in a sizable skill mismatch (Pakistan Economic Survey, 2021). High unemployment rates are the result of political unrest and economic uncertainty, which have deterred foreign direct investment and impeded economic growth. As per the World Bank (2022) Pakistan has undergone multiple political shifts and economic crises, such as the global financial crisis of 2008, the energy crisis of 2013, and an unstable government regime, particularly in the last ten years. Over 60% of people in Pakistan are under age 25. Despite this, the country's economy has not been able to produce enough jobs to accommodate this demographic surge, which has resulted in a high youth unemployment rate of 8.5% (ILO, 2022).

The unemployment rate in Pakistan over the time period of 1980-2022 is depicted in the following graph:

Figure 1: Unemployment Rate in Pakistan
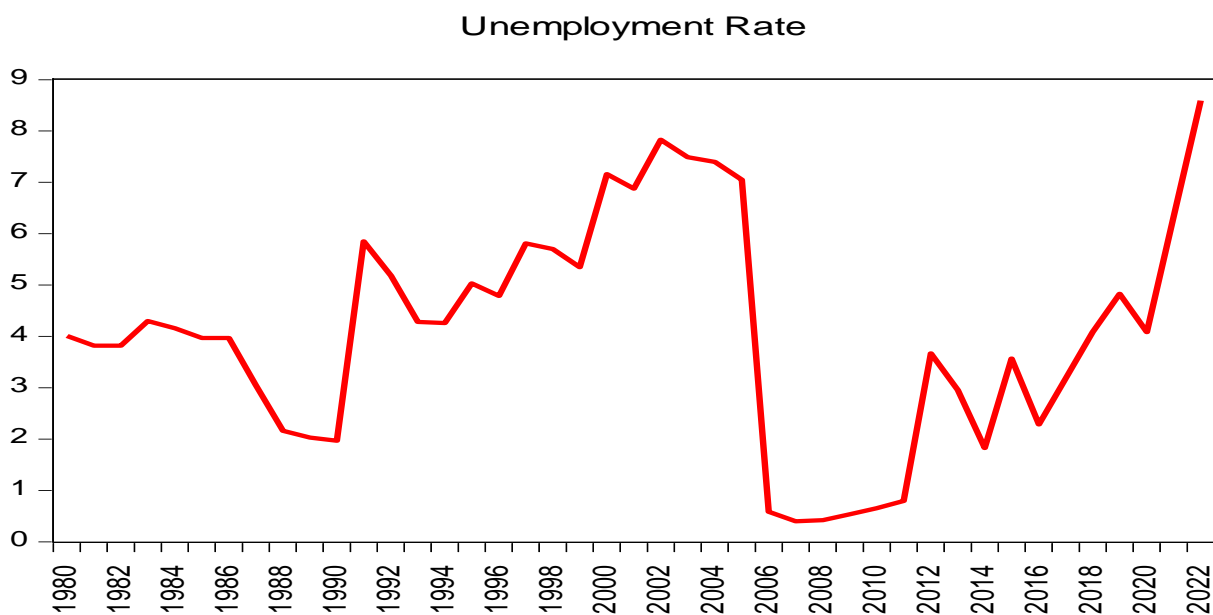
This study aims to contribute to the existing literature by examining the macroeconomic determinants of unemployment in Pakistan. Looking into the short and long-term impacts of various macroeconomic variables on unemployment from a fresh perspective and to incorporate Technical Cooperation Grants (TCG) variable which has not yet been taken by researchers. Specifically, this research attempts to investigate the relationship between GDP, Inflation and Unemployment in Pakistan and to examine the role played by trade openness in determining unemployment in Pakistan and the extent to which this relationship hold true. Further this study examine the role of technical assistance provided by government in reducing Pakistan's unemployment and to analyze whether the TCGs are contributing to the fight against unemployment. Also to offer possible policy suggestions based on the study's findings for lowering Pakistan's unemployment rate. The aim is realized by employing Autoregressive Distributed Lag (ARDL) for data analysis over the time span of 1980-2022.

Although the problem of unemployment has been thoroughly studied, it still exists, therefore this study aims to identify the vital macroeconomic determinants and reconcile the disagreements among researchers. This study will add to the literature by providing further evidence on determinants of unemployment and incorporating for the first time the role of technical assistance in unemployment model. Unemployment has numerous significant social and economic costs, including poverty, inequality, crime, social unrest, and hindering economic growth and development. By addressing the determinants of unemployment, this study will help to improve social well-being and promote economic development in Pakistan. The study's findings will not only affect policies related to Pakistan's labor market but also provide guidance for other developing countries which are in line of similar problems like unemployment and stagnant economic growth.

Literature Review

Unemployment remains a pervading global issue, generating considerable research interest worldwide. In Pakistan, researchers have broadly studied unemployment in relation with various economic, social, and political factors. Maqbool et al. (2013) revealed that population is positively related with unemployment, while GDP and FDI have inverse correlations. External debt and private sector investments, however, were found to be insignificant in lowering unemployment. Kamran et al. (2014) investigates that unemployment rate decreases by 0.63% as interest rates increases by 1%. Additionally, the study indicated that a 1% increase in literacy was associated with a 6.759% increase in unemployment, pointing towards frictional unemployment due to inconsistency between job descriptions and qualifications. Cheema and Atta (2014) further extended this by discovering that output gap, productivity, and economic uncertainty positively affected unemployment, while gross fixed investment and trade openness had opposite effects. Their findings focus on the significance of policies that emphasis on GDP growth, depreciation, and investment to lower unemployment in Pakistan. Mahmood et al. (2014) emphasized the importance of addressing financial uncertainty, economic growth, and poverty in lowering unemployment. Due to inverse relationships between FDI, inflation, and unemployment, increasing FDI and controlling inflation can significantly lower unemployment. Arslan and Zaman (2014), find out inverse correlation between FDI, inflation, and unemployment, while population growth depicts a positive relationship. Their findings were in line with Keynesian economics, showing that policies encouraging FDI and economic growth can help to reduce unemployment. Riaz and Zafar (2018) referred to the positive influence of technical and vocational education on unemployment rates, revealing that human capital development is vital for lowering unemployment in less developed nations. Ahmad and Khan (2018) added that promoting public expenditures are essential to reduce youth unemployment as youth unemployment was positively affected by wage rates and population growth, while government spending had

inverse relationships. They further focused on the vitality of projects like the Pakistan China Economic Corridor in lowering unemployment and boosting economic growth.

Apart from economic factors, researchers also have investigated gender-specific and energy-related aspects of unemployment. Shabbir and Zeb (2019), discovered that exchange rate depreciation and inflation add to female unemployment, while budget deficits lower it in the short run. Azhar et al. (2019) find significant long-term influence of and point to need for policies addressing the output gap, energy supply, and real exchange rate to reduce unemployment. Comprehensive reviews of recent studies underscore the diverse nature of unemployment in Pakistan as Imtiaz et al. (2020) and Siddiqa (2021) referred to overpopulation and political instability having positive relationships, while better education lowers unemployment rates. Shahzad et al. (2023) found that economic globalization positively affects unemployment, while Asif et al. (2023) point to the urgent need to address factors like lack of education, inefficient skills, and poor economic conditions to lowers the 37.2% youth unemployment rate in Pakistan, which is far higher than the overall unemployment rate of 6.7%. Binuyo et al. (2024) found that trade openness, GDP, and institutional quality have negatively relationships with unemployment in Sub-Saharan Africa, pointing to similar dynamics in Pakistan.

Even after extensive research, there is still a significant knowledge gap about the factors that lead to unemployment in Pakistan. Numerous economic, social, and political variables have previously been investigated in relation to unemployment which include GDP, inflation, education, foreign direct investment, population, and political instability with small amount of data available until 2015 on average. Not enough attention is paid to how the government can reduce unemployment by taking technical cooperation grants into account which can improve the transfer of technology to build overall national capacity. This study aims to address these limitations by examining the short and long-term relationships between unemployment and GDP, inflation, trade, and technical cooperation grants using the Autoregressive Distributed Lag (ARDL) approach, which can account for both short- and long-term dynamics and will sheds light on to what extent is government helping in lowering unemployment via TCG This research attempts to fill this vacuum in the literature, provide a deeper comprehension of Pakistan's unemployment factors, and assist in the development of effective policies to address this pressing issue.

Theoretical Framework and Methodology
Theoretical Framework

The theoretical basis of unemployment and its determinants can be found in economic literature. The two popular theories are Okun's Law (1962) and Philips Curve (1958). In the literature of economics, the inflation-unemployment relation is attributed to Philips and is known as Philips curve. The seminal work of Philips (1958) however linked wages and unemployment showing that there is likely a high non-linear relation between unemployment and rate of change of money wage rates, as the later increases rapidly when unemployment is low, and decreases rapidly when unemployment is high. In other words, due to high labor demand and fewer worker's availability employer from every firm will bid above the prevailing rate to accommodate worthy labors from other firms and this surge in money wage tend to reduce unemployment while, with lower demand for labor and high unemployment, workers oppose to serve at lower than prevailing rate hence wages fell slowly and unemployment increases further. The reason for this non-linearity is that to cope up with increase in labor demand, instead of rising wages much, there is great reserve of labor which is drawn upon while in other case wages increases sufficiently to meet the rising demand for labor because there is small reserve of labor due to low unemployment. Phillips laid a firm base for later research as wage inflation is related to price inflation in way that it increases production costs

and ultimately prices. Later on Paul Samuelson and Robert Solow (1960) add further by replacing wage inflation with price inflation and deriving negative relationship between unemployment and inflation which is the core concept of Phillips Curve.

Attaining full employment is the very goal of policies, which are formulated to affect unemployment through aggregate demand and production. With expansion in GDP the demand for goods increases and more labor is employed to meet the increasing demand which ultimately lowers the unemployment while in the opposite case businesses tend limit their workforce and unemployment rises. On account of production when economy is producing below the potential output it does not utilize its labor resources efficiently and unemployment rises this indicates the importance of output in lowering unemployment. According to Okun (1962) on average, a 3% decrease in real output shows that unemployment is increased by 1% above the 4 percent. Further it is found that unemployment rose by 0.3-point even if real output is unchanged from previous quarter to the next because increase in both productivity and labor force tend to push further unemployment rate.

From the literature trade is important factor in determining unemployment for instance Cheema and Atta (2014) found inverse impact of trade on unemployment which guide this study to incorporate trade however there is no attention paid to how the government can tackle unemployment by taking technical cooperation grants into account which can improve the transfer of technology to build overall national capacity.

Keeping in consideration the above details the following model is defined.

$$UER = f (GDP, TRD, INF, TCG)$$

UER= Unemployment rate, it is taken as a percentage of total labor force.

GDP = Gross Domestic Product taken in constant 2015 US dollar.

INF = Inflation quantified by the consumer price index.

TRD= Trade, Total exports and imports expressed as a percentage of the GDP.

TCG = Technical cooperation grants, having two categories: investment-related TCG are given to improve the ability to carry out particular projects, and free-standing TCG are intended to support the transfer of technology in order to improve overall capacity of nation. This study used TCG as total including both categories.

Methodology

In order to estimate the defined model of unemployment in the theoretical framework section initially stationarity of the variables is checked. Testing stationarity is important to avoid spurious regression because time series data involves observations on one or more variables over time. This study used Augmented Dicky-Fuller (ADF) to carry out unit root test and to list order of integration. Then ARDL bound cointegration test is employed to ensure existence of long run relationship. After this the study delves into long run and short run estimation by means of ARDL technique. Various diagnostic tests are performed to check for any potential issues in the model.

Autoregressive Distributed Lag (ARDL)

Various cointegration methods exist, such as the Engle Granger, Johansen Jousilus, and ARDL techniques. The order of integration influences the approach selection. When all variables are stationary at level I(0) then OLS is applied. For single explanatory variable when all variables are integrated of order I(1), then the technique of Engel Granger Cointegration is utilized. The Johanson Juselious cointegration technique is used when there are multiple independent variables with similar order of integration while ARDL is used for different order of integration. In this study the model is a mix of I(0) and I(1) variables so ARDL is applied.

The ARDL model was presented by Pesaran and Shin (1999) and expanded by Pesaran et al. (2001).

ARDL general form (p, q) is given as;

$$Y_t = \alpha_0 + \sum_{j=0}^{q} \beta_j \, L^J X_t + \sum_{j=0}^{p} \gamma_I \, L^J Y_t + \varepsilon_t$$

Where,

$L = $ lag operator

$L^J = X_{t-j}$ is a dynamic model for variables at level and lags (Patterson, 2000).

The econometric model for this study is as follow:

$$\Delta UER_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta UER_{t-i} + \sum_{i=0}^{p} \gamma_i \Delta LGDP_{t-i} + \sum_{i=0}^{p} \delta_i \Delta INF_{t-i} +$$
$$\sum_{i=0}^{p} \sigma_i \Delta TRD_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta LTCG_{t-i} + \lambda_1 UER_{t-1} + \lambda_2 LGDP_{t-1} + \lambda_3 INF_{t-1} + \lambda_4 TRD_{t-1}$$
$$+ \lambda_5 LTCG_{t-1} + \mu_t$$

where,

Δ represent 1st difference, P shows the maximum lags in model and μ is the normally distributed error component having constant variance and mean of zero.

β, γ, δ, σ, and φ represent the short fluctuations of the model and all the λ's gives the relationship in long run.

To estimate the long run relationship among variables the ARDL method comprise of 2 steps:

1. Bound test is used to ensure the existing of cointegration. For this purpose, with a critical value of F-tabulated by Pesaran (1997) or Pesaran et al. (2001) F-statistic is compared. The value of the F-tabulated has two bounds. The upper bound is I(1), and the lower bound is I(0). Cointegration between the variables exists if the computed F-statistics is larger than the upper bound of the F-tabulated. If the F-statistics is between upper and lower bound, then the result is inconclusive while there is no cointegration if the F-Statistic is smaller than the lower bound.

2. In this step, the long-term relationship among the regressors is estimated.
   ARDL technique has various advantages as compared to other cointegration approaches. This is an OLS foundational method that preserves the long-term characteristics of the data while treating the model's short and long-term dynamics and equilibrium together. (Banerjee et al., 1993). Other cointegration techniques require the same order of integration of all variables while ARDL can count for I(0), I(1) or mix of both. Finding the short-term relationship between the unemployment rate, GDP, inflation, trade, and technical cooperation grants comes next after the long-term relationship has been evaluated i.e. This study uses the Error Correction Mechanism (ECM) to find short run elasticities.

Error Correction Model

The short-run cointegration is identified using Error Correction model approach. Sargan used this method for the first time in 1964. It is employed to verify that an economic system's disequilibrium proportion is accurate from one period to the next. (Engel & Granger, 1987).

ECM of general form is given by;

$$\Delta Y_t = \alpha_0 + b_1 \Delta X_t - \pi \mu_{t-1} + Y_t$$

Here, $b_1 = $ impact multiplier (short run effect) which calculates how quickly variation in X_t will affect a change in Y_t.

π is the adjustment effect which demonstrates the extent of disequilibrium correction.

And,

$$\mu_{t-1} = Y_{t-1} - \beta_1 - \beta_2 X_{t-1}$$

Long run response is represented by β_2 (Asteriou & Hall, 2007).

The following error correction model can be built to produce the ARDL design for the short run dynamic.

$$\Delta UER_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta UER_{t-i} + \sum_{i=0}^{p} \gamma_i \Delta LGDP_{t-i} + \sum_{i=0}^{p} \delta_i \Delta INF_{t-i} + \sum_{i=0}^{p} \sigma_i \Delta TRD_{t-i} +$$
$$\sum_{i=0}^{p} \varphi_i \Delta LTCG_{t-I} + \pi ECM_{t-i} + \nu_t.$$

In this equation ECMt-i is the error correction term and л demonstrates the adjustment speed. Additionally, ECM examined the potential of significant and insignificant coefficients (Hussain et al., 2010). As it estimates the correction from preceding period's disequilibrium, which has excellent implications, hence it is a very suitable model (Asteriou & Hall, 2007). If cointegration is present, error correction models are built using first differences, which remove the variable's trend and address the issue of erroneous regressions (Asteriou & Hall, 2007).

Diagnostic Tests
A range of statistical tests are employed to diagnose potential issues in the model and data and to examine the validity of the results obtained via ARDL. Ramsey's RESET test is employed to check whether the functional form of regression is appropriate or not. Heteroscedasticity test is done to check if the residuals of a regression have changing variance, for this purpose Breusch-Pagan-Godfrey test is used. To check for Autocorrelation i.e. if the error term in time series transfers from one period to another, Breusch-Godfrey Serial Correlation LM test is used. CUSUM and CUSUM Squares tests are employed to assess the stability of coefficients in regression. If the cumulative sum of recursive residuals falls within the bounds, the model is stable.

Results and Discussion
Unit Root Results
To examine the stationarity of the variables Augmented Dicky Fuller (ADF) test was carried out. The null hypothesis for the test is that the series has either unit root or is non-stationary while the series is stationary according to alternative hypothesis. The table reflects that inflation is stationary at levels I(0) while rest of the variables which are LGDP, Trade, LTCG and the dependent variable Unemployment rate, are stationary at 1st difference I(1).

Table 1: Unit Root Result

Variable	I(0)	I(1)
LGDP	0.2474	0.0005
LTCG	0.1101	0.0000
TRD	0.2119	0.0000
UER	0.3513	0.0000
INF	0.0001	0.0011

ARDL Result
ARDL technique of estimation is found suitable for the analysis. Initially bounds test is used to test the existence of cointegration. Then the long run and short run effects are deduced by utilizing the ARDL approach.

Bounds Cointegrations Test
This study employ ARDL approach to examine the potential determinants of unemployment in Pakistan. For the long run results to be obtained, it is necessary to ensure the presence of the long run relationship via bound cointegration testing. As the F-statistic (5.66) is greater than value of upper bound (3.49) at 5% significance level the null hypothesis is rejected hence that long run cointegrations exist. From the table it is clear that long run cointegration also exists at 10%, 2.5% and even at 1%.

Table 2: Bound Cointegration

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	5.657925	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Long Run Results

ARDL model presented in section 3 is estimated to get the long run results. From the estimated model of the determinants of unemployment in Pakistan it is clear that LGDP and TRD variables are significant while the case is opposite for INF and LTCG. The results indicate inverse relationship between unemployment rate, GDP and trade, a 1% raise in GDP results in 17 points decrease in unemployment rate as predicted by Okun's law which state that unemployment decreases with increase in real output in the economy however, the drop in unemployment is way more than predicted by the theory. A 0.81% decrease in unemployment occurs when trade is raised by 1% which is consistent with Kamran et al. (2014), Maqbool et al. (2013) and Cheema and Atta (2014).

This study discovers an insignificant relationship between Pakistan's unemployment rate and inflation, and the coefficient although is insignificant appears with positive sign, which is in contrast with empirical findings from earlier research, such as those of Mahmood et al. (2014) and Maqbool et al. (2013). However, the results are in confirmation with current scenario in Pakistan where it is observed that inflation and unemployment both are rising in the economy. Pakistan's labor market is presided over by a considerable informal sector, which may respond to inflationary pressure distinctly than the formal sector does. Moreover, Abugamea (2018) reported significant and positive coefficient by featuring how essential it is to take into account context and country-specific factors when applying theoretical frameworks to empirical analysis. The results suggest that when making decisions about inflation and unemployment, Pakistani policymakers should consider the unique features of the country's economy and labor market rather than relying solely on the conventional Phillips Curve relationship.

Even if TCG claims to contribute to job creation and economic growth, the study's findings show that the relationship of TCG and unemployment is insignificant. A variety of things including TCG's failure to address the fundamental causes of unemployment, which include a lack of training and expertise as well as inadequate infrastructure could be held responsible for the result. Put differently, the programs are either inadequate, poorly targeted or executed because the funding is going toward projects that are not in line with the demands of the labor market or that disproportionately benefit some groups or areas, which increases the rate of unemployment and inequality in other areas. Pakistan's labor market is characterized by a sizeable informal sector that might not be included in official employment statistics. Also, Pakistan has faced a number of recent political and economic challenges, including macroeconomic instability, political turbulence, and security concerns, which may have overshadowed the potential advantages of TCG programs on unemployment. The study's findings highlight how important it is to carefully evaluate how well technical assistance meets its goals.

Table 3: Long run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP	-17.49882	6.610790	-2.647008	0.0147
INF	0.037955	0.165745	0.228998	0.8210
TRD	-0.815918	0.299752	-2.721972	0.0124
LTCG	7.666406	6.983262	1.097826	0.2842
C	172.0726	44.02861	3.908201	0.0008

Error Correction Form

The short run fluctuations of unemployment's determinants and the coefficient of the error correction term are both illustrated by the short run model. The error correction term indicates the approximate time it will take to return to the long-term equilibrium (Hassan & Qayyum, 2013).

The following table displays the short run model's results. Only the variables that were found significant are listed in the table; all other variables are eliminated by using General to Specific approach.

Table 4: ECM Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UER(-3))	0.322465	0.133747	2.411015	0.0247
D(LGDP(-1))	-76.53177	26.91465	-2.843498	0.0095
D(LGDP(-2))	-152.5669	28.66613	-5.322199	0.0000
D(TRD(-1))	0.347851	0.103049	3.375598	0.0027
D(LTCG)	-4.583065	1.833117	-2.500149	0.0204
D(LTCG(-1))	-10.01893	2.252304	-4.448303	0.0002
D(LTCG(-2))	-5.703609	2.164189	-2.635448	0.0151
ECM(-1)*	-0.577196	0.089423	-6.454680	0.0000
R-squared	0.666519	Mean dependent var		0.110051
Adjusted R-squared	0.530656	S.D. dependent var		1.567558
S.E. of regression	1.073913	Akaike info criterion		3.228155
Sum squared resid	31.13881	Schwarz criterion		3.740020
Log likelihood	-50.94902	Hannan-Quinn criter.		3.411808
Durbin-Watson stat	2.003497			

The error correction term is negative, between 0 and 1 and significant ($p < 0.05$), which suggests convergence toward long run equilibrium. The coefficient of ECM is (-0.58) it indicates that the movement from short run dynamics to long run equilibrium is at a high pace. 58% of the disequilibrium from the shock convergence of the previous year to the long-term equilibrium in the current year. The result is consistent with Cheema and Atta (2014).

GDP appears in its 1st and 2nd lag in short run model. From the findings, a 1% increase in GDP in the preceding one and two periods reflects a very significant decrease in the unemployment rate, with a much larger impact in the second period, indicating that economic growth has a very strong influence in decreasing unemployment.

Trade is only seen as its first lag, and the coefficient of trade shows that a 1% rise in trade in the preceding period causes a 0.348% increase in current unemployment. This suggests that trade liberalization has a short-term positive impact on unemployment which is consistent with

the work of Menezes-Filho and Muendler (2011), Helpman et al. (2010) and Nawaka et al. (2015).

In short run model Technical Cooperation Grants (TCG) appears in first difference and its 1st and 2nd lag and all coefficients have negative signs indicate that TCG in first difference and its 2nd and 3rd lag affect unemployment negatively which means that TCG not only in current period but also in previous periods affects unemployment. From estimated equation it is clear that if TCG is high in current period and remained high during 3rd period then unemployment will be less in the current period.

Inflation variable does not appear in the short run model and implies that Philiphs curve prophecies are failing in the current scenario of Pakistan.

Diagnostic Tests

Diagnostic testing attempts to find out any potential issues with the model or in data to confirm the reliability of the results obtained. The results of various statistical tests are given in this section. The p values in the table are indicating that functional form is appropriate, there is no heteroscedasticity and no serial correlation.

Table 5: Diagnostic Tests Results

Test	F Statistics	Probability
Ramsey's RESET	1.035252	0.3205
Breusch-Pagan-Godfrey	0.388869	0.9714
Breusch-Godfrey Serial Correlation LM	0.906714	0.4198

CUSUM and CUSUM Square Test

The purpose of this test was to evaluate the ARDL model's goodness of fit. To verify the structural stability, Brown et al. (1975) proposed the CUSUM and CUSUMSQ tests. While CUSUMSQ captures parameter deviations from reliability, the CUSUM test express any systematic changes in regression coefficients and its stability. The model is stable, as evidenced by the plots of CUSUM and CUSUMSQ at 5% level of significance, where the cumulative sum of recursive residuals falls within the bounds.
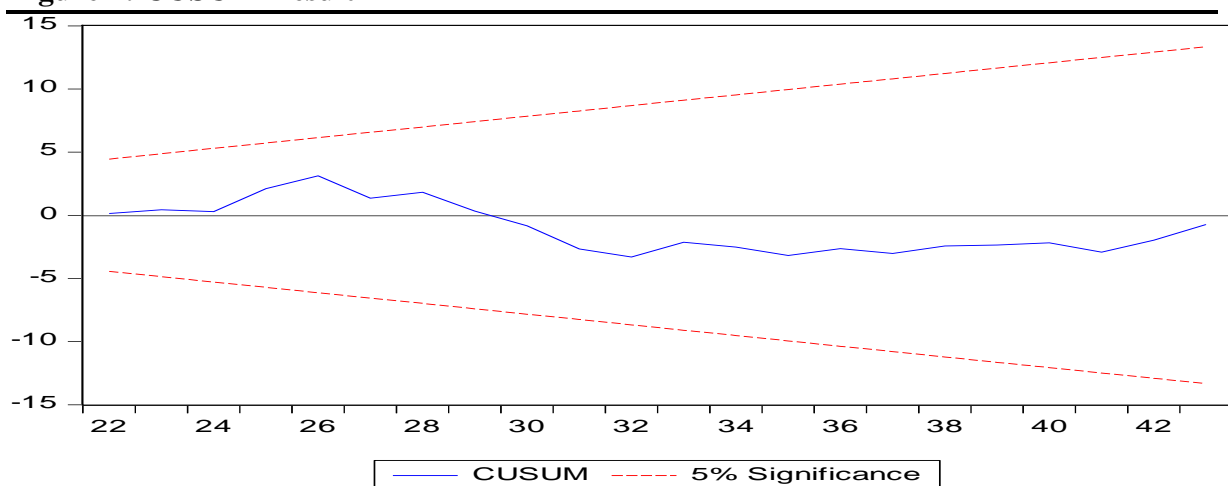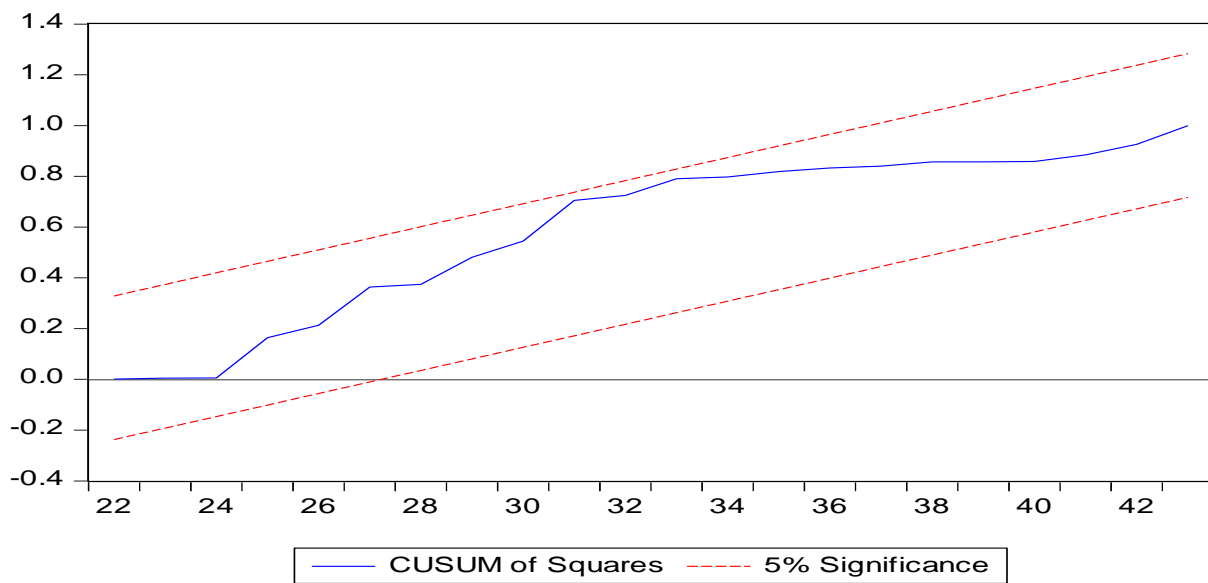
Figure 2: CUSUM Result

Figure 3: CUSUM of Square Result

Conclusion and Policy Recommendations

The current study attempted to determine the factors influencing Pakistan's unemployment rate and incorporating the role of TCGs for first time in unemployment model by utilizing ARDL. The long run results of the estimated model suggest that both GDP and Trade have an inverse and significant impact on unemployment in Pakistan. The unemployment rate is found highly elastic to GDP growth highlighting the importance of economic growth to lower down unemployment rate in the country. Similarly, increase in Trade results in a decrease of 0.81% in unemployment rate which means that expansion in trade can help to cope up with this burning issue pointing to adaptation of trade encouraging policies. Furthermore, the study discovers that inflation and TCG are insignificant in affecting unemployment in the country in the long run. Although the coefficients are insignificant they appear with positive sign. The short run results of the study show that unemployment is negatively impacted by GDP, with this effect being more pronounced in the second period. Trade liberalization increases unemployment in the short run as 1% raise in trade in the preceding period causes a 0.348% increase in current unemployment, however, it has the opposite impact over the long run. Technical Cooperation Grants (TCG) found to have a negative effect on unemployment in the short run suggesting contributing role of TCG in lowering unemployment. Inflation does not appear in the short run model and denies the applicability of Philips curve relation in Pakistan.

Policy Recommendations

This study explores the determinants of unemployment in Pakistan using quantitative approach and proposed a number of policy recommendations in light of the findings. The results imply that lowering unemployment requires economic growth so the government should put its attention on building a business-friendly environment, encouraging entrepreneurship, and making infrastructural investments to boost economic growth. Trade growth can contribute to a decrease in unemployment, to generate new employment opportunities, pursue trade liberalization policies, support exports, and welcome foreign investment. As TCG appeared insignificant in the long run hence, TCG programs should be reevaluated and redesigned with an emphasis on initiatives for job creation, skill development, and vocational training that meet market demands.

Limitations and Future Directions

This study focuses on the macroeconomic determinants of overall unemployment in Pakistan and further cross sectoral analysis and comparisons of unemployment within the country are not explored and required to be researched in order to have deeper understanding of the matter. This study has included TCGs and found that the impact is only in the short run and long run benefits of the grants are not actualized. Hence further research is required to know the reasons and to device policies to make TCG more effective. There is also room for research on gender based unemployment in Pakistan.

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