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Sustainable Employment and Economic Growth

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ABSTRACT

This study investigates the relationship between economic growth and employment in Pakistan at the aggregate and sectoral levels. It uses different econometric models, such as the Cobb-Douglas production function, the employment demand model, and the ARDL model, to analyse the data and test the hypotheses. It finds that economic growth does not create enough jobs for the population and that there is a mismatch between the output and employment growth of different sectors. It shows that the service sector, which is the fastest-growing sector in Pakistan, has a contradictory and weak impact on employment and growth, and that it relies on more capital-intensive technology. It recommends that the government and policy makers should focus on the real sector, especially the industry sector, which has a positive and significant effect on employment and growth. It also suggests that Pakistan should use its large population as a source of labour-intensive development rather than relying on technology.

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1. Introduction

According to a policy perspective, both economic growth and the labor-absorbing capacity of the economy are important factors. Any economy's persistent and long-run growth is directly coupled with its provision of sustainable employment occasions. It was observed through the time of the recent economic recovery's early stages, that a lot was discussed regarding the relation between employment and economic growth. Although, some disagree about it that the rate of unemployment is said to be a coincident or a lagging economic indicator. For instance, in the early year of the 1990s, the rate of unemployment rises for about a year which was followed by the end of the previous recession. From coming out of the recession, many companies were unwilling for hiring many workers till they were convinced about the sustainability of the new recovery of the economic situation, and those who left the labor force returned to job-seeking (Seyfried, 2011).

The supply of labor is categorized with the dependency on an individual's levels of skills and expertise for any particular work. The age-old skill-mismatch issue of labor demand and labor supply, and the situation of economic growth and education have carelessly determined the demand for and productivity of labor in the economy. However, this has also distinct and categorized the retunes to households and individuals based on their human-capital characteristics (Bhorat, Cassim, & Tseng, 2016). The provision of employment is the first thing that any government has to make sure of after coming into power in democratic countries. But there comes this question why any government, after coming into power, is so concerned about economic growth? The most relatable answer to this question has multi-dimension, but one of the most significant ones is for achieving political popularity. This is a global trend: when there is an output expansion, the level of employment will increase, which consequently reduces

unemployment. This reduced unemployment will make the government popular, which lead them to win the election (Abubakar & Nurudeen, 2019).

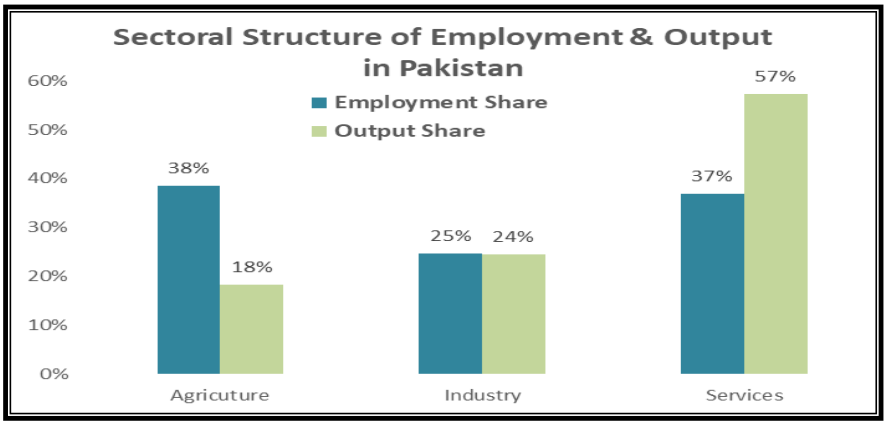
The aim to achieve full employment alongside other macroeconomic target are essential in many developing economics. Whereas, underemployment and unemployment are considered the main cause and consequences of poverty. Though, despite strong promises made by many political leaders in deprived nations, the common phenomenon among those nations is poverty with insignificant growth rates and miseries of public (Sodipe & Ogunrinola, 2011). According to the World Bank (2011), about one-third of all workers worldwide are employed in the informal sector. The government can use data from the Labor Force Survey (LFS) to measure the employment and hours worked in the informal sector (Gennari, 2004). Since the formal sector has failed to provide enough job opportunities, the informal sector is filling this gap.

Moving back to the topic, of utilizing sustainable employment, we want the government to generate new prospects of jobs for its labor force to get absorb when they declare themselves as the part of labor force actively and looking for job opportunities. Pakistan belongs to an agriculture-based country. In the past few decades, this sector is the most neglected one. Still, the majority of its labor force is accommodated by this sector. The problem is that due to less focus on this sector, most of the people who declare themselves as part of the agriculture sector are ghost unemployed. The majority is working on a family farm and earning less or no money from it. After the agriculture sector, it is the industrial sector that could be developed, as the availability of raw materials for most of the industrial sector is provided by the agriculture sector. Lack of interest and provision of facilities with infrastructure from the government sector has never flourished in this sector in the past. After the industrial sector, the people of Pakistan start serving in the services sector to earn a decent amount for their families. This helps a lot of families to come out of the vicious circle of poverty. But the question here is that, is the services sector is huge enough to cater to the 6th largest country in the world in terms of population. Every year, hundreds and thousands of graduates entering into the job market in search of employment. While there is a huge chunk of those as well who are coming as a part of the unskilled labor force having neither education nor any skill in hand to simply help their dependent to feed. The question here is from the authorities how will they accommodate such a huge number of daily incomings of unemployed people both from educated and uneducated backgrounds to get absorbed in the job market?

1.1. Statement of the Problem

There are three pillars of an economy agriculture, industry and services they interlink to each other. Pakistan is in the process of structural transformation and the service sector is growing more rapidly than other sectors, but the growth pattern of services sector is unable to follow the trend of basic macroeconomic variables both real and nominal. A minimum condition for a positive effect of sector changes on growth is that there has been a net shift of resources out of sectors with relatively low productivity level to sectors with high productivity levels.

Figure 1: Sectoral Structure of Employment and Output in Pakistan



The shifting of the economic resources has to follow the growth model which postulates that economic resources like labor, output and income are transform from low efficient and low productive sector to highly efficient and highly productive sector. As per theory of sectoral economics primary sector (agriculture and mining but not only mining) transforms its resources

for the secondary sector (manufacturing) that leads to substantial growth of tertiary sector (services).

1.2. Objective of the Study

- Analyze the causal link between output growth and employment growth in Pakistan
- Compare the employment creation and destruction across different sectors of the economy during business cycle shocks
- Determine the main factors that cause jobless growth in Pakistan
- Assess the impact of structural change on labor productivity levels and convergence across sectors.

1.3. Research Question

This study poses at least three significant research questions that this study will answer:

- How does output growth affect employment growth in Pakistan?
- Is there a differential impact of sectoral growth on sectoral employment during business cycle ups and downs (recession and recovery)?
- What are the main reasons for jobless growth in Pakistan? Structural change impact on labor productivity of real and nominal sectoral

1.4. Significance of Study

This study significantly enhances to the pool of literature on Pakistan's economic development and employment. It is one of the first studies to use a long time series of data and an a multitude of econometric models to analyse the relationship between economic growth and employment at both the aggregate and sectoral levels. The study's findings show that the real sector, particularly the industry sector, is vital for generating employment and promoting economic growth in Pakistan. The study proposes the government and policy makers to give top priority to measures that assist the growth of the industrial sector and raise the productivity and skill levels of the labour force. The study also suggests that organizations train their staff and invest in labor-intensive industries. The results of the study will help the government, decision-makers, and companies in Pakistan create policies and strategies that support economic growth and job creation in the economy.

1.5. Structure of the Study

There are the following sections in the study: Section II reviews the body of literature on the subject. The theoretical underpinnings and econometric strategy of the study are explained in Section III. The empirical results were presented and discussed in Section IV. The summary of the study's main findings and implications is in the concluding section.

2. Literature Review

Abubakar and Nurudeen (2019) studied the relationship between output and unemployment in India based on Okun’s Law. They used annual time series data for unemployment and output from the World Bank and Reserve Bank of St. Louis. They tested for unit root using Perron (1997) and (Elliot & Harackiewicz, 1996) (Econometrica 64(4):813–836). DF-GLS, and they compared nonlinear and linear econometric models for impact analysis. They found no significant difference between the two models. They also found that output and unemployment in India follow Okun’s Law.

It was also figured out in the analysis that most of the coefficients were negative which confirms the theoretical explanation of the study. It was also found during the analysis by estimating some of the evidence that, the 11.75% nominal growth rate of GDP only reduces 0.52% unemployment. This finding is insignificant for the population of India. It was also concluded in the study, that to reduce 1% unemployment, the government of India required a growth rate of 25% in nominal GDP which is two times the targeted value. This is the very reason that the author writes in their concluding remarks that though the economy is growing, this is jobless growth.

Haider (2010); Waqas and Sial (2013) in their study evaluated the rising issue of jobless growth specifically in the manufacturing sector of Pakistan’s economy by taking the data from World Bank Enterprise Survey from 2002 to 2007 and affirm that jobless growth exists in

Pakistan. The study focuses on four labor categories named production, non-production, skilled and unskilled. The results concluded in the regional analysis that over-utilization in Karachi and Sialkot and under-utilization in Peshawar and Quetta were witnessed in the study.

Elroukh, Nikolsko-Rzhevskyy, and Panovska (2020) The study considers many popular measures of the output cycle. It was found in the case of many countries that the findings of the study come significant and in favor of the structural changes against the coefficients of employment growth to its gap. These findings suggest that slow recovery in labor markets is consistent with the jobless recovery hypothesis. Moreover, it was also concluded in the findings of the study that there exists heterogeneity across countries in the case of employment-to-employment gaps against the responses of employment to the output cycle.

McCord and Slater (2015) in a study focusing on the burning issue of unemployment and the availability of social protection discover the significance of the availability of sustainable employment in a wider context of graduation debate. The main focus of the study was to evaluate the labor market and employment and how they are affected by the social protection program that aims to create a positive impact on the lives of its recipients by providing broader opportunities.

The study also examined the availability and the number of job market graduations, which depend on factors such as labor demand and labor market structure, as well as individual capacity and productivity improvement. Green (2017) did a deep analysis of the causes of poverty and figured out that unemployment is one of the major issues which creates hurdles in the way of reducing poverty. The study also raises the issue of the increasing gap between lower-paid and higher-paid jobs which are the cause of rapidly spreading poverty. The study criticizes the problem of government policies only focusing on the issues of specific sectors to associate them with the economic growth of the country.

To validate the Kaldorian approach of development and growth in the case of Pakistan, Khan and Siddiqi (2011) took the initiative to perform an analysis titled "Impact of manufacturing industry on economic growth in Case of Pakistan: A Kaldorian Approach". The study evaluates the relationship between growth and the manufacturing sector in economic development and found a significant impact of Kaldor's first and third laws; meanwhile, some of the evidence supported the second law as well in terms of the rate of return. The study confirms the importance of the manufacturing sector in economic development in the case of Pakistan. Madiha Kamal (2021) Study indicated that Pakistan suffering from high level of jobless growth. The empirical result show that service split in two types; one in labour intensive and other is capital intensive, and the elasticity of labour intensive sector is declining and capital intensive sector elasticity increasing over the period of time. Perhaps it due to increasing practice of using capital-intensive technology.

In the case of East Asian economics, the law presented by Okun was scrutinized by Hanusch (2013), who performed an analysis with titled "Jobless growth? Okun's law in East Asia". The study concludes that the agriculture sector's employment varies from one country to another and it has a cyclical pattern, unlike no agriculture employment. The study highlights this effect specifically in the time during the economic crisis which reflects the agriculture sector as the shock absorber sector of the economy. The study reveals that isolating non-agriculture employment shows a robust relationship between growth and job creation. Gehrke and Hartwig (2015) findings that it is needed for public work programs that to generate sufficient employment in the long run, with this it was also advised in the study that such programs should also provide credit. The study also suggests focusing more on agricultural-related improvement. The study concluded its findings by focusing on such schemes that provide more employment for the masses.

3. Methodology

3.1. Employment Demand Model

The production functions have been used for empirical studies on employment demand often. Some examples are (Birchall, Burger, Hazeldine, & Nova, 1981; Hamermesh, 1986) who have applied it. The study presents labor employment as a function of output and generates the demand equation from a well-defined production function. The aggregated production function that usually shows national output, typically The study uses capital and labor as the two inputs

to express Gross Domestic Product (GDP) as a function. This helps to derive an equation for the demand for employment across the economy. Instead of taking the input prices as the final output of the production function, the study considers the employment demand.

The functionality of the production function is that it helps in connecting the output to production inputs like labor and capital. For the comparison purpose, the optimum value of productive inputs with the actual utilization of these inputs, the measurement of underutilization of labor for various sectors is needed for generating parameter estimates of the production function. To estimate the equation, the literature commonly uses the Cobb-Douglas production function and takes the logs of its variables. The Cobb-Douglas (1928) production function also forms the basis of the job demand equation in Pakistan[1].

$$Yt = A(0)\, L\alpha t\, K\, bt \tag{1}$$

Equation (1) shows how the production function changes with time trends due to technological progress that affects the efficiency of production factors. By applying natural logarithms to both sides, the equation (1) above can be made linear, resulting in the following equation:

$$lnYt = lnA + \alpha lnLt + blnKt \tag{2}$$

Rearranging equation (2) and solving for what we get,

$$\alpha lnLt = lnYt - lnA - blnKt$$

Therefore;

$$lnLt = \beta 0 + \beta 1\, lnYt + \beta 2 lnKt \tag{3}$$

where,

$$\beta 0 = -lnA/\alpha;\ \beta 1 = 1/\alpha;\ \beta 2 = -\beta/\alpha$$

According to equation (3), the firm will use less labor when it uses more capital, more production will increase the demand for employment.

Table 1: Time Frame of Business Cycles in Pakistan

Business Cycle	Recession	Trough	Recovery	Peak
First Cycle: 1949-1965 (16 Ys)	1949-58 (9 Ys)	1958	1959-65 (7 Ys)	1965
Second Cycle: 1966-1985 (20 Ys)	1966-75 (10 Ys)	1975	1976-85 (10 Ys)	1985
Third Cycle: 1986-2005 (20 Ys)	1986-97 (12 Ys)	1997	1998-05 (8 Ys)	2005
Fourth Cycle 2006-2018	2006-12	2012		

Source: Farooq Alvi

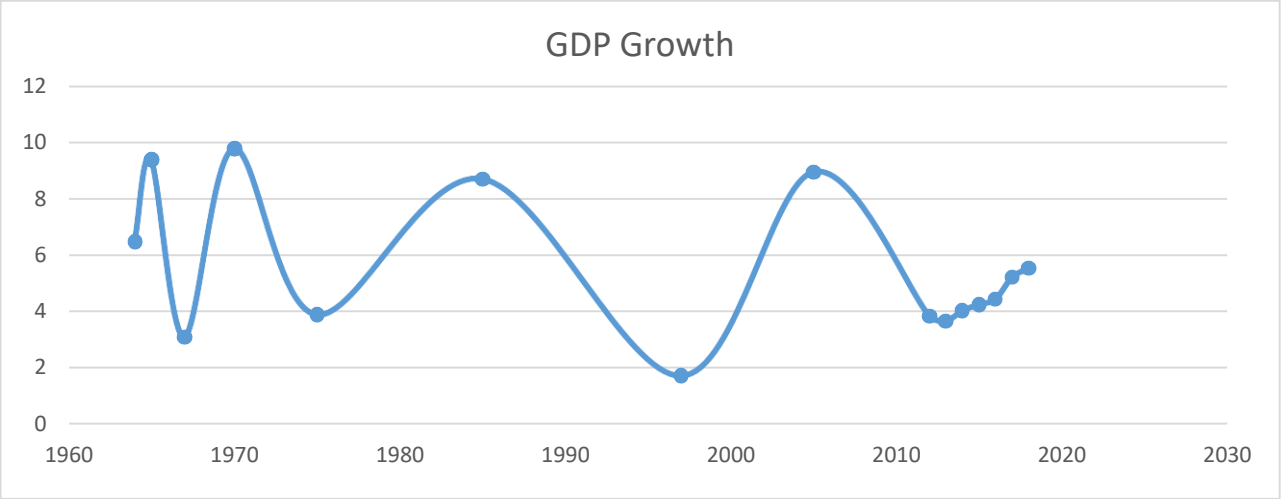
The business cycle of Pakistan's economy is presented in the table above depicting the recession and recovery period specifically highlighting its peak time during that period. The first cycle persists for about 16 years facing 9 years of decline and 7 years of regaining with its peak in 1965. The initial time of Pakistan witnessed an economic languor which was commonly attributed to the communal upset, no or little infrastructure, weak industrial base, and lack of private sector confidence in the infant economy. With all the above-mentioned problems in hand, during that period Pakistan faces its first Indo-Pak war as well. Which pushes back the struggling economy a little further. However, with proper planning, the recovery quickly picked up the falling economy after the time of 1959.

After that time another cycle of 20 years starting from 1966 till 1985 faces a recession time of 10 years, during that time the fall of Dhaka faced by Pakistan pushed it into another war with its life-long neighbor and enemy India. The separation of East Pakistan and the nationalization of industrial, financial, and other institutions severely affect the rising confidence

[1] The Cobb-Douglas production function assumes that the inputs have a unitary elasticity of substitution. Two alternative production function forms that allow for different elasticities are Constant Elasticity of Substitution and Translog. Several studies on the Pakistani manufacturing and food sectors have used these forms and found low or unitary elasticities of substitution between capital and labour. These include Zahid, Akbar, and Jaffry (1992), Battesse, Malik, and Sultana (1993), and Kalim (2009).

of the business community during that time. The repossession time persists for the coming 10 years with its peak in 1985. The third cycle persists for another 20 years starting from 1986 to 2005. During that time, a sharp short time of economic revival was faced in the economy which was fueled by the primary support of foreign capital inflow. The back-and-forth political instability and impact of the 1979 Russian war on neighboring Pakistan, as Pakistan play the role of ally with the United States.

Figure 2: Graph A



The time faces its recession time of about 12 years and it ended up with another military cope in 1997. The recovery time lasted for the coming 8 years when the economy faces its peak in 2005 with 6.5% annual GDP growth. The employment demand model will be re-estimated with the dummy variable to examine the employment patterns in different growth phases.

$$lnLt = \beta 0 + \beta\, 1lnYt + \beta\, 2lnGFCFt + \beta\, 3lnImportsharet + \beta\, 4Dt + \mu t \quad (4)$$

The finding presented in Table 2 (appendix) The regression analysis shows that employment is positively correlated with output and negatively correlated with gross fixed capital formation. The import share has a positive correlation with employment, while the recovery dummy has a negative correlation. The R-squared value of 0.98 indicates that the model is significant.

3.2. Real and Nominal Sector

Commonly, in an economy, the agriculture and industrial sectors are considered as the real whereas the services as the nominal sector. (Clark & Paivio, 1991; Fisher, 1939), developed a clarification by splitting the complete economy into three sectors i.e., primary, secondary, and tertiary; and considered the services sector as the tertiary and nominal sector while agriculture and mining as primary and manufacturing as the secondary sector of an economy.

Rodríguez-Lozano and Sarmiento-Muñoz (2017) analysis also used this concept and estimated the performance of real sector companies with financial sector companies for the year 2014. Prominent economists implicitly consider the service sector as nominal. This research considers the goods-producing sector (agriculture and industry Sector) as a real sector and the service sector as a nominal sector. The authors argue that the real sector drives the growth of the tertiary sector. They explain how an economy shifts from being agriculture-based to being service-dominated, through the intermediate stage of industrialization. This is especially true for an economy with an agrarian base, such as Pakistan.

Table 2: Description of Variables

Remp	Real Employment, Agriculture sector plus industry sector employment, or real sector employment
Nemp	Service sector employment or nominal sector employment
TotalEmp	Total employment (Agriculture, industry, and service sector employment)
Remp/TotalEmp	Relative real sector employment
Nemp/TotalEmp	Relative nominal Sector Employment
RealOP	Real sector output (agriculture plus industry sector)

NominalOP	Nominal Sector Output (service Sector Output)
TotalOP	Total Output (agriculture, industry, and service sector output)
RealOP/TotalOP	Relative real sector Output
NominalOP/TotalOP	Relative Nominal Sector Output
RealGFCF	Real sector Gross fixed Capital formation(agriculture, industry sector Gross fixed Capital formation)
NominalGFCF	Nominal Sector Gross fixed Capital formation (service Sector Output)
TotalGFCF	Total Gross fixed Capital formation (agriculture, industry, and service sector Gross fixed Capital formation)
RealGFCF/TotalGFCF	Relative real sector Gross fixed Capital Formation
NominalGFCF/TotalGFCF	Relative nominal Sector Gross fixed Capital Formation
imp share	import share
Recovery Dummy	Recovery Dummy

3.3. Data

The study used data from various official sources of the Government of Pakistan, both published and unpublished. This study has collected data on the employed labor force through Labor Force Survey's (LFS) various issues and the Pakistan Economic Survey which is published on an annual basis by the Federal Bureau of Statistics, the government of Pakistan[2].

4. Results

4.1 Summary Statistics

The study interprets the basic properties of the data by using the following statistics. The maximum and minimum represent the upper and lower limit values of the variables respectively Table A1 & A2 (appendix). This study analyzed the economic data of Pakistan from 1971 to 2018. The overall economy showed positive trends for employment, output, and gross fixed capital formation, but negative trends for import share. The mean values for these variables were 1.56, 6.43, 5.43, and -0.2, respectively. The real and nominal sectors also showed negative trends for all variables, with mean values of -0.16, -0.30, -0.36, and -0.21, and -0.50, -0.29, -0.24, and -0.21, respectively. The results of this study suggest that the overall economy of Pakistan showed positive trends for employment, output, and gross fixed capital formation, but negative trends for import share. The real and nominal sectors also showed negative trends for all variables. These findings could be used to inform economic policy in Pakistan.

4.2 Unit root tests for Stationarity

The study uses the ADF test to check the stationarity of the data. The table below shows the ADF test results for both level and first difference with one-sided p-values from MacKinnon (1996) in parentheses. The results show that some series are not stationary in level form.

Table 3: Unit Root Tests

Variables	Level Without Trend P	Level With Trend P	1st Diff. Without Trend P	1st Diff. With Trend P
LogREmp/TotalEmp	-2.156218	-2.143252	-4.329954*	-4.165407**
	0.2258	0.5001	0.0024	0.0157
LogROP/TotalOP	1.189812	-1.081878	-5.974695*	-6.744997*
	0.9972	0.9144	0.0000	0.0000
LogRGFCF/TotalGFCF	-2.336203*	-3.217754***	-6.054065*	-6.000432***
	0.1683	0.1014	0.0000	0.0000
LogNEmp/TotalEmp	-2.112896	-2.089284	-4.244460*	-2.55436
	0.2414	0.5283	0.0030	0.3017
LogNOP/TotalOP	0.815229	-1.512651	-6.391536*	-3.825642**
	0.9925	0.8008	0.0000	0.0336
LogNGFCF/TotalGFCF	-2.406765***	-3.153306***	-6.045187*	-5.979895*
	0.1490	0.1141	0.0000	0.0000
LogImportShare	-0.279054	-2.009759	-5.046457*	-5.037054*
	0.9162	0.5710	0.0004	0.0020
Recovery Dummy	-1.831223	-1.916368	-5.062896*	-4.964198*
	0.3584	0.6194	0.0003	0.0024

(*, **, ***) denotes statistically significant at levels of significance of 1, 5, and 10%, respectively. The series is therefore thought to be stationary.

[2]The Ministry of Finance of the Government of Pakistan publishes an annual report on the economy of Pakistan.

However, the null hypothesis of a unit root in the first difference is rejected for all variables, as the t-statistic values are higher than the critical values and the p-values are significant with and without trend. The unit root test for both real and nominal sectors are being employed, some variable has stationary at their level while some have at their first difference. Both with and without trends methods are used. The variables are stationary at their first difference both with and without trend. Concluding that the model is fit for employing the ARDL model.

4.3 Co-Integration Test

The table below is showing the results of the co-integration examination. By employing the technique of co-integration, the findings of the technique approbate the existence of noteworthy long-run associations among variables.

Table 4: Co-Integration Test

Real Sector						
Hypothesized No. of CE(s)	**Trace Statistic**	**0.05 Critical Value**	**Prob.****	**Maximum Eigenvalue Statistic**	**0.05 Critical Value**	**Prob.****
None *	188.4539	88.80380	0.0000	74.04148	38.33101	0.0000
At most 1 *	114.4124	63.87610	0.0000	54.47911	32.11832	0.0000
At most 2 *	59.93331	42.91525	0.0005	28.96048	25.82321	0.0187
At most 3 *	30.97282	25.87211	0.0106	24.28667	19.38704	0.0089
Nominal Sector						
Hypothesized No. of CE(s)	**Trace Statistic**	**0.05 Critical Value**	**Prob.****	**Maximum Eigenvalue Statistic**	**0.05 Critical Value**	**Prob.****
None *	188.4900	88.80380	0.0000	77.99857	38.33101	0.0000
At most 1 *	110.4914	63.87610	0.0000	54.24078	32.11832	0.0000
At most 2 *	56.25063	42.91525	0.0014	25.85019	25.82321	0.0496
At most 3 *	30.40044	25.87211	0.0127	22.06934	19.38704	0.0199

The trace test indicates that the variables in the model have 4 cointegrating equations at the 0.05 level of significance, The max-eigenvalue test indicates that the variables in the model have 4 cointegrating equations at the 0.05 level of significance, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Author's estimations

The stationarity test results show that the variables are a mix of I(0) and I(1) series. This means that the Johansen and Johansen-Juselius cointegration test can be applied with an integration order of one. The results of the cointegration test show that all four equations of both real and nominal sectors are cointegrated. The ARDL Bound F test also confirms this result. This means that there is a long-run relationship between the variables in each equation

4.4 ARDL Bounds Test

The main purpose of using the bond test is to evaluate whether the model is fit for using ARDL or not. For that very reason, we apply it; the table Real sector bond test is presented above showing the values of both level and first different with F-statistic, the rule of thumb for assessing it is if the value of F-statistic is greater than both lower and upper values should be lesser than the value of F-statistic, validating the non-exitance of co-integration hence proving the model is appropriate for the application of ARDL model.

Table 5: ARDL Bounds Test

Test Statistic	Value	k
Real Sector		
F-statistic	7.608891	3
Nominal Sector		
F-statistic	8.045180	3
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Almost the same findings are visible in the Nominal sector's ARDL bond test, showing the value F-Statistic to be greater than of level and first leg.

4.5 ARDL Short Run and long Run

$$lnLt = \beta 0 + \beta\, 1 lnYt + \mu t \quad \text{Model 1}$$

$$lnLt = \beta 0 + \beta\, 1 lnYt + \beta\, 2 lnGFCFt + \mu t \quad \text{Model 2}$$

$$lnLt = \beta 0 + \beta\, 1 lnYt + \beta\, 2 lnGFCFt + \beta\, 3 lnImportsharet + \mu t \quad \text{Model 3}$$

$$lnLt = \beta 0 + \beta\, 1 lnYt + \beta\, 2 lnGFCFt + \beta\, 3 lnImportsharet + \beta\, 4 Dt + \mu t \quad \text{Model 4}$$

The study has considered 4 ARDL models for analysis. In the first model, the simple employment and output relation has been considered, employment being the dependent variable in the model showing a dependency on output. Model two of the analysis has included gross fixed capital formation as a proxy of investment along with output and independent variables. Model 3 has another crucial variable included i.e., import share along with gross fixed capital formation and output, and finally model 4, has considered the recovery as a dummy variable presenting the speed of recovery when an economy faces any shock. It presents the speed of recovery of an economy.

Table 6 of the analysis shows that employment rises by 0.4% with respect to output in the short run. This means that a 1 unit increase in output leads to a 0.4% increase in employment. When gross fixed capital formation is added to the model, the coefficient of employment becomes even larger, indicating that investment is also a significant factor in employment growth. The import share also has a positive impact on employment, with a 1% increase in the import share leading to a 0.09% increase in employment. Finally, the recovery dummy shows that the economy recovers from shocks at a rate of 0.006%.

Table 6: Real Sector Relative Employment in Short Run

Variables	Model 1	Model 2	Model 3	Model 4
ROP/TOP	0.048931 (0.0939)	0.158920 (0.0800)	0.252433 (0.0000)	0.158919 (0.0998)
RGFCF/TGFCF		0.0066912 (0.0601)	0.070495 (0.0426 (-1)	-0.120747 (0.0018) (-1)
Import Share			0.093755 (0.0322)	0.068468 (0.0910)
Recovery Dummy				0.006768 (0.0179)
C	-0.120479 (0.0254)	-0.546473 (0.0001)	-0.46066 (0.0000)	-0.915228 (0.0000)

Author's estimations

The table with real sector relative employment in the long run has been given in Table 7; a significant positive relation between real sector relative employment and output is visible presenting a 4% increase in employment with an increase in output. Model 2 has an inclusion of gross fixed capital formation as a proxy of investment with employment and output, showing a 6% negative and significant relation with employment, model 3 has included import share with the existing variables and shows a 0.14% increase in employment after the inclusion of import share. While model 4 has a recovery dummy, presenting the speed of recovery of an economy with a 0.006% significant positive value.

Table 7: Real Sector Relative Employment in Long Run

Variables	Model 1	Model 2	Model 3	Model 4
ROP/TOP	0.406135 (0.0180)	0.416538 (0.000)	0.390723 (0.0000)	0.402359 (0.0000)
RGFCF/TGFCF		-0.622516 (0.0000)	-0.507330 (0.000)	-0.581629 (0.0000) (-1)
Import Share			0.145117 (0.0151)	0.074810 (0.0554)
Recovery Dummy				0.006194 (0.0345)
C	-0.173314 (0.0000)	-0.391570 (0.0000)	-0.316910 (0.0000)	-0.363590 (0.0000)

Author's estimations

In Table 8, nominal sector relative employment for the short run is presented, in the first model the relation of output with employment is shown; model 1 is showing the employment and output relation with positive and significant values of the coefficient, and an increase in one unit of output will cause a rise of 0.213% increase in employment in the economy. In model 2 there is an inclusion of gross fixed capital formation as a proxy of investment along with output, the model shows a positive and significant increment of 0.201 in employment when investment is made in an economy. Model 3 has an additional variable named import share, showing a significant negative relation with employment, translating -0.1559 reduction in employment when the inclusion of import share is incorporated in an economy. While model 4 has the recovery dummy as the fourth variable keeping all the other variables in an economy. The significant and positive value of the recovery dummy shows a speed of 0.020 of an economy when it faces any shock in the short run.

Table 8: Nominal Sector Relative Employment in Short Run

Variables	Model 1	Model 2	Model 3	Model 4
NOP/TOP	0.213935 0.1260	1.030734 0.0038	0.835000 (0.0679)	-1.363631 (0.0262) (-2)
NGFCF/TGFCF		0.201811 0.02223	0.175255 (0.0603) (-1)	0.174470 (0.1744)
Import Share			-0.155985 (0.1385)	0.563892 (0.0192)
Recovery Dummy				0.020853 (0.0242)
C	-0.131737 0.0187	-0.355508 0.0003	-0.662564 (0.000)	-1.003984 (0.0027)

Author's estimations

Table 9 is depicting a relationship between nominal sector relative employment in the long run. The first model is presenting the employment and output relation showing a 1.623% significant and positive increase in employment when 1% output is increased, model has an inclusion of gross fixed capital formation as a proxy of investment with significant and negative relation of investment and employment indicating a decrease of -1.531% of employment when an increase of 1% investment is caused in an economy, while model 3 has an addition of import share with a significant and negative impact showing a reduction of -0.235% in employment when 1% import share increases. The recovery dummy in model 4 demonstrates the speed of recovery in an economy when it faces any crises. In model 4, it is visible a positive and significant share that

Table 9: Nominal Sector Relative Employment in Long Run

Variables	Model 1	Model 2	Model 3	Model 4
NOP/TOP	1.623949 0.0236	1.782084 0.0000	1.959525 (0.000)	1.316129 (0.0001)
NGFCF/TGFCF		-1.531247 0.0000	-1.322144 (0.0000)	-0.643540 (0.0310) (-6)
Import Share			-0.235426 (0.1017)	-0.577183 (0.0110)
Recovery Dummy				0.033480 (0.0456)
C	0.003262 0.9872	-0.348422 0.0024	-0.295507 (0.0001)	0.402121 (0.0010)

Author's estimations

4.6 Model stability/ Stability Test

The stability test given by Brown et al., (1975) for the ARDL model grounded on the error correction model by employing the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ), figures (appendix) show the test for both real sector and the nominal sector is under the critical bounds at 5% significance level, which concludes that the model is stable structurally. Normally, the regression analysis of time series data is based on the assumption that the regression relationship is persistent over a while. Specifically, for social and economic analysis; it validates the sample size taken for the analysis (Brown, Durbin, & Evans, 1975).

4.7 Granger Causality Test

The results show in table A3 (appendix) that there is a one-way causal relationship between relative real sector output and employment, and between relative real sector GFCF and employment. There is also bidirectional causality between import share and relative real sector employment, and unidirectional causality between import share, GFCF, recovery, and relative nominal employment.

5. Discussion

The study analyzes the pattern of economic growth in Pakistan and its impact on employment. The study uses the Cobb-Douglas production function and the employment demand model to analyze the data. The results show that aggregate output has a positive impact on aggregate employment, but the impact of sectoral growth on sectoral employment is different. The real sector (agriculture and industry) has a positive impact on employment, while the nominal sector (services) has a negative impact on employment. The study also finds that the service sector is growing faster than the real sector, and employment is shifting from the agriculture sector to the service sector. However, the growth of the service sector is not sustainable because it is not creating enough jobs. The study concludes that the government should focus on the real sector to create sustainable employment and economic growth. The study's findings are important for policymakers in Pakistan. The study shows that the current economic growth model is not sustainable because it is not creating enough jobs. The government needs to focus on the real sector to create sustainable employment and economic growth.

6. Conclusion and Policy Recommendation

This study analyzes the economic growth and employment in Pakistan, and whether it is jobless or job-creating. It uses two models to analyze the data from 1971 to 2018. It finds that the output has a positive impact on employment, but the sectoral differences are unclear. The study recommends focusing on employment-generating growth rather than just economic growth. The study also examines how growth affects employment during business cycle shocks, and finds a negative relationship during recovery periods. The study also explores the impact of sectoral growth on sectoral employment, and finds that the real sector has a positive effect in the short run, but the nominal sector has a negative effect. The study also investigates the reason for jobless growth in Pakistan and the structural transformation, and finds that the service sector is growing faster but creating fewer jobs. The study also finds that both sectors have a positive effect in the long run, but the nominal sector has a higher effect. The study concludes that the economic growth in Pakistan is jobless, and suggests focusing on the real sector, especially the industry sector, for sustainable growth and employment. The study also suggests using the large population as a source of labor-intensive growth rather than technology. The study supports policies that help Pakistan grow and achieve sustainable development. The study also finds that employment shifts from agriculture to services, but services cannot provide long-run growth.

6.1 Based on the above Analysis and Conclusions, Several Recommendations Follow

The government should focus on employment subsidies, especially for young people. They should also encourage the employment of the agricultural industry and the industry sector. The government should provide subsidies to businesses that hire new workers, especially young people. This would help to create jobs and reduce unemployment. The government should also invest in the agricultural sector to make it more productive and create more jobs. This would help to reduce rural poverty and unemployment. Additionally, the government should provide support to the industry sector, such as tax breaks and loans, to help it grow and create more jobs. This would help to reduce urban unemployment.

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Appendix

Table A1

Variables	Coefficient	Prob
LogOutput	0.776710	0.0000
LogGFCF	-0.094239	0.0607
LogImportShare	0.368942	0.0000
Recovery Dummy	-0.010798	0.0594
C	-2.872022	0.0000

R^2	0.989774
Sum squared resid	0.016576
F-statistic	1040.503 (0.0000)

Table A2: Descriptive Statistic

		LogEmp	LogOutput	LogGFCF	LogImpshare
Overall	Mean	1.528222	6.431702	5.437690	-0.211851
	Max	1.790356	6.906444	6.719410	-0.140395
	Min	1.264109	5.913116	3.879109	-0.304968
	StdDev	0.156785	0.296998	0.825402	0.042772
Relative Real Sector	Mean	-0.166407	-0.309484	-0.367739	-0.211851
	Max	-0.115091	-0.245984	-0.278037	-0.140395
	Min	-0.201626	0.369275	-0.474762	-0.304968
	StdDev	0.026599	0.025959	0.042899	0.042772
Relative Nominal Sector	Mean	-0.502900	-0.294204	-0.246018	-0.211851
	Max	-0.430158	-0.242067	-0.177276	-0.140395
	Min	-0.633017	-0.3634080	-0.325308	-0.304968
	StdDev	0.060526	0.025627	0.033302	0.042772

Source: Authors' Estimation

Figure A1: Real Sector

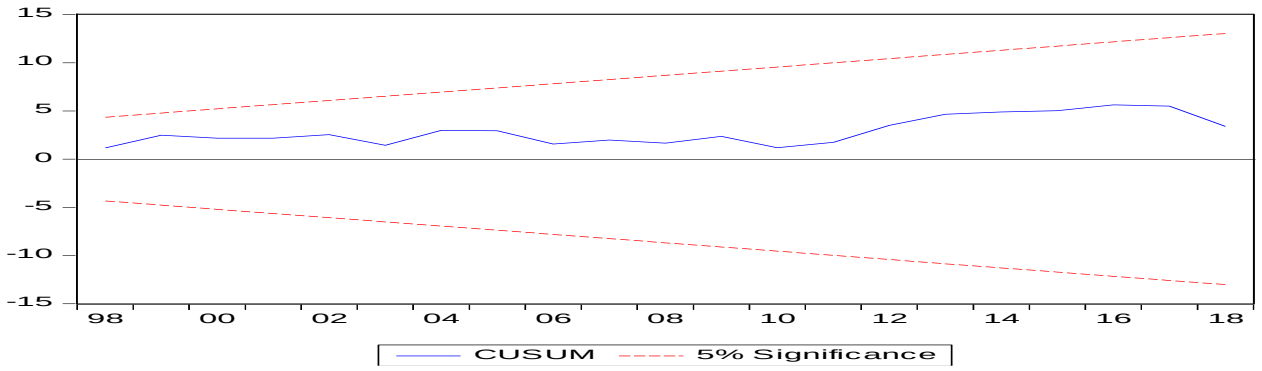

Figure A2: Nominal sector

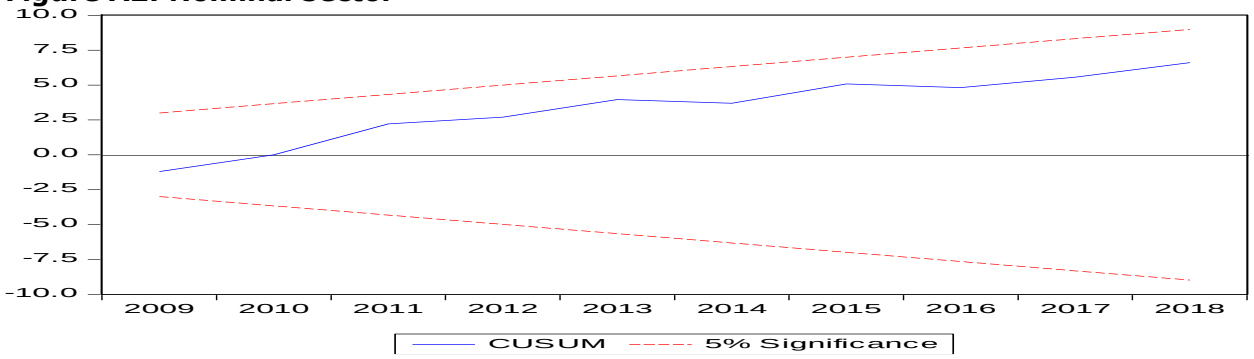

Figure A3:

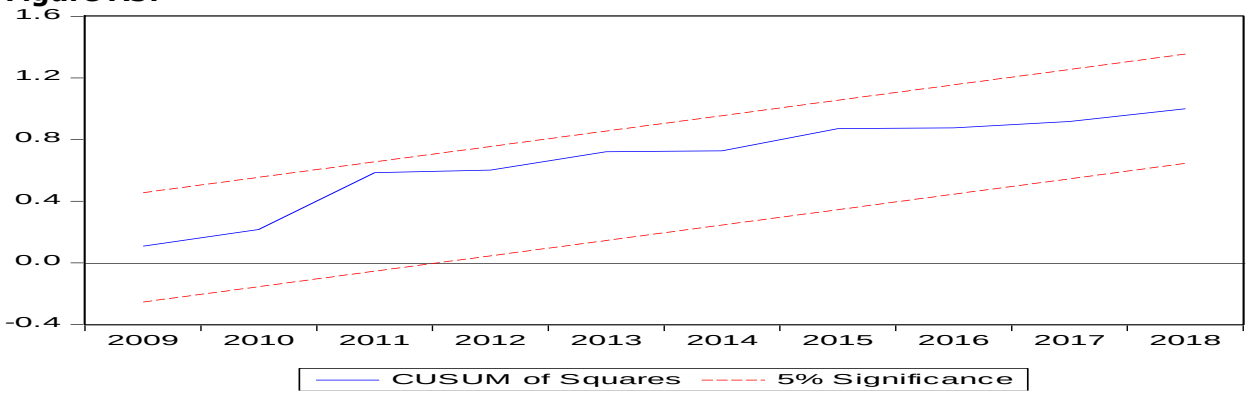

Table A3: Granger Causality Test Results

Null Hypothesis	lags	F-Statistic	Prob	Result
LOGRS_TOTALS does not GC* LOGREMP_TOTALEMP	10	0.81120	0.6223	Uni-directional
LOGREMP_TOTALEMP does not GC LOGRS_TOTALS		2.27927	0.0648	
LOGRGFCF_TOTALGFCF does not GC LOGREMP_TOTALEMP	1	4.74135	0.0349	Uni-directional
LOGREMP_TOTALEMP does not GC LOGRGFCF_TOTALGFCF		0.95624	0.3335	
LOGIMPSHARE does not GC LOGREMP_TOTALEMP	15	12.7568	0.0750	Uni-directional
LOGREMP_TOTALEMP does not GC LOGIMPSHARE		9.81645	0.0962	
RECOVERY_DUMMY does not GC LOGREMP_TOTALEMP	11	0.99083	0.4971	Uni-directional
LOGREMP_TOTALEMP does not GC RECOVERY_DUMMY		4.12350	0.0075	
LOGNS_TOTALS does not GC LOGNEMP_TOTALEMP	10	0.77291	0.6531	Uni-directional
LOGNEMP_TOTALEMP does not GC LOGNS_TOTALS		2.15592	0.0785	
LOGNGFCF_TOTALGFCF does not GC LOGNEMP_TOTALEMP	1	3.73263	0.0598	Uni-directional
LOGNEMP_TOTALEMP does not GC LOGNGFCF_TOTALGFCF		1.10488	0.2989	
LOGIMPSHARE does not GC LOGNEMP_TOTALEMP	15	45.1005	0.0219	Uni-directional
LOGNEMP_TOTALEMP does not GC LOGIMPSHARE		17.5038	0.0553	
RECOVERY_DUMMY does not GC LOGNEMP_TOTALEMP	11	1.04125	0.4631	Uni-directional
LOGNEMP_TOTALEMP does not GC RECOVERY_DUMMY		3.56410	0.0141	

Granger Cause = GC*