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UNEMPLOYMENT, UNSKILLED WORKERS, WAGE INEQUALITY, AND PER CAPITA INCOME: AN ANALYSIS OF SERVICE SECTOR IN PAKISTAN.

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Abstract

The purpose of this study is to investigate in the relationship between wage inequality, unskilled workers, inflation, foreign direct investment and low per capita income of workers in services sector. The author utilized time series secondary data of 20 years to examine empirical relationship between dependent variable, per capita income, and independent variables such as foreign direct investment (FDI), inflation, unemployment, population growth and wages. Different statistical tools such as ADF Test, Correlation matrix, ARDL Model, Error Correction Model, Granger causality and Ramsey Reset test were employed to analyze these relationships. The empirical findings reveal that FDI has positive association with dependent variable, per capita income, while population growth unemployment and wages have negative relationship with it. The study suggests that the Government of Pakistan should boost FDI, control population growth, inflation, wage rate and reduces unemployment to improve per capita income of workers in service sector.

Key words: Unemployment; Wage inequality; Unskilled workers; Per capita income; Service sector.

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1.Introduction

1.1 Background of study

1.1.1 Role of Service sector in Economic growth

The Trade Development Authority of Pakistan (TDAP) Report (2023) pinpoints the important role of the service sector, its existing share in GDP at a staggering 61.40%. The rise of service sector coincides with a relative decline of the share of agriculture (22.35%) and industry (20.42%) in Pakistan's GDP. However, the potential of service sector for job creation and economic development is vital for sustainable growth. But there are many bottlenecks such weak infrastructure; unskilled labor forces can hinder the fostering innovation and growth of service industries. But the pace of expanding service sector indicates a structural shift in Pakistan's economy with important implication for future development strategies. By capitalizing the potential of service sector and addressing existing challenges Pakistan can strengthen its position as service-driven economy.

1.1.2 Unskilled labour force and their impact.

Pakistan boasts a large and growing labor force, ranking among the top 10 globally. However, a significant portion of this workforce lacks essential skills, hindering the country's economic potential. This paper explores the prevalence of unskilled labor in Pakistan and its multifaceted impact on the national economy. Studies by the International Labour Organization (ILO) Report, (2021) highlight the skills gap in Pakistan's workforce as well as a mismatch between skill demand and supply. Employers struggle to find workers with the necessary qualifications, while a vast pool of unskilled labor remains underutilized. This imbalance can be attributed to factors like limited access to quality education and vocational training, particularly for women in

rural areas (Word Bank, 2023). The dominance of unskilled labor has several negative consequences for Pakistan's economic development. Research published in The Express Tribune (2023) emphasizes how low skill levels translate into lower productivity. Unskilled workers often perform repetitive tasks with limited innovation, hindering industrial output and hindering Pakistan's ability to compete in the global market. Furthermore, a study by the Pakistan Bureau of Statistics (PBS) (2020) highlights the concentration of unskilled labor in the agricultural sector, which contributes significantly less to GDP compared to the service sector. This trend impedes Pakistan's transition towards a more diversified and industrialized economy, where skilled labor plays a crucial role. The prevalence of unskilled labor also has detrimental social consequences. A study of Pakistan Institute of Development Economics (PIDE) (2022) points towards a correlation between low skill levels and lower wages. This translates into limited economic mobility and perpetuates poverty cycles, hindering overall human capital development.

1.1.3 Wage inequality

The World Inequality Lab Report (2022) points out that Pakistan has a Gini coefficient of 0.39, signifying a high level of income inequality. This translates to a significant gap between the wages earned by the top earners and the bottom earners in the labor market. Several factors contribute to wage inequality in Pakistan. Research published by the Pakistan Institute of Development Economics (PIDE) (2023) highlights the role of skill mismatch as a key driver. The dominance of unskilled labor, coupled with limited access to quality education and vocational training, creates a situation where a large portion of the workforce is unable to compete for higher-paying jobs. Furthermore, a study by the International Labour Organization (ILO) (2021)

emphasizes the gender pay gap as a significant contributor to wage inequality. Women in Pakistan often earn considerably less than men for performing similar work, further exacerbating the issue. The women's participation in labor force is around 22% although their population is nearly 50%. The ratio of male and female participation in labour force is 84.79 and 22.62% respectively. According to an estimate, a woman's income is 16.3% of a man's income. The reason is that out of 5.6 million labour working in the informal sector 81% are women. Even though this contribution accounts for 65% of Pak Rupee 400 billion which is equivalent to US$2.8 billion. From this, one can assess the size of informal economy in Pakistan. According to World Bank estimate, the earning of women is only between PKR 3000-4000 (US$ 15-20) per month, causing poor nutrition, low-income security, health issues, absence of social protection and high economic vulnerability during crisis hours. International Labor Organization (ILO), disclosed in its report,2019-20, that gender pay gap variation between men and women in Pakistan is 34 percent

Wage inequality has a multifaceted impact on Pakistan's development. According to the study of UNDP (2021), only 20% (13.5 million) women are participating in labor force in Pakistan. About 7.0 million are working in agriculture sector which is non-remunerative sector for women because under this category they support their male family members without receiving any wages. The gap between the earnings of men and women has also widen in Pakistan. Women earned just 18% of what men earned in 2018-2019 because their most of time are consumed in domestic activities. Their main responsibility is to look after their children and to main domestic affairs of their houses. They spend about 10 times the hours as men in unpaid care work receiving any economic benefits. A study of Asian Development Bank (ADB) (2020) discloses that there is close correlation between wage inequality and

social unrest. When a significant portion of the population have no work, it can lead to social tensions and instability. Thus, addressing wage inequality in Pakistan is crucial for achieving sustainable economic development and social progress.

1.1.4 Unemployment and its effects

Unemployment remains a persistent issue in Pakistan, hindering economic growth and human development. The Labour Force Survey (2022-23) reports an unemployment rate of around 6.2%. However, this figure might not capture the full extent of the problem, as underemployment and discouraged workers are not always reflected in official data. The World Bank Report (2022) suggests a broader definition of underemployment could push the true unemployment rate closer to 10%. The skill mismatch is one of the main causes of unemployment. A study of the Sustainable Development Policy Institute (SDPI) (2022) highlights the skills mismatch between job seekers and labor market demands. The education system often fails to equip graduates with the necessary skills for the evolving job market, leading to a surplus of unskilled labor and a scarcity of skilled workers. Furthermore, research published in the Journal of Economic Cooperation and Development (2020) emphasizes the role of slow economic growth in creating limited job opportunities. When the economy expands slowly, businesses are less likely to hire new employees, leading to a stagnant job market. Unemployment has a multifaceted impact on individuals and society at large. Research from the Institute of Policy Studies (IPS) (2023) indicates that unemployment can lead to poverty, social exclusion, and psychological distress. Unemployed individuals face financial hardship, which can have cascading effects on their families and communities. The Asian Development Bank (ADB) Report,

(2022) suggests that policies that promote job creation, such as fostering entrepreneurship and attracting foreign investment, can play a crucial role in expanding employment opportunities. Unemployment remains a significant hurdle to Pakistan's economic and social development. One of the causes of rising terrorism and crimes in Pakistan is due to high rate of unemployment among youth.

1.1.5 Per capita income

Per capita income (PCI) is a crucial indicator of a nation's economic well-being, representing the average income earned by each citizen. This paper examines the current state of per capita income in Pakistan, analyzing trends, challenges, and potential areas for improvement based on recent studies. According to the World Bank Report (2023), Pakistan's Gross National Income (GNI) per capita stands at approximately $1,890 (current USD). This figure indicates a lower-middle-income status for the country. While Pakistan has experienced some growth in PCI over the past decade, the pace of improvement remains relatively slow. The Asian Development Bank (ADB) Report (2022) highlights significant regional disparities in per capita income within Pakistan. Urban areas generally boast higher PCI compared to rural regions. This disparity can be attributed to factors like limited access to education, healthcare, and economic opportunities in rural areas. Several factors impede faster growth in Pakistan's per capita income. The Pakistan Institute of Development Economics (PIDE) Report (2021) emphasizes the issue of low productivity as a key challenge. The dominance of unskilled labor and underinvestment in research and development hinder the efficiency and competitiveness of Pakistan's industries. Additionally, research by the International Monetary Fund (IMF) (2022) points towards high levels of inflation as a barrier to improving living standards. Inflation erodes the

purchasing power of individuals, effectively reducing the value of their income. To enhance Pakistan's per capita income, various strategies require exploration. Research by the World Bank Report (2023) suggests a focus on human capital development through improved education and vocational training programs. This can equip the workforce with the necessary skills to contribute to a more productive and diversified economy. Additionally, the United Nations Development Program (UNDP) Report (2022) emphasizes the importance of promoting good governance and reducing corruption as measures to attract investment and stimulate economic growth. Per capita income remains a critical measure of Pakistan's economic well-being. While there have been some improvements in recent years, regional disparities and internal challenges pose obstacles to faster growth. By prioritizing human capital development, promoting good governance, and tackling inflation, Pakistan can create a more inclusive and prosperous future for its citizens.

From the above discussion, we can conclude that unskilled labor, wage inequality and low per capita income are the pressing issues that need in-depth analysis because these issues are main hurdles in the way of fast economic growth and sustainability of Pakistan. Therefore, the author has intended to empirically explore the causes and effects of these issues and suggest their possible solution. The main objectives of this study are listed below: -

- To investigate the impact of the role of service sector in GDP, job creation, and potential challenges facing by Pakistan’s economy
- To analyze high ratio of unskilled labor, its causes, and its impact on economic growth in Pakistan.
- To examine the causes of wage inequality particularly in informal sector and its multifaceted impact on Pakistan’s society.

● To evaluate the current state of unemployment in Pakistan, its causes, and its effects on individuals and overall economy.

● To analyze the causes of low per capita income and identify potential strategies for its improvement.

The scope of this study is large because it investigates into issues of unskilled workers, wage inequality, informal sector and lack of proper training and development of labor force. Half of the population of Pakistan is consisted of female but their share in labor participation and employment is far less as compared to their male counterpart. This causes low productivity and low per capita income of individuals and rising poverty. This study has probed its causes and suggests possible solutions and as such the findings of this study are valuable for consideration by policy makers, practitioners and academicians, who can devise effective strategies for Pakistan's sustainable development. The findings of this study will contribute to promotion of UN's Sustainable Development Goals (SDGs) (2015) which emphasize members countries to priorities the policies for eradication of poverty, hugeness, wage disparity and promote women empowerment.

2.Underpinning theories and hypothesis development.

Human Capital Theory developed by Becker (1964). states that there is positive relationship between wage rate and GDP per capita. According to this theory, investments in education and skill development lead to increased productivity and economic growth as well as higher wages because wages are determined on the level of education and experience of the workers.

Population Growth Theory proposed by Malthus, (1798). identified negative relationship between population growth and per capita income. This theory suggests that rapid population growth can strain resources and lead to lower economic output per capita due to increased competition for resources

and jobs and consequently lower wages as surplus labor are available in the market.

Foreign Direct Investment (FDI) Theory suggested by Blomström,, Lipsey, & Zejan, (1996). reveals positive and significant relationship between Foreign direct investment (FDI and per capita income because it brings capital, technology, and expertise, which stimulating economic growth and development in the host country and improve the skill of workers.

Wage Inequality Theory was presented by Atkinson & Brandolini (2001) and this theory negative association between wage rate and per capita income. When wage inequality increases, it may lead to disparities in purchasing power and hinder overall economic growth by reducing aggregate demand. Thus, wage inequality has negative impact on per capita income.

Structural Transformation Theory proposed by Lewis (1954) is related to the service sector of Pakistan. This theory suggests that shifts in employment from agriculture to industry and services sectors contribute to economic growth. The positive relationship between service sector employment (represented by wage rates) and GDP per capita highlights the importance of this theory. The growth in services sector leads to higher wages which, in turn, leads to higher per capita income.

Unemployment Theory suggested by Okun (1962) sheds light on the insignificant relationship between unemployment rate and GDP per capita. It indicates that the relationship between unemployment and economic growth is complex and may depend on various factors such as labor market policies, technological changes, and structural shifts in the economy.

These economic theories provide a conceptual foundation for understanding the association between the variables of study and offer insights

into the dynamics of economic growth and development in the service sector of Pakistan. These theories also provide deep understanding of the intricate association between unskilled labor force, wage inequality, foreign direct investment with per capita income.

Now we also review some relevant studies from literature to understand further the nature of relationship between variables of the study.

Irfan, 2008; Ali, (2018) revealed a widening gap between skilled and unskilled worker and disparity in wages in Pakistan. They disclosed that limited access to education and vocational training are the main causes of low productivity and low wages of female workers. Ybbochi & Chaudhuri (2006) and Mirza et al. (2017) discussed those challenges of skill mismatch between available labor force and labor market demand dur to non-market education system. They suggested that the graduates should be equipped with relevant skills so that they can meet market demand and earn high wages. Ahmad, 2008; Bajwa & Yousaf, 2014) disclosed that low wages in informal sector and limited protection of workers are a main challenge for policy makers because most of female workers are receiving low wages in informal sector. They suggested to organize informal sector in order to improve wages of female workers. Khan (2007) and Jaffry et al. (2015) shed light on gender disparity in Pakistan and discuss the challenges faced by women in entering and remaining in the workforce. Cultural norms and limited access to education contribute to low female labor force participation. Beladi et al. (2010) and Ajmer & Ahmed (2011) explore the impact of globalization on Pakistan's labor market. While foreign direct investment can create jobs, concerns about job displacement in certain sectors is still existing. Shahid (2014) and Ali (2018) examine how inflation and unemployment can hinder economic growth and exacerbate existing labor market inequalities.

2.1 Hypotheses of study

In the light of the objectives and literature review, the following hypotheses have been formulated for testing relationship between dependent and independent variables, using different statistical techniques.

Ho: The expansion of the service sector will not contribute positively to Pakistan's GDP growth, but challenges like infrastructure limitations and a lack of innovation in service industries need to be addressed for sustained progress.

H_1: The expansion of the service sector will contribute positively to Pakistan's GDP growth, but challenges like infrastructure limitations and a lack of innovation in service industries need to be addressed for sustained progress.

Ho: The high ratio of unskilled labor in Pakistan does affects economic development and cause low productivity. The Investment in education and vocational training cannot develop necessary skills among workers and bridge the skill gap.

H_1: The high ratio of unskilled labor in Pakistan affects economic development and cause low productivity. Investment in education and vocational training can develop necessary skills among workers and bridge the skill gap.

Ho: Skill mismatch and wage inequality are not significant contributors to low productivity in Pakistan. Policies promoting equal pay for equal work and upskilling initiatives cannot positively contribute into equitable income distribution.

H_1: Skill mismatch and the wage inequality are significant contributors to low productivity in Pakistan. Policies promoting equal pay for equal work and

upskilling initiatives can help positively contribute into equitable income distribution.

Ho: The skills mismatch between available workers and labor market demands, coupled with slow economic growth, are not the key factors of unemployment in Pakistan.

H_1: The skills mismatch between available workers and labor market demands, coupled with slow economic growth, are the key factors of unemployment in Pakistan.

Ho: Low productivity, regional disparities, and high inflation hinder growth of per capita income in Pakistan.

H_1: Low productivity, regional disparities, and high inflation hinder growth of per capita income in Pakistan.

2.2 Research gap and novelty of study

Most of reviewed studies focus on national data, overlooking regional disparities within Pakistan. The impact of automation and technological advancements on the future of jobs in Pakistan requires further investigation. The effectiveness of government policies aimed at improving labor market outcomes needs rigorous evaluation. Studies exploring the psychological well-being and mental health of workers in Pakistan's demanding labor market are scarce. Thus, the novelty of this study is that it examining the impact of unemployment, unskilled labour force, per capita income and wage inequality in the context of growing service sector of Pakistan. No study has so far conducted on the combined effect of these variables and role of service sector in economic growth in Pakistan.

3.Data and Methodology

This study conducted to observe the effects of unemployment, unskilled workers, wage inequalities and their impact on per capita income in Pakistan,

taking services sector as a sample of study. The GGD per capita, Foreign Direct Investment, unemployment, Population Growth, wages, Inflation are selected as variable of study. GDP per capita is dependent variable while all other variables are independent variables. Further, econometrics techniques used to estimate the results. The study is quantitative in nature and analyzed data through quantitative methods and econometric techniques. Convenience sampling method was used for collection and data and the data was collected from the sources such as World Development indicators, State Bank of Pakistan, Pakistan economic survey and Pakistan Bureau of Statistics for the period spanning from 1990 to 2022. The econometric model of the study is given below:

$$Y = \beta_1 FDI + \beta_2 UE + \beta_3 POP + \beta_4 GCE + \beta_5 USK + \beta_6 IN + \beta_7 WI + \beta$$

The author employed different statistical and econometric techniques to analyze the data and draw the results. These techniques include Autoregressive Regressive Distributed lag (ARDL) model, ADF test, Correlation Matrix, Error Correction Model (ECM), Granger causality test was utilized to analyze data and nature of relationship between variables in the short run and long run and causality between variables.

4. Results

The results of empirical analysis are discussed in detail in the following:

4.1 Descriptive statistics

Descriptive statistics help us make sense of raw data, which can be overwhelming in its unprocessed form. By using measures like mean, median, mode, range, and standard deviation, we can condense a large dataset into key

characteristics that provide a quick understanding of the central tendency, spread, and shape of the data. This makes it easier to identify patterns and

trends that might not be readily apparent from looking at individual data points. Table 1 shows the estimate results of descriptive statistics analysis.

Table 1

Results of descriptive statistics

	GDP	FDI	IF	POP	LF	WS	UE
Mean	1.733255	1.146257	11.41552	2.279788	50.45455	37.72683	3.885909
Median	1.411983	0.788669	9.618872	2.232156	50.43000	37.07895	4.270000
= maximum	5.169693	3.668323	38.51199	3.230643	52.73000	44.38512	7.830000
minimum	-1.912790	0.375528	3.729013	1.296552	48.36000	33.89495	0.400000
std. Dev.	2.083221	0.927446	7.498075	0.577879	0.993851	3.158722	2.499430
skewness	0.134893	1.850804	2.265545	-0.084377	0.200490	0.622646	-0.157541
kurtosis	1.869123	5.010111	8.873826	1.919495	3.141787	2.566306	1.720725
Jarque-era	1.239027	16.26391	50.44656	1.096305	0.165815	1.593938	1.591171
probability	0.538206	0.000294	0.000000	0.578017	0.920436	0.450693	0.451317
Sum	38.13162	25.21766	251.1415	50.15533	1110.000	829.9903	85.49000
sum sq. dev.	91.13601	18.06326	1180.644	7.012838	20.74255	209.5280	131.1901
observations	22	22	22	22	22	22	22

This study utilized 30 years of annual time series data spanning from 1990 to 2022.The descriptive statistics analysis results in Table 1 exhibits that the average GDP is 1.41 with the standard deviation 2.0. Average of Foreign direct investment is 0.79 with the standard deviation of 0.92. Average of Inflation is 9.61 with the standard deviation of 7.4. Average of Labor force is 50.4 with the standard deviation of 0.9. Average of Population is 2.23 with the standard deviation 0.5. Average of Wage and Salaries is 37.0 with the standard deviation of 3.1. Average of unemployment is 4.27 with the standard deviation of 2.4. Kurtosis is the measure of the combined weight of distribution tails relative to the center of distribution, so if kurtosis value is = 3 (Meso Kurtic), >3 (Lepto Kurtic), <3 (platykurtic). The skewness of population is -0.08 and

the skewness of unemployment is -0.01 so they are negatively skewed and the skewness of GDP is 0.1, FDI 1.8, inflation 2.2, labor force 0.2, and wages and salaries have 0.6 so they all latterly have positively skewed. The results of kurtosis shows that the values of all variables expect of inflation and FDI are lies between 3 or -3 so, they are normally distributed.

4.2 Correlation Matrix

The primary function of a correlation matrix is to summarize the strength and direction of the linear relationship between pairs of variables in a dataset. It reveals how much two variables change together, either in a positive (increase in one lead to increase in another) or negative (increase in one lead to decrease in another) correlation. This can be particularly helpful in exploratory research where you're looking to understand potential connections within your data. Table 2 shows the estimated results of correlation matrix.

Table 2

Results of Correlation Matrix

	GDP	FDI	IF	POP	LF	WS	UE
GDP	1	-0.0510	-0.2797	-0.4450	0.3256	0.3822	0.0960
FDI	-0.0510	1	-0.1193	-0.0351	-0.2354	-0.0120	-0.573
IF	-0.2797	-0.1193	1	0.4677	-0.1683	-0.3695	0.0377
POP	-0.4450	-0.0351	0.4677	1	-0.7462	-0.7871	0.4053
LF	0.3256	-0.2354	-0.1683	-0.746	1	0.8182	-0.025
WS	0.3822	-0.0120	-0.3695	-0.7871	0.818	1	-0.0211
UE	0.0960	-0.5739	0.0377	0.4053	-0.0258	-0.0211	1

Table 2 shows the results of correlation matrix. It shows that estimated FDI (-0.05), IF (-0.27), POP (0.4) have negative but weak relationship with GDP because they are father away from -1 value. while estimated LF (0.3), UE

(0.09), WS (0.3) have positive relationship with GDP .The results shows that estimated GDP (-0.05),UE (-0.57),WS (-0.01),IN (-0.1), LF (-0.2), POP (-0.03) have negative relationship with FDI, its mean with increase of FDI all these variables will decrease but they have weak negative correlation, .The results reveals that estimated IF(Inflation) has negative relation with GDP (-0.27) ,FDI (-0.11), WS (-0.36) ,LF (-0.16),and UE (0.03), POP (0.4) has positive relationship but labor force has negative relationship with FDI (-0.2), IF (-0.16), UE (-0.02), POP (-0.7) and positive with WS (0.8),GDP(0.3).The estimated POP has negative relationship with GDP (-0.4) FDI (-0.03) WS(-0.7) LF(-0.7) and positive relationship with UE (0.4),IF (0.4).The estimated WS has negative relationship with FDI (-0.01),POP (-0.7),UE(-0.02) and positive relationship with LF(0.3),IF(0.8).The estimated UE has negative relationship with FDI (-0.5),LF (-0.02),WS(-0.02) and GDP (0.09),IF (0.03),POP(0.4) has positive relationship , it's with the increase or decrease of unemployment the per capita income , inflation, and population will increase or decrease respectively .

4.3 ADF Unit Root Test

The ADF test specifically looks for the presence of a unit root in a time series. A unit root essentially means that the past value of a variable strongly predicts its future value, and the series lacks a stable mean and variance over time. Non-stationary data with unit roots can lead to spurious results in further analysis. The ADF test is a versatile tool that can be applied to a variety of time series data. It doesn't require strong assumptions about the underlying trend or seasonality in the data, making it adaptable to many real-world scenarios. The ADF test outputs a statistic and a p-value. A negative statistic exceeding a critical value (based on the sample size) and a low p-value (often less than 0.05) indicate that we can reject the null hypothesis of a unit root and

conclude that the series is likely stationary. While the ADF test is popular, there are alternative tests for stationarity like the KPSS test. However, the ADF test is often the preferred starting point due to its wide applicability and ease of interpretation. Table 3 exhibits the results of ADF test.

Table 3

Results of ADF Unit Root Test

	1(0)		1(1)	
	(C)intercept	trend intercept	(C) intercept	Trend intercept
GDP	0.005	0.0217	0.0000	0.0002
FDI	0.0541	0.1832	0.0115	0.0485
WS	0.8933	0.4638	0.0004	0.0022
UE	0.4936	0.5742	0.0005	0.0063
IN	0.0000	0.0001	0.0000	0.0000
POP	0.3927	0.0741	0.0002	0.002

In time series data it is necessary to check the stationarity of variables in order to decide which model can be used for further analysis of data for further application of tests. The null and alternate hypotheses are the following.

H_0: data is non-stationer if prob value is > than 0.05

H_1: data is stationer if prob value is lesser than 0.05

The result in Table 3 shows that GDP, FDI and inflation are stationer at level while WS, UE and POP are stationer at 1st difference. So, null hypothesis is rejected as variables are non-stationer. Further ARDL model can be applied in time series data because variables are stationers at different levels.

4.5 ARDL Model

The Autoregressive Distributed Lag (ARDL) model is a powerful tool in empirical analysis, particularly when dealing with time series data. It enables us to determine cointegration and long-run equilibrium relationship between variables. The ARDL model performs well even with relatively small sample and due to this reason, this model is widely used by the researchers. Table 4 shows the estimated results of ARDL Model.

Table 4

Results of ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP	-0.355581	0.232197	-1.531376	0.1496
FDI	2.109626	0.876171	2.407780	0.0316
FDI	-1.200088	0.818819	-1.465633	0.1665
IF	0.082994	0.049283	1.684041	0.1160
POP	-5.616166	1.700784	-3.302104	0.0057
UE	0.387034	0.283024	1.367495	0.1946
UE	0.402565	0.253335	1.589064	0.1361
WS	-0.938336	0.286277	-3.277723	0.0060
WS	0.380936	0.304012	1.253031	0.2323
C	30.90474	13.12319	2.354973	0.0349
R-square	0.711572	Mean dep var		1.525799
Adjusted R-square	0.511890	S.D.		1.969778
S.E. of regression	1.376182	Akaike info criterion		3.775524
Sum square resid	24.62041	Schwarz criterion		4.269217

Log likelihood	-33.41852	Hannan-Quinn criteria.		3.899686
F-statistic	3.563537	Durbin-Watson stat		2.704278
Prob(F-statistic)	0.019007			

*GDP per capita is dependent variables.

The results in Table 6 reveals that Foreign Direct Investment (FDI) has positive and significant relationship with per capita income because of significant positive coefficient (p-value = 0.0316) indicates that higher levels of current FDI are associated with an increase in GDP per capita. This suggests that foreign investment brings capital and potentially technology, which can boost economic growth. However, Population Growth (POP) has negative association with per capita income because a statistically significant negative coefficient (p-value = 0.0057) suggests that rapid population growth is associated with a decrease in GDP per capita. This could be due to factors like strain on resources or limitations on job creation proportionate to population growth rate. Wage rate also has negative association with per capita income because of a statistically significant negative coefficient (p-value = 0.0060) that indicates that a decline in the wage rate on account of a decrease in GDP per capita. The coefficient for GDP is negative and statistically insignificant (p-value = 0.1496). It's important to consider the model specification and potential omitted variables that might explain this result. The coefficients for Unemployment Rate (UE) and its lag term are statistically insignificant, suggesting a weak or inconclusive relationship with GDP per capita in this model. The coefficient for the constant term (C) is statistically significant (p-value = 0.0349) and represents the estimated average GDP per capita when all other independent variables are zero (which is not a realistic scenario but

provides a reference point). Overall model is good because R-squared (0.7116). This value indicates that the model explains 71.16% of the variation in GDP per capita. However, a high R-squared doesn't necessarily guarantee a good model. The Adjusted R-squared value is (0.5119) which suggests a moderate fit. F-statistic (3.5635) and Prob(F-statistic) (0.0190): The model, as a whole, is statistically significant in explaining GDP per capita. The Durbin-Watson statistic (2.7043) suggests there might be some autocorrelation present in the model's residuals, which could affect the reliability of the standard errors and p-values. Further tests or model adjustments might be required to address this. This ARDL model suggests that Foreign Direct Investment, Population Growth, and past performance of the wage rate are statistically significant factors influencing GDP per capita. However, the presence of insignificant coefficients and potential autocorrelation highlight the need for further exploration and potentially model refinements.

4.5. Error correction model

ECMs are built upon the concept of cointegration, which suggests a short run equilibrium relationship exists between variables. This means that even if the variables fluctuate in the short-run, they tend to move together in the long-run to maintain a stable balance. It incorporates an error correction term (ECT). This term captures the deviation from the long-run equilibrium observed in the previous period. Essentially, it reflects how much and how quickly the variables adjust back towards their equilibrium state after a shock or temporary imbalance. By analyzing the coefficients of the short-run terms, we can understand how shocks or changes in one variable affect the dependent variable in the current period. This presents a more comprehensive picture of the relationship between variables. Table 5 exhibits the estimated results of ECM.

Table 5

Results of Error Correction Model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
d(FDI)	2.109626	0.563366	3.744679	0.0025
d(UE)	0.387034	0.185021	2.091843	0.0566
d(WS)	-0.938336	0.218039	-4.303521	0.0009
ECM	-1.355581	0.173930	-7.793827	0.0000
R-square	0.773227	Mean dep var		-0.183103
Adjusted R-square	0.737420	S.D. depe var		2.221469
S.E. of regression	1.138337	Akaike info criterion		3.253785
Sum square resid	24.62041	Schwarz criterion		3.451262
Log likelihood	-33.41852	Hannan-Quinn criter.		3.303450
Durbin-Watson stat	2.704278			
Test Statistic	Value	Signif.	I (0)	I (1)
F-statistic	5.937358	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

The results of the error correction model (ECM) suggest a statistically significant relationship between the dependent variable and the independent variables, both in the short-run and long-run. The test statistic (F-statistic) is 5.937358 with a significance level of 10%. This implies that the variables are cointegrated, meaning they have a long-run equilibrium relationship. The coefficient of the error correction term (ECM) is -1.355581 and statistically significant (p-value = 0.0000). This negative coefficient indicates that deviations from the long-run equilibrium in the previous period (represented

by the ECM term) are corrected in the current period. In other words, the model suggests that the dependent variable adjusts towards its long-run equilibrium over time. The R-squared value of 0.773227 indicates that the model explains a significant portion of the variation in the dependent variable. The adjusted R-squared value of 0.737420 further accounts for the number of explanatory variables in the model. Overall, the ECM appears to be a good fit for the data, suggesting that there is a stable relationship between the variables and that short-run deviations are corrected over time.

4.5. Bounds test

In empirical research, particularly when dealing with time series data and potentially mixed stationarity, we use the bound test (often referred to as the Pesaran-Shin test) for several key reasons: Unlike traditional cointegration tests that require all variables to be either purely stationary (I (0)) or integrated of order one (I (1)), the bound test can accommodate a mix of these properties. This is a significant advantage in real-world scenarios where economic or social data may exhibit different degrees of stationarity. The bound test is often considered a more powerful alternative to traditional cointegration tests like the Engle-Granger and Johansen tests, especially with small sample sizes. This test combines various steps of unit root testing and cointegration testing into a single framework and in this way, it makes easier to implement multi-step procedures. Through bound test we can compare this F-statistic to critical values established for different scenarios (both sides I (0) or one I (1)) to determine if cointegration exists. Table 6 shows estimated results of Bound Test.

Table 6

Results of Bound Test

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	30.90474	13.12319	2.354973	0.0349
GDP (-1) *	-1.355581	0.232197	-5.838062	0.0001
FDI (-1)	0.909538	0.568093	1.601036	0.1334
IF**	0.082994	0.049283	1.684041	0.1160
POP**	-5.616166	1.700784	-3.302104	0.0057
UE (-1)	0.789599	0.248239	3.180802	0.0072
WS (-1)	-0.557400	0.282018	-1.976471	0.0697
d(FDI)	2.109626	0.876171	2.407780	0.0316
d(UE)	0.387034	0.283024	1.367495	0.1946
d(WS)	-0.938336	0.286277	-3.277723	0.0060
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.670958	0.386322	1.736785	0.1060
IF	0.061224	0.034971	1.750696	0.1035
POP	-4.142995	1.078356	-3.841956	0.0020
UE	0.582480	0.173346	3.360207	0.0051
WS	-0.411189	0.200785	-2.047905	0.0613
C	22.79815	9.112733	2.501791	0.0265
Test Statistic	Value	Sig.	I (0)	I (1)
F-statistic	5.937358	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Table 6 contains the results of Bond test used to determine long-run relationships between the dependent variable, GDP per capita, and various independent variables including Foreign Direct Investment (FDI), Inflation Rate (IF), Population (POP), Unemployment (UE), and Wages

4.6 Ramsey reset test

The Ramsey Reset Test is used to check whether there is evidence of omitted variables or a mis specification of the functional form of model. It helps check whether including additional nonlinear combinations of the explanatory variables significantly improves the fit of the model. The null hypothesis is that there is not specification of error in the model, while the alternative hypothesis states that that there is a specification error in the model. Table 7 demonstrates the estimated results of Ramsey reset test.

Table 7

Estimated results of Ramsey Reset Test

	Value	**df**	**Probability**	
t-statistic	0.241380	12	0.8133	
F-statistic	0.058264	(1, 12)	0.8133	
	Sum of Sq.	df	Mean Squares	
Test SSR	0.118964	1	0.118964	
Restricted SSR	24.62041	13	1.893877	
Unrestricted SSR	24.50144	12	2.041787	
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP (-1)	-0.338989	0.250701	-1.352164	0.2013
FDI	1.958879	1.103473	1.775194	0.1012
FDI (-1)	-1.161029	0.865454	-1.341526	0.2046
IF	0.075246	0.060407	1.245653	0.2367
POP	-5.044830	2.953143	-1.708292	0.1133

UE	0.347304	0.336823	1.031118	0.3228
UE (-1)	0.349335	0.343252	1.017720	0.3289
WS	-0.854898	0.455898	-1.875198	0.0853
WS (-1)	0.355972	0.332171	1.071654	0.3050
C	27.82317	18.67218	1.490087	0.1620
FITTED^2	0.026869	0.111312	0.241380	0.8133
R-squared	0.712965	Mean dependent var		1.525799
Adjusted R-squared	0.473770	S.D. dependent var		1.969778
S.E. of regression	1.428911	Akaike info criterion		3.857637
Sum squared resid	24.50144	Schwarz criterion		4.400699
Log likelihood	-33.36282	Hannan-Quinn criter.		3.994215
F-statistic	2.980678	Durbin-Watson stat		2.654206
Prob(F-statistic)	0.038479			

The estimated results of Ramsey Rest test demonstrate that the F-statistic is quite small, and the p-value is 0.8133, which is significantly greater than the commonly used significance level of 0.05. This indicates that there is no evidence to reject the null hypothesis. Therefore, the test suggests that the functional form of the model is well-specified, and there is no strong evidence of omitted variables or a mis specification of the model.

4.7 Heteroscedasticity test

Heteroscedasticity is a violation of one of the assumptions of linear regression, where the variance of the residuals is not constant across all levels of the independent variables. Heteroscedasticity can affect the reliability of the model's coefficients and the statistical significance of the results. Table 8 shows results of Hetoscedasticity test.

Table 8

Hetoscedasticity test

F-statistic	0.968636	Prob. F (9,13)		0.5052
Obs*R-squared	9.232443	Prob. Chi-Square (9)		0.4161
Scaled explained SS	2.885547	Prob. Chi-Square (9)		0.9687
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.32374	14.69409	1.247014	0.2344
GDP (-1)	0.101810	0.259992	0.391590	0.7017
FDI	-0.677054	0.981052	-0.690130	0.5022
FDI (-1)	1.429874	0.916835	1.559576	0.1429
IF	-0.057091	0.055182	-1.034583	0.3197
POP	-0.861513	1.904376	-0.452386	0.6584
UE	0.087596	0.316903	0.276413	0.7866
UE (-1)	0.102267	0.283660	0.360528	0.7242
WS	-0.448610	0.320546	-1.399521	0.1851
WS (-1)	0.003921	0.340403	0.011517	0.9910
R-squared	0.401411	Mean dependent var		1.070452
Adjusted R-squared	-0.012997	S.D. dependent var		1.531000
S.E. of regression	1.540917	Akaike info criterion		4.001653
Sum squared resid	30.86755	Schwarz criterion		4.495347
Log likelihood	-36.01901	Hannan-Quinn criter.		4.125816
F-statistic	0.968636	Durbin-Watson stat		1.818010
Prob(F-statistic)	0.505230			

H_0: No Heteroscedasticity, if p value is > than 0.05.

H_1: Heteroscedasticity if p value is lesser than 0.05.

The results of the heteroscedasticity test indicate that there is no strong evidence of heteroscedasticity in the regression model. The p-values for all

three heteroscedasticity statistics (F-statistic, Obs*R-squared, and Scaled Explained SS) are larger than the commonly used significance level of 0.05. Therefore, based on these test results, we conclude that the assumption of homoscedasticity (constant variance of residuals) is not violated in your regression model. Table 8 reveals that the probability of chi-square 0.416 is > than 0.05 that shows homoscedasticity and it is good for regression. So null hypothesis ($H_{0)}$ is accepted.

4.9 Normality Distribution Test

Normality tests can sometimes reveal outliers or data irregularities that might affect the analysis. By visualizing the distribution of the data using histograms or Q-Q plots alongside the normality test, we can identify potential issues that require further investigation. Normality distribution tests are valuable tools in statistical analysis. They help ensure we are using the appropriate statistical techniques for our data and can reveal potential issues that might influence the reliability of our results. By understanding normality assumptions and how normality test function, we can make informed decisions about data analysis methods. Figure 1 shows the results of normal distribution test.

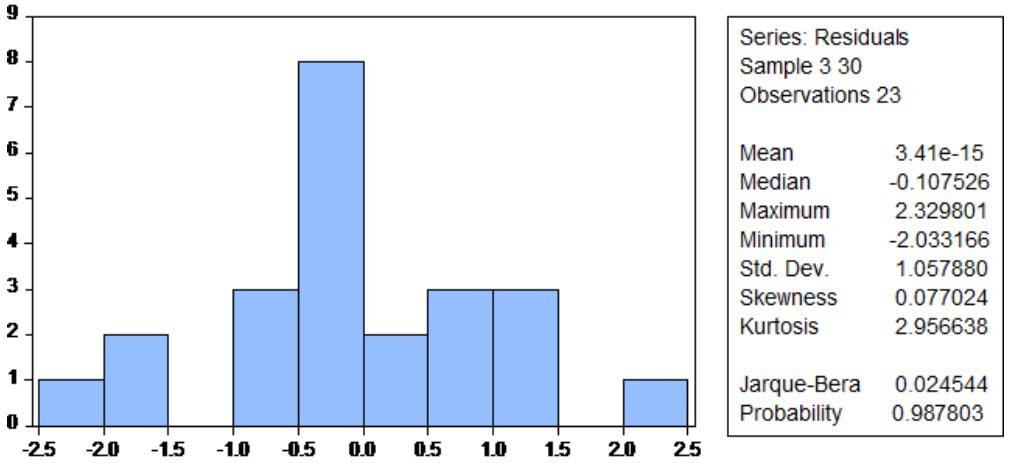

Fig 1: Normal distribution of data

The data in Figure 1 reveals that the p- value of Jarque Bera (0.98) is > than 0.05, is insignificant and shows normality of series (residuals) and there is no outlier in the model.

5. Discussion

The purpose of study is to explain the influence of unemployment, wage inequalities, unskilled workers, and their impact on per capita focusing on service sector of Pakistan. This study employed ADF test to check stationarity among variables. The results show GDP (per capita), FDI (foreign direct investment) and IF (inflation) are integrated of order 1(0) whereas, WS (Wage and Salaries), UE (unemployment), or POP (population) are of order 1(1). Therefore, ARDL technique can be applied for further analysis.

The results of correlation matrix show that FDI (-0.05), IF (-0.27), POP (0.4) have negative but weak relationship with GDP per capita because they are father away from -1 value. while estimated LF (0.3), UE (0.09), WS (0.3) have positive relationship with GDP .The results shows that estimated GDP (-0.05),UE (-0.57),WS (-0.01),IN (-0.1), LF (-0.2), POP (-0.03) have negative relationship with FDI, its mean with increase of FDI all these variables will

decrease but they have weak negative correlation, .The results reveals that estimated IF(Inflation) has negative relation with GDP (-0.27) ,FDI (-0.11), WS (-0.36) ,LF (-0.16),and UE (0.03), POP (0.4) has positive relationship but labor force has negative relationship with FDI (-0.2), IF (-0.16), UE (-0.02), POP (-0.7) and positive with WS (0.8),GDP(0.3).The estimated POP has negative relationship with GDP (-0.4) FDI (-0.03) WS(-0.7) LF(-0.7) and positive relationship with UE (0.4),IF (0.4).The estimated WS has negative relationship with FDI (-0.01),POP (-0.7),UE(-0.02) and positive relationship with LF(0.3),IF(0.8).The estimated UE has negative relationship with FDI (-0.5),LF (-0.02),WS(-0.02) and GDP (0.09),IF (0.03),POP(0.4) has positive relationship , it's with the increase or decrease of unemployment the per capita income , inflation, and population will increase or decrease respectively .

The empirical results of ARDL Model shows mixed relationships between independent and dependent variables in the long run. The analysis reveals Foreign Direct Investment (FDI) has positive and significant relationship with per capita income because of significant positive coefficient (p-value = 0.0316) that indicates that higher levels of current FDI are associated with an increase in GDP per capita. This suggests that foreign investment brings capital and potentially technology, which can boost economic growth. However, Population Growth (POP) has negative association with per capita income because a statistically significant negative coefficient (p-value = 0.0057) suggests that rapid population growth is associated with a decrease in GDP per capita. This could be due to factors like strain on resources or limitations on job creation proportionate to population growth rate. Wage rate also has negative association with per capita income because of a statistically significant negative coefficient (p-value = 0.0060)

that indicates that a decline in the wage rate on account of a decrease in GDP per capita. The coefficient for GDP is negative and statistically insignificant (p-value = 0.1496). It's important to consider the model specification and potential omitted variables that might explain this result. The coefficients for Unemployment Rate (UE) and its lag term are statistically insignificant, suggesting a weak or inconclusive relationship with GDP per capita in this model. The coefficient for the constant term (C) is statistically significant (p-value = 0.0349) and represents the estimated average GDP per capita when all other independent variables are zero (which is not a realistic scenario but provides a reference point). Overall, the model is good because R-squared (0.7116). This value indicates that the model explains 71.16% of the variation in GDP per capita. However, a high R-squared doesn't necessarily guarantee a good model. The Adjusted R-squared value is (0.5119) which suggests a moderate fit. F-statistic (3.5635) and Prob(F-statistic) (0.0190): The model, as a whole, is statistically significant in explaining GDP per capita. The Durbin-Watson statistic (2.7043) suggests there might be some autocorrelation present in the model's residuals, which could affect the reliability of the standard errors and p-values. Further tests or model adjustments might be required to address this.

The results of the Error Correction Model (ECM) suggest a statistically significant relationship between the dependent variable and the independent variables, both in the short-run and long-run. The test statistic (F-statistic) is 5.937358 with a significance level of 10%. This implies that the variables are likely cointegrated, meaning they have a long-run equilibrium relationship. The coefficient of the error correction term (ECM) is -1.355581 and statistically significant (p-value = 0.0000). This negative coefficient indicates that deviations from the long-run equilibrium in the previous period

(represented by the ECM term) are corrected in the current period. In other words, the model suggests that the dependent variable adjusts towards its long-run equilibrium over time. The coefficients of the independent variables (d(FDI), d(UE), d(WS)) represent their long-run impact on the dependent variable. For instance, a one-unit increase in d(FDI) is associated with a 2.109626 unit increase in the dependent variable in the long run, holding other factors constant.

The R-squared value of 0.773227 indicates that the model explains a significant portion of the variation in the dependent variable. The adjusted R-squared value of 0.737420 further accounts for the number of explanatory variables in the model. Overall, the ECM appears to be a good fit for the data, suggesting that there is a stable long-run relationship between the variables and that short-run deviations are corrected over time.

The result of the Ramsey Reset Test, where the p-value of the F-statistic is larger than 0.05 (0.8133 in this case), indicates that there is no evidence to reject the null hypothesis. Therefore, the test suggests that the functional form of the model is well-specified, and there is no strong evidence of omitted variables or a mis specified functional form of regression model.

The results of the heteroscedasticity test indicate that there is no strong evidence of heteroscedasticity in the regression model. The p-values for all three heteroscedasticity statistics (F-statistic, Obs*R-squared, and Scaled Explained SS) are larger than the commonly used significance level of 0.05. Therefore, we conclude that the assumption of homoscedasticity (constant variance of residuals) is not violated in your regression model.

5. 1 Theoretical contribution

The study significantly contributes to the theoretical framework concerning economic dynamics, particularly within the service sector of Pakistan. By delineating the complex interplay among unemployment, wage inequalities, foreign direct investment (FDI), inflation, and population growth, it enriches existing economic theories. The adoption of advanced econometric methodologies enhances our comprehension of the underlying mechanisms driving economic growth in developing economies such as Pakistan. The findings of this study also support economic theories such as "Human capital theory" developed by Becker (1964) that identifies positive relationship between wage rate and GDP per capita. The findings of this study is in line with "Population Growth Theory" developed by Malthus, (1798) which identified negative relationship between population growth and per capita income. These results of this study also consistent with "Foreign Direct Investment (FDI) Theory" of Blomström, Lipsey, & Zejan, (1996) which suggests positive and significant relationship between Foreign direct investment (FDI) and per capita income. The findings of this study also match with "Wage Inequality Theory" of Atkinson & Brandolini (2001). This theory found negative association between wage rate and per capita income. The results of this study also support "Structural Transformation Theory" of Lewis (1954) which suggests that shifts in employment from agriculture to industry and services contribute to economic growth. It means that the growth in services sector leads to higher wages which, in turn, leads to higher per capita income. The findings of this study also match with 'Unemployment Theory' suggested by Okun (1962) which identified insignificant relationship between unemployment rate and GDP per capita. This theory reveals that other factors such as market structure, technological advancement and structural shift in the

economy may also influence unemployment rate. Thus, this study significantly contributes into theoretical literature and provide practical implications for policy makers to formulate policies to reduce wage disparity, improve per capita income, unemployment and promote foreign direct investment particularly in service sector.

5.2 Practical Implications:

The findings of this study hold substantial practical implications for policymakers, businesses, and investors operating within Pakistan's service sector. The positive correlation identified between FDI and per capita income underscores the importance of attracting foreign investment to foster economic growth. Policymakers can utilize these insights to formulate strategies aimed at promoting FDI inflows while simultaneously addressing issues such as unemployment and wage disparities. Moreover, the negative relationship between per capita income and population growth emphasizes the effective policy measures to control population to ensure sustainable economic growth.

5.3 Limitations and suggestions for further research

This study contributes significantly into the existing knowledge but it has some limitations. This study has completely focused on the service sector of Pakistan and this approach limit the generalization of the findings of this study to other sectors of the economy. Moreover, the reliance on secondary data sources may causes biasedness or measurement errors, creating doubt about the accuracy of results. The author included specific variables into the model which may not reflect the structural changes being taken place in the economy and it does not reflect result robustness.

In the light of above limitations, the following suggestions are made for further research.

● The future research can adopt a broader scope and incorporate multiple sectors in their researches.

● The future research can conduct cross-country analysis and can compare different economies. Moreover, the future studies can integrate qualitative data or case studies in order to offer deeper insights about the mechanism of evolving relations between macroeconomic variables.

● The future studies can investigate into specific policy interventions or external shocks on the selectee variables and it can provide valuable roadmap for policymakers, academicians and practitioners.

● The researchers can employ latest econometric techniques or improve existing models to enhance the reliability and accuracy of the results.

Data statement

The data that used in this study will be made available on strong request.

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