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Trade Liberalization and Employment: Aggregate and Dis-Aggregate Analysis for Pakistan

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ABSTRACT

This study aims to investigate impact of trade on employment in Pakistan. This study tried to disclose that impact of trade on total and sectoral employment over the period of 1994- 2023. Trade elasticity is found positive but insignificant in long-run; however, it is found positive and significant in the short-run. The value of ECT is negative and significant; it also confirms the existence of long-run relationship and convergence of any short-run disequilibrium towards long-run equilibrium. In the second model, Trade elasticity of employment in agriculture sector is estimated. Negative elasticity is reported by the technique in agriculture sector in the long-run but insignificant. The short-run trade elasticity of employment is negative and significant. In the third model, Trade elasticity of employment in industrial sector was founded negative and statistically significant in both the short-run as well as long-run. In the fourth model, Trade elasticity of employment in services sector of the economy is estimated. This model's result reported that the trade elasticity of employment is negative but insignificant in the long-run. On the basis of the results of the present study it is suggested that trade policies may hurt the domestic structure of labour market. Trade can be used as a catalyst to boosts economic activities, but its impacts could be different on different sectors and different periods. Overall impact may be positive or negative.

Introduction

Trade is the transaction of goods and services of a country with the rest of the world. Trade is an important source of integration of the world economies (Din *et al*., 2003; Ali et al., 2019; Sana *et*

al., 2024). Trade transaction can affect the trading countries both beneficially and adversely. It may boost economic growth by accessing to foreign technology, market enlargement and brings previously unemployed labour force to productive environment (Ali et al., 2013; Nam & Ryu 2024; Irwin, 2025). Similarly, more open economies have the opportunities to get benefits from access to external cheap resources, market extension and can adopt sophisticated technology from developed world (Sala-i-Martin, & Barro, 1995; Sana *et al*., 2024). To intensify the use of world's resources by sharing it, the world trade has been liberalized in the second half of the twentieth century (De & Tajoli, 2011; Dollar, 2001). Trade liberalization basically means the removal and least the reduction of unnecessary trade barriers (Tariff and non-tariff barriers) they black the way of free trade of goods and services between the countries. It involves the elimination of tariff barriers, non-tariff barriers, trade quotas, exports subsidies and the most important is administrative legislations Krugman, (2009). The basic idea of trade liberalization is the belief that it will increase the world trade and will enable developing countries to concentrate on the production of goods and services in which they have comparative advantage. The fundamental establishments they attempt to push toward the exchange advancement are the World Trade Organization (WTO), International Monetary Fund (IMF) and US depository division has all received these thoughts. In this way, the Latin America nations have been urged to receive these markets based polices. The main aim of the liberalization policy is to perform trade and make exports to other country of those commodities and services in which they have comparative advantages while imports that goods and services which they cannot produce more efficiently in term of comparative advantage. The concept of comparative was given by Ricardo, (1817) and emphasized that country should produce those goods and services that they can produce more efficiently and should drop the production of those goods and services which cannot be produced at lowest cost.

The phenomenon of liberalization was started after world war-II in which twelve developed countries and eleven developing countries assigned the General Agreement on Tariffs and Trade (GATT). The main aim of GATT was to establish free trade and overwhelmed the Tariff and non-tariffs barriers. In 1994 the GATT was replaced by World Trade Organization. In the current period of Liberalization, developing countries allowed foreign investors to make investment and enter to their local market; therefore, it may lead to increase competition for domestic labour and among domestic industries and the size of the market further increases (Winters *et al*., 2004; Liu *et al*., 2024).

On one side trade and trade liberalization is an opportunity for developing countries rich with natural resources and will equipped. It creates the opportunity of market enlargement with reduce the fear of over-production which may help in developing of the labour market in developing countries (Winters *et al*., 2004; Ali et al., 2019). It is also a threat to nascent industries in most of the developing countries: the absence of protecting measures worse the situation which might affect adversely employment condition. Liberal trade completely changes nature and status such abrupt changes may also cause price level. It means that trade liberalization directly and indirectly affects employment and inflation. Different arguments are presented about the association between globalization and macroeconomic performance. It contributes positively to output and employment to those economies, which are endowed with natural resources and competitive at international market. Contrariwise, it affects negatively those economies, which have no natural resource potential. The expansion in import demand and the reduction in domestic production may adversely influence output and employment in domestic economy. Conversely, the increase in export and its demand at international market might leads to the maximum utilization of productive resources source of income generation, affect positively output and employment.

Strong economic status of the country increases the demand for imports. FDI and Remittances may contribute positively to employment generation through rise in international transactions affect the structure and performance of the domestic industries. Because, these transactions affect the demand and supply of both output and resources (inputs) the economy and overall world. Such variation in demand and supply of products cause variation in price level and also demand and supply of inputs (labour and capital etc.). In the modern world, labour market depends on trade composition. More generally unskilled and semi-skilled labour are observed adversely affect by the forces of globalization in manufacturing sector; because, modern technology requires skilled labour to operate. Moreover, labour force is replaced by machines (Grossman & Helpman, 1993; Feenstra, 2015). It is of relative importance to test the variation in impacts of globalization different regions and countries different countries, having huge variation in physical and natural resources existence as well as on political and social compositions. Therefore, further research is needed to clarify the impacts of globalization on Macroeconomic instability on South Asian region and countries.

Developing countries faced different repercussions of trade and related polices which affect directly and indirectly trade transactions. Such repercussions depend on the status of developing countries in term of resources. Pakistan is one of the developing countries which adopted trade policies extensively which affect the pattern and volume of trade. Pakistan adopted it in the early of 1980s with removal of import quota system and reduction in other barriers (Hussain & Muhammad (2010). These activities are responsible for huge changes in trade pattern. Moreover, in the 1990s Pakistan started the pure liberalization policy in term of trade and the reform which the government introduced in the name of liberalization were removed many industrial licenses, policy of import and export liberalized, technological up-gradation done, the fiscal policy and foreign investment also changed. Consequently, the trade deficit of Pakistan fallen from $3.11 billion to $0.90 billion (Mahmood *et at*., 2017; Zafar, 1999). Liberalization in trade is discussed in detail in this section while this study aimed to investigate employment elasticity of trade instead of liberalization. Because time series data is not available for trade liberalization, therefore, trade magnitude is used to investigate employment elasticity in Pakistan. In the light of the above discussions and mentioned literature, this study aimed to investigate the responsiveness of employment to trade for overall labour and sectorial share in agriculture, industrial and services in Pakistan.

According to the world Economic Outlook (2016) and United Nation Conference on Trade and Development (UNCTD) report the volume of trade output as percentage of worlds and employment/unemployment rate have been discussed during period of 1980-2015. It was observed that the world trade is increased from about 20% of the world's GDP to about 30% of the world GDP in 2015. The figures in column-3 in showed that the world GDP growth was about 2% in 1980 the trend in GDP growth is very much unstable during the period of 1980 to 2015. Fluctuations in GDP growth showed high uncertainty. The world's growth rate was highest in 1985 and lowest in 2010. It was also reported in their reports that unemployment rate of the world's economy. A continuous and persistent increasing trend was observed in the period. The number of unemployment was 145 million in 1980 and this trend was increased to 206 million in 2015. This is one of the most important issues associated with the world's economy which should to be addressed.

Pakistan also put into in to practice huge trade liberalization policies in the early of 1980s (Ali et al., 2013). Trade volume directly and indirectly affect by such sort of policies. Volume of trade's also affects employment status of the country. The concept of trade volume and employment status

was presented by Rodrick (1999). According to the statistics of Federal Bureau of Statistics and Economic Survey various issue that unemployment rate in Pakistan is given in column-3. A clear increase can be seen in both the trade as a percentage of GDP and Unemployment rate of Pakistan. The table addressed that it is important that the unemployment rate increased during the period under consideration. It might be due to the increase in the increase in international trade of Pakistan. Therefore, this study aimed to investigate the employment elasticity of trade in case of Pakistan that how changes in trade pattern affect employment status in the country. The present study is different from the past studies conducted in the sense that investigation will be made regarding the impact of trade transaction on overall employment elasticity and in different sectors of the economy i.e., industrial, agricultural and services sector during the study time period.

Methodology

Theoretical Framework

A plethora of research work is emerged on the most debated topic on trade and employment. Trade activities are investigated against growth, poverty, inequality and other aspects of the economy in broader extent. Mostly trade theories (conventional trade theories i.e., absolute and comparative trade theories) are of the view that trade encourage output and employment of the countries engaged in trade activities by specialization and division of labour. Liberalization is considered as a mean of growth and employment generation. It plays it part as a communication source to exchange resources and products to maximize world's welfare by boosting economic growth. It also provides a link to get foreign technology, foreign market and to foreign capital (Afzal 2007, Ali et al 2013). It is considering the lifeblood of growth and development on the bases of above virtues, but its contribution to employment is a more complex one. Different views are having here to discuss about the association between trade activities and employment status of the countries both developed and developing countries (Ali et al 2019). The concept of trade and employment was first put into discussion by Rodrik (1999). Labour market and its association with trade are much more complex phenomena in economics. The Employment status of the country closely related with trade's nature and with polices of openness (liberalization). Literature suggests that most of the labour in developing is unskilled and Simi-skilled while labour force in developed countries is mostly of high skilled and more productive. Therefore, policies formulation and implication regarding trade are more sensitive that might affect labour market of the developing countries very adversely. Liberalization policies are mostly favorable for labour skilled labour force (developed countries labour force) while badly affect employment status of the developing countries (Crankshaw, 1997). It means that trade liberalization policies create uncertainty for employed labour force in developing countries.

This tremendous decrease in exchange boundaries prompts more open internal growth of the market for unfamiliar creation and may influence the business circumstance of the nation. More import contrast with fare may influence work status antagonistically. Then again, the expansion in fare and its interest at worldwide market may prompts the most extreme usage of creation assets, which influences decidedly (expanded) yield and work of the home-grown economy. The expansion in public yield backward builds the interest for unfamiliar item (imported merchandise), which influences business seriously. In this manner, it is critical to research the effect of exchange on work in Pakistan.

Theme of present study is to find out the impact of trade transaction activities on labour market in Pakistan. Trade activities affect labour market in different ways. On one side may affect positively

labour market by promoting employment while on the other, it may affect labour market adversely by reducing employment opportunities. The latter is the outcome of diversion in export and import. If country imports are greater than exports, it may affect the use of domestic labour as the country relies on foreign products. Following is the conceptual framework of the present study.

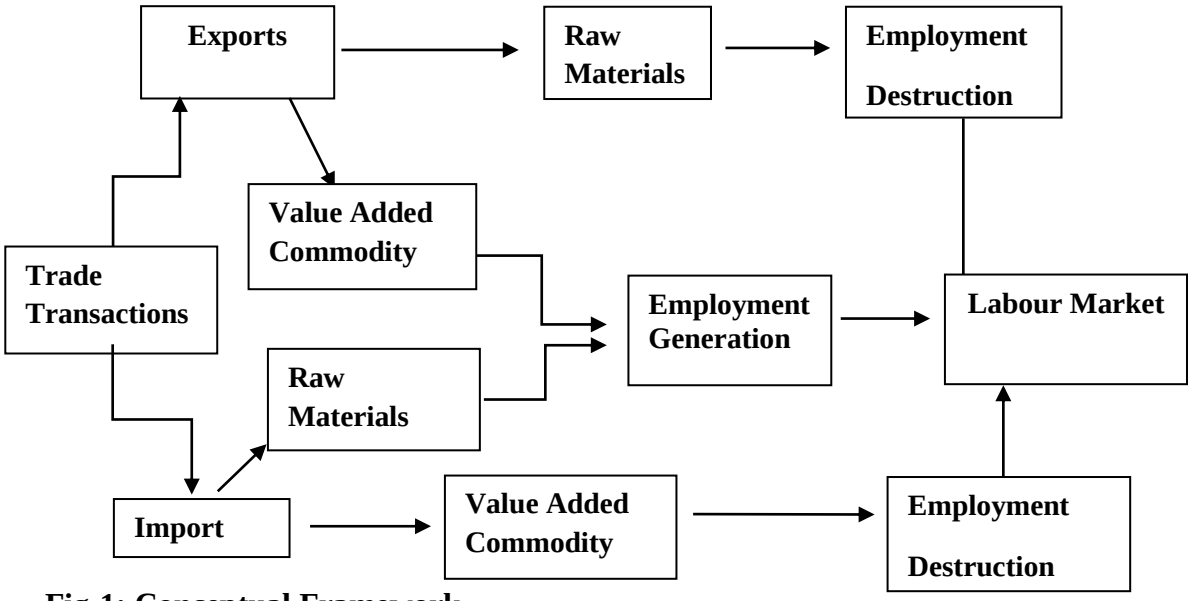

Fig-1: Conceptual Framework

The Model

It determines the dependent variables and independent variables and expresses the mathematical relationship between dependent and independent variables. This study based on some of the past studies conducted by Ali et al., (2019), Ali (2013), Sun (2010) and Rahimi (2006).

The model of the study can be written in functional form as:

EMP = f(TR, LF, GDI)

The econometric form of the model is as under:

$$\ln EMP_t = \alpha + \beta_0 \ln TR_t + \beta_1 \ln LF_t + \beta_2 \ln GDI_t + \mu_t \quad (1)$$

Where, EMP = Employment: over all, agriculture, industrial and services sector; TR = Trade (Imports + Exports) in $ Million; LF= Total Labour Force in Million; GDI= Gross Domestic Investment in $ Million; μ= White Noise Error Term

Econometric Techniques

Unit Root Test

As the nature of the data is time series, therefore, it is necessary to test the stationarity of the data. For this, most of the tests that are extensively used in literature are Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests.

Estimation Technique

According to researchers and theorists the augmented ARDL model can be expressed in the following equation form for the model under consideration is as:

$$\Delta \ln EMP_t = \beta_0 + \sum_{i=1}^{q} \beta_1 \Delta \ln EMP_{t-1} + \sum_{i=0}^{q} \beta_2 \Delta \ln TR_{t-1} + \sum_{i=0}^{q} \beta_3 \Delta \ln LF_{t-1} + \sum_{i=0}^{q} \beta_4 \Delta \ln GDI_{t-1} +$$

$$\beta_5 (\ln EMP_{t-1}) + \beta_6 (\ln TR_{t-1}) + \beta_7 (\ln LF_{t-1}) + \beta_8 (\ln GDI_{t-1}) + vt$$

The long-run elasticity's among the employment with its determinants can be examined through the formal procedure of computing the F-statistic. Where it includes the null hypothesis;

Results and Discussions

Unit Root Testing

The nature of the study is time series; therefore, the testing of unit root is required to minimize the risk of spurious regression and avoid the risk of meaningless results. The said purpose the two most common used tests for the testing of stationarity is used here are ADF and PP tests. The outcomes of the both tests are given the following table-1.

Table-1: Unit Root Test

Var	Augmented Ducky Fuller Test		Phillips Peron Test		Decision
	At Level	1st Difference	At Level	1st Difference	
	T-statistics (P-value)	T-statistics (P-value)	T-Statistics (P-value)	T-statistics (P-value)	
EMP	-1.072 (0.7113)	-6.47 (0.000)	0.678 (0.8369)	-6.4515 (0.000)	I(1)
EMPa	-0.836 (0.792)	-7.46 (0.000)	-0.615 (0.8522)	-7.308 (0.000)	I(1)
EMPs	-1.472 (0.532)	-4.528 (0.0013)	-1.4419 (0.5480)	-4.524 (0.001)	I(1)
EMPi	1.474 (0.9988)	-4.737 (0.000)	1.474 (0.9988)	-4.724 (0.000)	I(1)
LF	-0.344 (0.906)	-4.654 (0.000)	-0.338 (0.9072)	-4.658 (0.000)	I(1)
GDI	-2.259 (0.015)	-----	-2.212 (0.017)	-----	I(0)
TR	1.265 (0.6317)	-5.129 (0.000)	1.24 (0.6421)	-5.145 (0.0003)	I(1)

Null Hypothesis: There is no unit root.

It is clear from the value of T-statistic and P-values in Table-1 that all the variables are of stationary at first difference, while GDI is stationary at level.

Employment Elasticity Estimate of the Employment Total Model

The first step in co-integrational analysis is to test the existence of long-run relationship among the variables of the model. The existence of long-run is checked with the help of Bound test.

Bound Test

The results of the bound test are given and explained as under.

Table-2: F-Bounds Test

Test Statistic Value	Significance	Lower Bound	Upper Bound
F-statistic = 4.930	10%	2.37	3.2
	5%	2.79	3.67
	2.5%	3.15	4.08
	1%	3.65	4.66

Null Hypothesis: No levels relationship

The value of the Bound test (F-statistic) is 4.930 in table-2. It is clear from the table that the value of F-calculated is greater than the values of critical values bound test. Therefore, it is concluded that there is long-run relationship between the variables of the selected model of the study. Now we can precede to estimate the trade elasticity with the help of ARDL. In the next we are going to estimate the long-run elasticity estimates and short-run adjustment of the model with the help of Error correction.

Elasticity of the Total Employment Model

Long-run Elasticity of the Total Employment Model

The long-run estimates of the model are given in the following table.

Table-3: Long-run Elasticity Estimates

Dependent Variable: Total Employment of the country Levels Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDI	0.058678	0.076890	0.763142	0.4743
TRD	0.022003	0.026218	0.839243	0.4335
LF	0.861643	0.113198	7.611795	0.0003
C	0.495933	0.433703	1.143487	0.2964

Table-3 presents variable descriptions and elasticity estimates. The first column lists elasticity estimates, followed by S.E values, T-statistics, and probability values. All variables are statistically

insignificant except for the labor force, which has an elasticity estimate of 0.861, a T-statistic of 7.611, and a P-value of 0.0003. These results align with Ali et al. (2019) but contradict Ali et al. (2013), likely due to differences in data periods and estimation techniques. While trade's impact on employment is positive, it is not significant. Investment elasticity is also positive but insignificant, suggesting domestic investment does not significantly boost employment. However, the labor force positively and significantly impacts employment, indicating its effective utilization in productive environments.

ECM of the Total Employment

The outcomes of error correction model are given in the following Table.

Table- 4: Short-run Elasticity of the Total Employment Model

ECM Regression				
Dependent Variable Employment				
Variable	**Coeff**	**Std. Error**	**t-Value**	**Prob.**
D(EMP(-1))	0.162936	0.159260	1.023081	0.3457
D(EMP(-2))	-0.183503	0.135383	-1.355438	0.2241
D(EMP(-3))	-0.239760	0.127870	-1.875038	0.1099
D(GDI)	0.046165	0.037736	1.223351	0.2671
D(GDI(-1))	-0.226410	0.039015	-5.803079	0.0011
D(GDI(-2))	-0.131949	0.044633	-2.956323	0.0254
D(GDI(-3))	-0.156330	0.043565	-3.588458	0.0115
D(TRD)	0.034378	0.012808	2.684014	0.0363
D(TRD(-3))	0.034643	0.014115	2.454381	0.0495
D(LF)	0.787002	0.101696	7.738763	0.0002
D(LF(-2))	0.322067	0.137471	2.342796	0.0576
D(LF(-3))	0.301523	0.134282	2.245443	0.0659
CointEq(-1)*	-1.322807	0.206363	-6.410093	0.0007
R-squared	0.96172	Mean Dependent var		0.029819
Adj. R-squared	0.90430	S.D. Dependent var		0.010651
S.E. of Regression	0.00329	Akaike info Criterion		-8.31772
Sum Squared Resid	0.00010	Schwarz Criterion		-7.54351
Log likelihood	124.130	Hannan-Quinn Criter.		-8.094782
Durbin-Watson stat= 2.720369				

* p-value incompatible with t-Bounds distribution.

The results in Table-4 shows the short-run trade, investment and labour force elasticity's of employment in case of Pakistan it is clear from the table that the trade elasticity is positive and significant in the short-run while it was positive and insignificant in the long-run. It means that trade provide the opportunity to increase employment in the short-run. The investment elasticity of employment is negative and significant. The findings of the present study are against of the most theoretical and empirical literature. It may be due to the advancement in technology which needs low labour force in production process. Efficiency of technology increase which also increase the demand of technology.

The value of ECT term is negative and significant show that any disequilibrium in the short-run will be adjusted in the long-run. The coefficient of ECT is -1.322. in most of the empirical literature it is suggested that its value should be negative and less than one, but the most literature is of the view that it value should be less than Ali et al (2019). The speed of adjustment is 132 %, means that 132% of the disequilibrium is converged towards equilibrium in one year. The value or R2 is 0.90 which means that model is a good fitted model, and value of Durban Watson Statistic is about to 2 which mean that there is no serious issue of serial correlation.

Employment Elasticity in Agriculture Sector

In this section of the study trade activities are tested in association with employment in agriculture. The existence of the long-run is tested and results are given in the Table-4.7.

Bound Test

Table-5: Bound Test

F-Bounds Test	**Null Hypothesis: No levels Relationship**		
Test Statistic Value	**Significant**	**Lower Bound**	**Upper Bound**
F-statistic= 6.760	10%	2.37	3.2
	5%	2.79	3.67
	1%	3.65	4.66

The above table-5 shows the results of bound test which certify the presence of long-run association among the variables under consideration. The value of F-statistic is 6.760 which is greater than the critical values of upper bound at 1% level of significance, which indicate the existence of long-run relationship between variables.

Long-run Trade Elasticity of Employment in Agriculture Sector

Table-6: Long-run Elasticity

Dependent Variable: Employment				
Var	**Coeff**	**Std. Err**	**t-Stat**	**Prob.**
TRD	-0.086620	0.073509	-1.178354	0.2615
LF	2.031635	0.449544	4.519326	0.0007
GDI	-0.223040	0.085089	-2.621262	0.0223
C	-11.18868	4.414794	-2.534360	0.0262

Table-6 presents the results of long-run elasticity with restricted constant and no trend. The variable trade is statistically significant and negative impact on employment in agriculture sector in long-run. The coefficient value is -0.086 which shows that 100% increase in trade is leads to decline employment in agriculture sector by 8.6%. Similarly, the factor investment is statistically significant and inverse impact on employment in agriculture sector in long-run. The coefficient value is -0.223, which stated that 1% increase in investment cause to decrease employment in agriculture sector by 22.1%. Likewise, the coefficient of labour force is statistically significant and having positive influence on employment in agriculture sector. The results indicated that 1% increase in labour force is leads to employment in agriculture sector by 2.03%.

Short-run Trade Elasticity of Employment in Agriculture Sector

The elasticity estimates and speed of adjustment results are given in the following table.

Table-7: Error Correction Model

ECM Regression				
Dependent Variable Employment				
Var	**Coeff**	**Std. Error**	**t-Stat**	**Prob.**
D(EMPAG(-1))	-0.369023	0.115427	-3.197012	0.0077
D(TRD)	0.127869	0.029871	4.280735	0.0011
D(TRD(-1))	0.157332	0.044957	3.499633	0.0044
D(TRD(-2))	0.087790	0.030517	2.876735	0.0139
D(TRD(-3))	0.111315	0.026385	4.218960	0.0012
D(GDI2(-1))	0.093421	0.018900	4.942916	0.0003
D(GDI2(-3))	0.045089	0.016286	2.768565	0.0170
CointEq(-1)*	-0.592885	0.088311	-6.713624	0.0000
R-squared	0.885979	Mean Dependent Var		0.027
Adj. R-squared	0.821842	S.D. Dependent Var		0.020
S.E. of Regression	0.009	Akaike info Criterion		-6.263
Sum Squared Resid	0.002	Schwarz Criterion		-5.882
Log likelihood	95.69	Hannan-Quinn Criter.		-6.147
Durbin-Watson stat= 2.175				

*p-value incompatible with t-Bounds distribution

Table-7 shows the results of error correction model of the interest variables. Lag of the dependent variable is statistically significant in short-run with the coefficient value -0.369. The variable total trade is statistically significant in short-run and having positive impact on employment in agriculture sector with 0.127 coefficient value, while 0.157 in 1st lag. However, the coefficient of investment is statistically significant in level and also significant in 1st lag with the coefficient 0.093 and 0.045 respectively. The coefficient value of ECT is -0592 and significant which means that any disequilibrium is converged to long-run equilibrium. ECT term confirmed the existence of long-run relationship and show the speed of adjustment. The value of ECT shows that 59% of the disequilibrium is adjusted in one and half year.

Trade Elasticity of Employment in Industrial Sector

In this section of the study the impact of trade on employment in industrial sector is tested.

Bound Test

Table-8: Bound Test

F-Bounds Test	**Null Hypothesis: No levels relationship**		
Test Statistic Value	**Significant**	**Lower Bound**	**Upper Bound**
F-statistic=12.38	10%	2.37	3.2
	5%	2.79	3.67
	1%	3.65	4.66

The above table-8 shows the results of bound test which certify the presence of long-run association among the variables under consideration. The value of F-statistic is 12.38 which is greater than the critical values of upper and lower bound at 1% level of significance, which indicate the existence of long-run relationship between variables.

Long-run Trade Elasticity of Employment in Industrial Sector

Table-9: Long-run Elasticity

Dependent Variable Employment				
Var	**Coeff**	**Std. Error**	**t-Stat**	**Prob.**
TRD	-0.333448	0.132019	-2.525751	0.0282
GDI	-2.385379	1.188071	-2.007774	0.0699
LF	4.066908	1.352381	3.007219	0.0119
C	9.417777	7.197180	1.308537	0.2174

Table-9 presents the results of long-run elasticity with restricted constant and no trend. The variable trade affects negatively and statistically significant employment in industrial sector in the long-run. The elasticity estimate is -0.3334 which shows that 1% increase in trade leads to decline employment in industrial sector by 0.333%. Similarly, the factor investment is statistically significant and negative to affect employment in industrial sector in the same period in the country in long-run. The result in respect of Investment of the study is against the theoretical concept and to most of the empirical literature. This may be possible due to the investment in advanced technology which reduces the demand for labour in industrial sector. It means the investment may decrease the use of labour in industrial production (labour substituted by capital). Likewise, the coefficient of labour force is statistically significant and having positive affect on employment in industrial sector. The results suggested that the increase in labour supply provided the opportunity to employ cheap labour force and to employ labour force easily in industrial sector.

Short-run Trade Elasticity of Employment in Industrial Sector

Table-10 Error Correction Model

ECM Regression: Dependent Variable Employment				
Var	**Coeff**	**Std. Error**	**t-Stat**	**Prob.**
D(EMPI(-1))	-0.486462	0.108520	-4.482676	0.0009
D(EMPI(-2))	-0.697105	0.096741	-7.205916	0.0000
D(EMPI(-3))	-0.542092	0.113347	-4.782576	0.0006
D(TRD)	-0.236127	0.026332	-8.967421	0.0000
D(GDI(-1))	0.169714	0.084071	2.018683	0.0686
D(LF)	2.110324	0.189658	11.12702	0.0000
D(LF(-1))	0.706084	0.161223	4.379545	0.0011
D(LF(-2))	1.534489	0.167761	9.146854	0.0000
D(LF(-3))	0.439413	0.180958	2.428257	0.0335
ECT*	-0.225283	0.024516	-9.189193	0.0000
R-squared	0.920974	Mean dependent Var		0.035681
Adj R-squared	0.868291	S.D. Dependent Var		0.017216

S.E. of Regression	0.006248	Akaike info Criterion	-7.016970
Sum Squared Resid	0.000586	Schwarz Criterion	-6.484699
Log likelihood	102.2206	Hannan-Quinn Criter.	-6.863695
Durbin-Watson Stat = 2.003			

* p-value incompatible with t-Bounds distribution.

Table-10 shows the results of error correction model. The short-run elasticity estimates of in also given in the table. It is clear from the table that the elasticity of trade elasticity of employment is negative and significant in the short-run. The elasticity of investment and labour force is positive and significant in the short-run. Means that the increase in investment and labour force lead to increase employment in industrial sector in the country under consideration. The coefficient of ECT is negative and significant is which means that any disequilibrium is converged to long-run equilibrium. ECT term confirmed the existence of long-run relationship and show the speed of adjustment. The value of ECT is -0.22 which means that 22% of the disequilibrium is adjusted in one-year.

Trade Elasticity of Employment in Services Sector

Services sector employment also affect by the flow of traded commodities. In this part the trade elasticity employment is examined.

Bound Test

Table-11: Bound Test

F-Bounds Test	**Null Hypothesis: No levels relationship**		
Test Statistic Value	**Significant**	**Lower Bound**	**Upper Bound**
F-statistic= 9.350	10%	2.37	3.2
	5%	2.79	3.67
	1%	3.65	4.66

The above table-11 shows the results of bound test which confirm the presence of long-run association among the variables under consideration. The value of F-statistic is 9.35 which is greater than the critical values of lower bound at 1% level of significance but greater than upper bound values, which indicate uncertainty in long-run relationship between variables.

Long-run Trade Elasticity of Employment in Service Sector

Table-12: Long-run Estimates

Levels Equation **Dependent Variable Employment**				
Var	**Coeff**	**Std. Error**	**t-Stat**	**Prob.**
TRD	-0.020796	0.021470	-0.968602	0.3472
GDI	0.232556	0.060439	3.847754	0.0014
LF	0.693424	0.081355	8.523435	0.0000

C	-0.671100	0.453012	-1.481415	0.1579

Table-12 presents the results of long-run elasticity with restricted constant and no trend. The elasticity of trade is negative but statistically insignificant. The effect of investment and labour force on employment in serviced sector is positive and significant in the long-run means that the increase in investment leads to increase employment in services sector of Pakistan. The results of the study are parallel with the theoretical and empirical literature Ali et al., (2019). Similarly, the factor labour force affect also positively employment in the long-run.

Short-run Trade Elasticity of Employment in Services Sector

Table-13: Short-run Elasticity

ECM Regression **Dependent Variable Employment**				
Var	**Coeff**	**Std. Error**	**t-Stat**	**Prob.**
D(EMPS(-1))	0.3564	0.094	3.788	0.001
D(GDI(-1))	-0.445	0.076	-5.781	0.000
D(GDI(-3))	-0.2210	0.072	-3.049	0.007
ECT(-1)*	-1.00	0.131	-7.644	0.000
R-squared	0.771	Mean Dependent Var		0.029
Adj R-squared	0.714	S.D. Dependent Var		0.012
S.E. of Regression	0.006	Akaike Info Criterion		-6.982
Sum Squared Resid	0.0008	Schwarz Criterion		-6.691
Log likelihood	96.76738	Hannan-Quinn Criter.		-6.898
Durbin-Watson stat=2.08				

* p-value incompatible with t-Bounds distribution.

Table-13 shows the results of error correction model. The impact of investment is negative and significant in the short-run. While the other two variables are not considering to affect in the short-run. The Coefficient is negative and statistically significant. The coefficient value of ECT is -1.00 means that any disequilibrium converged towards long-run with the speed of 100% recovery in one year.

Conclusions

This study examines the trade elasticity of employment in Pakistan from 1994 to 2023 using time series techniques. ADF and PP tests confirm stationarity at the first order, except for GDI, which is stationary at level. The ARDL approach is applied due to the short study period. Bound test results indicate a long-run relationship among variables. Long-run trade elasticity is positive but insignificant, while short-run elasticity is both positive and significant. Sector-wise analysis reveals mixed impacts: trade negatively affects employment in agriculture and industry in the long run but has a positive effect in services. Investment also negatively impacts agriculture and industry employment, likely due to labor substitution by capital in industrial production. However, an increasing labor force positively influences employment in agriculture and industry, with investment and labor force growth benefiting services employment.

Policy implications suggest trade may disrupt the labor market differently across sectors. While it boosts employment in some areas, it harms others, particularly agriculture, which has declined as trade volume rises. Structural shifts in the economy may be shifting labor from agriculture to industry. With increasing imports of agricultural products, Pakistan faces a weakening agricultural sector, signaling the need for targeted trade policies to balance employment effects across sectors.

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