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TİCARİ AÇIKLIK İLE İŞGÜCÜ PİYASASI ARASINDAKİ İLİŞKİ (TÜRKİYE VAKA ÇALIŞMASI) [1]

The Relationship Between Trade Openness and the Labor Market (Türkiye Case Study)

Bushra HAKKI[2]

Özet

Ticaret açıklığı, son yıllarda ekonomik entegrasyona katkıda bulunan en önemli faktörlerden biridir. İkinci Dünya Savaşı sonrası dönem, 1980'lerde gelişmekte olan ülkeleri de kapsayacak şekilde önemli ölçüde genişleyen geniş bir ticaret açıklığı dalgasına tanık oldu. Ticaret serbestleşmesinin ülkelerin ekonomik büyümesi üzerindeki olumlu etkileri kanıtlanmış olsa da, işgücü piyasası üzerindeki etkileri net değildir. Bu durum, gelişmekte olan ve gelişmiş ülkeler arasında, artan ticaret açıklığının işgücü piyasasına yansımaları konusunda endişelere yol açmıştır. İstihdam oranları, ülkelerdeki refah düzeyini gösteren en önemli ekonomik göstergelerden biri olduğundan ve gelişmekte olan ülkeler gelişmiş ülkelerin ekonomik düzeyine ulaşmaya çalıştıklarından, iktisatçılar istihdam oranlarını incelemeye ilgi duymuşlardır. Bu çalışma, gelişmekte olan ülkelerde ticaret açıklığı ile istihdam oranı arasındaki ilişkiyi inceliyor ve çalışma için Türkiye model olarak seçilmiştir. Bu döneme ait değişkenler hakkında veri bulunması nedeniyle 1990-2022 yıllarını kapsayan bir zaman serisi seçilmiştir. Değişkenler arasındaki ilişkiyi incelemek için Otos regresif Dağıtılmış Gecikme (ARDL) tekniği kullanılmıştır. Çalışmanın sonuçları, Türkiye'de ticaret açıklığının istihdam oranı üzerinde negatif ve anlamlı bir etkiye sahip olduğunu göstermektedir. Bu, ticaret açıklığının Türkiye'deki artan işgücünü karşılayabilecek kadar iş yaratmadığını ve bu durumun istihdam oranlarının düşmesine katkıda bulunduğunu göstermektedir.

Abstract

Trade openness is one of the most important factors that have contributed to economic integration in recent decades. The post-World War II period witnessed a wave of trade openness that expanded to include developing countries in the 1980s. Despite the proven positive effects of trade liberalization on economic growth, its effects on the labor market have not been clear. This has raised concerns among developing and developed countries about its impact on the labor market. Given the importance of

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employment rates in determining the welfare levels of countries, economists have been interested in studying the impact of trade openness on employment rates. This study investigates the relationship between trade openness and employment rate in Turkey, a developing country, over the period 1990-2022. The Autoregressive Distributed Lag (ARDL) technique is employed to examine the relationship between the variables. The results indicate that trade openness has a negative and significant impact on employment rate in Turkey. This suggests that trade openness did not generate sufficient job opportunities to absorb the growing labor force in Turkey, contributing to declining employment rates.

1. Introduction

The surge in trade liberalization between countries in the late 1970s, driven by the dismantling of trade barriers, has been accompanied by growing concerns regarding its impact on the labor market. While the positive effects of trade liberalization on economic growth have been widely documented (Edwards,1998:2), both developed and developing nations have expressed apprehensions about the implications of open trade for their respective workforces (Lee, 2005:1).

Developing countries, in particular, fear job losses in import-competing sectors, while developed nations worry about the displacement of low-skilled workers. These concerns stem from the Heckscher-Ohlin-Samuelson (HOS) theory, which posits that developing countries, characterized by an abundance of unskilled labor, will specialize in producing and exporting labor-intensive goods, while capital-abundant developed nations will focus on the production and export of capital-intensive goods (Mitra, and Hossain, 2018:1187). However, empirical studies conducted on both developed and developing countries have yielded results that contradict the HOS model's predictions. A pioneering study by Leontief on the U.S. economy, using trade data on exports and imports to measure the labor and capital intensity of traded goods, revealed that the U.S., despite being capital-abundant, exported relatively labor-intensive goods and imported capital-intensive goods (Dunn, and Mutti, 2004:68-69).

Similarly, a study on Turkey, a developing nation, found that trade liberalization did not lead to the expected specialization in labor-intensive sectors, despite Turkey's abundant low-skilled labor force Ozsari, et al., 2022:146).

The lack of a clear and definitive relationship between trade liberalization and employment levels in both developed and developing countries has prompted extensive research to unravel this complex dynamic (Yanikkaya, 2008:3). Turkey presents an intriguing case study for examining this relationship, given its status as a middle-income country with significant trade flows with developed nations, particularly the European Union, making it a net importer of technology (Meschi et al., 2008:3).

In the remainder of the study, firstly, trade openness and employment rates in Turkey will be included in the general framework, then a literature review will be conducted and studies on the relationship between openness and employment will be cited. In the next step, the methodology will be explained and the analysis and findings will be mentioned.

1.1. Overview of Trade Openness and Employment Rates in Turkey

The world has witnessed three waves of globalization, with the third wave beginning in the 1980s. This wave has been characterized by the integration of the world's economies, increased trade liberalization, the transformation of production systems, the diversification of goods, and the growth of foreign trade. Financial globalization has led to the removal of capital barriers, the emergence of new financial instruments, and the expansion of global financial markets.

Turkey, as an emerging market economy, began integrating its economic and financial markets with the outside world and embarked on this process through a series of measures in the early 1980s (Yuce et al, 2013:184).

1.2.   Turkey's Economic Transformation

In the 1960s, Turkey adopted an import-substitution industrialization policy, which initially yielded high growth rates but led to a severe balance of payments crisis in 1979. As the growth process was not sustainable under import-substitution industrialization, Turkey shifted to an export-oriented industrialization policy. On January 24, 1980, the Turkish government unveiled the "Stabilization Program," which was initially described as a short-term plan aimed at achieving economic stability in Turkey. However, its scope quickly expanded to encompass comprehensive structural reforms, guided by the standard instructions of the International Monetary Fund and the directives of the World Bank. The Stabilization and Structural Adjustment Program aimed to bring about radical changes in the Turkish economy by addressing imbalances in various sectors and promoting openness to global markets (Taymaz, 1999:4).

Despite the government's implementation of the program, the deterioration of the macroeconomic structure resulting from previous policies led to a series of economic crises. The 1994 economic crisis occurred due to the failure to implement structural reforms in the economy. However, thanks to some temporary solutions, the state was able to overcome the crisis within just one year. However, this did not lead to permanent improvements in the economy, which in turn contributed to sowing the seeds of the 2001 crisis (Yilmaz, 2020:235-263).

1.3.   Economic Indicators and Growth in Turkey after 1980:

Examining economic indicators in Turkey reveals a significant surge in exports during the 1980s and 1990s as shown in Figure (1) This surge was a direct response to export incentives and the continuous real depreciation of the currency during the early 1980s. The share of exports in GDP increased substantially, from 5.16% in 1980 to 18.65% in 1988. Despite the economic crisis of 1994, the share remained relatively high at 21.36% that year, only to decline slightly to 19.89% the following year before resuming its upward trend.

**Figure 1.** Ratio of Exports to GDP in Turkey from 1980 to 2021.
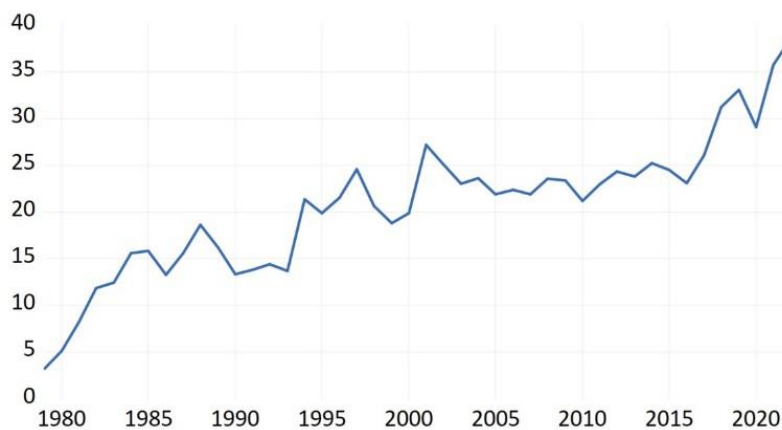
Source: Prepared by the author based on data from World Bank.

Figure (2) shows that GDP growth in 1981 was 4.85%, compared to -2.44% in 1980. GDP growth accelerated further in 1987, reaching 9.48%, and remained positive throughout the remaining years (despite declining growth rates compared to the initial years of trade liberalization), except during

periods of domestic and external economic crises such as the 1998 and 2008 crises. In the years following these crises, GDP growth rates turned negative, with the following figures recorded for 1994, 2001, 1999, and 2009: -4.66%, -5.75%, -3.26%, and -4.82%, respectively.

Figure 2. GDP Growth and Trade Openness from 1980 to 2021.
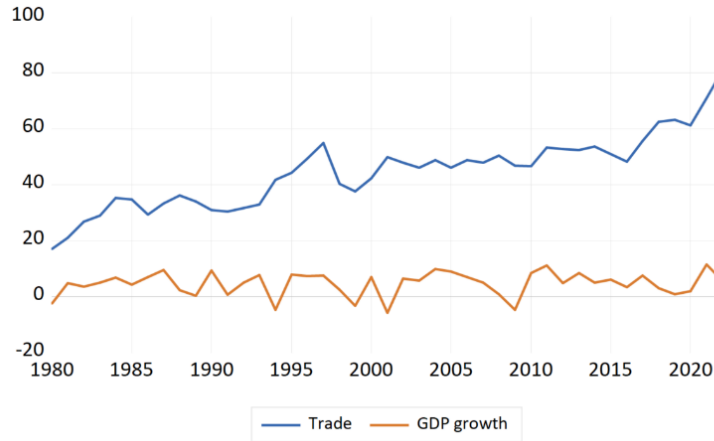
Source: Prepared by the author based on data from World Bank.

Examining labor market indicators in Turkey, particularly employment rates (defined as the ratio of the working population over 15 years of age to the total population of the same age group), reveals a mixed picture following trade liberalization.

A study conducted on the manufacturing sector in Turkey, investigating the relationship between trade openness and productivity growth, found that despite an annual employment growth of 3.9%, this rate remains relatively low compared to the high population growth rates and the intensified rural-urban migration. Previous studies also suggest that opening the economy to free trade has negatively impacted employment. Following trade liberalization, the employment opportunity growth rate declined from 4.5% to 3.5% annually. Despite a significant increase in real wages and the liberalization of the capital account after 1988, employment growth witnessed a sharp decline from 4.9% in the early years of trade liberalization to 2.0% annually (Filiztekin, 2000:11).

Another study revealed that the relative demand for skills in Turkey increased noticeably during the period from 1980 to 2001. This period coincided with radical changes in Turkish policies, including trade liberalization (Meschi, et al, 2008:21).

Comparing employment rates from 1990 to 2022 based on data from World Bank, it is evident that employment rates have been on a continuous decline, reaching their worst levels of 41% during the period from 2004 to 2009, only to recover slightly to a peak of 47% in 2017 before resuming their downward trend.

Employment rates have also undergone sector-specific changes. As illustrated in Figure (000), employment rates in the agricultural sector have experienced a continuous decline, falling from 47.76% in 1991 to 16.65% in 2022. The service sector, on the other hand, has witnessed a steady increase in employment rates, rising from 31.95% in 1991 to 55.61% in 2022. The manufacturing sector, in contrast, has not experienced significant changes in employment rates compared to the previous two sectors, with rates standing at 20.29% in 1991 and 27.73% in 2022.

Figure 3: Employment rates by sector from 1990 to 2022
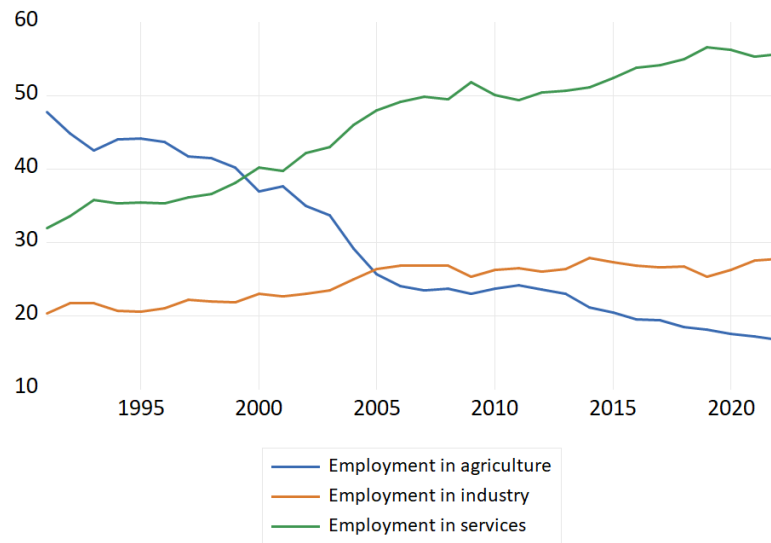
Source: Prepared by the author based on data from World Bank.

2. Literature Review

The international trade has witnessed significant advancements over the years, accompanied by many theories. Among these stands the Heckscher-Ohlin model (1991), an extension of David Ricardo's model that incorporates a second factor of production: capital. This model posits the existence of two countries, two factors of production (labor and capital), and two goods, with identical technology and similar consumption preferences between the countries. The sole difference lies in the relative abundance of production factors. The Heckscher-Ohlin theorem predicts that the capital-abundant country will export capital-intensive goods, while the labor-abundant country will export labor-intensive goods, based on the principle of comparative advantage arising from the abundance of production factors (Jones, 2008:2).

Consequently, trade openness exerts a profound influence on the labor market within countries, shaped by their respective comparative advantages. The significance of this relationship has prompted numerous empirical studies to investigate the impact of trade openness on employment and unemployment rates.

2.1. Empirical Studies on the Trade Openness-Employment on Turkey

Meschi, et al., (2008) investigate the relationship between trade openness, technology adoption, and the relative demand for skilled labor in the Turkish manufacturing sector. The study utilizes firm-level data from 1980 to 2001, focusing on firms engaged in international trade and technology adoption. A dynamic panel data set is constructed using a unique database of 17,462 firms. The findings indicate that trade openness and technology play a significant role in shifting the pattern of labor demand within each firm towards a preference for highly skilled workers. Furthermore, the study reveals that firms with larger increases in imported inputs also experienced a higher increase in the share of labor costs for skilled workers.

Polat and Uslu (2011) investigated the impact of international trade on the level of employment in manufacturing in Turkey for the period 1992-2001 using a panel data set of 95 industries for that period. A dynamic panel data model was employed to examine the variables. The results showed that real

exports, real imports, export penetration, and import penetration do not have any significant impact on employment in the current year. It was found that the first-lagged export penetration and real exports coefficients were positive and statistically significant, indicating that growth in export penetration and real exports in the current year had a significant and positive impact on employment growth in the following year. As for imports, only second-lagged import penetration had a significant and negative impact on employment.

Akcoraoglu and Acikgoz (2011) provides an analysis of the impact of trade openness and Foreign Direct Investment (FDI) inflows on employment in Turkey over the period from the first quarter of 1990 to the second quarter of 2010. The ARDL (Autoregressive Distributed Lag) bounds testing approach was used to study the dynamic relationship between these variables. The results showed a significant positive long-term relationship between exports and employment. The results show that the impact of FDI inflows on employment is negative and large in the long run due to the fact that they are foreign acquisitions and mergers rather than new investments in the case of Turkey.

Kizilirmak (2012) examined the impact of increased foreign trade on labor demand in the private manufacturing sector in Turkey. The study used data from 71 manufacturing subsectors at the 4-digit ISIC (ISIC 2) level between 1989 and 2004. The researchers examined the change in labor use efficiency, given output in each sector, using the Arellano-Bond (1991) method. The results showed that labor demand, relative to output, is not affected by import growth. This means that the increased competition resulting from increased imports does not lead to a change in the efficiency of firms in using labor. However, in sectors that experienced export growth, labor demand is negatively affected in the short term and positively in the long term.

Sandalcilar and Yalman (2012) examined the causal relationship between labor markets and trade liberalization in Turkey for the period 1980-2010. Employing cointegration tests, Granger causality tests, and the Hsiao causality test, the study found a negative statistically significant unidirectional causal relationship from the openness rate to the employment rate in Turkey, indicating that trade liberalization adversely affects labor markets. Additionally, the study found no long-run causal relationship between the variables.

Srour, et al., (2014).This study investigates the factors that led to differences in skill-based employment within the Turkish manufacturing sector between 1980 and 2001. The analysis employed firm-level data within a dynamic framework, using a two-equation model to separately represent employment trends for skilled and unskilled workers. The Generalized Method of Moments (GMM-SYS) technique was applied to a dataset of 17,462 firms. The study found that developing countries face the phenomenon of skill-biased technological change and the import of skill-enhancing technologies, both of which contributed to a widening skill gap between skilled and unskilled workers in the labor market.

Altay and Yilmaz (2016) provides an econometric analysis of the relationship between exports and employment in Turkey over the period 2005-2015. The study aims to examine whether an increase in exports has a positive impact on the level of employment in the country. The study used monthly data from 2005M01 to 2015M09. Export and employment data were first analyzed, and their stationarity was tested using the Carrion-i-Silvestre (2009) unit root method with multiple structural breaks. In the second stage, the existence of a cointegration relationship between exports and employment was examined using the Maki (2012) test for cointegration with multiple structural breaks. The results showed the existence of a cointegration relationship between the variables, indicating a long-term relationship between exports and employment. In the third stage, the long-term coefficient between exports and employment was estimated using the fully modified least squares (FMOLS) method. The results showed a positive and long-term relationship between exports and employment in Turkey.

Simsek and Hepaktan (2019) analyzed the relationship between foreign trade, unemployment, and inflation in Turkey from the first quarter of 2005 to the first quarter of 2018. A VAR model was employed to measure the impact of trade on inflation and unemployment, the Johansen test for cointegration to determine the existence of a long-run relationship between the variables, and the Granger causality test to determine the direction of the causal relationship between the variables. Considering the unemployment results, the study found a bidirectional relationship between trade openness and unemployment in Turkey in the short run. In the long run, an increase in unemployment leads to an increase in trade openness, while trade openness leads to an increase in unemployment rates. Gulmez (2019) investigated the impact and level of foreign trade on economic growth and employment using data from 2003-2018 for Turkey. The study employed cointegration tests, a VAR model, and Granger causality to understand the evolution of causal relationships between the variables. Exports and imports were used as proxies for foreign trade, GDP as an Indicator of growth, and the number of employed persons as an Indicator of employment. The study's results showed that the employment variable is not directly related to exports and imports. It was found that the employment variable is only related to the GDP variable in the short run, through a unidirectional causal relationship from employment to GDP. No cointegration relationship was found between the variables in the long run.

Ozsari, et al., (2022) analyzes the impact of exports on labor demand in the manufacturing industry in Turkey over the period from 2003 to 2013. The study employs the Generalized Methods of Moments (GMM) technique to examine firm-level production and trade data from the Turkish manufacturing industry. The results show that the impact of exports on export-oriented firms differs by firm size and technology. The effect of exports on employment in medium-technology firms is positive, leading to increased employment rates, while the effect is negative for employment rates in low-technology firms. In addition to the impact on low-technology subsectors, increased exports by low-technology firms will lead them to use more labor-saving alternative production technologies, which will reduce employment levels. However, overall, the results show that both manufacturing exports and imports have a significant and positive impact on labor demand in firms.

2.2. Empirical Studies on the Trade Openness-Employment on Other Countries

Yanikkaya (2008) examined the impact of trade liberalization on the employment growth rate in developed and developing countries. The study was conducted on approximately 98 countries, including Turkey. The estimation results indicate that the increase in trade volume has not been able to generate sufficient employment opportunities in developing countries. It also has a negative impact on industrial and agricultural employment in developed countries.

Ersungur et al. (2021) aimed to analyze the relationship between foreign trade (exports and imports) and employment. The study was conducted on 20 OECD member countries over the period from 1980 to 2018. Panel data analysis methodology was applied using data from 20 OECD countries to examine the relationship between foreign trade and employment. In the study, the CCEMG estimator was employed to identify the long-run relationship between the variables, and the Emirmahmutoğlu and Köse (2011) causality test was utilized for the short-run relationship. The study's results suggest that exports and the squared of exports do not have a statistically significant impact on long-run employment at the panel level, while imports and fixed capital investments have a statistically significant positive impact on employment.

Ngouhouo and Nchofoung (2021) examined the impact of trade openness on employment levels in Cameroon, employing the Engle-Granger test to estimate the relationship between the variables and accurately estimate model parameters. Additionally, the Johansen procedure was utilized to verify the existence of a cointegrating relationship among the variables. Having confirmed the presence of

cointegration, the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) methods were employed to estimate the model. The study revealed a statistically significant positive relationship between trade openness and employment in Cameroon. Furthermore, investments and manufacturing were found to significantly increase employment opportunities in the country. In addition, the study did not identify any significant relationship between human capital (skills and education), population growth, and employment in Cameroon.

Jadhav and Arora (2023) delved into the impact of trade openness on employment in the Indian manufacturing sector. Panel data analysis was employed to examine the variables, encompassing a sample of 51 industries over the period from 1990-1991 to 2010-2011. The findings indicated that international trade exerts a negative impact on total employment, as well as on specific types of employment, such as male versus female, regular versus contract, and skilled versus unskilled workers, in terms of job creation. On the other hand, imports were found to have a detrimental effect on these employees.

Oriakpono et al. (2024) examined the relationship between trade liberalization and employment in Nigeria from 1985 to 2018. The analytical framework combines classical linear regression models and autoregressive distributed lag (ARDL) models to identify the relationship between the variables in the long and short run. The results of the study were mixed. Error correction estimates indicate a negative relationship between the trade openness index and the employment rate. On the other hand, it shows a negative relationship that is not statistically significant between foreign direct investment and the employment rate, and the exchange rate shows a positive and significant relationship with the employment rate.

Busse, Dary, and Wustenfeld (2024) examined the impact of trade liberalization on employment in the manufacturing sector in developing countries using data for 131 developing countries from 1991 to 2020. This is done using panel fixed-effects and instrumental variable regression approaches. The results indicate that trade openness has led to a decline in the share of manufacturing employment in total employment in many developing economies. And that the productivity of labor that is relatively lower than its productivity in the manufacturing sector in China will lead to a decline in its share of employment relative to the manufacturing sector.

3. Methodology of Research

For the purpose of examining the relationship between trade openness and employment rates in Türkiye, the following model was applied.:

$$EMP = f(Trade) \qquad\qquad 1$$

Additional other control variables that are considered important factors affecting the employment rate were identified based on previous literature (see Ngouhouo and Nchofoung, 2021). When the control variables were introduced into the equation, Equation 1 became as follows:

$$EMP = f(Trade, GDPPC, IAV, GFCF) \qquad\qquad 2$$

Linearing equation (2):

$$EMP_t = \beta_0 + \beta_1 * Trade_t + \beta_2 * GDPPC_t + \beta_3 * IAV_t + \beta_4 * GFCF_t + \varepsilon_t \qquad 3$$

From equation (3) EMP is the dependent variables while trade, GDPPC, IAV and GFCF are the independent variables, β_0 is constant and ε_t is the stochastic error term, using a time series extending from 1990 to 2022.

Table 1. Description of Variables

Variable	Definition	Source
Employment Rate - EMP	The ratio of people with jobs to the total working-age population, which is defined as 15 years and over	World Bank Database
Trade Openness - Trade	The total value of a country's exports and imports of goods and services. It is calculated as a percentage of a country's total gross domestic product (GDP).	World Bank Database
GDP per capita - GDPPC	A country's total GDP divided by its population. Calculated in US dollars taking inflation into account, with 2015 prices used as a basis for comparison.	World Bank Database
Gross Fixed Capital Formation -GFCF	The total investment made by businesses, households and government in buildings, machinery, equipment and infrastructure during a given period of time. It is calculated as a percentage of total GDP	World Bank Database
Industry value added -IAV	It refers to the difference between the value of goods or services when they are produced and the value of the inputs used in their production. This term measures the contribution of the industry sector (including the construction sector) to a country's GDP,	World Bank Database

Source: World Bank Database

Theoretically, the expected relationship between Trade Openness (Trade) and Employment Rate (EMP) is uncertain and not clearly defined, as reported in the literature, but it is expected that an increase in GDP per capita (GDPPC) and Industry value added (IAV) will lead to an increase in employment rates while an increase in Gross Fixed Capital Formation (GFCF) rates contributes to a reduction in employment rates. In this study, descriptive and appropriate econometric techniques were used based on preliminary econometric tests such as unit root and cointegration estimation using a bounds testing approach.

3.1. Data Analysis and Results

The augmented Dickey-Fuller (ADF) test was employed to verify the stationarity of the study variables. The results of the unit root test shown in the following tables revealed that all variables were integrated of order one (I(1)). Therefore, we could apply the cointegration method to conduct our estimation.

Table 2. Results of Unit Root Test

Variable	None		Cnstant		Constant, Linear Trend	
	t-Statistic	Prob	t-Statistic	Prob	t-Statistic	Prob
EMP	-4.323906***	0.0001	-4.247832***	0.0024	-4.564584***	0.0053
TRADE	-4.320272***	0.0001	-4.881174***	0.0005	-4.771325***	0.0032
GDPPC	-3.955538***	0.0003	-5.66003***	0.0001	-5.707303***	0.0003
IAV	-4.873149***	0.0000	-4.791265***	0.0000	-5.167852***	0.0012
GFCG	-6.147915***	0.0000	-6.080988***	0.0000	-5.984114***	0.0001

Source: Authors' computation. Notes: ***, ** and * indicate stationary at 1%, 5% and 10%, respectively.

The following table presents the results of the cointegration test. The F-statistic value which is equal to 9.35 is greater than the critical values at the 1%, 5%, and 10% significance levels. This implies that we can reject the null hypothesis of no cointegration and accept the alternative hypothesis of a cointegration relationship between the study variables. In other words, the variables in the model exhibit a long-term equilibrium relationship.

Table 3: ARDL Bound Co-integration Test

Estimated Model	F-Statistics	
	9.355692	
Critical Values	Lower Bound	Upper Bound
1%	3.29	4.37
5%	2.56	3.49
10%	2.2	3.09

Source: Authors' computation

The long-run coefficients were estimated using the ARDL approach, as shown in Table 4. Based on these coefficients, the long-run estimated regression equation can be formulated as follows:

$EMP = -0.3869*TRADE + 0.2346*GDPPC + 0.8443*IAV -0.3401*GFCF + 1.4693$
The value of the coefficient of determination (R-squared) indicates the high explanatory power of the model (0.99). The value of the F-Statistics indicates the statistical quality of the estimated model as a whole.

Table 4. Results of Estimation

Variables	Coefficients	Std. Error	t-Statistics	Prob.
TRADE	-0.386861	0.035255	-10.97321	0.0000
GDPPC	0.234635	0.024695	9.501337	0.0000
IAV	0.844285	0.024007	35.16831	0.0000
GFCG	-0.340083	0.051130	-6.651333	0.0002
C.	1.469304	0.099766	14.72751	0.0000
R-squared	0.992531	Durbin-Watson Stat.		2.220918
AdjustedR-Squared	0.974792	F-Statistics (Prob.)		0.000002

Source: Authors' computation

• Trade openness is negatively correlated with employment rates. A 1% rise in openness leads to a 0.38% drop in employment.

• GDP per capita has a positive impact on employment. A 1% increase in GDP per capita is linked to a 0.23% rise in employment.

• The share of industry's value added in GDP positively affects employment. A 1% increase is associated with a 0.84% rise in employment.

• Gross fixed capital formation as a share of GDP has a negative impact on employment. A 1% increase is linked to a 0.30% decrease in employment.

Diagnostic tests for the regression estimate, including normality, Breusch-Godfrey Serial Correlation LM, heteroskedasticity Breusch-Pagan-Godfrey, and structural stability tests, indicate the appropriateness and robustness of the model.

The normality test's Jarque-Bera p-value exceeding 0.05 indicates that the regression residuals are normally distributed.

Figure 4: Normality Test
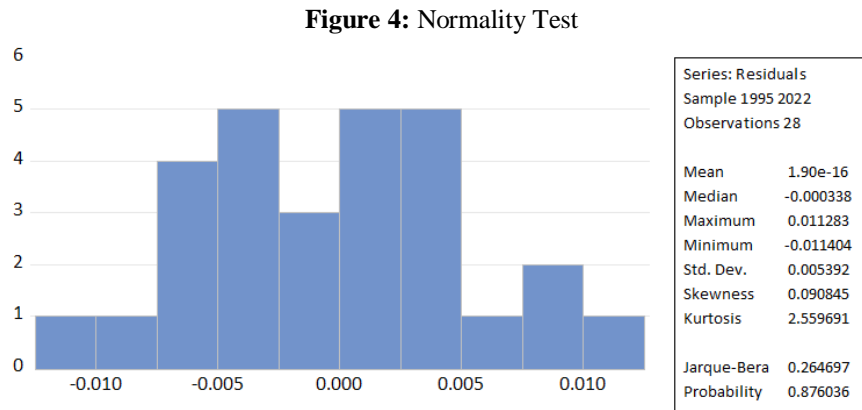
Source: Authors' Computation

The Breusch-Godfrey LM test (Lagrange multiplier) confirms no autocorrelation in the residuals. A high probability value (Prob. Value = 0.7099) exceeding 0.05 leads us to accept the null hypothesis of no serial correlation.which states that there is no serial connection between the remainders.

Table 5. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test			
F-Statistics	0.150148	Prob. Value F(1,7)	0.7099
Obs*R-squared	0.587978	Prob. Chi-Square (1)	0.4432

Source: Authors' Computation

The Breusch-Pagan-Godfrey test, also known as the Heteroscedasticity Test, was conducted to evaluate the presence of heteroscedasticity in the error term. The null hypothesis (H0) of homoscedasticity, which posits constant variance of errors, was not rejected.

This conclusion is supported by the high p-value (Prob. Value = 0.3340), which surpasses the conventional significance level ($\alpha = 0.05$). Since the p-value is greater than α, we fail to reject the null hypothesis and can infer that there is no evidence of heteroscedasticity in the data.

Table 6. Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-Statistics	1.374096	Prob. Value	0.3340
Obs*R-squared	21.43259	Prob. Chi-Square.	0.3134
Scaled explained SS	1.364417	Prob. Chi-Square.	1.0000

Source: Authors' Computation

The CUSUM and CUSUMSQ plots of the estimated residuals fall within the test's critical bounds. This suggests stability of the cointegration relationship, implying that the short-run and long-run parameters of the model variables are structurally stable.

Table 5. Structural Stability Testing
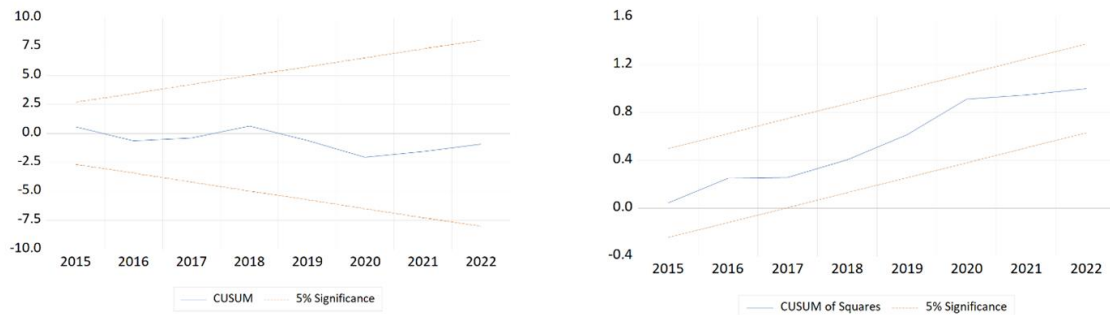
Source: Authors' Computation

4. Conclusion

This study investigates the relationship between trade openness and employment rates in Turkey for the period 1990-2022. Unit root tests, specifically the Dickey-Fuller test, were conducted on the variables to ensure the stationarity of the time series. The employment rate was adopted as the dependent variable, trade openness as the independent variable, and the control variables included per capita income to GDP, gross fixed capital formation to GDP, and value added of industry to GDP. The ARDL model was employed to examine the relationship between the study variables, and it revealed the existence of a long-run relationship between the variables.

To validate the reliability of the study model's results, diagnostic tests were performed, including the Normality Test, LM Test, Heteroskedasticity Test, and CUSUM and CUSUMSQ. The test results confirmed that the model is appropriate for the study.

The study findings demonstrate the existence of a long-run relationship between the variables, indicating that trade openness is negatively associated with employment rates. This means that increasing trade openness will lead to lower employment rates. This finding is consistent with some previous studies. For instance, research on trade openness in Turkey confirms that trade openness has a negative impact on employment rates in Turkey, as evidenced by the findings of Sandalcilar and Yalman (2012) and Simsek and Hepaktan (2019). These studies suggest that the shift from labor-intensive to capital-intensive exports negatively impacts labor markets and reduces job opportunities. Ozsari, et al., (2022) further emphasize that trade openness will adversely affect low-technology firms.

Studies examining a group of developing countries and comparing them have also found that trade openness has negative effects on employment rates in developing countries. Yanikkaya (2008) and Busse, Dary, and Wustenfeld (2024) both confirm that trade openness has negative implications for employment rates in developing countries. In studies conducted on individual developing countries, Jadhav and Arora (2023) found that trade openness has a negative impact on employment rates in India, while (Oriakpono, et al ., 2024) concluded that trade openness has led to a decline in employment rates. In addition, an increase in the gross fixed capital formation to GDP ratio led to a decrease in employment rates. International trade's effects extend beyond exposure to increased foreign competition in shifting

labor towards export-oriented sectors. It also encompasses better resource allocation and increased production efficiency, which could promote capital deepening across all industries by providing implicit support for capital goods imports, thereby affecting employment growth rates. According to (Ozsari, et al., 2022), an increase in exports from low-technology firms will come at the expense of labor, as alternative technology replaces workers.

An increase in the share of value added of industry to GDP led to an increase in employment rates in the Turkish economy. This is confirmed by studies examining the relationship between trade openness and employment rates in the Turkish manufacturing sector. According to (Kizilirmak, 2012), export growth has led to long-term employment growth. An increase in per capita GDP also leads to higher employment rates. This is likely due to increased demand for goods and services, leading to business expansion and job creation. High incomes also allow individuals to invest in skill development, improve their employability, and create a larger pool of skilled workers, which increases employment growth. (Krugman and Obstfeld, 2009:21).

The results of this study reveal that trade openness has a negative impact on employment rates in Turkey during the study period. Trade openness did not create enough job opportunities to absorb Turkey's growing population. This may be due to the slow expansion of labor-intensive exports. The expected outcome of trade openness under the Heckscher-Ohlin-Samuelson theorem was not realized. This theorem assumes that Turkey would specialize in relatively more labor-intensive sectors, leading to faster employment growth. Instead, this trade openness has led to a shift to sectors that require highly skilled labor. For Turkey, where the European Union is a major partner, the reciprocal relations have led to the transfer of technology to Turkey, resulting in the substitution of jobs in export sectors from unskilled to skilled labor. The results of the following studies show the effect of skill-biased trade openness in Turkey (Meschi, et al., 2008; Surur, et al., 2014). These studies found that developing countries face the phenomenon of skill-biased technological change, and that technology imports have led to skill upgrading, both of which have contributed to the widening skill gap between skilled and unskilled workers in the labor market. Trade openness and technology also play an important role in shifting the demand pattern for labor within each firm towards preferring highly skilled workers.

Accordingly, the government should target skills development programs and train workers who have lost their jobs due to the shift towards skill-biased demand to increase their ability to participate in the labor market. In addition, it should increase support for vocational programs to keep pace with the requirements of the new labor market that has changed as a result of structural shifts in the labor market. It should also work to create opportunities in sectors that require labor-intensive workers to meet the growing demand for labor due to the continuous increase in population.

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