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DETERMINANTS OF EMPLOYMENT IN TURKEY: AN ARDL ANALYSIS OF COMMERCIAL AND FINANCIAL DYNAMICS

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ABSTRACT

This study analyzes the determinants of employment in Turkey, focusing on commercial and financial dynamics. Employment is a key indicator of economic growth and social welfare. Annual data from 1990 to 2024 are used. The study examines how exports (LNEX: natural logarithm of export volume) and domestic credit (LNKREDİ: natural logarithm of total domestic credit) affect employment (LNİSTİHDAM: natural logarithm of total employment). The ARDL (Autoregressive Distributed Lag) model captures both short- and long-run relationships. Results from the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, along with other stationarity tests, indicate that the variables are stationary at different levels. Thus, the ARDL approach is suitable. The F-Bounds test confirms the presence of a long-term cointegration relationship. Long-term estimates reveal exports have a strong, positive impact on employment. Increased credit volume also significantly supports employment. The error correction coefficient is –0.501, which is negative and statistically significant. This means about half of short-term disequilibria are corrected within one period. The findings suggest that trade openness and financial deepening in Turkey improve production capacity and employment. Policies promoting exports, financial accessibility, and better credit flow to the real sector should be maintained to sustain employment.

Keywords: Exports, Employment, Finance, ARDL Model
JEL Clasifications: F14, O11, R11, C32

1. INTRODUCTION

The concept of employment is defined in the economic literature in both broad and narrow ways. In broad terms, employment refers to the effective and efficient use of all production factors in the production process. It also refers to the use of labor as an input in the production process. In the labor market, anyone actively involved in production is considered employed. Those seeking work but unable to find employment are considered unemployed. The employment rate is the ratio of employed individuals to the total population of working age and those willing to work. This rate is key for assessing the efficiency of the labor market and the extent to which an economy uses its production capacity (Cerev and Yenihan, 2017: 79).

Employment rates are a fundamental indicator of how much of the labor force is used in production. In less developed and developing countries, high population growth and limited capital accumulation constrain employment opportunities, becoming significant macroeconomic problems. Therefore, sustainable policies to increase employment and reduce unemployment are crucial (Caliskan, 2019: 275).

Exports are crucial indicators of economic growth and openness, playing a significant role in boosting production capacity and competitiveness. For developing countries, exports carry political and strategic importance by providing foreign exchange earnings, increasing

employment, and diversifying production (Helpman & Krugman, 1985; Grossman & Helpman, 1991). Before 1980, Turkey followed an import-substitution industrialization strategy. After 1980, it moved to an export-based growth model, aligning with global trends. This change was formalized by decisions made on January 24, 1980. Turkey's integration deepened with the transition to the Customs Union with the European Union in 1996. While the Customs Union boosted short-term foreign trade, it led to structural problems over time. These included greater import dependence and a limited industrial policy (Sahin, 2023: 83).

The banking sector—a key part of the monetary transmission mechanism—plays an important role by providing domestic loans to companies and households. Bank loans make investment financing possible and support domestic demand. They increase capital accumulation and production capacity, which, in turn, support consumption expenditures (Folawewo and Adeboje, 2017). Increasing credit volume directly affects production and investment decisions in the real sector, which is crucial for economic growth and employment.

Examining both commercial and financial indicators is important for identifying sustainable employment policies in Turkey. Most studies on employment determinants focus on economic factors, while few analyze commercial and financial effects. By considering both variables, this study offers a new perspective on employment.

This study analyzes employment determinants in Turkey using commercial and financial dynamics (CFD). Short- and long-term effects were examined using data from 1990 to 2024, with the Autoregressive Distributed Lag (ARDL) method. The ARDL model is well-suited because it can find long-term relationships even if variables differ in stationarity (Pesaran, Shin & Smith, 2001; Tatoğlu, 2020). Stationarity was tested for each series using the ADF and PP unit root tests. The F-Bounds test analyzed long-term relationships. The statistical consistency of the model was assessed using the Breusch–Godfrey, Ramsey, Jarque–Bera, and ARCH tests.

The findings show that exports and credit have positive, significant impacts on employment. This demonstrates that commercial and financial development in Turkey boosts production and employment. Using resources effectively and efficiently is important for sustaining employment.

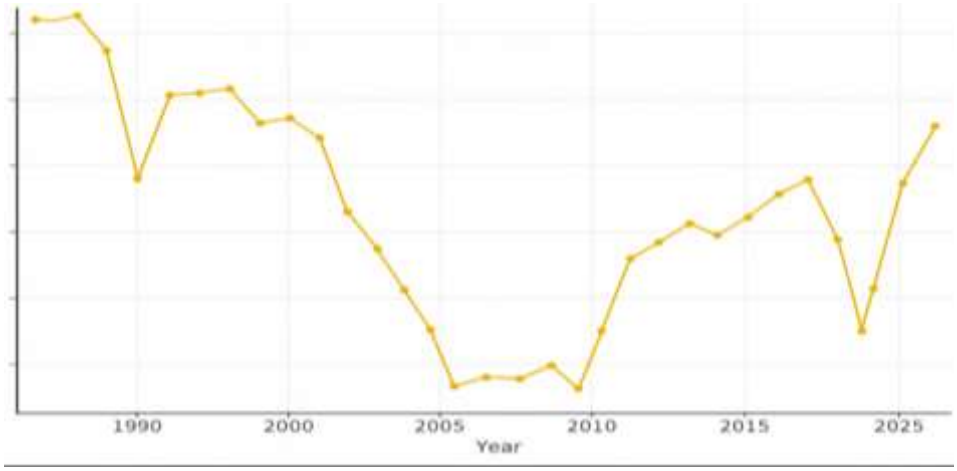

Figure 1. Employment Indicator Chart (1990-2024)

Figure 1 shows employment data in Turkey from 1990 to 2024. The general trend reveals notable fluctuations over time. Employment was relatively high in the early 1990s but declined

sharply after the 2001 economic crisis, hitting its lowest level in 2005. Macroeconomic imbalances, financial crises, and structural changes during this period hurt employment. After the global financial crisis in 2009, the Philippines experienced a recovery in its employment rate. The upward trend continued after 2010, driven by economic growth and credit expansion. The COVID-19 pandemic in 2020 led to a sudden drop, followed by a recovery. As of 2024, employment is again trending upward.

In general, the graph shows that employment in Turkey is sensitive to economic fluctuations, rising during periods of macroeconomic stability and falling sharply during times of crisis. This demonstrates that the labor market is closely linked to the dynamics of economic growth.

In Turkey, corporate and government incentives to boost employment are central to economic growth policies. The government has adopted various supportive policies for employers and job seekers. Insurance premium discounts and tax incentives under the Social Insurance and General Health Insurance Law No. 5510 lower job-creation costs, making hiring easier. ISKUR offers on-the-job training, active labor market measures, and vocational programs to help individuals better adapt to the labor market. KOSGEB, TUBITAK, and development agencies offer incentives for entrepreneurship, R&D, and innovation. These aim to boost production capacity, thereby indirectly supporting employment. The Investment Incentive System aims to reduce regional disparities and encourage job creation in disadvantaged areas. These comprehensive incentives are key to sustainable job growth and reducing informal employment (Ministry of Industry and Technology, 2024; ISKUR, 2023; KOSGEB, 2023).

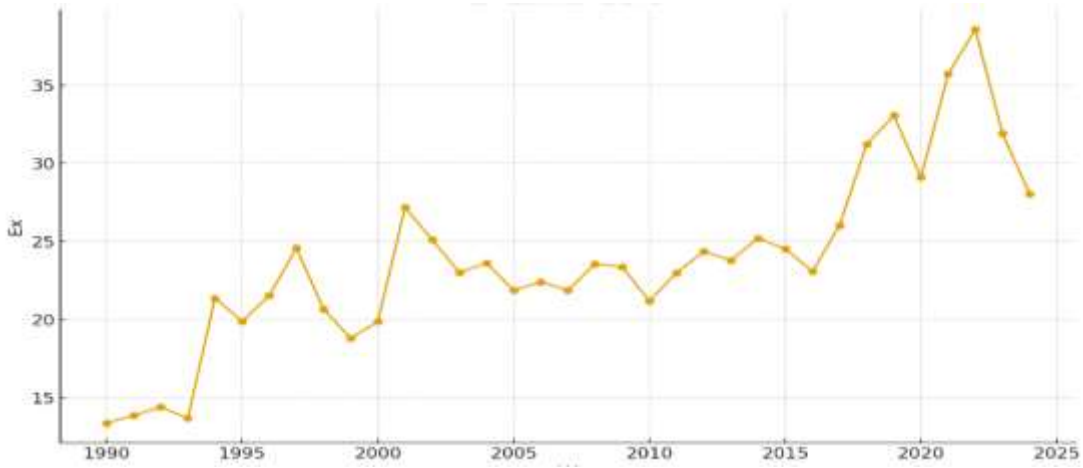

Figure 2. Export Indicator Chart (1990-2024)

Export (EX) data from 1990 to 2024 show that Turkey's foreign trade performance has risen over the long run. Exports were low in the early 1990s and fell in the short term after the 1994 crisis, but steadily rose in the 2000s due to outward-oriented policies and global integration. Exports slowed temporarily during the 2008 global financial crisis but rebounded after 2010, reaching highs in 2021–2022.

The COVID-19 pandemic in 2020 reduced exports for a short period, but recovery followed as external demand and production capacity grew. Even though some decline is expected after 2023 due to weaker global demand, Turkey's exports are generally steady and continue to fuel development.

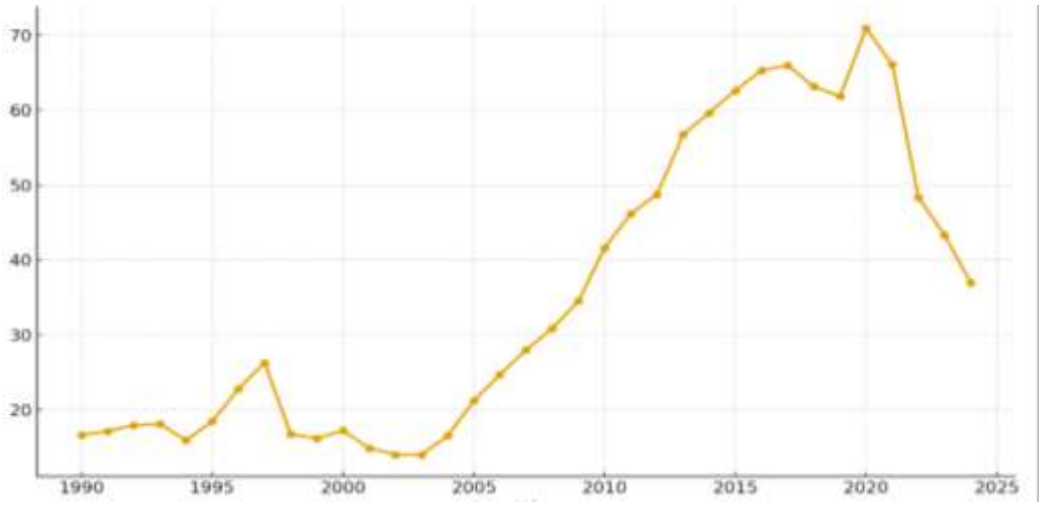

Figure 3. Domestic Loans Indicator Chart (1990-2024)

The credit volume generally shows an upward trend between 1990 and 2024. Credits, which remained low in the 1990s, increased steadily in the 2000s, peaking at 70.9 units in 2020. However, after 2021, the credit volume decreased due to tight monetary policies and interest rate increases, falling to 36.9 units in 2024. Overall, the amount of credit has fluctuated but trended upward, in line with periods of economic expansion and crises.

2. LİTERATURE

International studies examining the relationship between exports and employment generally show that exports positively and significantly affect employment. Badri and Dizaji (2014), in their analysis of data from the Iranian economy for the period 1976–2005, found that exports increased employment in the long term. Similarly, Kiyota (2014), in his study covering the period 1995–2009 for China, Indonesia, Japan, and Korea within the OECD countries, revealed that exports increase employment through direct and indirect effects, and that the increase in employment resulting from exports is particularly pronounced in China, Japan, and Korea. Feenstra, Ma, and Xu (2019) examined the period 1991–2011 in the US and found that exports have an employment-creating effect. Similarly, Sasahara (2019), in a global input-output analysis covering the period 2000–2014 for the United States, China, and Japan, emphasized that increases in exports create more employment.

Studies on the Turkish economy also support the positive effect of export growth on employment. Aydıner (2016) examined the effect of exports on employment in Turkey using data from the 1,000 companies with the highest exports and determined that a 1% increase in exports raised employment by 0.20%. Tandoğan (2019), in his panel data analysis of Level-2 regions for the period 2005–2016, revealed that an increase in regional exports positively and significantly affected regional employment. Zengin-Tasdemir, Dalgıc, and Fazlıoğlu (2023), using firm-level data from 2003–2015 and applying Propensity Score Matching (PSM) and Difference-in-Differences (DID) methods, found that exports significantly increased firms' employment levels. Eren and Eryer (2025) examined the impact of foreign trade on employment in Turkey for the period 1991–2023 using Johansen cointegration and FMOLS analyses and found that export trade has a positive effect on employment.

The general framework of the domestic literature on the relationship between credit and employment can be summarized as follows: In studies conducted in Turkey, Eryılmaz, Öksüz, and Zeren (2021) examined the effect of SME loans on economic growth and employment using the ARDL method and concluded that credit increases support employment in the long term. Karacayır and Karacayır (2016) analyzed the effect of financial development on

unemployment for the period 2006–2015 and found that an increase in credit volume reduced unemployment in the short term, thereby increasing employment, but had no significant effect in the long term. Gür (2023) identified a negative long-term relationship of 23.8% between domestic credit volume and unemployment for the period 2010–2022, suggesting that credit expansion increases employment.

In the international literature, Melcangi (2019) emphasizes that credit tightening affects not only credit-constrained firms but also firms at risk of future constraints in a job-reducing manner. Abras and Rocha (2020), in their study covering the period 1995–2015, concluded that a 1% increase in bank credit growth in Brazil increased employment by 0.12%. Mumtaz and Zanetti (2016) show that the interaction of financial and labor market frictions amplifies macroeconomic fluctuations, particularly by strengthening the impact of monetary policy shocks on employment. Champagne and Gouin-Bonenfant (2022) found that financial constraints increase the impact of monetary policy shocks on employment by approximately one-third. Gutierrez et al. (2023) used regression analysis in a study covering the period 2010–2015 and found that increases in bank credit supply in Mexico positively and significantly increased employment, particularly in small and young firms. Herkenhoff et al. (2024) found that credit expansion also improves the quality of employment by enabling young, constrained individuals, in particular, to be employed in more productive, higher-paying jobs.

In conclusion, the findings from both Turkish and international studies show that financial and commercial development positively affects employment. Credit expansion has an employment-boosting effect, whereas financial constraints and credit tightening have employment-reducing effects. This situation also arises from the development of commercial relations.

3. DATA AND METHODOLOGY

This study uses annual data from 1990 to 2024 to analyze the determinants of employment in the Turkish economy. The variables analyzed are exports (LNEX), employment (LNISTIHDAM), and credit ratio (LNKREDİ). The export variable represents Turkey's total exports of goods and services, employment refers to the total working population ratio, and credit denotes the loans granted by domestic banks.

Table 1. Variables and Their Abbreviations

Variables	Description	Source
LNİSTİHDAM	Employment rate by population, total (%)	World Bank Data
LNEX	Exports of goods and services (as a percentage of GDP)	World Bank Data
LNKREDİ	Domestic credit extended by banks to the private sector (as a percentage of GDP)	World Bank Data

Table 1 summarizes the definitions and data sources for the dependent and independent variables used in this study. Indicators such as the employment rate, exports, and credit volume were selected to analyze the impact of economic activities on employment. All variables are annual data obtained from the World Bank, an international database.

Table 2. Unit Root Test Results (PP and ADF)

Variables	ADF	PP
LNİSTİHDAM	-1.713	-1.784
LNEX	-2.187	-2.325
LNKREDİ	-7.207***	-12.314***
ΔLNİSTİHDAM	4.615***	-4.603***
ΔLNEX	-5.434***	-6.882***
ΔLNKREDİ	-3.868***	-3.868***

Table 2 presents the results of the Phillips–Perron (PP) and Augmented Dickey–Fuller (ADF) tests. While credit is stationary at level I(0), the export and employment variables were found to be non-stationary at level. When the first differences of the non-stationary variables were taken, the resulting series became stationary at I(1). The fact that some variables are I(0) and some are I(1) allows for ARDL analysis. Therefore, the long-term cointegration relationship between the variables was examined.

Table 3. ARDL Long-Term Results

LNİST	Coefficient	Standard Error	t-Statistic	Probability
LNEX	0.902	0.093	9.625	0.000***
LNKREDİ	0.258	0.082	3.147	0.007***

The coefficient for the LNEX variable is 0.902. This suggests that a 1% increase in exports leads to a long-term increase in employment of approximately 0.90%. This finding supports the production- and employment-creating effect of exports, indicating that an increase in external demand creates new employment opportunities by expanding firms' production capacity. The coefficient of the LNKREDİ variable is 0.258, indicating that a 1% increase in credit volume results in approximately a 0.26% increase in employment. This shows that credit expansion contributes to employment growth by stimulating economic activity through investment and consumption channels.

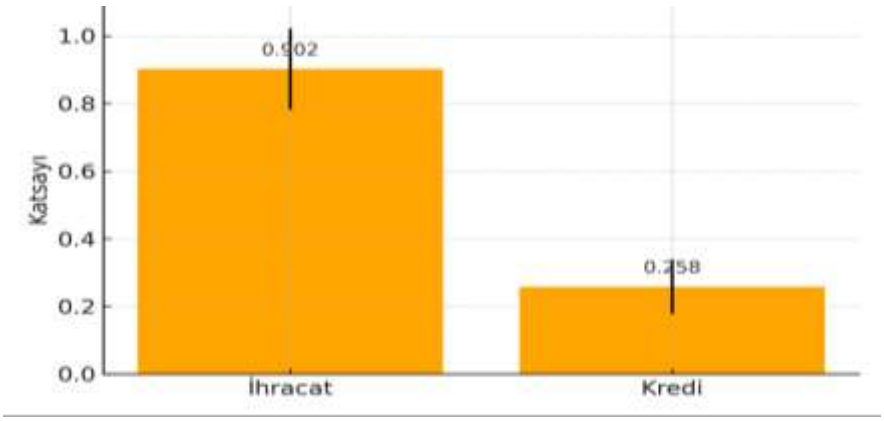

Figure 4. Estimation Results Based on ARDL Results

Figure 4 presents the long-run estimation results of the ARDL model. Here, LNEMPLOYMENT serves as the dependent variable, while LNEX (exports) and LNCREDIT are the independent variables. The estimated coefficient for exports (0.902) demonstrates a strong, positive effect on employment, whereas the coefficient for credit (0.258) indicates a smaller positive impact.

Table 4. F-Bounds Test Results

Test İstatistiği	Değer	Anlam Düzeyi	I(0)	I(1)
F-istatistiği	7.24***	10%	2.17	3.19
		5%	2.72	3.83
		1%	3.88	5.30

The F-statistic value (7.24) is above the upper limit value of I(1)=5.30. This result indicates the existence of a long-term cointegration relationship between the variables. In other words, a long-term equilibrium relationship has been established among exports, employment, and credit.

Table 5. ARDL Model Diagnostic Test Findings

Diagnostic Tests	Test Statistic	Probability
Breusch–Godfrey	1.908	0.511
Jarque–Ber	0.976	0.613
Ramsey	0.551	0.586
ARCH	0.519	0.476

Probability values greater than 0.05 from the Breusch–Godfrey, Jarque–Bera, Ramsey, and ARCH tests indicate that there are no statistical problems with the model, such as autocorrelation, heteroscedasticity, normality, or model specification errors. Therefore, this result demonstrates that the ARDL model has a statistically consistent, reliable, and valid structure.

Table 6. Error Correction Model for the ARDL Model

Değişkenler	Katsayı	Standart Hata	t-İstatistik	
C	2.094	0.568	3.686	0.002
D(LNIST(-1))	0.130	0.151	0.860	0.402
D(LNEX)	-0.076	0.052	-1.455	0.164
D(LNEX(-1))	-0.058	0.038	-1.526	0.146
D(LNKREDI)	-0.205	0.054	-3.796	0.001
D(LNKREDI(-1))	-0.041	0.088	-0.470	0.644
CointEq(-1)	-0.501	0.136	-3.683	0.002

According to the error correction model (ECM), which measures short-term changes in relationships between variables, the error correction term, CointEq(-1), was negative and significant, with a coefficient of -0.501. CointEq(-1) indicates how quickly a system returns to equilibrium after a disturbance, showing the speed of adjustment. This means about 50% of short-term imbalances are corrected within one period.

In addition to these findings on error correction, the CUSUM and CUSUMQ test graphs, which remain within the 5% significance level limits, confirm that the model's parameters are stable over time.

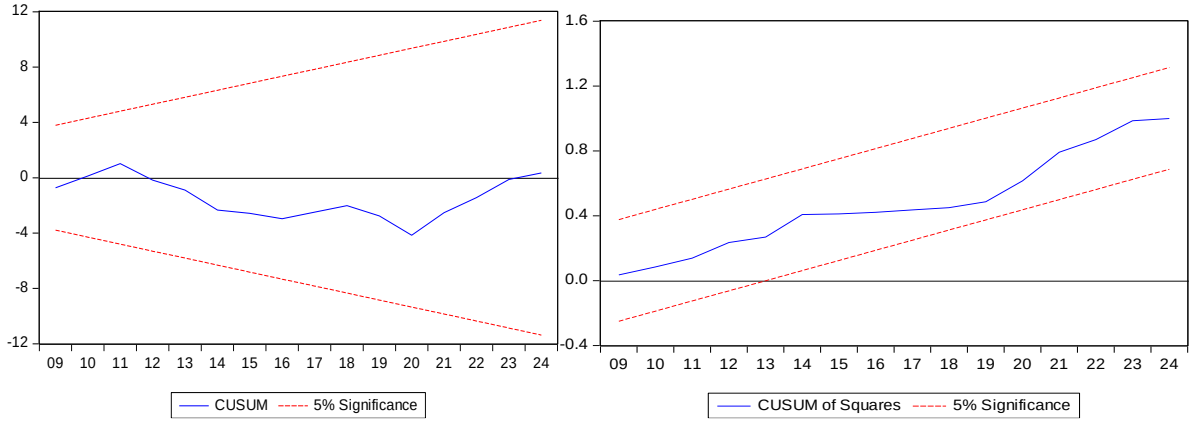

Figure 5. CUSUM and CUSUM of Squares (CUSUMQ) Stability Tests

4. CONCLUSION AND EVALUATION

In this study, the determinants of employment in Turkey were examined within the framework of trade and financial dynamics using annual data for the period 1990–2024 through the ARDL (Autoregressive Distributed Lag) model. The analysis results reveal that the variables of exports (LNEX) and domestic credit volume (LNCREDIT) have a positive and statistically significant long-term effect on employment (LNEMPLOYMENT). It was found that a 1% increase in exports raises employment by approximately 0.90%, while a 1% increase in credit volume raises employment by 0.26%.

The F-Bounds test results confirm the existence of a long-term cointegration relationship among the variables. Moreover, the error correction coefficient of –0.501, being negative and statistically significant, indicates that approximately half of the short-term disequilibrium is corrected within one period. The Breusch–Godfrey, Ramsey, Jarque–Bera, and ARCH test results show no evidence of autocorrelation, heteroskedasticity, or model specification errors. Therefore, the findings indicate that trade and financial developments in Turkey have a supportive effect on employment.

These results demonstrate that exports contribute to the creation of new employment opportunities through increased production capacity and external demand. Likewise, the expansion of financial resources and the resulting increase in credit volume positively affect employment through investment, production, and consumption channels. Hence, implementing policies that promote exports, facilitate financial access, and strengthen credit flows to the real sector is essential for achieving sustainable employment growth.

The findings are consistent with many studies in the literature. In particular, Badri and Dizaji (2014), Kiyota (2014), Feenstra, Ma, and Xu (2019), and Sasahara (2019) reported that exports have a positive and significant long-term impact on employment. Similarly, studies conducted for Turkey by Aydıner (2016) and Tandoğan (2019) revealed the employment-generating effects of export growth. Therefore, the results of the present study support the view that foreign trade enhances production and employment capacity and confirm the positive effects of Turkey's export-oriented growth strategy on employment.

Regarding financial indicators, the findings on the positive impact of credit expansion on employment are also consistent with both national and international literature. In Turkey,

Eryılmaz, Öksüz, and Zeren (2021) and Gür (2023) found that credit growth increases employment in the long run. Similarly, at the international level, Abras and Rocha (2020) showed that bank credit growth positively affects employment in Brazil, while Gutierrez et al. (2023) revealed that increases in credit supply create employment-generating effects in Mexico. These results align with the present study's findings, confirming the positive impact of financial deepening on employment. However, some studies, such as Karaçayır and Karaçayır (2016), found that increases in credit volume do not have a statistically significant long-term effect. This divergence is attributed to fluctuations in Turkey's credit markets and the unstable nature of monetary policy implementation. Therefore, maintaining a positive and sustainable credit–employment relationship requires efficient functioning of financial markets, predictability in interest rate policies, and the allocation of credit flows toward productive sectors.

In conclusion, this study reveals the determining role of exports and credit volume in employment and emphasizes that trade and financial policies in Turkey should be implemented in a coordinated manner to ensure sustainable employment growth. Consistent with the general trend in the literature, the findings indicate that both trade and financial deepening have structurally positive effects on the labor market. Future research could make significant contributions to the literature by examining employment dynamics at the micro level, taking into account sectoral differentiation and regional heterogeneity.

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