

The Analysis of the Relationship Between Exports, Economic Growth, and Types of Loans in Türkiye (2007-2024)¹

Türkiye’de Türlerine Göre Krediler ile İhracat ve Büyüme Arasındaki İlişkinin Analizi (2007-2024)

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Abstract

It is well known that exports play a critical role in a country’s economic growth and development process. The sustainability of exports, however, largely depends on financing conditions, particularly credit availability. In this context, the study seeks to understand and analyze the effects of credit types, macroeconomic variables, and exports on economic growth, as well as provide insights into Türkiye’s economic growth and export strategies by using data from Turkey for the period 2007–2024, including economic growth, exports, manufacturing loans, SME loans, export credits, inflation rate, and the real effective exchange rate. In the first stage, short-term causal relationships among the variables were analyzed using the Granger causality test. In the next stage, long-term relationships were evaluated using the ARDL (Autoregressive Distributed Lag) cointegration method. Export and credit-related variables were log-transformed before being included in the model. The results show a bidirectional causality between SME credits and growth, unidirectional causality from growth to manufacturing credits, from exports to export credits, and from export credits to inflation. ARDL models reveal that exports and the real effective exchange rate have a significant positive relationship with growth, while SME credits negatively affect growth. The study highlights the varying impacts of credit types and macroeconomic variables on exports and growth.

Keywords: Credits, Export, Growth, ARDL method, Granger Causality Relationship

JEL Codes: C32, C51, C58, F17, G21

Özet

Bir ülkenin ekonomik büyüme ve kalkınma sürecinde ihracatın kritik bir rol oynadığı bilinmektedir. İhracatın sürdürülebilirliği ise büyük ölçüde finansman koşullarına, özellikle de kredi olanaklarına bağlıdır. Bu bağlamda, çalışma, 2007–2024 dönemi Türkiye verilerini kullanarak (ekonomik büyüme, ihracat, imalat kredileri, KOBİ kredileri, ihracat kredileri, enflasyon oranı ve reel efektif döviz kuru dâhil) kredi türlerinin, makroekonomik değişkenlerin ve ihracatın ekonomik büyüme üzerindeki etkilerini anlamayı ve analiz etmeyi, ayrıca Türkiye’nin ekonomik büyüme ve ihracat stratejilerine ilişkin bulgular sunmayı amaçlamaktadır. İlk aşamada, değişkenler arasında kısa vadeli nedensellik ilişkileri Granger nedensellik testi ile analiz edilmiştir. Sonraki aşamada ise ARDL (Autoregressive Distributed Lag) eşbütünleşme yöntemi ile uzun vadeli ilişkiler değerlendirilmiştir. İlgili ekonomik verilerden ihracat ve kredi değişkenleri logaritmik forma dönüştürülerek modele dâhil edilmiştir. Sonuçlar, KOBİ kredileri ile ekonomik büyüme arasında karşılıklı nedensellik ilişkisi ve büyümeye yönelik imalat kredileri, ihracata yönelik krediler ve enflasyon arasında tek yönlü nedensellik ilişkileri olduğunu göstermektedir. ARDL modelleri, ihracat ve reel efektif döviz kuru ile ekonomik büyüme arasında anlamlı pozitif bir ilişki olduğunu ortaya koymakta, ancak KOBİ kredilerinin büyüme üzerinde olumsuz etkisi bulunmaktadır. Çalışma, kredi türlerinin ve makroekonomik değişkenlerin ihracat ve büyüme üzerindeki farklı etkilerini vurgulamaktadır.

Anahtar Kelimeler: Krediler, İhracat, büyüme, ARDL yöntemi, Granger Nedensellik İlişkisi

JEL Kodları: C32, C51, C58, F17, G21

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Introduction

Türkiye, as a developing economy, has embraced the critical role of export and foreign trade in its economic growth process. Particularly, with the decisions made on January 24, 1980, the country shifted from an import-substitution growth model to an export-oriented growth policy, further increasing the importance of exports for its economy. During this period, increasing foreign trade and expanding exports were identified as key strategies to achieve sustainable development goals.

Studies on export-led growth have identified three major contributions of exports to economic growth: First, increased demand for export goods leads to the expansion of production volume, which results in higher national income and employment. Second, increased exports allow for more efficient resource use and lower costs through economies of scale. Third, the competitive environment in foreign markets indirectly triggers economic growth by encouraging companies to adopt technological innovations. Additionally, exports strengthen companies' capital structures by generating foreign exchange inflows, providing resources for new investments (Awokuse, 2006; Bülbül and Demiral, 2016: 22).

In this context, various credit policies are implemented in Türkiye to support the financing of exports. For instance, financial institutions such as Eximbank support export activities through export credits, while commercial banks and other financial institutions contribute directly or indirectly to financing exports. Loans for the manufacturing sector and SME (Small and Medium-sized Enterprises) loans increase production and expand export capacity. Given that 99.8% of businesses in Türkiye are SMEs, the impact of these credit types on exports is highly significant. Similarly, the manufacturing sector—responsible for the largest share of economic growth—relies heavily on credit to expand production and competitiveness.

Recent economic developments, including fluctuations in global demand, exchange rate volatility, and rising inflation, have intensified the need to examine the role of credit in supporting exports and growth. Different types of credit—manufacturing loans, SME loans, and export credits—may affect economic growth and export performance in distinct ways, especially under conditions of macroeconomic uncertainty. Understanding these dynamics is crucial for designing effective credit policies that not only foster short-term export expansion but also ensure sustainable long-term economic growth.

The aim of this study is to analyze the relationships between Türkiye's economic growth, exports, manufacturing industry loans, SME loans, export loans, inflation rate, and real effective exchange rate during the period 2007-2024. Both short-term causality relationships and long-term cointegration relationships will be analyzed using the Granger causality test and ARDL (Autoregressive Distributed Lag) cointegration model. By exploring the effects of different types of credit, macroeconomic variables, and exports on economic growth, this study provides evidence-based insights to inform Türkiye's growth and export strategies.

After this brief introduction, the first section will discuss the export-led growth model in Türkiye and the development of exports and credit policies. The second section summarizes selected studies from national and international literature. Section 3 provides information about the methods and dataset used in the study. The results of the methods used are discussed in section four, followed by a conclusion and recommendations section.

1. Export-Based Growth, Exports and Credits in Türkiye

As a result of the liberalization of the economy following the January 24, 1980 decisions, the barriers to exports were removed, and export-oriented industrialization models were adopted. To this end, regulatory incentives were provided to businesses focused on exports (Soylu and Demirci, 2021: 23-25). As seen in Table 1 below, in 1980, exports amounted to \$2.9 million, with the ratio of exports covering imports at 36.8%. Within five years, exports increased to \$7.9 million, and the ratio of exports covering imports rose to 70.2%. Especially after 2018, the increase in exchange rates has created a competitive advantage, which has had a positive impact on exports. In 2021, exports increased by 32.76%, reaching 225.21 billion dollars. As of 2023, exports have risen to 255.7 billion dollars, and the export-to-import coverage ratio has reached 70.7%. The foreign trade deficit is 100.11 billion dollars. This indicates that exports are dependent on the import of intermediate goods. As a result, export revenues are not contributing sufficiently to foreign exchange reserves.

Table 1: Türkiye's Foreign Trade Statistics for the Period 1980-2024 (Thousand \$)

	Export	Change (%)	Balance	Proportion of imports covered by exports (%)
1980	2.910.122	28,7	-4.999.242	36,8
1981	4.702.934	61,6	-4.230.439	52,6
1982	5.745.973	22,2	-3.096.692	65,0
1983	5.727.834	-0,3	-3.507.168	62,0
1984	7.133.604	24,5	-3.623.429	66,3
1985	7.958.010	11,6	-3.385.367	70,2
1986	7.456.726	-6,3	-3.648.046	67,1
1987	10.190.049	36,7	-3.967.757	72,0
1988	11.662.024	14,4	-2.673.374	81,4
1989	11.624.692	-0,3	-4.167.451	73,6
1990	12.959.288	11,5	-9.342.838	58,1
1991	13.593.462	4,9	-7.453.552	64,6
1992	14.714.629	8,2	-8.156.426	64,3
1993	15.345.067	4,3	-14.083.303	52,1
1994	18.105.872	18	-5.164.147	77,8
1995	21.637.041	19,5	-14.071.970	60,6
1996	23.224.465	7,3	-20.402.178	53,2
1997	26.261.072	13,1	-22.297.649	54,1
1998	26.973.952	2,7	-18.947.440	58,7
1999	26.587.225	-1,4	-14.084.047	65,4

2000	27.774.906	4,5	-26.727.914	51,0
2001	31.334.216	12,8	-10.064.867	75,7
2002	36.059.089	15,1	-15.494.708	69,9
2003	47.252.836	31	-22.086.856	68,1
2004	63.167.153	33,7	-34.372.613	64,8
2005	73.476.408	16,3	-43.297.743	62,9
2006	85.534.676	16,4	-54.041.499	61,3
2007	107.271.750	25,4	-62.790.965	63,1
2008	132.027.196	23,1	-69.936.378	65,4
2009	102.142.613	-22,6	-38.785.809	72,5
2010	113.883.219	11,5	-71.661.113	61,4
2011	134.906.869	18,5	-105.934.807	56,0
2012	152.461.737	13	-84.083.404	64,5
2013	151.802.637	-0,4	-99.858.613	61,9
2014	157.610.158	3,8	-84.566.959	66,3
2015	143.838.871	-8,7	-63.395.487	70,7
2016	142.529.584	-0,9	-56.088.651	73,8
2017	156.992.940	10,1	-76.806.711	68,9
2018	177.168.756	12,85	-53 983 726	76,6
2019	180.832.722	2,07	-29 512 481	86,0
2020	169.637.755	-6,19	-49 879 052	77,3
2021	225.214.458	32,76	-46 211 095	83,0
2022	254.169.748	12,86	-109 540 827	69,9
2023	255.777.398	0,63	-105 996 645	70,7
2024	261.855.000	2,38	-100 111 912	70,2

Source: TURKSTAT, Soylu and Demirci (2021).

This study examines the causal relationship between export credits and exports and growth among the mentioned monetary incentives. The graph of the data for the period 2007-2024 is shown below, highlighting the increase in exports. Notably, increases in exports and credits are observed, particularly after the 2007 Global Crisis and the pandemic. This indicates that exports serve as a way out of the crisis and should be supported. Indeed, an increase in export credits has been observed, especially after 2021.

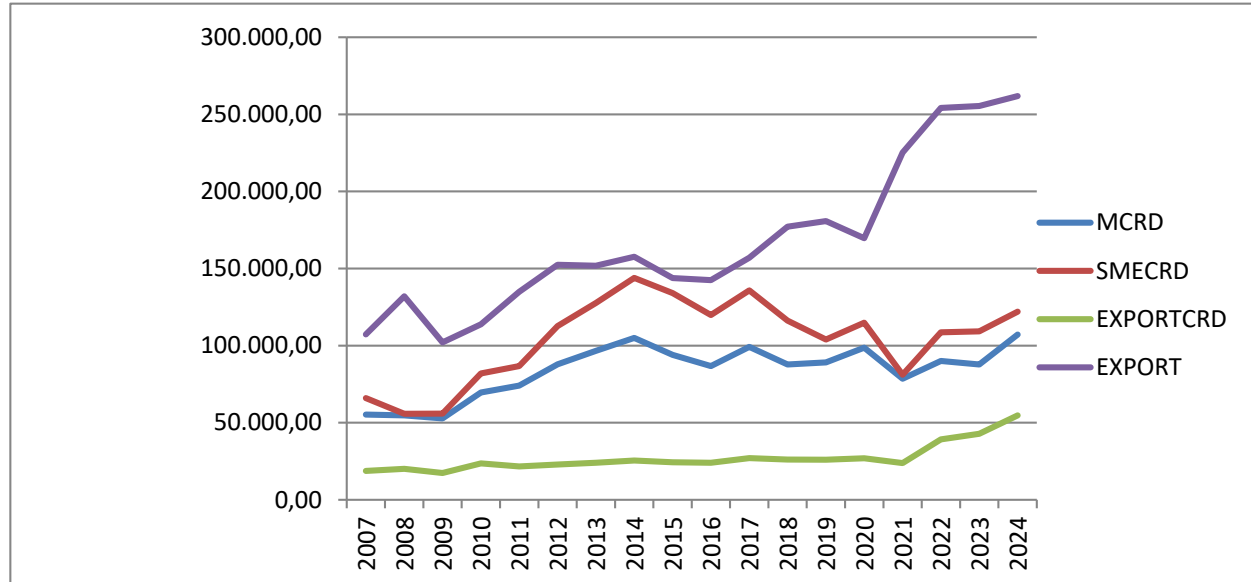


Figure 1: Loans and Export (2007-2023) (Billion \$)

2. Literature Review

In the Export-Led Growth (ELG) hypothesis, it is proposed that the primary determinant of economic growth is the increase in exports. The theoretical foundations of this hypothesis can be summarized under four main mechanisms. The first is related to the Keynesian theory through the trade multiplier. In an open economy with idle capacity and unemployment, the export variable contributes to output expansion, similar to consumption, investment, and government spending by the multiplier. Secondly, providing intermediate goods needed for investments and sustaining production in developing countries depends on their import capacities. The inability to import these complementary goods due to foreign exchange constraints can lead to stagnation in growth. Exports help generate foreign exchange earnings necessary for importing capital goods and by this way, it facilitate economic growth. Thirdly, increases in exports enhance productivity levels and contribute to the development of specialization in the production of export goods, which raises the overall skill level of the export sector. This leads to a reallocation of resources towards more efficient exporting sectors compared to relatively less efficient non-exporting sectors. According to Verdoorn's Law, changes in productivity result in increased output. Fourthly, economies of scale are largely applicable to capital-intensive manufacturing industries and technology has significantly increased the optimal production levels in capital-intensive sectors of manufacturing. In this way, exports allow firms in countries with limited domestic markets to include external demand in their processes, enabling larger scale production in the manufacturing industry. Thus, production can be achieved at lower unit costs, and firms can gain the ability to compete in foreign markets. On the other hand, Vernon (1966) argues in his growth-based export hypothesis that the growth rates of countries have a positive effect on their exports, thus causing a significant expansion in a country's exports due to factors such as an increase in domestic investments, technological advancements, and an increase in the international competitiveness of traded goods (Bilgin and Şahbaz, 2009:180).

The broader relationship between trade liberalization and economic growth has long been

debated in the literature. Classical Ricardian and Heckscher–Ohlin frameworks emphasize efficiency gains from specialization based on comparative advantage, though their implications for long-term growth remain ambiguous. The Solow growth model suggests that trade openness contributes to long-run growth only insofar as it enhances technological progress. The emergence of endogenous growth models in the 1980s shifted the focus toward human capital accumulation, innovation, R&D, and knowledge spillovers. Within this framework, free trade can promote growth by facilitating technological diffusion and international knowledge transfer. However, the growth effects of trade openness may differ across countries depending on factor endowments and sectoral specialization. While economies specializing in unskilled-labor-intensive production may experience sustained growth, those relying heavily on skilled labor may face rising costs that hinder long-term growth. Moreover, intensified international competition may crowd out domestic production, particularly in R&D-intensive sectors, leading to ambiguous growth outcomes (Hanişoğlu, 2023: 434).

Empirically, evidence on the exports–growth relationship remains mixed, although a substantial portion of the literature supports the ELG hypothesis. Balassa (1978), in a seminal study covering several developing economies between 1960 and 1973, demonstrates that export growth has a strong and independent positive effect on economic growth, separate from domestic demand and investment dynamics. This study provides early support for export-oriented development strategies, particularly for developing countries. Similarly, Jung et al. (1985), using causality tests for 37 developing countries, find limited but notable support for export-led growth in countries such as Indonesia, Egypt, Costa Rica, and Ecuador. Cross-country evidence is mixed, however; El-Sakka and Al-Mutairi (2000), analyzing 16 Arab countries, report no general cointegration between exports and GDP and heterogeneous causality results, underscoring the country-specific nature of the exports–growth relationship.

A large share of empirical studies employs single-country time-series analyses, particularly for Türkiye. Numerous studies report evidence consistent with the ELG hypothesis, identifying long-run relationships and unidirectional causality running from exports to economic growth (Bahmani-Oskooee & Domaç, 1995; Demirhan, 2005; Erdoğan, 2006; Yapraklı, 2007; Yavuz, 2012; Tiraşoğlu, 2012). Göçer and Hepkarşı (2013) further quantify this relationship, showing that a 10% increase in exports raises national income by approximately 2.7%, alongside the significant contributions of labor and capital accumulation. More recent studies emphasize nonlinear and regime-dependent dynamics, demonstrating that exports play a particularly important role during expansionary phases of the business cycle (İspir et al., 2009; Saraç, 2013; Dura et al., 2017).

Nevertheless, other studies challenge the validity of the ELG hypothesis for Türkiye. Aktaş (2009), Karagöl and Serel (2005), Şimşek (2003), Takım (2010), and Korkmaz and Aydın (2015) find either no causal relationship from exports to growth or evidence of reverse causality. Similar results are reported for Greece (Panas & Vamvoukas, 2002) and India (Sharma & Panagiotidis, 2003), suggesting that growth may drive export expansion rather than vice versa. These findings underscore the importance of domestic productive capacity, structural factors, and import dynamics, with some studies highlighting the critical role of imports in sustaining growth.

Beyond aggregate exports, the literature also emphasizes sectoral composition, productivity effects, and financial linkages. Herzer et al. (2006) show that manufacturing exports enhance productivity in Chile, whereas primary exports exert a limiting effect. For Türkiye, several studies find that exports positively affect industrial production, supporting the supply-side channel of export-led growth (Halicioğlu, 2007; Bilgin & Şahbaz, 2009; Özcan & Özçelebi, 2013). From a financial perspective, Bülbül and Demiral (2016) demonstrate bidirectional causality between exports and growth, as well as unidirectional causality from exports to Eximbank loans, suggesting that export performance stimulates trade finance, though credit alone may not ensure sustained export growth.

On the other hand, Sezal (2023) examines the relationship between bank credit and the current account deficit in Türkiye and finds bidirectional causality between credit volume and external imbalances using ADF, PP, Zivot–Andrews unit root tests and the Toda–Yamamoto approach. The results suggest that credit expansion can widen the current account deficit, while external imbalances may also feed back into credit dynamics, underscoring the importance of assessing credit policies in terms of both growth and external sustainability.

The relationship between credit and growth has also received extensive attention in the literature (Ceylan and Durkaya, 2010; Apaydın, 2018; Koç, 2015; Korkmaz, 2015; Çonkar et al., 2018; Sezal, 2022; Sarı, 2023a; Sarı, 2023b; Karaöz and Aksu, 2024). It can even be said that the majority of these studies focus on the relationship between financial development and growth, providing positive evidence in this direction (Khan et al., 2005; Beck and Levine, 2004). Some other studies on credit and growth suggest that "credit triggers economic growth," while others argue that "economic growth increases credit" or that "economic growth accelerates financial development" (Sarı, 2023a: 23).

Kaya et al. (2013) show that domestic private sector credit significantly influences economic growth and real sector indicators in Türkiye. Haykır and Aydın (2019) find that manufacturing credits Granger-cause exports, with long-lasting effects, implying that credit support to the manufacturing sector enhances export performance. Similarly, Şahin and Baş (2018) conclude that syndication loans positively affect foreign trade by financing both imports and exports. Taşseven and Yılmaz (2021) identify long-run relationships among economic growth, credit growth, and export growth, as well as bidirectional causality between exports and growth. Studies focusing on export finance emphasize the positive role of Eximbank credits in supporting export development (Soylu & Demirci, 2021; Hanişoğlu, 2023).

Overall, the literature provides no consensus on a universal export-led growth mechanism. While many studies support a positive and causal relationship from exports to growth, others emphasize reverse causality, bidirectional feedback, or the dominant role of imports and financial development. These mixed findings suggest that the growth effects of exports are contingent on country-specific conditions, export composition, and the structure of the financial system.

Against this background, this study comprehensively examines the short- and long-term relationships between exports, different types of credit, and macroeconomic indicators in the

context of the Turkish economy. Unlike previous studies ,specifically, it analyzes the effects of different types of credit (manufacturing, SME, and export credits) on economic growth and exports, with a particular focus on differentiating and evaluating these impacts. By addressing both short-term and long-term relationships, the study separates temporary and permanent effects between the variables, thus providing a more comprehensive assessment. The long-term dataset (2007–2024) is crucial for analyzing the impact of recent economic fluctuations and structural changes. In this regard, the study is expected to contribute to the literature on the effects of credit distribution policies on growth and exports in developing countries, using Türkiye as a case study.

3. Model and Data

In this study, the Granger causality test was used to investigate the short-term causality relationships between the variables, and the ARDL method was employed to examine the long-term cointegration relationships. As well-known, other cointegration tests require the variables to be integrated of the same order, whereas the Auto-Regressive Distributed Lag (ARDL) model, developed by Pesaran et al. (2001), provides robust results even when the time series are not integrated of the same order, that is, when they are $I(0)$ or $I(1)$. This approach can also be applied to small sample estimation methods with the critical values created by Narayan (2005) and allows for long-term analysis even when the variables have different levels of stationarity, such as $I(0)$ and $I(1)$, or a combination of both (Pesaran and Shin, 1998; Pesaran et al., 2001).

The ARDL method is based on the standard Ordinary Least Squares (OLS) regression method, where both the dependent variable and the lagged values of the independent variables are used as explanatory variables. Accordingly, the $ARDL(p, q_1, q_2, \dots, q_k)$ model, where y_t is the dependent variable and $x_{j,t}$ $j=1,2,\dots,k$ are the independent variables, is represented as follows:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^p \varphi_i y_{t-i} + \sum_{j=1}^k \sum_{l_j=0}^{q_j} \beta_{jl_j} x_{j,t-l_j} + \varepsilon_t \quad (1)$$

Here, α_0 represents the constant term, α_1 is the linear trend coefficient, φ_i are the coefficients of the lagged values of the dependent variable ($i=1,\dots,p$), β_{jl_j} are the coefficients of the lagged values of the independent variables k , and ε_t is the error term. In the ARDL model, the number of lags is determined using criteria such as the Akaike Information Criterion (AIC), Schwarz Criterion (SC), Hannan-Quinn (HQ) criterion, or the adjusted R^2 value (Mert and Çağlar, 2019: 280).

In the ARDL bounds testing approach, first, it is tested whether there is a long-term relationship among the variables included in the analysis. If a cointegration relationship exists, both long-term and short-term relationships are analyzed.

In this study, the fixed and trendless error correction model (Case 3—unrestricted constant and no trend) was used out of the five error correction models:

$$\Delta y_t = a_0 + b_0 y_{t-1} + \sum_{j=1}^k b_j x_{j,t-1} + \sum_{i=1}^{p-1} c_{0,i} \Delta y_{t-i} + \sum_{j=1}^k \sum_{l_j=1}^{q_j-1} c_{j,l_j} \Delta x_{j,t-l_j} + \sum_{j=1}^k d_j \Delta x_{j,t} + \varepsilon_t \quad (2)$$

The error correction equation obtained from this model is as follows:

$$EC_t = y_t - \sum_{j=1}^k \frac{b_j}{b_0} x_{j,t} \quad (3)$$

To investigate the existence of a cointegration relationship between the variables, the null hypothesis $H_0: b_0 = b_j = 0, \forall j$ (no cointegration) is tested using the F-test. If the calculated F value exceeds the upper bound critical value of I(1), there exists a cointegration relationship among the variables. However, for unrestricted models (Case 1, 3, and 5), the calculated t-bound test values are also examined. The t-bound test is used to test the statistical significance of the error correction coefficient (Mert and Çağlar, 2019: 280-283).

In this study, quarterly data from the first quarter of 2007 to the second quarter of 2024 were used to analyze the effects of different credit types on economic growth and export, as well as the role of macroeconomic stability variables (inflation and real exchange rate) in mediating these relationships. This period is comprehensive and representative, covering important economic fluctuations such as the global financial crisis (2008), the European debt crisis, the 2018 currency shock, the COVID-19 pandemic, and the high inflation period after 2021.

The variables used in the study were selected based on both theoretical and empirical literature. The growth rate is a frequently used key macroeconomic indicator in the literature. Real GDP measures economic growth by reflecting the production level adjusted for price effects. It is influenced by consumption, investment, public expenditures, and net exports. Since changes in the volume of credits, which finance production and consumption, directly and indirectly affect growth, this variable was used as the dependent variable in the study.

Export is a demand-side component of growth in developing countries. In open economies like Türkiye, the production structure and access to finance determine the sustainability of exports. Therefore, export is considered both a dependent and independent variable.

Export credits increase competitiveness by meeting firms' financing needs in export processes. The effects of these credits on export and growth are analyzed in the study. Manufacturing industry is a key sector in Türkiye's exports, and credits in this sector support production and exports. Therefore, manufacturing industry credits were included in the model to examine sectoral effects. SMEs constitute a significant portion of the Turkish economy, and they stand out due to their increasing export capacities. Since their access to finance influences both growth and export, SME credits are also analyzed.

Inflation is a key variable that affects economic decision-making processes and financial stability. High inflation can raise credit costs and create fluctuations in export costs, negatively affecting growth. The real effective exchange rate is an important indicator that reflects Türkiye's competitiveness with its trading partners. Real currency appreciation makes exports more expensive, while depreciation can make exporting firms more competitive in international markets. Therefore, exchange rate movements are considered in the model due to their indirect effects on both export and growth.

These seven selected variables allow for a comprehensive analysis of the functioning of credit channels and the interaction between these processes and the macroeconomic environment in the context of Türkiye's growth-export relationship. The differentiation of credit types facilitates a deeper examination of the link between the nature of financing and economic performance. Moreover, the inclusion of macro indicators like inflation and real exchange rates contributes to a more accurate reflection of the model's economic reality.

Growth rate, inflation, and export data were obtained from the Turkish Presidency of Strategy and Budget website, while credit data were sourced from the Banking Regulation and Supervision Agency (BRSA) website. Real effective exchange rate data were obtained from the Central Bank of Türkiye (CBRT) website. The logarithms of credit and export data were included

in the model. Credit data were stock variables, and export data were flow variables obtained by summing quarterly data. The Eviews10 software was used for the models and tests.

The variables used in the models and their sources are summarized in the table below.

Table 2: Variables of Models and Sources

Variables	Explanation	Resource
GR	Growth Rate	Presidency of the Republic of Türkiye, Directorate of Strategy and Budget
LOGX	Export	Presidency of the Republic of Türkiye, Directorate of Strategy and Budget
LOGXCRD	Export Credits	BRSA
LOGMCRD	Manufacturing Credits	BRSA
LOGSMECRD	SME Credits	BRSA
INFR	Consumer Price Index Change Compared to December of the Previous Year (2003=100)	Presidency of the Republic of Türkiye, Directorate of Strategy and Budget
RER	Real Effective Exchange Rate	CBRT

4. Empirical Findings

As is well known, for econometric relationships to be meaningful between variables in economic time series and to obtain efficient and consistent forecasts, the series must be stationary. In the ARDL model, the stationarity condition (i.e., no unit root) is not required, but still, a stationarity test is applied. This is because the model cannot be applied if the variables are stationary only at their second differences. In the Granger causality test, a condition of stationarity at level is required. Therefore, unit root tests must be performed beforehand. For this purpose, the Augmented Dickey-Fuller Test (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root test (Kwiatkowski et al., 1992) were applied to the series.

As seen in the summary results table below (Table 3), the growth rate (GR) variable is stationary at level according to both tests, while other variables are not stationary at level. Manufacturing credits (LOGMCRD), however, is stationary at level according to the ADF test but not according to the KPSS test. According to the first-difference unit root test results provided in Table 4, all other variables become stationary according to both tests.

Table 3: Unit Root Test Results for Level Values of the Series

Serial	ADF (H0: The series has a unit root)			KPSS (H0: The series has not a unit root)		
	Test Stast.	05 critical value (notrend)	Result	Test Stast.	05 critical value (notrend)	Result
GR	-4,29	-2,90	stationary	0,06	0,46	stationary
LOGX	-0,94	-2,90	N.stationary	1,01	0,46	N.stationary
LOGXCRD	-0,26	-2,90	N.stationary	0,94	0,46	N.stationary
LOGMCRD	-3,12	-2,90	N.stationary	0,73	0,46	N.stationary
LOGSMECRD	-2,56	-2,90	N.stationary	0,59	0,46	N.stationary
INFR	-0,72	-2,90	N.stationary	0,71	0,46	N.stationary
RER	-1,07	-2,90	N.stationary	1,05	0,46	N.stationary

Table 4: Unit Root Test Results for the First Differences of the Series

Serial	ADF (H0: The series has a unit root)			KPSS (H0: The series has not a unit root)		
	Test Stast.	.05 critical value (notrend)	Result	Test Stast.	.05 critical value (notrend)	Result
LOGX	-10	-2,90	stationary	0,12	0,46	stationary
LOGXCRD	-7,24	-2,90	stationary	0,13	0,46	stationary
LOGMCRD	-7,11	-2,90	stationary	0,28	0,46	stationary
LOGSMECRD	-7,87	-2,90	stationary	0,28	0,46	stationary
INFR	-4,86	-2,90	stationary	0,22	0,46	stationary
RER	-9,43	-2,90	stationary	0,08	0,46	stationary

According to the unit root test results, the ARDL model can be established. However, in the Granger causality test, all variables must be stationary. Therefore, non-stationary variables at the level were differenced and subjected to the Granger causality test. However, as seen above, the manufacturing credits (LOGMCRD) variable is stationary at the level according to the ADF test, but not according to the KPSS test. The Granger causality test was conducted based on the ADF unit root test results. In this direction, the difference of LOGMCRD was not taken, and it was included in the Granger causality test.

4.1. Granger Causality Test Results

According to the Granger causality test results presented in Table 5, no causality relationship was observed from export to growth or from growth to export in the short term. This result is consistent with some studies in the literature (Takım, 2010; Korkmaz and Aydın, 2015).

A bidirectional relationship was detected between SME loans and growth in the short term. This result shows that there is a reciprocal causality relationship between SME loans and the growth rate in the short term. In other words, when SME loans increase, they have a positive effect on growth. When financial facilities are provided, SMEs can contribute to growth by producing more. Likewise, when the growth rate increases, the demand for SME loans also increases. This is because economic growth may increase demand for the goods produced by SMEs, which in turn may trigger more credit usage.

In the short term, a unidirectional causality relationship was found from growth to manufacturing credits. Economic growth leads to an increase in manufacturing credits, while manufacturing credits do not seem to have a direct impact on growth in the short term. This result may suggest that manufacturing credits are generally provided in response to current economic conditions in the short term, and are more related to immediate sectoral demands rather than growth.

A unidirectional causality relationship was observed from exports to export credits. Export credits are a financing tool that allows exporters to reach foreign markets more easily. Economic growth and an increase in exports can lead to more credit usage. However, it is not expected that export credits directly increase export volume, as exports are generally influenced by other factors such as production capacity, competitiveness, and foreign market demands.

A unidirectional relationship was also detected from export credits to inflation rate. An increase in export credits can create a rise in production and demand, which can lead to higher prices. Specifically, increasing foreign trade and foreign exchange revenues may stimulate domestic demand, which can, in turn, drive prices up. However, inflation's direct effect on export credits is a more complex process and simply having high inflation rates may not necessarily cause an increase in export credits.

Table 5: Granger Causality Test Results

	Observation Number	F-Statistic	Prob.	Relation
DLOGX→GR	69	0.64342	0.5289	Yok
GR→DLOGX	69	0.02459	0.9757	Yok
DLOGXCRD→GR	69	0.34908	0.7067	Yok
GR→DLOGXCRD	69	2.24057	0.1147	Yok
LOGMCRD→GR	70	0.95758	0.3892	Yok
GR →LOGMCR	70	2.43841	0.0952	Var
DLOGSMECRD →GR	69	3.12878	0.0505	Var
GR→ DLOGSMECRD	69	2.93413	0.0604	Var
DINFR→GR	69	0.01211	0.9880	Yok
GR→DINFR	69	0.81368	0.4478	Yok
RER→GR	69	1.25088	0.2932	Yok

GR→RER	69	1.55374	0.2193	Yok
DLOGXCRD → DLOGX	69	0.96701	0.3857	Yok
DLOGX → DLOGXCRD	69	2.93194	0.0605	Var
LOGMCRD → DLOGX	69	1.13162	0.3289	Yok
DLOGX → LOGMCRD	69	2.06598	0.1351	Yok
DLOGSMECRD → DLOGX	69	1.16896	0.3172	Yok
DLOGX → DLOGSMECRD	69	0.65437	0.5232	Yok
DINFR →DLOGX	69	0.19593	0.8226	Yok
DLOGX→ DINFR	69	1.41933	0.2494	Yok
DRER→DLOGX	69	0.31538	0.7306	Yok
DLOGX→DRER	69	0.65272	0.5241	Yok
LOGMCRD→DLOGXCRD	69	0.37881	0.6862	Yok
DLOGXCRD→LOGMCRD	69	0.47807	0.6222	Yok
DLOGSMECRD→ DLOGXCRD	69	0.43885	0.6467	Yok
DLOGXCRD→ DLOGSMECRD	69	0.57109	0.5678	Yok
DINFR→DLOGXCRD	69	0.62660	0.5377	Yok
DLOGXCRD→DINFR	69	3.28905	0.0437	Var
DRER→ DLOGXCRD	69	0.58676	0.5591	Yok
DLOGXCRD→ DRER	69	1.59295	0.2113	Yok
LOGSMECRD → DLOGMCRD	69	0.81735	0.4462	Yok
DLOGMCRD → LOGSMECRD	69	2.34507	0.1040	Yok
DINFR→LOGMCRD	69	0.49729	0.6105	Yok
LOGMCRD→DINFR	69	0.09062	0.9135	Yok
DRER → LOGMCRD	69	0.18056	0.8352	Yok
DLOGMCRD → DRER	69	0.72831	0.4867	Yok
DINFR → LOGSMECRD	69	0.58906	0.5578	Yok
LOGSMECRD → DINFR	69	0.35873	0.7000	Yok
DRER → LOGSMECRD	69	0.75697	0.4732	Yok
LOGSMECRD → DRER	69	1.67583	0.1953	Yok
DRER→ DINFR	69	0.64661	0.5272	Yok

DINFR→DRER	69	0.61435	0.5441	Yok
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4.2. ARDL Models Results

After conducting the Granger causality test to investigate the short-term causality relationships, the ARDL model was applied in the second stage to investigate whether there is a long-term cointegration relationship between the variables.

In this context, the growth rate (GR) variable was taken as the dependent variable, while export (LOGX), export credits (LOGXCRD), manufacturing credits (LOGMCRD), SME credits (LOGSMECRD), real effective exchange rate (RER), and inflation rate (INFR) were considered as independent variables. An unrestricted constant (C) and no trend error correction model was used to derive the ARDL(4, 1, 2, 1, 3, 4, 0) model. Among these independent variables, export and export credits were included as explanatory variables, while the other independent variables were included as control variables in the model. Additionally, a dummy variable (DUMMY) was added to the model for the Global Economic Crisis and the COVID-19 Pandemic Crisis.

The optimal lag length of the model was determined to be 4, as lags 1, 2, 3, and 5 did not pass the diagnostic tests. Furthermore, there is no autocorrelation issue with the selected model for this lag length. The lag length and model were determined according to the Schwarz criterion. The ARDL(4, 1, 2, 1, 3, 4, 0) model has an R^2 of 0.85, an F-statistic value of 11.78, and a p-value of 0.0. Most of the coefficients in the model, including the Crisis Dummy, are statistically significant. The negative value of the Crisis Dummy variable suggests that the economic conditions during the crisis negatively affected the economy.

Table 6: ARDL(4, 1, 2, 1, 3, 4, 0) Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GR(-1)	0.340240	0.091612	3.713949	0.0006
GR(-2)	0.145309	0.097808	1.485664	0.1443
GR(-3)	0.189741	0.105587	-1.796999	0.0790
GR(-4)	0.351880	0.083888	-4.194635	0.0001
LOGX	34.39901	4.515909	7.617295	0.0000
LOGX(-1)	18.62257	4.524556	-4.115888	0.0002
LOGXCRD	34.25785	8.795079	3.895116	0.0003
LOGXCRD(-1)	65.60750	11.00046	-5.964072	0.0000
LOGXCRD(-2)	25.15036	7.547765	3.332160	0.0017
LOGMCRD	24.92893	14.56344	-1.711748	0.0938
LOGMCRD(-1)	47.44079	14.92199	3.179253	0.0027
LOGSMECRD	14.98388	10.12094	1.480482	0.1457
LOGSMECRD(-1)	16.24740	12.70703	-1.278615	0.2076
LOGSMECRD(-2)	0.454996	9.588685	0.047451	0.9624

LOGSMECRD(-3)	14.44661	5.929685	-2.436320	0.0189
RER	0.286323	0.091056	-3.144487	0.0029
RER(-1)	0.251863	0.121586	2.071475	0.0441
RER(-2)	0.160607	0.119999	-1.338404	0.1875
RER(-3)	0.136719	0.094598	1.445263	0.1553
RER(-4)	0.177499	0.066941	2.651559	0.0110
INFR	0.012720	0.042150	-0.301785	0.7642
DUMMY	3.307503	1.255948	-2.633471	0.0115
C	189.6946	58.68956	-3.232170	0.0023
R-squared	0.852109			
Adjusted R-squared	0.779806			
F-statistic	11.78535			
P	0.000000			

According to the diagnostic tests summarized below, the model does not exhibit issues such as serial correlation, heteroscedasticity, specification errors, or normality problems.

Table 7: Diagnostic Test Results for Model 1

Purpose	Test	F	P
Serial correlation	Breush-Godfrey	1,15	0,32
Model spesification	Ramsey RESET	0,27	0,60
Normality	Jarque-Bera =1,37		0,50
Heterosedasticity	Breush-Pagan-Godfrey	0,61	0,88

Additionally, based on the results of the CUSUM test and CUSUM-squared test, the models are stable. As seen in the graphs below, the parameter estimates are within the dashed lines representing the 95% confidence interval.

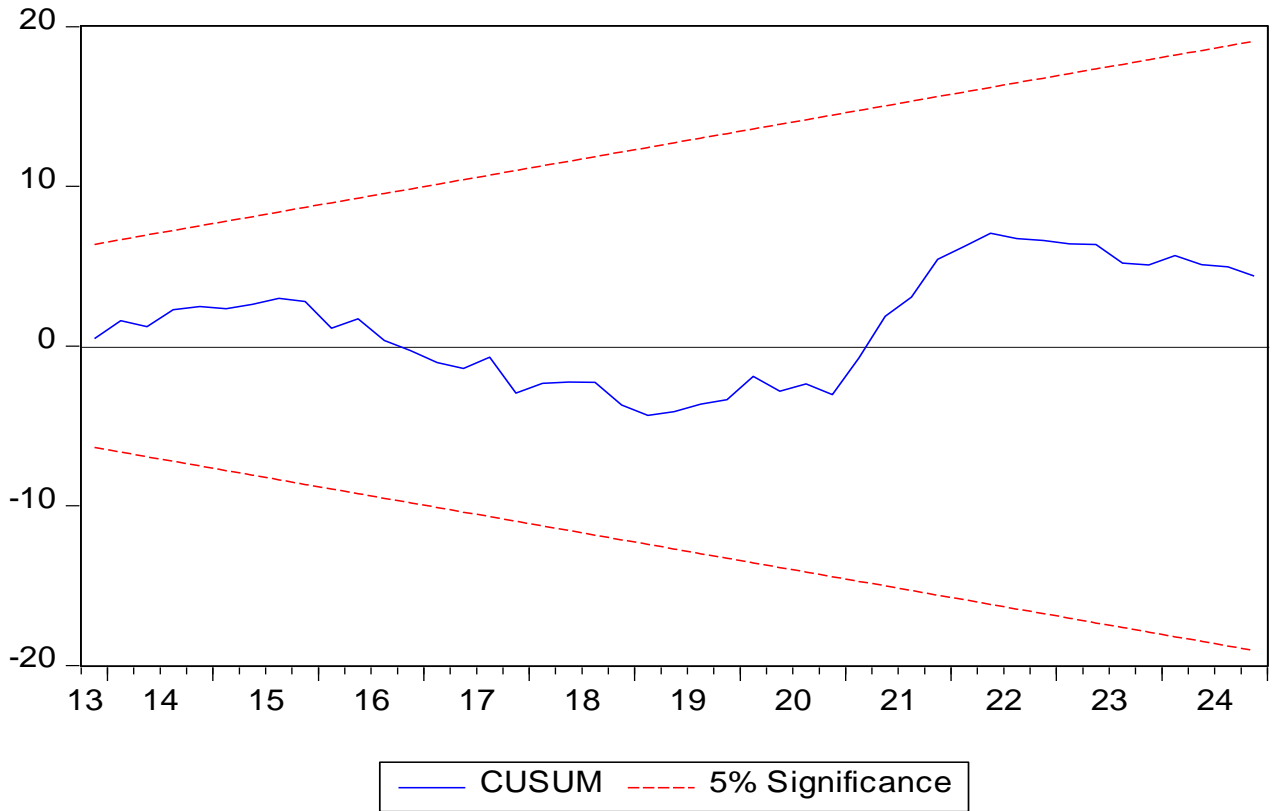


Figure 2: Model 1 CUSUM graph

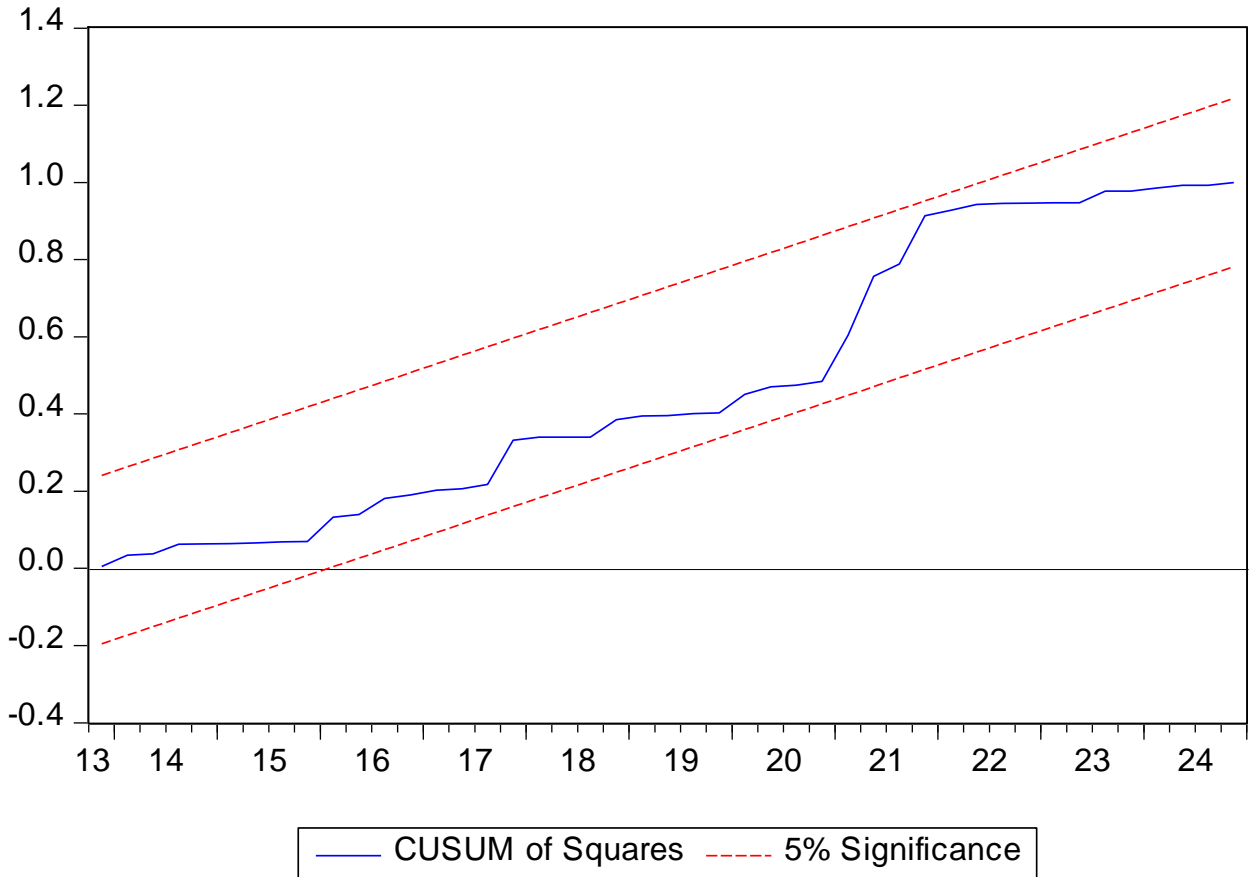


Figure 3: Model 1 CUSUM- squared graph

After the ARDL model selected with the unrestricted constant and no trend error correction model passed the diagnostic tests, the F-bound test and t-bound test were conducted on this error correction model to investigate whether there is a cointegration relationship between the variables. This is the most crucial stage of the ARDL model. The results are shown in Table 8 below.

Table 8: Model1's Bound Test Results

		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	11.57518	10%	2.12	3.23
k	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43
Actual Sample Size	68		Finite Sample: n=70	
		10%	2.233	3.407
		5%	2.629	3.906
		1%	3.436	5.044
			Finite Sample: n=65	
		10%	2.256	3.43
		5%	2.647	3.921
		1%	3.501	5.051
t-statistic	-8.445481	10%	-2.57	-4.04
		5%	-2.86	-4.38
		2.5%	-3.13	-4.66
		1%	-3.43	-4.99

As can be seen from the table, the F-bound test result is calculated as $F = 11.57$. Since this value is greater than all the upper critical values at all significance levels [$F > I(1)$], the hypothesis of "no cointegration" is rejected, and it is concluded that the variables are cointegrated. However, in order to test whether this cointegration is a valid one, a t-bound test should also be performed. These results are presented below the table. According to the results, $t = -8.44$, and since this value is greater in absolute terms than the upper critical value for all significance levels, this cointegration relationship is valid. From this point, we can move on to interpreting the long-term equilibrium relationship shown in Table 9 below.

Table 9: Long-Term Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX	14.93881	3.910729	3.819955	0.0004
LOGXCRD	-5.870147	3.376738	-1.738408	0.0890
LOGMCRD	21.31661	9.324270	2.286143	0.0270
LOGSMECRD	-14.44519	6.413728	-2.252230	0.0292
RER	0.112825	0.040593	2.779415	0.0079
INFR	-0.012045	0.040079	-0.300526	0.7652
EC = GR - (14.9388*LOGX - 5.8701*LOGXCRD + 21.3166*LOGMCRD				
-14.4452*LOGSMECRD + 0.1128*RER - 0.0120*INFR)				

According to this, a statistically significant positive relationship at the 1% level has been found between the growth rate and exports in the long term. As expected, an increase in exports leads to an increase in the growth rate. The export-led growth theory (Balassa, 1978) is working. This result is consistent with many studies in the literature (Begum and Shamsuddin, 1998; Erdoğan, 2006; Tıraşoğlu, 2012; Özcan and Özçelebi, 2013; Saraç, 2013; Dura et al., 2017).

The relationship between growth and export credit is also statistically significant at the 10% level, but it is negative. That is, an increase in export credits has a negative effect on economic growth. This result shows whether export credits are used effectively or not, and it may carry a different meaning compared to the effects observed in the short term. This negative relationship suggests that, in the long term, the inefficient use of export credits or difficulties in accessing foreign markets may have hindered growth. Additionally, exchange rate volatility and structural issues related to foreign trade may have limited the effectiveness of these credits.

The relationship between manufacturing credits and growth is statistically significant at the 5% level and positive, as expected. Credits provided to the manufacturing sector increase production and positively contribute to growth. This result is consistent with studies that conclude a positive relationship between manufacturing sector credits and growth (Apaydın, 2018; Sarı, 2023a), as well as studies that find that credits support economic growth (Koç, 2015; Kandemir et al., 2018; Çonkar et al., 2018).

On the other hand, the contribution of SME credits to growth is negative, and this result is statistically significant at the 5% level. This indicates that the credits given to SMEs are not being spent on productive investments. This finding contrasts with some studies in the literature (Tutar and Ünlüleblebici; Sarı, 2023b). The relationship between exchange rates and growth is statistically significant at the 1% level and positive. Although a high real effective exchange rate is macroeconomically negative, it may have led to an increase in exports by making export goods cheaper, which in turn increased the growth rate. The relationship between inflation rate and growth is negative as expected, but it is not statistically significant.

According to the short-term regression estimation results, shown in the table below, based on the Error Correction Model (ECM), the CointEq(-1) coefficient is calculated as -1.05. The error correction model is a tool that helps to eliminate imbalances between the short and long term and test the causality between cointegrated variables. The error correction coefficient must be negative

and statistically significant. The CointEq(-1) coefficient of -1.05 indicates that imbalances in the short term will be corrected quickly. The magnitude of the coefficient suggests that the model returns to equilibrium very quickly. In this case, deviations in the short term are expected to be corrected within approximately 3 months.

Table 10: Model 1 Short-Term Results and Boundary Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-189.6946	19.78144	-9.589526	0.0000
D(GR(-1))	0.396311	0.090332	4.387284	0.0001
D(GR(-2))	0.541621	0.088841	6.096516	0.0000
D(GR(-3))	0.351880	0.075672	4.650082	0.0000
D(LOGX)	34.39901	3.331344	10.32587	0.0000
D(LOGXCRD)	34.25785	7.396235	4.631796	0.0000
D(LOGXCRD(-1))	-25.15036	5.998019	-4.193111	0.0001
D(LOGMCRD)	-24.92893	12.14766	-2.052159	0.0460
D(LOGSMECRD)	14.98388	8.444995	1.774291	0.0828
D(LOGSMECRD(-1))	13.99162	5.570380	2.511788	0.0157
D(LOGSMECRD(-2))	14.44661	5.163905	2.797614	0.0075
D(RER)	-0.286323	0.079877	-3.584565	0.0008
D(RER(-1))	-0.153611	0.083163	-1.847114	0.0713
D(RER(-2))	-0.314218	0.082916	-3.789600	0.0004
D(RER(-3))	-0.177499	0.059414	-2.987491	0.0045
DUMMY	-3.307503	0.802351	-4.122266	0.0002
CointEq(-1)*	-1.056071	0.110205	-9.582783	0.0000
R-squared	0.822835			
Adjusted R-squared	0.767254			
F-statistic	14.80418			
Prob(F-statistic)	0.000000			
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	11.57518	10%	2.12	3.23
K	6	5%	2.45	3.61

		2.5%	2.75	3.99
		1%	3.15	4.43
t-statistic	9.582783	10%	-2.57	-4.04
		5%	-2.86	-4.38
		2.5%	-3.13	-4.66
		1%	-3.43	-4.99

In the second model, the export variable (LOGX) is the dependent variable, while the growth rate (GR), export credits (LOGXCRD), manufacturing credits (LOGMCRD), SME credits (LOGSMECRD), real effective exchange rate (RER), and inflation rate (INFR) are the independent variables. The ARDL(1, 2, 0, 0, 4, 1, 0) model is obtained through an unrestricted constant (C) and trendless error correction model. Among these independent variables, export credits are included as explanatory variables, while the other independent variables are included as control variables. Since the 1, 2, 3, and 5 lag lengths did not pass diagnostic tests, the optimal lag length of this model was determined to be 4 according to the Schwarz criterion. Additionally, the selected model does not have an autocorrelation problem at this lag length. The ARDL(1, 2, 0, 0, 4, 1, 0) model has an R^2 of 0.96, an F-statistic of 98.79, and a p-value of 0.0. The majority of the model's coefficients are statistically significant. Since the crisis dummy was not statistically significant in this model, it was excluded.

Table 11: Model 2 Long-Term Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX(-1)	0.555149	0.082634	6.718130	0.0000
LOGXCRD	0.240238	0.135319	-1.775347	0.0816
LOGXCRD(-1)	0.578246	0.206606	2.798783	0.0071
LOGXCRD(-2)	0.278787	0.143857	-1.937950	0.0580
LOGMCRD	0.186646	0.191973	0.972254	0.3353
LOGSMECRD	0.109327	0.120716	-0.905649	0.3692
GR	0.013336	0.001857	7.181159	0.0000
GR(-1)	0.005414	0.002116	-2.558822	0.0134
GR(-2)	0.000590	0.002083	-0.283001	0.7783
GR(-3)	0.000385	0.002117	0.181979	0.8563
GR(-4)	0.006059	0.001813	3.342272	0.0015
RER	0.003176	0.001579	2.011026	0.0494
RER(-1)	0.006290	0.001697	-3.705644	0.0005
INFR	0.002003	0.000887	2.257207	0.0281
C	3.464006	1.030761	3.360630	0.0014

R-squared	0.963094		
Adjusted R-squared	0.953345		
F-statistic	98.79117		
Prob(F-statistic)	0.000000		

As seen below, the model does not have issues with serial correlation, heterosedasticity, specification errors or normality.

Table 12: Model 2 Diagnostic Test Results

Purpose	Test	F	P
Serial Correlation	Breush-Godfrey	0,83	0,43
Model spesification	Ramsey RESET	0,82	0,36
Normality	Jarque-Bera =1,07		0,58
Heterosedacticity	Breush-Pagan-Godfrey	1,41	0,18

Additionally, the results of the CUSUM test and CUSUM-square test, shown in the graphs below, indicate that the estimated parameters in the model are stable and there are no structural breaks.

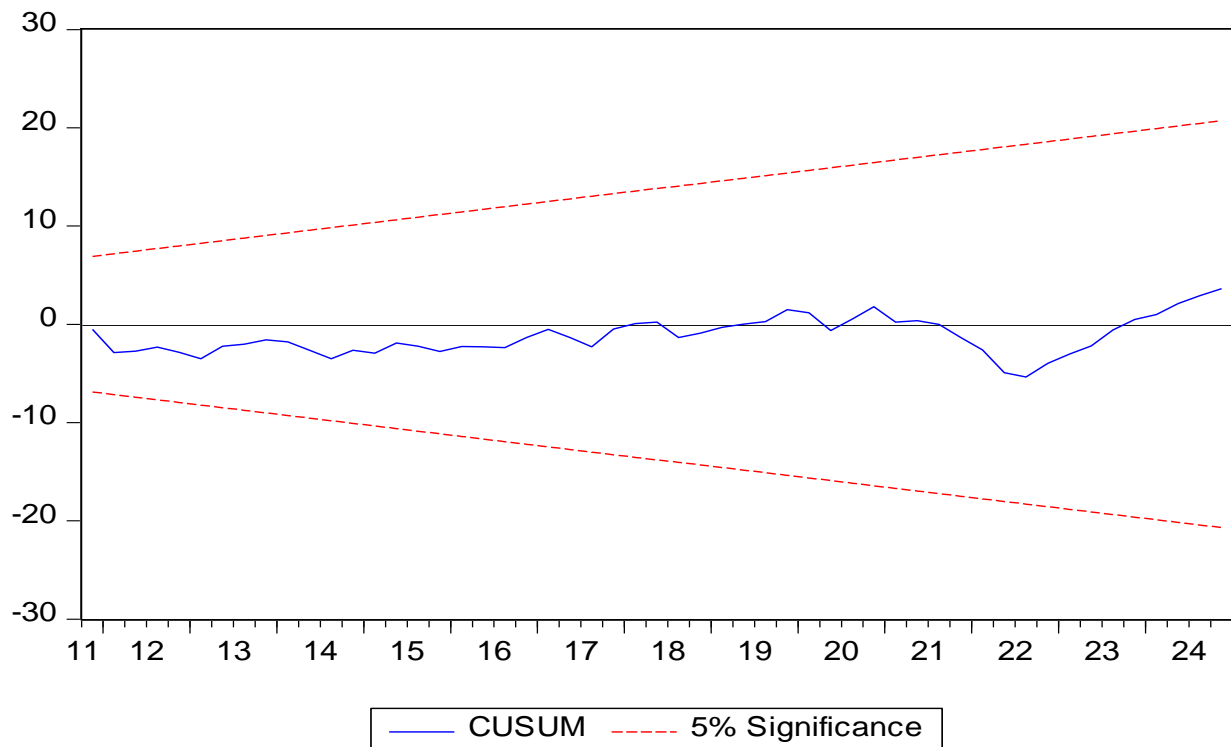


Figure 5: Model 2 CUSUM Graph

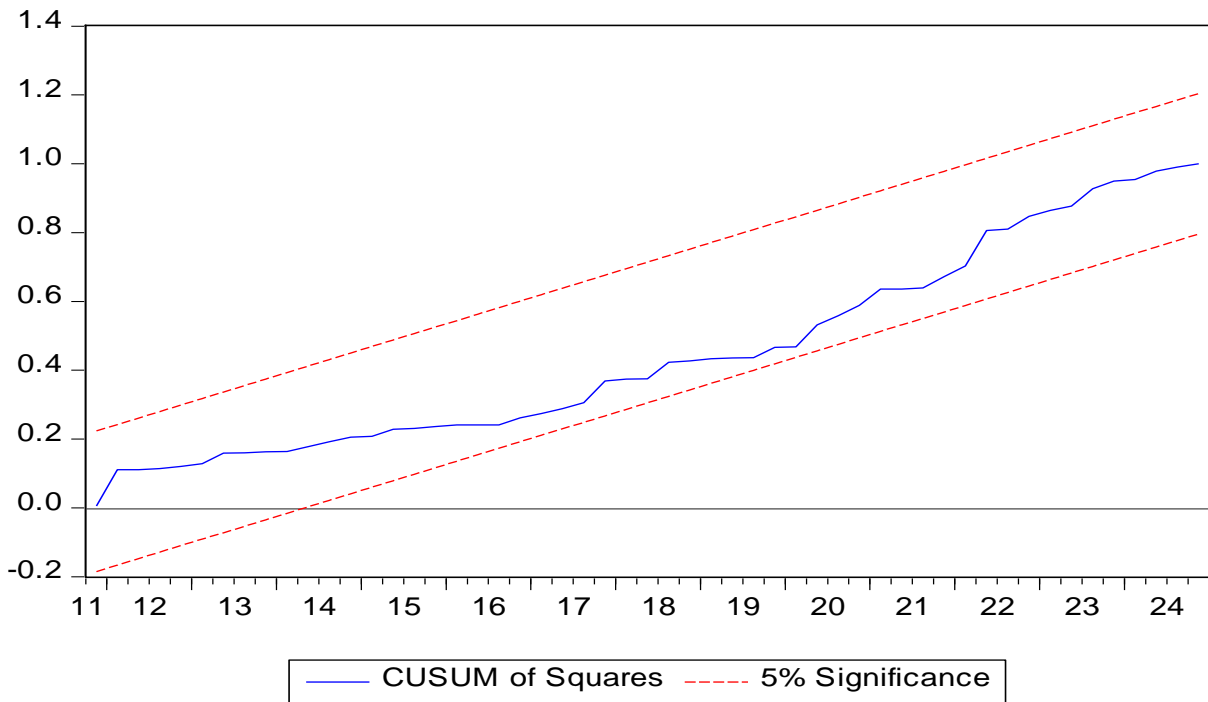


Figure 6: Model 2 CUSUM Squared Graph

The results of the F-bound test and t-bound test for Model 2 are presented in Table 13 below.

Table 13: Model 2’s Bound Test Results

		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.829971	10%	2.12	3.23
k	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43
Actual Sample Size	68		Finite Sample: n=70	
		10%	2.233	3.407
		5%	2.629	3.906
		1%	3.436	5.044
			Finite Sample: n=65	
		10%	2.256	3.43
		5%	2.647	3.921

		1%	3.501	5.051
t-statistic	5.383364	10%ç	-2.57	-4.04
		5%	-2.86	-4.38
		2.5%	-3.13	-4.66
		1%	-3.43	-4.99

As seen in the table, the F-bound test result shows that $F = 7.82$ was calculated. Since this value is greater than the upper critical values for all significance levels ($F > I(1)$) according to Narayan's (2005) critical values for small samples, the null hypothesis of "no cointegration" is rejected, and it is concluded that the variables are cointegrated. According to the t-bound test results shown below the table, $t = -5.38$, and this value is greater than the upper critical value for all significance levels in absolute terms, indicating that this cointegration relationship is valid. Below, Table 14 shows the long-term equilibrium relationship prediction results.

Table 14: Long-Term Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGXCRD	0.133126	0.149 841	0.88844 6	0.3783
LOGMCRD	0.419570	0.419 924	0.99915 7	0.3223
LOGSMECRD	-0.245760	0.265 359	- 0.926141	0.3586
GR	0.030971	0.007 057	4.38887 8	0.0001
RER	-0.007002	0.001 476	- 4.742364	0.0000
INFR	0.004502	0.002 014	2.23571 7	0.0296
$EC = LOGX - (0.1331*LOGXCRD + 0.4196*LOGMCRD - 0.2458*LOGSMECRD$				
$+ 0.0310*GR - 0.0070*RER + 0.0045*INFR)$				

In the ARDL model where export is the dependent variable, no statistically significant relationship could be found between exports and export credits, export-manufacturing credits, and export-SME credits in the long-term prediction results. In other words, these credits do not increase exports. This situation shows that the increase in exports is related not only to financing but also to structural factors such as production capacity and competitive strength. This result is consistent with Hanişoğlu's (2023) finding, which determined that there is no significant causality relationship between commercial bank export credits and exports using the Toda Yamamoto method. However, the same study found a significant relationship between Eximbank credits and exports. While some studies in Türkiye (Soylu and Demirci, 2021) have concluded that there is a positive relationship between Eximbank credits and exports, there are also studies that conclude there is no long-term relationship between Eximbank credits and exports (Bülbul and Demiral, 2016).

A statistically significant positive relationship at the 1% level was found between exports and growth. That is, economic growth increases exports, and foreign trade contributes to the sustainability of growth. This result is consistent with the finding from Model 1 above that exports contribute positively to economic growth in the long term. Additionally, it aligns with some studies in the literature that have concluded that exports and growth are cointegrated in the long term, and that there is a causality relationship from growth to exports (Karagöl and Sertel, 2005; Aktaş, 2009; Panas and Vamvoukas, 2002).

There is a statistically significant positive relationship at the 5% level between exports and inflation rate. This means that inflation increases exports. This suggests that inflation can stimulate exports through increased domestic demand and production but can also create inflationary pressures.

The relationship between the real effective exchange rate and exports is negative and statistically significant at the 1% level. That is, an increase in the real effective exchange rate does not increase exports. An increase in the real effective exchange rate makes Turkish goods more expensive in foreign markets, reducing competitiveness. In recent years, Türkiye's exports have become increasingly dependent on imports. A high exchange rate reduces the competitiveness of Turkish products in foreign trade, leading to a decline in exports. Exchange rate stability is critical for the sustainability of exports.

According to the short-term regression prediction results shown below in tabular form, i.e., based on the Error Correction Model (ECM), the CointEq(-1) coefficient was calculated as -0.44. As mentioned above, the error correction model helps to correct the imbalances between the short and long terms and tests the causality between cointegrated variables. The error correction coefficient must be negative and statistically significant. Here, the CointEq(-1) coefficient of -0.44 indicates that short-term deviations in the model will correct themselves slowly and approach equilibrium in the long term. 44% of short-term deviations will be corrected in one period, and it will take approximately 2.27 periods (around 7 months) for all deviations to be eliminated. This suggests that the model has a stable and slow adjustment process.

Table 15: Model 2 Short-Term Results and Boundary Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.464006	0.441912	7.838671	0.0000
D(LOGXCRD)	-0.240238	0.116430	-2.063357	0.0440
D(LOGXCRD(-1))	0.278787	0.114482	2.435199	0.0183
D(GR)	0.013336	0.001506	8.853742	0.0000
D(GR(-1))	-0.005855	0.001754	-3.337546	0.0016
D(GR(-2))	-0.006444	0.001702	-3.785997	0.0004
D(GR(-3))	-0.006059	0.001594	-3.801820	0.0004

D(RER)	0.003176	0.001417	2.240848	0.0292
CointEq(-1)*	-0.444851	0.056951	-7.811189	0.0000
R-squared	0.679016			
Adjusted R-squared	0.635493			
F-statistic	15.60121			
Prob(F-statistic)	0.000000			
Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.829971	10%	2.12	3.23
K	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43
t-statistic	-7.811189	10%	-2.57	-4.04
		5%	-2.86	-4.38
		2.5%	-3.13	-4.66
		1%	-3.43	-4.99

Conclusion and Recommendations

As well known, exports play an important role in the growth and development of a country. Credits are of great importance in financing exports. In this study, the short-term causality relationship between economic growth, exports, manufacturing credits, SME credits, export credits, inflation rate, and the real effective exchange rate for Türkiye during the period 2007-2024 was investigated using the Granger causality test, followed by an analysis of the long-term cointegration relationship among these variables using the ARDL method.

The results of the short-term Granger causality test and the long-term ARDL model complement each other. In the short term, the relationships between SME credits, growth, exports, and manufacturing credits show faster interactions and are generally based on mutual interactions (bidirectional relationships) and external shocks (e.g., inflation). In the long term, these relationships show more structural and lasting effects. Results such as the positive effect of manufacturing credits on growth indicate that credits which increase production capacity help make growth sustainable in the long term. The negative effect of SME credits on growth can be explained by the fact that these credits are often used for low-productivity investments. This suggests that financing policies for SMEs need to be reconsidered. It is understood that the increase in exports is determined not only by credits but also by factors such as competitiveness, production capacity, and external market demands. Türkiye's export growth is based on structural factors, and improvements are needed in areas such as technological development and production efficiency, not just financial support.

The effect of export credits on inflation in the short term triggers the rapid growth of foreign trade; however, the contribution of these credits to growth in the long term is more limited. In the long run, growth increases exports, but it was found that export credits do not directly increase exports. In the short term, there is a reciprocal relationship between SME credits and growth. That is, when financing facilities are provided in the short term, SMEs contribute to growth by increasing production. In the long term, there is a negative relationship between the real exchange rate and exports, while in the short term, export credits

can facilitate exporters' access to foreign markets. However, it is clear that exchange rate fluctuations have a negative effect on exports. In the long term, inflation increases exports, while in the short term, inflation is related to the increase in export credits.

In conclusion, the combination of short-term Granger causality test and long-term ARDL analysis shows that policymakers need to shape credit and foreign trade policies to balance short-term demands with long-term production and growth objectives. It is evident that financial support alone is insufficient for Türkiye's export growth, and structural reforms and improvements in competitiveness are necessary. Another important finding is that more efficient usage strategies should be developed in areas such as SME credits. The contribution of SME credits to growth shows that financing facilities support economic growth in the short term, but in the long term, foreign trade has a greater impact on growth. It was also found that macroeconomic factors such as exchange rates and inflation have significant effects on exports, but these do not have a direct effect through export credits.

This study contributes to the existing literature by examining the relationships between exports, economic growth, and various types of credits (export, manufacturing, and SME credits) for the 2007-2024 period in Türkiye, both at the short-term causality and long-term cointegration levels. While the literature generally examines the relationship between total credit volume and growth, this study addresses the credit market in more detail by separating the effects of different types of credit. In this sense, it is one of the rare studies that focuses on the differentiated effects of credit types on economic growth and exports. Additionally, the combined use of ARDL and Granger causality analysis in the study allows both short-term interactions and long-term equilibrium relationships to be identified, thus separating temporary effects from permanent structural relationships. In the context of Türkiye's specific macroeconomic dynamics, this study fills an important gap in both empirical literature and the insights it offers to policymakers regarding the effects of credit policies on exports and growth.

However, considering the multidimensional structure of the credit market and macroeconomic relationships, several recommendations can be made for future research: The effects of external shocks such as the pandemic, geopolitical risks, or global financial fluctuations on the credit-export-growth relationship should be examined using different methods. Since regional economic structures in Türkiye differ, future studies may analyze the regional effects of SME and manufacturing credits and develop more localized policy recommendations. Similar methodologies could be applied with panel data sets (e.g., comparing developing countries), enabling the evaluation of Türkiye's situation on a global scale. This study focused on credit volumes; in the future, variables such as credit quality and repayment performance can be incorporated into the model to analyze not only the quantity but also the efficiency of credit.

Reference

- Aktaş, C. (2009). Türkiye'nin ihracat ithalat ve ekonomik büyüme arasındaki nedensellik analizi. *Kocaeli Üniversitesi Sosyal Bilimler Dergisi*, (18), 35-47.
- Awokuse, T. O. (2006). Export-led growth and the Japanese economy: evidence from VAR and directed acyclic graphs. *Applied Economics*, 38(5), 593-602.
- Bahmani-Oskooee, M., & Domaç, İ. (1995). Export growth and economic growth in Turkey: Evidence from cointegration analysis. Retrieved from: <https://open.metu.edu.tr/handle/11511/108411>
- Balassa, B. (1978). Exports and economic growth: further evidence. *Journal of development Economics*, 5(2), 181-189.
- Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, 28(3), 423-442.
- Begum, S., & Shamsuddin, A. F. (1998). Exports and economic growth in Bangladesh. *The Journal of Development Studies*, 35(1), 89-114.
- Bilgin, C., & Şahbaz, A. (2009). Causality relations between growth and export in Turkey. *Gaziantep University Journal of Social Sciences*, 8(1), 177-198. Bilgin, C., & Şahbaz, A. (2009). Retrieved from: <https://dergipark.org.tr/en/download/article-file/223480>
- Bülbül, S. E., & Demiral, A. (2016). Türkiye Ekonomisinde Ekonomik Büyüme, İhracat Ve Eximbank Kredileri Arasındaki Nedensellik İlişkisi: 2002-2015. *Öneri Dergisi*, 12(46), 21-40.
- Ceylan, S., & Durkaya, M. (2010). Türkiye'de kredi kullanımı-ekonomik büyüme ilişkisi. *Atatürk*

Üniversitesi İktisadi ve İdari Bilimler Dergisi, 24(2), 21-35.

- Çonkar, M. K., Canbaz, M. F., ve Arifoğlu, A. (2018). Mevduat Ve Katılım Bankaları Kredilerinin Ekonomik Büyüme İle İlişkisi: Ekonometrik Bir Analiz. *Afyon Kocatepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 20(1), 1-11.
- Demirhan, E. (2005). Büyüme Ve İhracat Arasındaki Nedensellik İlişkisi: Türkiye Örneği. *Ankara Üniversitesi SBF Dergisi*, 60(4), 75-88.
- Dura, Y. C., BEŞER, M. K., & Acaroğlu, H. (2017). Türkiye'nin İhracata Dayalı Büyümesinin Ekonometrik Analizi. *Ege Academic Review*, 17(2).
- El-Sakka, M. I., & Al-Mutairi, N. H. (2000). Exports and economic growth: The Arab experience. *The Pakistan Development Review*, 153-169.
- Erdoğan, S. (2006). Türkiye'nin İhracat Yapısındaki Değişme Ve Büyüme İlişkisi: Koentegrasyon Ve Nedensellik Testi Uygulaması. *Karamanoğlu Mehmetbey Üniversitesi Sosyal Ve Ekonomik Araştırmalar Dergisi*, 2006(1), 30-39.
- Göçer, İ., & Hepkarşı, N. (2013). İhracat-büyüme ilişkisi: yapısal kırılmalı bir analiz. *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi*, 1(4), 57-87.
- Halıcıoğlu, F. (2007). A multivariate causality analysis of export and growth for Turkey. Retrieved from: https://mpira.ub.uni-muenchen.de/3565/1/MPRA_paper_3565.pdf
- Hanişoğlu, G. S. (2023). Türkiye'nin İhracat Hacmi ile İhracat Kredileri Arasındaki Nedensellik İlişkisinin Analizi. *Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 25(2), 432-448.
- Haykır, Ö., & Aydın, M. (2019). Türkiye'de Banka Kredilerinin İhracat üzerine Etkileri; Ekonometrik Analiz. *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi*, 9(2), 515-533.
- Herzer, D., NOWAK-LEHMANN D, F., & Siliverstovs, B. (2006). Export-led growth in Chile: Assessing the role of export composition in productivity growth. *The Developing Economies*, 44(3), 306-328.
- İspir, M. S., Ersoy, B. A., & Yılmaz, M. (2009). Türkiye'nin Büyüme Dinamiğinde İhracat Mi İthalat Mi Daha Etkin?. *Dokuz Eylül Üniversitesi İktisadi İdari Bilimler Fakültesi Dergisi*, 24(1), 3-16.
- Jung, W. S., & Marshall, P. J. (1985). Exports, growth and causality in developing countries. *Journal of development economics*, 18(1), 1-12.
- Kandemir, T., Arifoğlu, A., & Canbaz, M. F. (2018). Sektörel Krediler ve Ekonomik Büyüme Arasındaki Nedensellik İlişkisi: Türkiye Katılım Bankaları Örneği. *Journal of Aksaray University Faculty of Economics & Administrative Sciences/Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 10(2).
- Karaöz, N., & Aksu, A. (2024). Türkiye'de Kredi Türlerinin Ekonomik Büyümeyle İlişkisi. *Journal of Economics, Finance and Sustainability*, 2(1), 63-78.
- Karagöl, E., & Serel, A. (2005). Türkiye'de İhracat Ve GSMH Arasındaki İlişkinin Kointegrasyon Yöntemiyle İncelenmesi. In *Journal of Social Policy Conferences* (No. 50, pp. 1029-1040). Istanbul University.
- Kaya, A., Gülhan, Ü., & Güngör, B. (2013). Türkiye ekonomisinde finans sektörü ve reel sektör etkileşimi. *Akademik Araştırmalar ve Çalışmalar Dergisi (AKAD)*, 5(8), 2-15.
- Khan, M. A., Qayyum, A., Sheikh, S. A., & Siddique, O. (2005). Financial development and economic growth: The case of Pakistan [with Comments]. *The Pakistan development review*, 819-837.
- Koç, S. (2015). Türkiye'deki Bankaların Sektörler Bazında Kullandıkları Krediler İle Ekonomik Büyüme Arasındaki İlişki: 1999-2011. *Muhasebe ve Finansman Dergisi*, (67), 135-156.
- Korkmaz, S., & Aydın, A. (2015). Türkiye'de dış ticaret-ekonomik büyüme ilişkisi: Nedensellik analizi.
- Mert, M. & Çağlar, A.E. (2019), *Eviews ve Gauss Uygulamalı Zaman Serileri Analizi*, Ankara: Detay Yayıncılık.
- Narayan, P. K. (2005). "The Saving and Investment Nexus for China: Evidence from Cointegration Tests". *Applied economics*, 37(17), 1979-1990.

- Özcan, B., & Özçelebi, O. (2013). İhracata Dayalı Büyüme Hipotezi Türkiye İçin Geçerli Mi?. *Yönetim ve Ekonomi Dergisi*, 20(1), 1-14.
- Panas, E., & Vamvoukas, G. (2002). Further evidence on the export-led growth hypothesis. *Applied Economics Letters*, 9(11), 731-735.
- Pesaran, M. H., and Shin, Y. (1998). “An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis”. *Econometric Society Monographs*, 31, 371-413.
- Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). “Bounds Testing Approaches to the Analysis of Level Relationships”. *Journal of applied econometrics*, 16(3), 289-326.
- Saraç, T. B. (2013). İhracat ve İthalatın Ekonomik Büyüme Üzerindeki Etkisi: Türkiye Örneği/The Effects of Exports and Imports on Economic Growth: Turkey Case. *Ege Akademik Bakis*, 13(2), 181.
- Sezal, L. (2022). Ticari kredi kullandırmaları ile imalat sanayi üretim endeksi arasındaki ilişkinin keşfi: 2004-2022 dönemi. *Muhasebe ve Finansman Dergisi*, (95), 117-134. <https://doi.org/10.25095/mufad.1125870>
- Sezal, L. (2023). Banka Kredileri ile Cari Açık Arasındaki İlişki: Türkiye İçin Asimetrik Nedensellik Analizi. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (50), 34-44. <https://doi.org/10.52642/susbed.1219328>
- Sharma, A., & Panagiotidis, T. (2003). An Analysis of Exports and Growth in India: Some Empirical Evidence (1971-2001). Retrieved from: <https://eprints.whiterose.ac.uk/9883/1/SERP2003004.pdf>
- Şimşek, M. (2003). İhracata Dayalı-Büyüme Hipotezinin Türkiye Ekonomisi Verileri İle Analizi, 1960–2002. *Dokuz Eylül Üniversitesi İktisadi İdari Bilimler Fakültesi Dergisi*, 18(2), 43-63.
- Soylu, C., & Demirci, A. (2021). İhracat teşvik yöntemleri ve Eximbank kredilerinin ihracat üzerindeki rolü. *Gümrük ve Ticaret Dergisi*, 8(23), 22-33.
- Şahin, Z., & Baş, M. (2018). Sendikasyon Kredileri Dış Ticaret İlişkisi: Türkiye Örneği. *Uluslararası Afro-Avrasya Araştırmaları Dergisi*, 3(6), 105-114.
- Takım, A. (2010). Türkiye’de GSYİH ile ihracat arasındaki ilişki: granger nedensellik testi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 14(2), 315-330.
- Taşseven, Ö., Yılmaz, N. (2021). Türkiye Ekonomisinde Banka Kredisi, İhracat ve Ekonomik Büyüme Arasındaki Nedensellik İlişkisi, *Akademik Hassasiyetler*, 8(16), 429-455.
- Tıraşoğlu, M. (2012). Türkiye Ekonomisi'nde İhracata Dayalı Büyüme Hipotezinin Yapısal Kirilmali Birim Kök Ve Eşbütünleşme Testleri İle İncelenmesi. *İstanbul Üniversitesi İktisat Fakültesi Mecmuası*, 62(2), 373-396.
- Tuna, K. ve Bektaş, H. (2013). Kredi hacminin ekonomik büyüme üzerindeki rolünün incelenmesi: Türkiye örneği. *Finansal Araştırmalar ve Çalışmalar Dergisi*, 5(9), 139-150.
- Tutar, F., & Ünlüleblebici, Y. (2014). Türkiye’de KOBİ kredilerinin ekonomik büyümeye etkisi (2006-2011). *Global Journal of Economics and Business Studies*, 3(5), 1-14.
- Yapraklı, S. (2007). İhracat ile ekonomik büyüme arasındaki nedensellik: Türkiye üzerine ekonometrik bir analiz. Retrieved from: <https://open.metu.edu.tr/handle/11511/58508>
- Yavuz, M. (2012). Türkiye’de İhracatın Ekonomik Büyüme Üzerine Etkisi: Bir Zaman Serisi Analizi. *Ege Üniversitesi 15. İktisat Kongresi*.

Extended Summary

The Impact of Credit and Macroeconomic Variables on Economic Growth and Export Performance in Türkiye (2007-2024)

Exports play a crucial role in a country's economic growth and development, and their sustainability depends significantly on financing conditions, especially credit availability. For Türkiye, as a developing economy, export-led growth has become a key strategy for economic stability. Since the 1980 economic reforms, the country has shifted from an import-substitution growth model to one that emphasizes exports. This shift has underscored the importance of exports for Türkiye's economic growth.

Exports contribute to growth in three main ways: First, higher demand for export goods expands production capacity, leading to increased national income and employment. Second, increased exports improve resource efficiency, helping firms reduce costs through economies of scale. Third, global market competition drives technological innovation, which fosters broader economic growth. In Türkiye, financial institutions like Eximbank support export financing, while loans to manufacturing and SMEs enhance production capacity, directly influencing export potential. Given that 99.8% of Turkish businesses are SMEs, the impact of credit on exports is significant.

This study aims to explore the relationship between economic growth, exports, manufacturing loans, SME loans, export credits, inflation, and the real effective exchange rate in Türkiye from 2007 to 2024. The analysis uses the Granger Causality test for short-term causal relationships and the ARDL (Autoregressive Distributed Lag) model for long-term equilibrium relationships. The goal is to understand how credit, macroeconomic factors, and exports impact economic growth and inform Türkiye's export strategies.

The study uses annual data from 2007 to 2024, focusing on economic growth, exports, manufacturing loans, SME loans, export credits, inflation, and the real effective exchange rate. The Granger Causality test first identifies short-term relationships between the variables. Then, the ARDL model is employed to analyze long-term equilibrium relationships. The ARDL model helps capture both short-term dynamics and long-term equilibria, making it particularly suited for examining the relationships between credit and export variables in an economy like Türkiye's.

The Granger Causality test reveals several key short-term relationships: Bidirectional causality exists between SME loans and economic growth, suggesting that changes in SME credit influence growth, and vice versa. Moreover, unidirectional causality runs from economic growth to industrial loans, indicating that growth leads to increased demand for manufacturing loans. Furthermore, unidirectional causality is found from exports to export credits, implying that higher exports encourage the provision of credit to exporters. Unidirectional causality is detected from export credits to inflation, indicating that changes in export credit availability can influence inflationary pressures.

The results from the ARDL model offer further insights into long-term relationships: Exports and the real effective exchange rate are positively and significantly related to economic growth at the 1% level, indicating that both exports and a favorable exchange rate contribute to growth. Manufacturing loans have a positive and significant effect on economic growth at the 5% level, suggesting that credit to the manufacturing sector promotes growth. SME loans have a negative impact on economic growth at the 5% level, likely due to inefficient resource allocation. Export credits show a negative relationship with economic growth at the 10% significance level, suggesting that although export credits help in the short term, they may have adverse long-term effects. Inflation is negatively related to growth, though this relationship is not statistically significant.

In the second ARDL model, where exports are the dependent variable, the results reveal the following: Manufacturing loans and SME loans do not significantly impact exports. Economic growth is positively related to exports at the 1% significance level, highlighting the importance of economic growth in boosting exports. Inflation has a significant positive effect on exports at the 5% level, suggesting that inflation may enhance export competitiveness by making domestic goods cheaper on international markets. The real effective exchange rate negatively affects exports at the 1% significance level, indicating that a stronger domestic currency reduces the competitiveness of Turkish exports.

The combination of short-term Granger causality test and long-term ARDL analysis shows that policymakers need to shape credit and foreign trade policies to balance short-term demands with long-term production and growth objectives. It is evident that financial support alone is insufficient for Türkiye's

export growth, and structural reforms and improvements in competitiveness are necessary. Another important finding is that more efficient usage strategies should be developed in areas such as SME credits. The contribution of SME credits to growth shows that financing facilities support economic growth in the short term, but in the long term, foreign trade has a greater impact on growth.

This study contributes to the existing literature by examining the relationships between exports, economic growth, and various types of credits (export, manufacturing, and SME credits) for the 2007-2024 period in Türkiye, both at the short-term causality and long-term cointegration levels. While the literature generally examines the relationship between total credit volume and growth, this study addresses the credit market in more detail by separating the effects of different types of credit.

Genişletilmiş Özet

Türkiye’de Türlerine Göre Krediler ile İhracat ve Büyüme Arasındaki İlişkinin Analizi (2007-2024)

İhracat, bir ülkenin ekonomik büyümesinde ve kalkınmasında kritik bir rol oynamakta olup, sürdürülebilirliği büyük ölçüde finansman koşullarına, özellikle de kredi imkânlarına bağlıdır. Gelişmekte olan bir ekonomi olarak Türkiye’de ihracata dayalı büyüme, ekonomik istikrarın sağlanmasında önemli bir strateji hâline gelmiştir. 1980’de uygulamaya konulan ekonomik reformlarla birlikte Türkiye, ithal ikameci büyüme modelinden ihracata dayalı bir modele geçiş yapmış ve bu süreç ihracatın ekonomik büyüme açısından önemini artırmıştır.

İhracatın ekonomik büyümeye üç temel katkısı bulunmaktadır. Birincisi, ihracata yönelik talebin artması üretim kapasitesini genişleterek milli gelir ve istihdamı artırmaktadır. İkincisi, artan ihracat kaynak kullanım verimliliğini yükseltmekte ve ölçek ekonomileri yoluyla maliyetlerin düşmesine katkıda bulunmaktadır. Üçüncüsü, uluslararası piyasalardaki rekabet ortamı teknolojik yenilikleri teşvik ederek genel ekonomik büyümeyi desteklemektedir. Türkiye’de Eximbank gibi kurumların sağladığı ihracat finansmanı, imalat sanayi kredileri ve KOBİ kredileri üretim kapasitesini güçlendirerek ihracat potansiyelini doğrudan etkilemektedir. Türkiye’de işletmelerin %99,8’inin KOBİ olması, kredilerin ihracat üzerindeki etkisini daha da önemli kılmaktadır.

Bu çalışmanın amacı, 2007–2024 döneminde ekonomik büyüme, ihracat, imalat sanayi kredileri, KOBİ kredileri, ihracat kredileri, enflasyon ve reel efektif döviz kuru arasındaki ilişkiyi analiz etmektir. Kısa dönem ilişkileri incelemek için Granger Nedensellik Testi, uzun dönem denge ilişkisini belirlemek için ise ARDL (Gecikmesi Dağıtılmış Ototegresif Model) kullanılmıştır. ARDL modeli, hem kısa hem de uzun dönem ilişkilerini aynı modelde inceleyebilmesi nedeniyle Türkiye gibi kredi-ihracat etkileşiminin güçlü olduğu ülkeler için uygun bir yöntemdir.

Granger Nedensellik Testi’nin bulguları kısa dönem için önemli sonuçlar sunmaktadır: KOBİ kredileri ile ekonomik büyüme arasında çift yönlü nedensellik bulunmuş; ekonomik büyümeden imalat sanayi kredilerine doğru tek yönlü nedensellik tespit edilmiştir. Ayrıca ihracattan ihracat kredilerine doğru tek yönlü nedensellik bulunmuş, bu da ihracat arttıkça ihracat finansmanı talebinin yükseldiğini göstermektedir. Bunun yanında ihracat kredilerinden enflasyona doğru tek yönlü nedensellik saptanmış olup, ihracat kredilerindeki değişimlerin enflasyon üzerinde etkili olabileceği anlaşılmaktadır.

ARDL modeli, uzun dönem ilişkilerine dair daha ayrıntılı bulgular sunmaktadır. Buna göre ihracat ve reel efektif döviz kuru ekonomik büyümeyle %1 düzeyinde pozitif ve anlamlı ilişkiye sahiptir. İmalat sanayi kredileri büyümeyi %5 düzeyinde pozitif ve anlamlı biçimde etkilerken, KOBİ kredileri büyüme üzerinde %5 düzeyinde negatif etkiye sahiptir; bu durum kaynakların verimsiz kullanımından kaynaklanmış olabilir. İhracat kredileri büyümeyle %10 düzeyinde negatif ilişkili bulunmuş olup, kısa dönem katkılarına rağmen uzun vadede olumsuz etkiler yaratabileceğine işaret etmektedir. Enflasyon ile ekonomik büyüme arasındaki negatif ilişki ise istatistiksel olarak anlamlı değildir.

İkinci ARDL modelinde bağımlı değişken ihracat olduğunda, imalat sanayi kredilerinin ve KOBİ kredilerinin ihracat üzerinde anlamlı etkisi olmadığı tespit edilmiştir. Ekonomik büyüme ihracatı %1 düzeyinde pozitif ve anlamlı biçimde etkilemekte, enflasyon ise %5 düzeyinde pozitif etkiye sahiptir; bu durum enflasyonun yerli ürünleri uluslararası pazarlarda görece daha ucuz hâle getirerek rekabet avantajı sağlayabileceğini göstermektedir. Reel efektif döviz kuru ise ihracatı %1 düzeyinde negatif ve anlamlı biçimde etkilemekte olup, yerel para biriminin değer kazanmasının ihracat rekabet gücünü azalttığı anlaşılmaktadır.

Kısa dönem Granger nedensellik testi ile uzun dönem ARDL analizinin birlikte kullanılması, politika yapıcıların kısa dönem taleplerle uzun dönemli üretim ve büyüme hedefleri arasındaki dengeyi sağlayacak şekilde kredi ve dış ticaret politikalarını şekillendirmesi gerektiğini göstermektedir. Türkiye'nin ihracat büyümesi için yalnızca finansal desteğin yeterli olmadığı, bunun yanında yapısal reformlar ve rekabet gücünün artırılmasının da gerekli olduğu açıktır. Bir diğer önemli bulgu ise KOBİ kredileri gibi alanlarda daha verimli kullanım stratejilerinin geliştirilmesi gerektiğidir. KOBİ kredilerinin büyümeye katkısı, finansman olanaklarının kısa vadede ekonomik büyümeyi desteklediğini, ancak uzun vadede büyüme üzerinde dış ticaretin daha güçlü bir etkiye sahip olduğunu ortaya koymaktadır.

Bu çalışma, Türkiye'de 2007–2024 dönemine ilişkin ihracat, ekonomik büyüme ve farklı kredi türleri (ihracat, imalat ve KOBİ kredileri) arasındaki ilişkileri hem kısa dönem nedensellik hem de uzun dönem eşbütünleşme düzeyinde inceleyerek mevcut literatüre katkı sağlamaktadır. Literatürde genellikle toplam kredi hacmi ile büyüme arasındaki ilişki ele alınırken, bu çalışma kredi piyasasını farklı kredi türlerinin etkilerini ayırarak daha ayrıntılı biçimde incelemektedir.