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The Impact of Export Credits and Credit Insurance on Export Performance: Evidence from Turkish Eximbank

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Abstract

Trade-finance instruments may support export performance by alleviating financing constraints and reducing international payment risks. This study examines the short- and long-run relationships between Turkish Eximbank instruments and Turkey's aggregate exports using annual data for 2001–2024. Three nested log-linear Autoregressive Distributed Lag (ARDL) models jointly incorporate short-term credits, medium- and long-term credits, insured shipment values and the real effective exchange rate. Intermediate-goods imports and external demand are added in the second model, while tariff and Russia–Ukraine war-period controls are introduced in the third. ADF, PP and KPSS tests examine the integration properties of the continuous variables and ARDL bounds tests evaluate the existence of long-run relationships. The bounds-test results support a relationship with levels in all three specifications, while the negative and significant error-correction coefficients indicate convergence toward equilibrium. Insured shipments have a positive and statistically significant short-run coefficient in every model and a positive long-run coefficient in the benchmark model. However, their long-run significance disappears after imported-input conditions and external demand are controlled for. Neither credit category exhibits a statistically significant relationship with exports. Intermediate-goods imports are positively associated with exports in both horizons, while external demand has a positive long-run relationship. The REER generally has the expected negative sign, but its significance is specification dependent. The findings identify insurance as the strongest short-run correlate of exports while showing that its long-run aggregate relationship is sensitive to macroeconomic conditions. Recipient-level data are required to establish causal program effects.

Keywords: export financing; export credit; credit insurance; Turkish Eximbank; ARDL

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1. Introduction

The relationship between exports and economic growth has been extensively examined in the literature, with empirical evidence indicating that export expansion contributes to productivity improvements, technological diffusion and sustainable development (Emery, 1967; Sharma & Dhakal, 1994; Crespo Cuaresma & Wörz, 2005; Herzer et al., 2006; Kubar, 2016). Countries increasingly pursue export-oriented strategies to strengthen international competitiveness and achieve macroeconomic stability (Soylu & Demirci, 2021). In practice, a substantial proportion of global trade relies on trade-finance instruments and firms frequently use credit insurance to mitigate payment-default risks (Auboin, 2009). Financial-market imperfections, particularly in sectors dependent on external financing, can significantly constrain export performance (Polat & Yeşilyaprak, 2017).

Turkey adopted an export-led growth strategy following the structural transformation of the 1980s, which positioned export financing as a central policy instrument. Established in 1987, Turkish Eximbank serves as the primary institutional mechanism supporting exporters through credit, guarantee and insurance programs (Turkish Eximbank, 2025). The introduction of short-term export credit insurance in 1989 strengthened the financial infrastructure and enhanced exporters' risk-management capacity (Demiral, 2018). The bank's credit-evaluation processes also play an important role in firm-level risk assessment and access to finance (Küçükbay & Metin, 2019). Export financing is particularly significant for economies characterized by external savings gaps and import dependence, where access to international markets is closely linked to financial availability. Empirical studies demonstrate that financing constraints may prevent potential exporters from entering foreign markets and increase the risk exposure of existing firms (Beck et al., 2005; Chor & Manova, 2012). Consequently, accurately assessing publicly supported export-finance mechanisms is important for economic policy design (Njinyah, 2018).

Recent evidence has strengthened the case for public export-finance intervention while also showing that its effects are instrument- and context-specific. State guarantees have been found to ease financial frictions when exporters depend on external finance and destination-market risks are high (Heiland & Yalcin, 2021), whereas short-term export credit insurance increases exports particularly among smaller firms and in trades with developing countries (H. Choi & Kim, 2021). Quasi-experimental evidence further indicates that export credit guarantees mitigate buyer-default and information frictions, thereby increasing both the probability and value of exporting (Agarwal et al., 2023). More recent firm-level research demonstrates that export loans and insurance may produce different effects across export and employment outcomes (Hur & Yoon, 2025), while guarantees may also improve export survival, especially for smaller transactions and riskier destination markets (Lodefalk et al., 2025). Nevertheless, this recent literature is dominated by firm-level studies conducted in Germany, Korea and Sweden and generally examines either a single instrument or a broadly defined bundle of export-credit services. Consequently, limited evidence exists on whether short-term credits, medium- and long-term credits and insured shipment values exhibit distinct short- and long-run relationships with aggregate exports in an emerging economy. This limitation is particularly relevant to Turkey, where the aggregate relationships of Turkish Eximbank's credit and insurance channels with export performance remain insufficiently examined over an extended period that includes recent global disruptions.

Although several studies have examined Turkish Eximbank instruments and export performance in Turkey, the different instruments are generally considered separately. Some studies focus primarily on credit programs (Soylu & Demirci, 2021), whereas others examine export insurance independently or within broader macroeconomic frameworks (Çetiner et al., 2019; Kar, 2023). A comprehensive evaluation incorporating short-term credits, medium- and long-term credits and insured shipments within a common empirical framework remains limited. Moreover, international panel studies addressing export credit insurance often exclude Turkey from their samples (Köksal & Güneren Genç, 2019).

Against this background, the study addresses the following research questions: (RQ1) What are the short- and long-run relationships between Turkish Eximbank's short-term credits, medium- and long-term credits, insured shipment values and Turkey's total exports? (RQ2) Which of these instruments exhibit the strongest and most persistent association with export performance? (RQ3) How are the real effective exchange rate, intermediate-goods imports and external demand associated with exports and how does their inclusion affect the estimated relationships between Eximbank instruments and export performance?

To answer these questions, the study analyzes annual data for the 2001–2024 period using the ARDL bounds-testing approach. Three nested specifications are estimated. The benchmark model jointly includes short-term credits, medium- and long-term credits, insured shipment values and the real effective exchange rate. The second model adds intermediate-goods imports and external demand, while the fully augmented model additionally introduces binary event controls for the Turkey-specific US steel-tariff episode and the Russia–Ukraine war. This nested structure makes it possible to examine whether the estimated relationships of the Eximbank instruments remain stable after broader macroeconomic conditions and major trade disruptions are taken into account.

Based on trade-finance theory and the preceding literature, four hypotheses are proposed. H1: Short-term export credits are positively associated with exports in both the short and the long run. H2: Medium- and long-term export credits are positively associated with exports in both the short and the long run. H3: Insured shipment values are positively associated with exports in both the short and the long run. H4: An increase in the real effective exchange rate, indicating a real appreciation of the Turkish lira, is negatively associated with exports in both the short and the long run. By estimating the three Eximbank instruments jointly within a nested control structure, the study contributes to the empirical assessment of export-support mechanisms and provides policy-relevant evidence on the financial dimension of export-led growth strategies.

2. Literature Review

2.1. Development of Foreign Trade and Export Structure in Turkey

Turkey's foreign trade policies initially reflected liberal economic principles during the early Republican period, but the effects of the 1929 Great Depression led to a shift toward state-led industrialization and planned economic development (Soylu & Demirci, 2021). The structural transformation gained momentum following the stabilization decisions implemented in 1980, when Turkey adopted an export-oriented industrialization strategy and increased its degree of economic openness (Şaşmaz & Karamıklı, 2018). Despite macroeconomic fluctuations during the 1990s, exports demonstrated a long-term upward trend and the structural reforms implemented after the 2001 crisis, together with the Customs Union process, contributed to a substantial expansion of foreign trade (Orkunoğlu-Şahin, 2022).

Over the last two decades, the composition of exports has shifted from low-technology agricultural and textile products toward medium and high-technology manufacturing sectors, particularly automotive, machinery and electronics industries. Although traditional sectors such as textiles and agriculture continue to play an important role, their relative share has declined, while high value-added sectors have expanded (TURKSTAT, 2025). On the import side, Turkey's production structure remains highly dependent on energy and intermediate goods, resulting in a persistent trade deficit. Energy imports, particularly during periods of global price shocks, represent a major determinant of the import bill (Ekinci-Furtana, 2020). The share of intermediate goods in total imports, generally ranging between 65% and 70%, indicates the structural dependence of production on foreign inputs (TURKSTAT, 2025).

In terms of trade partners, the European Union continues to constitute the primary export destination while Russia and China are prominent suppliers due to energy and intermediate-goods imports, respectively (TURKSTAT, 2025). Russia is particularly important for energy imports, whereas China is a major source of machinery, electronics, and other intermediate and technology-intensive goods (Yılmaz, 2022; OECD, 2023). Although market diversification has increased, the structural characteristics of imports (especially dependency on energy) have contributed to the persistence of the trade deficit. Overall, the evidence suggests that while exports have gained increasing importance within the

economy, structural import dependence remains a key constraint on external balance (Erduman et al., 2020; Bölükbaşı & Civcir, 2024). Enhancing technology-intensive exports and reducing reliance on imported intermediate inputs are therefore considered critical for improving the trade balance (Chen & Huang, 2025).

2.2. Export Incentives and Public Support Mechanisms

Developing countries frequently implement export incentive policies to overcome foreign exchange constraints and improve external balances (Akkaplan, 2014; Yayman, 2020). These policies aim to support investment, production capacity, employment and regional development while providing exporters with a more favorable competitive environment (Şaşmaz & Karamıklı, 2018). Export incentives generate multiplier effects that influence macroeconomic indicators such as employment, export–import ratios and current account balances (Kekeç, 2020; Lederman et al., 2006).

State-supported export incentives in Turkey encompass a wide range of policy instruments coordinated by the Ministry of Trade and financed largely through public support funds. These instruments include market research support, international promotion activities, branding and Turquality programs, integration into global value chains, design and innovation support and employment incentives aimed at strengthening international competitiveness (Soylu & Demirci, 2021). Complementary institutional mechanisms such as KOSGEB contribute to exporters' capacity development through technology, quality improvement and international marketing support, particularly for small and medium-sized enterprises (Buğur, 2007; KOSGEB, 2025).

Fiscal incentives also play a significant role in export promotion. Tax, duty and fee exemptions reduce production costs by eliminating fiscal burdens associated with exported goods, thereby enhancing price competitiveness and facilitating market entry (Kemer, 2003; Kekeç, 2020). Free zones provide additional advantages through customs exemptions and administrative flexibility, encouraging export-oriented investments and increasing trade volumes (Buğur, 2007). Similarly, inward processing regimes enable duty-free importation of inputs used in export production, supporting diversification and expansion of exports (Takım & Ersungur, 2010; Önür Aslan & Dinçer, 2020). The outward processing regime allows temporary export of goods for processing abroad and their subsequent re-importation, contributing to cost efficiency and production flexibility (Akça, 2011).

Value-added tax exemptions represent another important instrument based on the destination principle in international trade. Exported goods and services are exempt from VAT and taxes paid during production are refunded, allowing exporters to maintain a cost structure free of indirect tax burdens (Atayeter & Erol, 2011; Türkay & Ünsal, 2008). These fiscal mechanisms contribute to export growth and may support improvements in external balances over the medium term (Kekeç, 2020).

2.3. Turkish Eximbank and Export Financing Instruments

Within the export incentive framework, Turkish Eximbank constitutes the primary institutional mechanism providing financial support to exporters. Established in 1987 as a state-owned export credit agency, the bank offers credit, insurance and guarantee programs designed to facilitate exporters' access to financing and mitigate trade-related risks (Selvi Hanişoğlu, 2023; Turkish Eximbank, 2025). Since its operational launch in 1988, the bank has implemented short-term credit and credit insurance programs and gradually expanded its product portfolio to include medium- and long-term financing, overseas contracting support, SME-oriented programs and alternative financial instruments aligned with international export credit agency standards (Çetiner et al., 2019; Turkish Eximbank, 2025).

The primary objectives of Turkish Eximbank include supporting export diversification, facilitating entry into new markets, increasing market shares in traditional destinations and promoting foreign exchange-earning services and overseas investments (Ekincek, 2006; Samsunlu, 2019). Through credit insurance and guarantee mechanisms addressing commercial and political risks, the bank contributes to exporters' financial stability and enhances their competitiveness in international markets (Güneş & Uğur, 2007; Turkish Eximbank, 2025). Unlike commercial banks, Turkish Eximbank operates primarily within a public policy framework rather than profit maximization objectives, positioning it as a specialized development institution in export financing (Selvi Hanişoğlu, 2023).

2.4. Empirical Literature on Export Financing and Eximbank Instruments

Empirical research examining the relationship between export financing and export performance highlights the importance of credit availability and insurance mechanisms in supporting trade flows. Studies indicate that financial constraints may significantly reduce export participation and export volumes, particularly in developing economies (Beck et al., 2005; Chor & Manova, 2012). Export credit insurance is frequently identified as an effective risk mitigation tool that facilitates market entry and stabilizes export revenues.

Recent empirical research provides more detailed evidence regarding the mechanisms and heterogeneous effects of export-finance instruments. Using German firm- and transaction-level data, Heiland and Yalcin (2021) show that state credit guarantees are most effective when exporters depend heavily on external finance, the value at risk is large and refinancing conditions in private markets are restrictive. Based on detailed K-SURE data, H. Choi and Kim (2021) find that short-term export credit insurance increases exports by alleviating firms' financial constraints with stronger effects for smaller exporters and developing-country destinations. Examining the broader trade-finance channel, M. J. Choi et al. (2022) estimate that the contraction in cross-border trade credit accounted for approximately 6% of the trade collapse during the global financial crisis and find stronger export effects in countries with less-developed financial systems. Agarwal et al. (2023) provide causal evidence from Sweden, demonstrating that export credit guarantees increase both export participation and export values by mitigating buyer-default risk, information frictions and liquidity constraints. Doan and Le (2024) similarly show that access to trade credit improves export survival, particularly after the first year of exporting and during crisis and post-crisis periods. More recent findings indicate that public export loans and insurance both increase exports although only loans generate a significant employment effect (Hur & Yoon, 2025), while export credit guarantees are associated with longer export duration, especially among smaller firms, smaller contracts and riskier markets (Lodefalk et al., 2025). Taken together, these studies indicate that export-finance instruments should not be treated as homogeneous, since their effects vary according to financial constraints, destination risk, firm size, service type and the outcome examined. However, the evidence remains predominantly firm-level, leaving limited aggregate time-series research that jointly compares credit maturities and insurance within a single institutional setting.

In the Turkish context, several studies analyze the impact of Turkish Eximbank instruments on export performance. However, the majority focus primarily on short-term export credits or evaluate insurance mechanisms separately (Soylu & Demirci, 2021; Kar, 2023). Other research examines the relationship between short-term credit insurance and macroeconomic indicators such as GDP (Çetiner et al., 2019). Comprehensive analyses incorporating multiple credit maturities and insurance mechanisms simultaneously remain limited. Additionally, international panel studies investigating export credit insurance often exclude Turkey from the sample despite its active export credit agency structure (Köksal & Güneren Genç, 2019). This gap motivates the present study, which provides an

integrated econometric assessment of short-term credits, medium- and long-term credits and insured shipment values within an analytical framework.

3. Methodology

3.1. Data and Variables

This study examines the relationship between Turkish Eximbank financing instruments and Turkey's export performance using annual data covering the 2001–2024 period. The sample begins in 2001 because this is the first year for which consistent annual series can be assembled for all variables. Data on short-term export credits, medium- and long-term export credits and insured shipment values were obtained from Turkish Eximbank's annual reports (Turkish Eximbank, 2025). Total merchandise export data were obtained from the Turkish Statistical Institute (TURKSTAT, 2025), while the real effective exchange rate was obtained from the Electronic Data Delivery System of the Central Bank of the Republic of Türkiye (CBRT, 2025). The export-market volume series was obtained from the OECD Economic Outlook Database (OECD, 2025).

The intermediate-goods imports series (INT) was constructed from TURKSTAT's Broad Economic Categories (BEC) data published through CBRT EVDS. Monthly values reported under the Special Trade System for 2001–2019 were aggregated into annual totals. To account for the coverage difference between the Special and General Trade Systems, a linking coefficient of 1.0236 was calculated as the ratio of the cumulative General Trade System values to the cumulative Special Trade System values over the overlapping 2013–2019 period. The Special Trade System observations for 2001–2012 were adjusted using this coefficient, whereas the General Trade System values were used directly for 2013–2024. The resulting series was converted into billions of US dollars.

All dollar-denominated series are expressed in billions of US dollars. The EXT series is measured as a chain-linked volume at 2021 reference prices. The real effective exchange rate is represented by the CPI-based index with 2025 as the base year. An increase in this index indicates a real appreciation of the Turkish lira. All continuous variables are transformed into natural logarithms before estimation. This transformation reduces differences in scale, helps stabilize the variance of the series and allows the estimated coefficients to be interpreted as elasticities. Table 1 summarizes the definitions, measurement, data sources and theoretically expected relationships of the variables used in the analysis.

Total merchandise exports (EXP) are used as the dependent variable and represent Turkey's aggregate export performance. Short-term export credits (STC) capture the liquidity channel through which exporters finance working capital, production and shipment-related expenses. By easing short-term financing constraints, these credits are expected to be positively associated with exports.

Medium- and long-term export credits (MLC) represent financing directed toward investment, production capacity and longer-term export projects. Such financing may enable firms to expand their productive capacity and enter new foreign markets. Therefore, a positive relationship between medium- and long-term credits and exports is expected.

Insured shipment values (INS) represent the risk-mitigation channel of Turkish Eximbank support. Export credit insurance protects exporters against commercial and political payment risks and may also facilitate access to external financing. By reducing the risks associated with international transactions, insured shipments are expected to be positively associated with export performance.

The real effective exchange rate (REER) is included as a control for international price competitiveness. An increase in the REER indicates a real appreciation of the Turkish lira, which raises the relative price of Turkish goods in foreign markets and may reduce

export competitiveness. Accordingly, the expected relationship between REER and exports is negative.

Table 1. Research variables, measurement, sources and expected relationships.

Variable	Definition and Measurement	Source	Expected Relationship
EXP	Total merchandise exports, billion US dollars; natural logarithm	TURKSTAT	Dependent variable
STC	Short-term export credits, billion US dollars; natural logarithm	Turkish Eximbank	Positive
MLC	Medium- and long-term export credits, billion US dollars; natural logarithm	Turkish Eximbank	Positive
INS	Insured shipment value, billion US dollars; natural logarithm	Turkish Eximbank	Positive
REER	CPI-based real effective exchange rate index, 2025 = 100; natural logarithm	CBRT EVDS	Negative
INT	Intermediate-goods imports, billion US dollars; natural logarithm	CBRT EVDS (TURKSTAT); authors' calculations	Positive
EXT	Turkey's export-market volume (OECD series: XMKT), billion US dollars at 2021 reference prices; natural logarithm	OECD Economic Outlook Database	Positive
TAR	Turkey-specific U.S. steel-tariff shock dummy; 1 for 2018–2019 and 0 otherwise	Authors' construction based on U.S. Federal Register (Executive Office of the President, 2019)	Indeterminate
UKR	Russia–Ukraine war dummy; 1 for 2022–2024 and 0 otherwise	Authors' construction	Indeterminate

Intermediate-goods imports (INT) are included to account for Turkey's dependence on imported inputs in export production. Imported raw materials and components support domestic production and firms' capacity to supply foreign markets. INT is therefore expected to be positively associated with exports.

The OECD export-market volume series (EXT) is included as a control for external demand. The series measures the volume of Turkey's export markets in US dollars at 2021 reference prices. Stronger economic activity and demand in Turkey's export markets are expected to increase export opportunities. Consequently, the expected relationship between EXT and exports is positive.

Two binary event variables are included in the fully augmented specification to control for major external disruptions during the sample period. TAR equals one for 2018 and 2019 and zero otherwise, capturing the period affected by the higher U.S. steel tariff applied specifically to imports from Turkey. Its coding follows the official implementation period from 13 August 2018 to 21 May 2019. UKR equals one for 2022–2024 and zero otherwise, capturing the trade disruptions and possible trade-diversion effects associated with the Russia–Ukraine war. Because these events may restrict existing trade flows while also creating alternative market opportunities for Turkish exporters, their expected effects are indeterminate. TAR and UKR enter Model 3 in levels as fixed, unlagged controls and are not logarithmically transformed. The descriptive characteristics of all variables are reported in Table 2.

The descriptive evidence indicates that Turkish Eximbank instruments changed substantially over the sample period. Short-term credits rose from USD 2.700 billion in 2001 to USD 15.359 billion in 2024 and reached a sample maximum of USD 25.155 billion in 2019. Medium- and long-term credits were smaller and more volatile, standing at USD 1.180 billion in 2001 and reaching a sample maximum of USD 8.754 billion in 2024. Insured shipments increased from USD 2.811 billion in 2001 to USD 24.572 billion in 2024 and

peaked at USD 25.299 billion in 2022. In 2024, short-term credits, medium- and long-term credits and insured shipments corresponded to approximately 5.9%, 3.3% and 9.4% of total exports, respectively. These developments demonstrate the substantial and evolving quantitative relevance of Turkish Eximbank instruments and provide descriptive motivation for examining their short- and long-run relationships with exports.

Table 2. Descriptive statistics.

Variable	Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Short-term credits	24	12.101	14.938	8.242	2.200	25.155
Medium- and long-term credits	24	1.865	1.228	2.208	0.037	8.754
Insured shipments	24	10.618	7.648	7.657	2.706	25.299
Total exports	24	141.483	150.050	66.695	31.300	261.800
REER	24	130.838	139.830	29.725	70.000	177.790
Intermediate-goods imports	24	149.147	158.931	66.810	31.016	292.437
Export-market volume	24	220.733	228.508	53.146	124.706	305.439
TAR	24	0.083	0.000	0.282	0.000	1.000
UKR	24	0.125	0.000	0.338	0.000	1.000

Note: Dollar-denominated variables are expressed in USD billions. REER denotes the CPI-based real effective exchange rate index (2025 = 100) and EXT denotes the OECD export-market volume series at 2021 reference prices. Descriptive statistics for continuous variables are reported in their original levels. All continuous variables enter the econometric models in natural logarithms, whereas TAR and UKR are binary event variables that enter only Model 3 in levels as fixed, unlagged controls.

Intermediate-goods imports increased from USD 31.016 billion in 2001 to USD 238.253 billion in 2024 and reached a sample maximum of USD 292.437 billion in 2022. The export-market volume indicator rose from USD 124.706 billion at 2021 reference prices in 2001 to USD 305.439 billion in 2024, despite temporary contractions in 2009 and 2020. These developments illustrate the changing imported-input and external-demand conditions considered in the augmented specifications.

Although the econometric analysis relies on aggregate annual data, the destination breakdown for the final year of the sample provides additional information on the export flows most directly associated with Turkish Eximbank support. In 2024, the European Union accounted for 51.8% of the export commitments associated with Eximbank credits. Other destinations represented 20.8% while the Middle East and North Africa and North America accounted for 9.4% and 6.1%, respectively. The remaining share was distributed across the Far East, Central and Western Asia, non-EU Europe and Japan. Regarding short-term export credit insurance, the European Union accounted for 50.9% of insured shipments, followed by non-EU Europe with 16.9%, Asia with 12.8%, North and Central America with 9.1%, Africa with 7.8%, South America and the Caribbean with 1.8% and Oceania with 0.6% (Turkish Eximbank, 2025). These figures indicate that Europe represents the principal destination of export flows directly associated with Turkish Eximbank support. However, consistent annual destination-level credit and insurance series that can be matched with bilateral export flows are not publicly available for the entire 2001–2024 period. The econometric analysis is therefore conducted at the aggregate level.

3.2. Econometric Method

The empirical analysis adopts the Autoregressive Distributed Lag (ARDL) bounds-testing approach to examine long-run relationships. The ARDL methodology can be applied when the variables are integrated of order zero or one, provided that none is integrated of order two and allows short-run dynamics and long-run coefficients to be estimated within a unified framework. Before the bounds analysis, the integration properties of the continuous variables are examined using the Augmented Dickey–Fuller (ADF), Phillips–Perron (PP)

and KPSS tests. Because these tests employ different null hypotheses, their combined use provides complementary evidence regarding the integration orders of the series.

The bounds test subsequently evaluates the null hypothesis of no level relationship. If the calculated F-statistic exceeds the upper critical bound, the null hypothesis is rejected, supporting the existence of a long-run relationship among the variables. Long-run coefficients are then estimated, while the error-correction representation is used to examine short-run dynamics and the speed at which deviations from equilibrium are corrected. A negative and statistically significant error-correction coefficient indicates that deviations from the estimated long-run equilibrium are corrected over time.

3.3. Model Specification

To assess whether the relationships between Turkish Eximbank instruments and aggregate exports are robust to progressively richer controls, three nested log-linear ARDL specifications are estimated. Total merchandise exports (EXP) are the dependent variables in every model. Model 1 is the benchmark specification and jointly includes short-term export credits (STC), medium- and long-term export credits (MLC), insured shipment values (INS) and the real effective exchange rate (REER). Model 2 adds intermediate-goods imports (INT) and external demand (EXT). Model 3 is the fully augmented specification and additionally includes the tariff episode (TAR) and the Russia–Ukraine war (UKR). This sequential structure makes it possible to determine whether the estimated relationships of the Eximbank instruments, particularly insured shipments, remain stable after macroeconomic conditions and major external disruptions are taken into account.

The benchmark specification is expressed as follows:

$$\begin{aligned}\ln EXP_t = \alpha_1 + \sum_{i=1}^{p_1} \phi_{1i} \ln EXP_{t-i} + \sum_{j=0}^{q_{11}} \beta_{1j} \ln STC_{t-j} + \sum_{j=0}^{q_{12}} \gamma_{1j} \ln MLC_{t-j} \\ + \sum_{j=0}^{q_{13}} \delta_{1j} \ln INS_{t-j} + \sum_{j=0}^{q_{14}} \vartheta_{1j} \ln REER_{t-j} + \varepsilon_{1t}\end{aligned}$$

Model 2 extends the benchmark specification by controlling for imported production inputs and conditions in Turkey's export markets:

$$\begin{aligned}\ln EXP_t = \alpha_2 + \sum_{i=1}^{p_2} \phi_{2i} \ln EXP_{t-i} + \sum_{j=0}^{q_{21}} \beta_{2j} \ln STC_{t-j} + \sum_{j=0}^{q_{22}} \gamma_{2j} \ln MLC_{t-j} \\ + \sum_{j=0}^{q_{23}} \delta_{2j} \ln INS_{t-j} + \sum_{j=0}^{q_{24}} \vartheta_{2j} \ln REER_{t-j} + \sum_{j=0}^{q_{25}} \eta_{2j} \ln INT_{t-j} \\ + \sum_{j=0}^{q_{26}} \kappa_{2j} \ln EXT_{t-j} + \varepsilon_{2t}\end{aligned}$$

Model 3 further introduces the two event variables as fixed, unlagged controls:

$$\begin{aligned}\ln EXP_t = \alpha_3 + \sum_{i=1}^{p_3} \phi_{3i} \ln EXP_{t-i} + \sum_{j=0}^{q_{31}} \beta_{3j} \ln STC_{t-j} + \sum_{j=0}^{q_{32}} \gamma_{3j} \ln MLC_{t-j} \\ + \sum_{j=0}^{q_{33}} \delta_{3j} \ln INS_{t-j} + \sum_{j=0}^{q_{34}} \vartheta_{3j} \ln REER_{t-j} + \sum_{j=0}^{q_{35}} \eta_{3j} \ln INT_{t-j} \\ + \sum_{j=0}^{q_{36}} \kappa_{3j} \ln EXT_{t-j} + \rho_1 TAR_t + \rho_2 UKR_t + \varepsilon_{3t}\end{aligned}$$

All continuous variables are expressed in natural logarithms. Consequently, their long-run coefficients are interpreted as elasticities. TAR and UKR are binary variables and enter Model 3 in levels. The event variables are not interpreted as causal treatment effects;

their coefficients capture conditional associations during the specified periods after the remaining variables are controlled for.

Given the limited sample of 24 annual observations, the maximum lag order is set to two for the dependent variable and one for each continuous explanatory variable. The optimal lag structure is selected using the Schwarz information criterion over a common estimation sample. TAR and UKR are excluded from lag selection because they enter Model 3 as fixed, unlagged controls. This parsimonious lag restriction preserves the remaining degrees of freedom and limits the risk of overparameterization. The selected lag orders are reported with the estimation results.

For the bounds test, each ARDL specification is reparameterized as an unrestricted error-correction model. Let Z_r denote the vector of continuous explanatory variables in Model r. Z_1 contains STC, MLC, INS and REER, while Z_2 and Z_3 additionally contain INT and EXT. The event terms in the following general representation apply only to Model 3 and are omitted from Models 1 and 2:

$$\Delta \ln EXP_t = a_r + \sum_{i=1}^{p_r-1} \lambda_{ri} \Delta \ln EXP_{t-i} + \sum_{j=1}^{K_r} \sum_{m=0}^{s_{rj}} \omega_{rjm} \Delta Z_{rj,t-m}$$
$$+\psi_{r0} \ln EXP_{t-1} + \sum_{j=1}^{K_r} \psi_{rj} Z_{rj,t-1} + d_{r1} TAR_t + d_{r2} UKR_t + u_{rt}$$

In Equation above, K_r denotes the number of continuous explanatory variables in Model r and s denotes the short-run difference lag order implied by the selected ARDL specification. The bounds test evaluates the joint null hypothesis that no level relationship exists:

$$H_0 : \psi_{r0} = \psi_{r1} = \cdots = \psi_{rK_r} = 0$$

H_a: At least one of these coefficients is non-zero.

The calculated F-statistic is compared with the lower- and upper-bound critical values reported by Pesaran et al. (2001). A statistic above the upper bound leads to rejection of the null hypothesis, a statistic below the lower bound implies that the null hypothesis cannot be rejected and a statistic between the bounds produces an inconclusive result. Consistent with the unrestricted-intercept and no-trend specification used in the empirical analysis, the Case III critical values are employed.

Following evidence of a long-run relationship, the long-run coefficients and the corresponding error-correction representation are estimated. In the error-correction model, ECM(-1) represents the lagged deviation from the long-run equilibrium. A negative and statistically significant error-correction coefficient indicates convergence toward equilibrium following a short-run disturbance. Model adequacy is assessed using tests for serial correlation, heteroskedasticity, residual normality, functional-form misspecification and parameter stability.

4. Results and Discussion

The stationarity properties of the continuous variables were examined using the ADF, PP and KPSS unit-root tests. As reported in Table 3, the results vary to some extent according to the test and deterministic specification. While some tests provide evidence of level stationarity for particular variables, the first-difference results generally support stationarity. Most importantly, there is no robust evidence that any variable is integrated of order two. The mixture of I(0) and I(1) evidence therefore supports the use of the ARDL bounds-testing approach.

The ADF and PP tests generally reject the unit-root null hypothesis after first differencing, particularly under the constant specification. The KPSS results largely support this

conclusion, although some differences arise under the trend specification. These differences are not unexpected given the short annual sample and the contrasting null hypotheses of the tests. Taken together, the results indicate that the variables can be treated as I(0) or I(1), satisfying the integration-order requirement of the ARDL approach.

Table 3. Unit-root test results.

PANEL A: CONSTANT						
Variable	**ADF Level**	**ADF 1st Diff.**	**PP Level**	**PP 1st Diff.**	**KPSS Level**	**KPSS 1st Diff.**
EXP	−2.816	−3.393 **	−4.044 ***	−3.672 **	0.665	0.359 *
STC	−1.042	−3.197 **	−1.233	−3.331 **	0.609	0.262 *
MLC	−0.998	−5.410 ***	−0.879	−5.420 ***	0.452 *	0.243 *
INS	−0.287	−5.065 ***	0.110	−7.846 ***	0.697	0.500
REER	−0.912	−5.089 ***	−0.978	−5.093 ***	0.472	0.213 *
INT	−2.876	−3.698 **	−4.700 ***	−3.887 ***	0.612	0.348 *
EXT	−1.845	−3.675 **	−3.426 **	−4.477 ***	0.681	0.270 *
PANEL B: CONSTANT + TREND						
Variable	**ADF Level**	**ADF 1st Diff.**	**PP Level**	**PP 1st Diff.**	**KPSS Level**	**KPSS 1st Diff.**
EXP	−3.254	−3.787 **	−3.321	−4.167 **	0.156	0.129 *
STC	−0.845	−3.240	−0.688	−3.529	0.127 *	0.149
MLC	−2.459	−5.702 ***	−2.349	−5.798 ***	0.123 *	0.124 *
INS	−2.732	−4.914 ***	−2.687	−7.448 ***	0.117 *	0.500
REER	−2.437	−5.119 ***	−2.413	−5.120 ***	0.165	0.121 *
INT	−2.543	−4.056 **	−3.210	−4.302 **	0.151	0.132 *
EXT	−2.557	−4.176 **	−1.945	−5.276 ***	0.160	0.193

Note: All tests are conducted using the natural logarithms of the continuous variables. ADF lag lengths are selected automatically using the Schwarz information criterion, with a maximum lag of five. The PP and KPSS tests employ the Bartlett kernel with automatic bandwidth selection. For the ADF and PP tests, ** and *** indicate rejection of the unit-root null hypothesis at the 5% and 1% levels, respectively. For the KPSS test, * indicates that the null hypothesis of stationarity cannot be rejected at the 5% level. TAR and UKR are binary event variables and are therefore not subjected to unit-root testing.

Using the Schwarz information criterion (SIC), Model 1 was selected as ARDL(1,1,0,1,0), where the lag orders refer respectively to EXP, STC, MLC, INS and REER. Model 2 was selected as ARDL(1,0,1,1,0,1,0), with the explanatory variables ordered as STC, MLC, INS, REER, INT and EXT. Model 3 was selected as ARDL(1,0,1,1,1,1,0) using the same variable order, while TAR and UKR enter as fixed, unlagged event controls. After the required lag adjustment, all three final equations are estimated over 2002–2024 and contain 23 observations. Because the lag structures are selected automatically, the conventional *p*-values are conditional on the selected specifications and do not incorporate model-selection uncertainty. Accordingly, the interpretation emphasizes coefficient patterns observed across the nested specifications rather than isolated estimates.

As reported in Table 4, the long-run estimates reveal an important distinction between the benchmark and augmented specifications. In Model 1, the coefficient of insured shipments is positive and statistically significant at the 1% level. Its estimated elasticity of 1.047 indicates that, before imported-input conditions, external demand and event controls are introduced, a 1% increase in insured shipment values is associated with an approximately 1.05% increase in aggregate exports in the long run. By contrast, the coefficients of short-term credits, medium- and long-term credits and REER are statistically insignificant in the benchmark model. The positive benchmark relationship for insured shipments is consistent with firm- and transaction-level studies showing that export insurance and guarantees may support exports by reducing payment risk, easing liquidity constraints

and facilitating transactions with riskier destination markets (Heiland & Yalcin, 2021; H. Choi & Kim, 2021; Agarwal et al., 2023; Hur & Yoon, 2025; Lodefalk et al., 2025).

Table 4. Long-run coefficient estimates.

Variable	Model 1	Model 2	Model 3
STC	−0.399 (0.304)	−0.050 (0.032)	−0.082 (0.069)
MLC	−0.113 (0.073)	0.016 (0.021)	0.031 (0.043)
INS	1.047 *** (0.307)	−0.087 (0.131)	−0.054 (0.191)
REER	−0.232 (0.704)	−0.276 * (0.133)	−0.261 (0.213)
INT	—	0.609 *** (0.088)	0.708 *** (0.194)
EXT	—	0.987 *** (0.318)	0.830 * (0.429)

Note: Standard errors are reported in parentheses. ***, and * denote statistical significance at the 1%, 5% and 10% levels, respectively. Model 1 is the benchmark specification. Model 2 adds intermediate-goods imports and external demand, while Model 3 additionally includes TAR and UKR as fixed event controls.

The long-run INS coefficient becomes negative but statistically insignificant when intermediate-goods imports and external demand are added in Model 2 and it remains insignificant after the tariff and war controls are introduced in Model 3. The negative coefficients in the augmented models should not be interpreted as evidence that export insurance reduces exports. Instead, the comparison indicates that the positive long-run relationship identified in the benchmark model is sensitive to broader macroeconomic conditions. Part of the aggregate co-movement between insured shipments and exports may therefore reflect changes in imported-input availability and foreign-market demand rather than a separately identifiable long-run insurance relationship.

Neither credit category exhibits a statistically significant long-run coefficient in any specification. The results therefore do not support a persistent positive aggregate relationship between exports and either short-term or medium- and long-term Eximbank credits. Nevertheless, the insignificant negative coefficients should not be interpreted as evidence that credit provision harms export performance. Public export support may be allocated countercyclically, with financing increasing when exporters experience weaker demand or tighter financial conditions. Moreover, aggregate annual data cannot identify the firms, transactions, or destinations directly supported by these instruments.

Intermediate-goods imports display the most stable long-run relationship in the augmented models. Their coefficients are positive and statistically significant at the 1% level, with estimated elasticities of 0.609 in Model 2 and 0.708 in Model 3. This finding reflects the dependence of Turkish export production on imported raw materials and components. External demand also has a positive long-run coefficient, although its statistical significance weakens from the 1% level in Model 2 to the 10% level in Model 3. The REER coefficients are consistently negative, but the relationship is statistically significant only at the 10% level in Model 2. The results therefore provide directional, but not fully robust, evidence that real appreciation is associated with lower exports.

The error-correction estimates presented in Table 5 provide stronger and more consistent evidence for the short-run insurance channel. The change in insured shipments has a positive and statistically significant coefficient in all three models. Its coefficient declines from 0.738 in the benchmark model to 0.216 after intermediate-goods imports and external demand are included and to 0.169 after the event controls are added. Thus, the magnitude of the relationship is sensitive to the inclusion of macroeconomic controls, but its positive statistical significance survives across all three specifications. This result indicates that insured shipment values have the strongest and most robust short-run association with aggregate exports among the Eximbank instruments considered.

Table 5. Error-correction model results.

Variable	Model 1	Model 2	Model 3
Constant	1.229 *** (0.172)	−1.457 *** (0.149)	−1.237 *** (0.131)
ΔSTC	0.058 (0.059)	—	—
ΔMLC	—	−0.0066 (0.0071)	−0.0009 (0.0078)
ΔINS	0.738 *** (0.115)	0.216 *** (0.051)	0.169 ** (0.054)
ΔREER	—	—	−0.161 ** (0.056)
ΔINT	—	0.283 *** (0.042)	0.353 *** (0.043)
TAR	—	—	−0.0002 (0.021)
UKR	—	—	−0.069 *** (0.019)
ECM(−1)	−0.263 *** (0.038)	−0.808 *** (0.081)	−0.829 *** (0.085)
Adjusted R^2	0.775	0.964	0.962
Observations	23	23	23

Note: Standard errors are reported in parentheses. ***, ** and denote statistical significance at the 1%, 5% and 10% levels, respectively. A dash indicates that the selected lag order does not produce a separately estimated differenced term for that variable; it does not indicate exclusion from the long-run equation. TAR and UKR enter Model 3 in levels as fixed event controls.

The persistence of the short-run insurance coefficient is consistent with the operational mechanism of export credit insurance. By reducing commercial and political payment risks, insurance may facilitate the execution of export contracts, improve exporters' access to working-capital financing and support shipments within the same period. Its weaker long-run performance in the augmented models suggests, however, that the immediate relationship does not translate into a separately identifiable permanent aggregate effect after imported-input conditions and external demand are taken into account. The findings should therefore be interpreted as conditional relationships rather than causal effects.

The short-run STC coefficient reported in Model 1 is positive but statistically insignificant. The selected lag structures in Models 2 and 3 do not generate a separate differenced STC term. Similarly, changes in medium- and long-term credits are statistically insignificant in Models 2 and 3. These results provide no evidence of a systematic short-run relationship between either credit category and aggregate exports.

Changes in intermediate-goods imports have positive and statistically significant coefficients in Models 2 and 3. The estimates imply that a 1% increase in intermediate-goods imports is associated with short-run export increases of approximately 0.28% and 0.35%, respectively. The short-run REER coefficient is separately estimated only in Model 3 and is negative and statistically significant, indicating that real appreciation is associated with a short-run reduction in exports in the fully augmented specification.

The TAR coefficient is effectively zero and statistically insignificant. By contrast, UKR has a negative and statistically significant coefficient of −0.069. In a model with a logarithmic dependent variable, this coefficient corresponds to exports being approximately 6.7% lower during 2022–2024, conditional on the other included variables. This estimate should not be interpreted causally because the dummy represents a broad event period and may capture several contemporaneous disruptions in addition to the Russia–Ukraine war.

The error-correction coefficients are negative, smaller than one in absolute value and statistically significant at the 1% level in all three models. Model 1 corrects approximately 26.3% of the preceding year's disequilibrium within one year. The adjustment process is considerably faster in Models 2 and 3, where approximately 80.8% and 82.9% of disequilibrium, respectively, is corrected within one year. These findings indicate convergence toward the estimated long-run equilibrium in every specification.

According to the bounds-test results summarized in Table 6, the F-statistics exceed the corresponding 5% upper-bound critical values in all three models. The null hypothesis of no level relationship is therefore rejected for every specification. The bounds-test evi-

dence consequently supports the existence of a long-run relationship among the variables included in each model. This finding establishes the presence of a levels relationship but does not imply that every individual explanatory variable has a statistically significant long-run coefficient.

Table 6. Bounds-test results.

Model	F-Statistic	k	Lower Bound (5%)	Upper Bound (5%)	Cointegration
Model 1	7.692	4	2.86	4.01	Cointegration
Model 2	9.539	6	2.45	3.61	Cointegration
Model 3	8.077	6	2.45	3.61	Cointegration

Note: Critical values correspond to Case III of Pesaran et al. (2001), with an unrestricted intercept and no trend. The value of k represents the number of continuous explanatory variables entering the long-run relationship; TAR and UKR are fixed event controls.

Table 7 brings together the residual and stability diagnostics used to evaluate the statistical adequacy of the estimated models. The F versions of the Breusch–Godfrey test do not reject the null hypothesis of no residual serial correlation at the 5% level. The Breusch–Pagan–Godfrey results similarly provide no evidence of heteroskedasticity, while the Jarque–Bera tests support residual normality in all three models. The CUSUM paths remain within the 5% critical bounds. Nevertheless, the recursive stability evidence for Model 3 is based on a particularly limited portion of the sample because of the number of estimated parameters and should therefore be viewed as supportive rather than conclusive.

Table 7. Diagnostic test results.

Model	Serial Correlation	Heteroskedasticity	Normality	RESET	CUSUM
Model 1	F = 1.280 (0.311)	F = 1.098 (0.413)	JB = 3.981 (0.137)	F = 0.388 (0.544)	Within bounds
Model 2	F = 1.525 (0.264)	F = 1.261 (0.347)	JB = 0.466 (0.792)	F = 8.225 (0.015)	Within bounds
Model 3	F = 2.363 (0.164)	F = 1.011 (0.508)	JB = 0.109 (0.947)	F = 10.828 (0.011)	Within bounds

Note: Values in parentheses are *p*-values. The Breusch–Godfrey F test uses two residual lags. Heteroskedasticity is examined using the Breusch–Pagan–Godfrey test, residual normality using the Jarque–Bera test and functional form using the Ramsey RESET test. The asymptotic Obs $\times$ R^2 *p*-values for the serial-correlation test are 0.151, 0.068 and 0.010 for Models 1–3, respectively.

For Model 3, the asymptotic Obs $\times$ R^2 version of the Breusch–Godfrey test rejects the no-serial-correlation null, whereas the F version does not. This divergence prevents an unequivocal conclusion regarding residual serial independence in the fully augmented model and reinforces the need for cautious interpretation.

The Ramsey RESET test does not indicate functional-form misspecification in Model 1 but rejects the null of correct specification in Models 2 and 3. These rejections suggest that the augmented equations may not capture every nonlinear or omitted functional feature of the export relationship. However, the RESET test does not identify the source of the misspecification. Adding further lags, nonlinear terms, or interactions solely to eliminate the rejection would substantially reduce the already limited degrees of freedom and create a risk of overparameterization and data-driven specification search. The theoretically motivated specifications are therefore retained, with Model 1 treated as the benchmark and Models 2 and 3 interpreted as sensitivity extensions. Consequently, the augmented-model findings are used to assess the robustness of coefficient patterns and are not given a structural or causal interpretation.

Taken together, the results provide a qualified evaluation of the hypotheses. H1 is not supported because short-term credits do not have a statistically significant positive coefficient in either horizon. H2 is also not supported because the medium- and long-term credit

coefficients are statistically insignificant. H3 receives partial support. Insured shipments are positive and significant in both the short and long run in the benchmark specification and their positive short-run coefficients remain significant after the macroeconomic and event controls are added. However, the long-run INS coefficient becomes statistically insignificant in the augmented models. The evidence therefore supports a robust short-run insurance relationship but indicates that its long-run relationship is specification-sensitive. H4 also receives only partial support. The REER coefficients generally have the expected negative sign, but the long-run coefficient is only marginally significant in Model 2, while the separately estimated short-run coefficient is significant only in Model 3.

The research questions can consequently be answered as follows. First, insured shipments exhibit the strongest relationship with aggregate exports among the three Eximbank instruments. Their short-run relationship is positive and statistically significant in every model, whereas the two credit categories do not display statistically significant relationships. Second, insured shipments are the only instrument with a significant positive long-run coefficient in the benchmark model, but this relationship does not remain significant after imported-input conditions and external demand are controlled for. Thus, insurance is the strongest short-run correlate, while no Eximbank instrument exhibits a fully robust and persistent long-run relationship with aggregate exports. Third, REER generally has the expected negative sign, but its statistical significance is not stable across specifications. Intermediate-goods imports emerge as the most consistent macroeconomic correlate of exports, while external demand remains positive but becomes less precisely estimated in the fully augmented model.

5. Conclusions

This study examined the short- and long-run relationships between Turkish Eximbank instruments and Turkey's aggregate export performance using annual data for the 2001–2024 period. Three nested log-linear ARDL models were estimated. The benchmark model includes short-term credits, medium- and long-term credits, insured shipment values and the real effective exchange rate. The second model adds intermediate-goods imports and external demand, while the third model additionally incorporates event controls representing the Turkey-specific US steel-tariff episode and the Russia–Ukraine war. The bounds-test results support the existence of a long-run relationship in all three specifications. The negative and statistically significant error-correction coefficients also indicate convergence toward long-run equilibrium.

The principal finding concerns the insurance channel. Changes in insured shipment values have positive and statistically significant coefficients in all three models, making insurance the strongest and most consistent short-run correlate of exports among the Eximbank instruments considered. Insured shipments also have a positive and significant long-run coefficient in the benchmark model. However, this long-run relationship becomes statistically insignificant after intermediate-goods imports and external demand are included. The findings therefore support a robust short-run insurance relationship but indicate that its long-run relationship is sensitive to broader macroeconomic conditions.

Accordingly, H1 is not supported because short-term credits do not exhibit a statistically significant positive relationship with exports. H2 is also not supported because the medium- and long-term credit coefficients are statistically insignificant. H3 receives partial support: insured shipments are positive and significant in both horizons in the benchmark model and their short-run significance survives in the augmented models, but their long-run significance does not. H4 likewise receives only partial and specification-dependent support. Although the REER coefficients generally have the expected negative

sign, the long-run coefficient is only marginally significant in Model 2, while the separately estimated short-run coefficient is statistically significant only in Model 3.

Among the macroeconomic controls, intermediate-goods imports display the most consistent relationship with exports. Their coefficients are positive and statistically significant in both the short and long run in Models 2 and 3, reflecting Turkey's dependence on imported raw materials and components in export production. External demand also has a positive long-run relationship with exports, although its statistical significance weakens in the fully augmented model. The tariff indicator is statistically insignificant, whereas the Russia–Ukraine war-period indicator has a negative and significant coefficient. These event coefficients represent conditional period associations and should not be interpreted as causal estimates.

The persistent short-run insurance result is consistent with firm- and transaction-level studies showing that export insurance and guarantees may facilitate trade by reducing payment risk, easing liquidity constraints and supporting transactions in riskier markets (Heiland & Yalcin, 2021; H. Choi & Kim, 2021; Agarwal et al., 2023; Hur & Yoon, 2025; Lodefalk et al., 2025). At the same time, the disappearance of the long-run insurance coefficient after the macroeconomic controls are added illustrates the difference between aggregate and recipient-level evidence. Aggregate annual data cannot determine which firms or transactions were insured, which destinations were covered, or whether support was allocated countercyclically during periods of weak export performance. The insignificant credit coefficients should therefore not be interpreted as evidence that Eximbank credit programs are ineffective at the firm or transaction level.

From a policy perspective, the findings underline the short-run relevance of export credit insurance as a risk-mitigation instrument. Nevertheless, the estimates do not provide sufficient causal evidence for reallocating Eximbank resources among credit and insurance programs solely on the basis of aggregate time-series relationships. A reliable assessment of program effectiveness requires recipient-level information on additional exports, destination coverage, firm size, sector, maturity structure, financing conditions and repayment risk. The positive intermediate-goods imports and external-demand coefficients further indicate that export-support policies should be considered together with policies affecting access to production inputs, foreign-market diversification and international competitiveness.

The study has several limitations. First, the use of annual aggregate data produces a small effective estimation sample and restricts the complexity of the dynamic specifications. The automatic lag-selection process also introduces model-selection uncertainty that is not reflected in conventional coefficient p-values. Second, the aggregate data do not permit separate examination of firms, sectors, products, transactions, or export destinations. Consistent annual destination-level series matching Eximbank-supported transactions with bilateral exports are unavailable for the entire sample period. Third, Eximbank support and export performance may be jointly determined, creating potential reverse-causality and endogeneity concerns that the ARDL framework cannot eliminate by itself. Fourth, the intermediate-goods imports series combines data reported under two trade systems using a linking coefficient and may therefore contain some measurement uncertainty. Fifth, the tariff and war indicators provide only broad representations of complex disruptions. Finally, the RESET rejections in Models 2 and 3 and the conflicting serial-correlation indicators for Model 3 demonstrate that the augmented-model estimates should be regarded as sensitivity evidence rather than definitive structural estimates.

Future research could use firm-, transaction-, sector-, product-, or destination-level data to distinguish directly supported exports from possible indirect relationships with aggregate exports. Higher-frequency data would allow a more detailed examination of short-run adjustment and global disruptions. Comparative studies involving different

countries and export credit agencies could improve the generalizability of the findings. Future studies could also employ causal identification strategies and alternative econometric approaches capable of addressing endogeneity, structural breaks, nonlinearities and time-varying relationships. Incorporating industrial production, labor costs and more detailed measures of trade-policy uncertainty would further clarify the conditions under which export credit and insurance programs contribute to export performance.

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Abbreviations

The following abbreviations are used in this manuscript:

EXP	Total exports
STC	Short-term export credits
MLC	Medium- and long-term export credits
INS	Insured shipment value
REER	Real effective exchange rate
INT	Intermediate-goods imports
EXT	Export-market volume (external demand)
TAR	Turkey-specific U.S. steel-tariff shock dummy
UKR	Russia–Ukraine war dummy
ARDL	Autoregressive Distributed Lag
GDP	Gross Domestic Product
ECM	Error-correction model

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