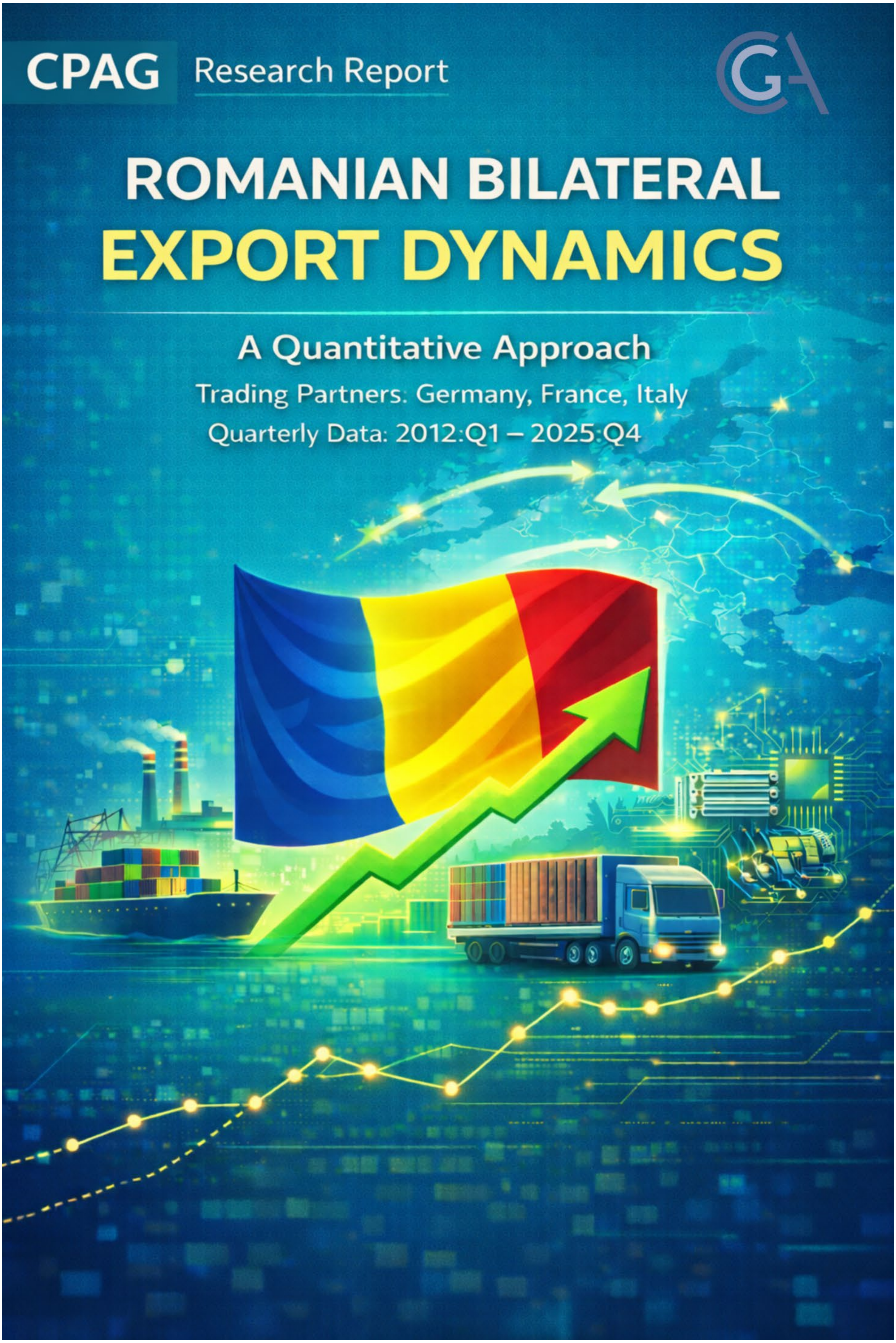
CPAG
Research Report
ROMANIAN BILATERAL
EXPORT DYNAMICS
A Quantitative Approach
Trading Partners: Germany, France, Italy
Quarterly Data: 2012:Q1 – 2025:Q4

ROMANIAN BILATERAL EXPORT DYNAMICS

Trading Partners: Germany, France, Italy

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Key Findings

Summary of main conclusions from the study

1

Romania's exports grow faster than partner countries

Romanian exports respond strongly to economic developments in partner countries. A 1% increase in income per capita in main partner countries leads to an approximately 1.4-1.5% increase in Romania's exports. The effect is even stronger in certain bilateral relationships.

Income elasticity: **Germany: 2.07** | **France: 1.71** | **Italy: 1.03**

2

Exchange rate has a limited impact on exports

Contrary to common perceptions, the study shows that exchange rate fluctuations play a limited role in the evolution of Romania's exports. Across all econometric models analyzed, the exchange rate effect is weak or statistically insignificant.

Romania is deeply integrated into European industrial supply chains, particularly in sectors such as automotive and electrical equipment. Many exported products contain imported components, which reduces the competitive advantage from currency depreciation. Romania's exports depend more on industrial integration than on exchange rate competitiveness.

3

Export structure differs across trading partners

Germany: Industrial components (automotive parts, wiring systems, mechanical equipment) used as inputs in German manufacturing.

France: Mix of final goods and components, notably vehicles produced in Romania and electrical equipment.

Italy: Larger share of traditional and lower value-added goods (textiles, footwear, wood products, metal articles).

4

Export adjustments occur relatively quickly

The analysis shows that when trade flows move away from their long-term trend, the adjustment toward equilibrium occurs relatively quickly.

~30% adjustment per quarter - Trade imbalances are typically corrected within approximately **six months**.

EUR 35bn	~37%	1.40	0.35
Total Exports to DE+FR+IT	Share of RO Total Exports	Long-Run Income Elasticity	Long-Run NER Elasticity

Germany
20-21% of RO exports | **EUR 20 billion** | Income Elasticity: **2.07*****

France
6-7% of RO exports | **EUR 6 billion** | Income Elasticity: **1.71*****

Italy
10-11% of RO exports | **EUR 9 billion** | Income Elasticity: **1.03*****

01 Introduction, Data, and Methodological Framework

Research motivation and scope of analysis

1.1 Motivation and Scope

This report presents an econometric investigation of Romania's bilateral export performance with its three principal EU trading partners—Germany, France, and Italy—over the period 2012:Q1 to 2025:Q4. The analysis is based on the demand equation in which Romanian exports to each destination are modelled as a function of partner-country economic activity (proxied by GDP per capita) and the nominal EUR/RON exchange rate, capturing the relative price channel through which currency movements may affect export competitiveness.

The choice of these three partners is not arbitrary. Germany, France, and Italy collectively absorb a substantial share of Romania's total goods exports, and the bilateral trade linkages with these economies reflect both supply-chain integration (particularly in the automotive sector with Germany) and complementary production structures. The EUR/RON exchange rate, while exhibiting a managed-float trajectory characteristic of Romania's depreciation path, nonetheless reports a variation that can be used to identify price-competitiveness effects on export volumes.

Trade Volume Hierarchy

Based on Trademap data for 2025, Germany consistently receives approximately 20-21% of Romania's total exports (EUR 20 billion annually), Italy approximately 10-11% (EUR 9 billion), and France approximately 6-7% (EUR 6 billion). Thus, exports to Italy represent roughly 44% of the German volume, and exports to France approximately 30% of the German volume. This size hierarchy has important implications for the econometric estimates.

1.2 Comparative Cross-Country Income Elasticities

The income elasticity estimates have well-established empirical research, especially for emerging/developing countries. Senhadji and Montenegro (1999), published as an IMF Staff Paper, estimated export demand equations for 53 developing and industrial countries using cointegration techniques. Their key finding was that the average long-run income elasticity of exports was approximately 1.5, with the average long-run price elasticity close to -1.0. Within this framework, regional heterogeneity is pronounced: Asia exhibited the highest income and price elasticities, while Africa faced the lowest. European and upper-middle-income countries typically clustered in the 1.2-1.8 range.

Bayoumi (1999), using panel data for 21 industrialised countries, obtained income elasticities of 1.84 for product-level export functions, aligning well with our German bilateral estimate. Studies on Turkish bilateral trade, a structurally comparable economy, report income elasticities around 1.99-2.24 in gravity frameworks, reinforcing the plausibility of the upper end of our range.

Table 1. Benchmarking elasticity estimates against international empirical literature

Study	Method	B(Inc)	B(Price)	N	Period
Senhadji & Montenegro (1999)	Time-series, cointegration	1.50	-1.00	53	1960-1993
Bayoumi (1999)	Panel, product-level	1.84	-0.31	21	Various
Devarajan, Go & Robinson (2023)	Time-series, CET/CES	1.40	Varies	191	1970-2018
Ahmed, Appendino & Ruta (2015)	Panel, GVC-adjusted	-	-22%	46	1996-2012
De Soyres et al. (2021)	Panel, bilateral I-O	-	Reduced	40+	1995-2009
Adler et al. (2019, IMF)	Bilateral panel, GVC	-	Reduced	37	2000-2014

*Source: Literature review. Note: * p < 0.01, * p < 0.10, n.s. = not significant. "Reduced" indicates a reduction in exchange rate elasticity due to GVC participation rather than reporting a point estimate.*

The more recent World Bank paper by Devarajan, Go, and Robinson (2023) updates these estimates for 191 countries and confirms that export and import elasticities of high-income countries average approximately 1.4, with a theoretically meaningful split at 1.0 between low-income and high-income economies.

The literature on Romanian trade elasticities specifically is rather scarce, as Romania is typically included in broader CEE panels rather than studied individually. The ECB Working Paper No. 545 (Bussière, Fidrmuc, and Schnatz, 2005) on trade integration of CEE countries found that Romania had achieved trade levels broadly consistent with gravity-model predictions but noted significant heterogeneity within the CEE group. Most directly relevant is the gravity model study by Goschin (2016) and the COVID-era panel analysis using augmented gravity specifications incorporating GVC positioning. These studies found that Romania's exports are primarily demand-driven and that the country's position in European manufacturing value chains plays a critical role in export dynamics.

02 Product Composition by Partner

Short analysis of export structure

Germany - Intermediate Goods Dominance

Romanian exports to Germany are dominated by three product categories: electrical machinery and equipment (HS 85), particularly wiring harnesses and electronic assemblies; vehicles and vehicle parts (HS 87), reflecting the Dacia/Renault and Ford production platforms as well as a dense network of Tier 1-2 component suppliers; and machinery and mechanical appliances (HS 84). Together, these three categories account for over 60% of total bilateral exports. Crucially, these are overwhelmingly intermediate goods and components rather than final consumer products.

Key Insight - Germany

Romania's primary exports to Germany—insulated wire (wiring harnesses), transmissions, and circuit boards—are inputs into German manufacturing. This intermediate-goods character explains the high income elasticity (B = 2.07): when German industrial output expands, demand for Romanian-sourced components is amplified through the production multiplier. It also explains the insignificant (and negative) exchange rate coefficient, as the high import content of these exports neutralises the price competitiveness channel.

France - Mixed Product Profile

Exports to France show a more diversified composition. Vehicles (including Dacia models produced in Romania and destined for the French market) constitute a significant share, alongside electrical equipment and, increasingly, agricultural products and chemicals. The presence of finished Dacia vehicles—a final consumer good—alongside intermediate electrical components creates a mixed product profile.

Key Insight - France

The income elasticity of 1.71 is consistent with this mix: final vehicle demand is income-elastic (as a durable consumer good), while the intermediate-goods component behaves similarly to the German bilateral. The positive (though insignificant) exchange rate coefficient (0.66) may reflect the final-goods component, where price competitiveness matters more than in pure intermediate-goods trade.

Italy - Traditional Goods Focus

The Italian bilateral has the most distinctive product composition. While vehicles and electrical equipment feature, there is a notably larger share of lower-value-added and traditional goods: textiles and apparel (HS 61-62), footwear and leather products (HS 64), wood products (HS 44), and iron and steel articles (HS 72-73). These product categories have more stable, less income-elastic demand patterns—textiles and footwear are closer to necessities, and their trade is often driven by cost advantages and outward processing arrangements (lohn work) rather than by income-driven absorption.

Key Insight - Italy

The income elasticity of 1.03, barely above unity, reflects this composition: Italian demand for Romanian textiles and leather does not amplify with GDP growth in the way that German demand for automotive components does.

Table 2. Summary of bilateral trade characteristics and estimated elasticities

Characteristic	Germany	France	Italy
Export volume (2025)	EUR 20 bn	EUR 6 bn	EUR 9 bn
Share of RO exports	~20-21%	~6-7%	~10-11%
Dominant HS chapters	HS 85, 87, 84	HS 87, 85, 84	HS 64, 85, 87, 73, 62
Primary export type	Intermediate / components	Mixed (final + intermediate)	Traditional + intermediate
Key products	Wiring harnesses, transmissions, boards	Dacia vehicles, electrical equip., agri-food	Footwear, textiles, vehicles, iron/steel
GVC integration depth	Very high (Tier 1-2)	Moderate (assembly + final)	Low-moderate (lohn + assembly)
Estimated B(GDP)	**2.07*** **	**1.71*** **	**1.03*** **
Estimated B(NER)	**-0.40 (n.s.)**	**0.66 (n.s.)**	**0.80 (n.s.)**
Model R2	0.896	0.842	0.784

*Data: Trademap (trade composition), own estimates (elasticities). Note: * p < 0.01, n.s. = not significant.*

03 Data and Variables

Panel dataset structure and descriptive statistics

2.1 Data and Variables

The dataset is structured as a balanced panel of N = 3 cross-sectional units (bilateral pairs: RO-DE, RO-FR, RO-IT) observed over T = 56 quarters, yielding 168 total observations. All data are sourced from Eurostat. The variables are defined as follows:

Exports

Romanian goods exports to each partner, in EUR, quarterly (TradeMap database). These are used in natural logarithm as the dependent variable, so that estimated coefficients are interpretable as elasticities.

NER (Nominal Exchange Rate)

The EUR/RON bilateral exchange rate, quarterly averages (Eurostat database). An increase denotes RON depreciation. In the log-log model, its coefficient represents the exchange rate elasticity of exports.

GDP per capita

Partner-country GDP per capita, current prices (EUR), serving as a demand-side absorptive capacity proxy (Eurostat database). This variable captures the income elasticity of Romanian exports with respect to the destination market.

Table 3. Descriptive statistics for the panel dataset (pooled across three bilateral pairs)

Statistic	Mean	Std. Dev.	Min	Max	N
Exports (EUR)	2,196,731	1,196,590	716,511	5,109,029	168
NER (EUR/RON)	4.71	0.23	4.35	5.09	168
GDP p.c. (EUR)	9,159.92	1,705.37	6,374.01	13,587.10	168
ln(Exports)	14.466	0.521	13.482	15.447	168
ln(NER)	1.548	0.048	1.471	1.627	168
ln(GDP p.c.)	9.106	0.182	8.760	9.517	168

Figure 1. Romanian bilateral exports (mil. EUR) to Germany, France, and Italy, 2012Q1–2025Q4.

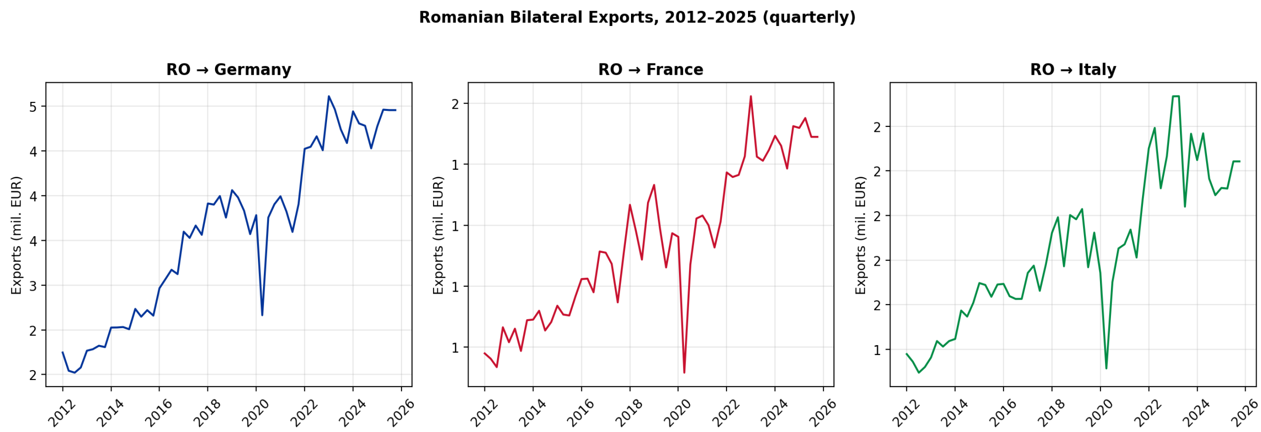
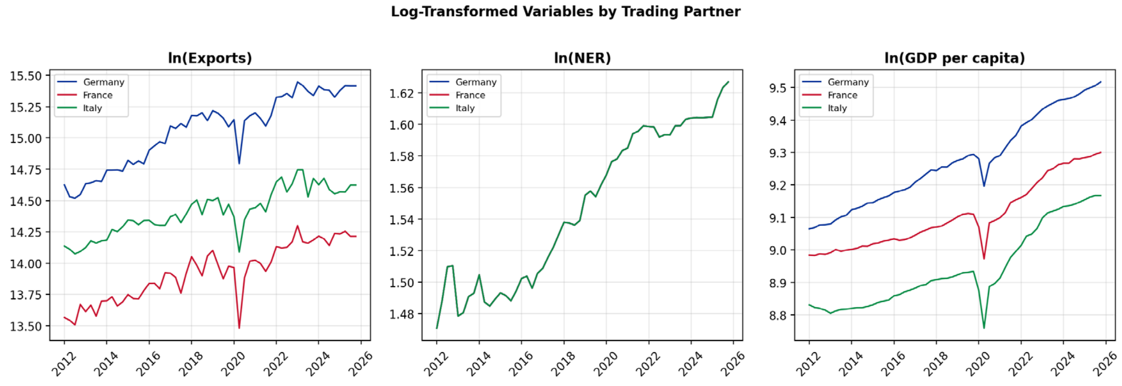


Figure 2. Log-transformed variables by trading partner.



Sources: authors, based on Trademap data

2.2 Unit Root Testing

Before proceeding to estimation, we assess the order of integration of each series using the Augmented Dickey-Fuller (ADF) test with automatic lag selection via the AIC criterion. This step is essential: if the variables are non-stationary in levels but stationary in first differences—that is, I(1)—then estimating level-based regressions without accounting for cointegration risks producing spurious results, while a dynamic (ARDL/ECM) specification becomes the appropriate modelling framework.

The results are explicit. Every series—ln(Exports), ln(NER), and ln(GDP per capita)—fails to reject the null hypothesis of a unit root in levels for all three partner countries, with p-values uniformly exceeding conventional significance thresholds. In first differences, every series rejects the null decisively ($p < 0.001$), confirming that all variables are I(1). This uniform integration order validates the use of both the levels-based Fixed Effects estimator and the panel ARDL in error-correction form.

Table 4. ADF unit root test results. Lag length selected by AIC (max 8)

Partner	Variable	Form	ADF Stat	p-value	Lags	5% CV	Result
DE	ln(Exports)	Level	−1.363	0.600	1	−2.917	Non-stationary
DE	**ln(Exports)**	**1st Diff**	**−11.142**	**0.000**	**0**	**−2.917**	**Stationary**
DE	ln(NER)	Level	−0.206	0.938	5	−2.921	Non-stationary
DE	**ln(NER)**	**1st Diff**	**−4.465**	**0.000**	**3**	**−2.920**	**Stationary**
DE	ln(GDP_pc)	Level	0.076	0.964	0	−2.916	Non-stationary
DE	**ln(GDP_pc)**	**1st Diff**	**−8.639**	**0.000**	**0**	**−2.917**	**Stationary**
FR	ln(Exports)	Level	−0.968	0.765	3	−2.919	Non-stationary
FR	**ln(Exports)**	**1st Diff**	**−7.449**	**0.000**	**2**	**−2.919**	**Stationary**
FR	ln(NER)	Level	−0.206	0.938	5	−2.921	Non-stationary
FR	**ln(NER)**	**1st Diff**	**−4.465**	**0.000**	**3**	**−2.920**	**Stationary**
FR	ln(GDP_pc)	Level	−0.058	0.953	0	−2.916	Non-stationary
FR	**ln(GDP_pc)**	**1st Diff**	**−8.682**	**0.000**	**0**	**−2.917**	**Stationary**
IT	ln(Exports)	Level	−1.604	0.482	2	−2.918	Non-stationary
IT	**ln(Exports)**	**1st Diff**	**−7.720**	**0.000**	**1**	**−2.918**	**Stationary**
IT	ln(NER)	Level	−0.206	0.938	5	−2.921	Non-stationary
IT	**ln(NER)**	**1st Diff**	**−4.465**	**0.000**	**3**	**−2.920**	**Stationary**
IT	ln(GDP_pc)	Level	0.043	0.962	0	−2.916	Non-stationary
IT	**ln(GDP_pc)**	**1st Diff**	**−7.941**	**0.000**	**0**	**−2.917**	**Stationary**

04 Static Panel Models (Levels)

Pooled OLS and Fixed Effects estimation

2.3 Static Panel Models

We estimate the following log-log specification:

$$ln(Exports_{it}) = \alpha_i + \beta_1\ ln(NER_t) + \beta_2\ ln(GDP\_pc_{it}) + \varepsilon_{it}$$

where i indexes the trading partner (DE, FR, IT) and t the quarter. The Pooled OLS imposes alpha_i = alpha (common intercept), while the Fixed Effects estimator allows partner-specific intercepts that capture time-invariant heterogeneity—differences in baseline trade volumes attributable to gravity-type factors such as geographic proximity, industrial complementarity, and historical trade linkages.

Table 5. Static panel estimates. Note: p-values in parentheses. Clustered standard errors by entity.

Variable	Pooled OLS	Fixed Effects
ln(NER)	-0.2726 (0.896)	0.5981 (0.071)
ln(GDP p.c.)	1.9146 (0.068)	1.5242 (0.000)
Constant	-2.5466	(entity-specific)
R2 (within)	0.426	0.830
Observations	168	168
F-test (poolability)	-	1317.7 (p = 0.000)

Source: Authors estimates. Note: p-values in parentheses. Clustered standard errors by entity.

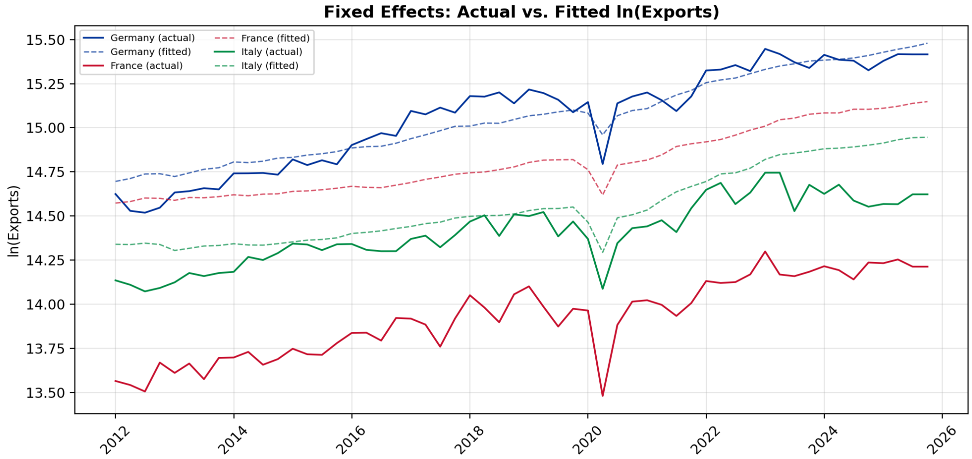
The F-test for poolability (F = 1317.7, p = 0.000) decisively rejects the null of a common intercept, confirming the relevance of entity-specific fixed effects and the inappropriateness of the Pooled OLS estimator.

1.52	0.60	83%
Income Elasticity (FE)	**NER Elasticity (FE)**	**Within R-squared**
p = 0.000	p = 0.071	Strong model fit

Under Fixed Effects, the income elasticity of Romanian exports stands at 1.5242 and is statistically significant at the 1% level (p = 0). This implies that a 1% increase in partner GDP per capita is associated with approximately a 1.5% increase in Romanian exports—an elastic response consistent with the income-sensitive composition of Romania's export basket (vehicles, electrical equipment, machinery).

The exchange rate elasticity is 0.5981, positive but only marginally significant at the 10% level (p = 0.0708). The positive sign is economically coherent: a weaker RON improves the price competitiveness of Romanian goods on European markets, supporting higher export volumes. The within R-squared of 0.8299 indicates that partner GDP and the exchange rate jointly explain approximately 83% of the within-entity variation in log exports—a strong fit for a two-regressor specification.

Figure 3. Fixed Effects model: actual vs. fitted ln(Exports) by partner.



05 Panel ARDL(1,1,1) in Error-Correction Form

Short-run dynamics and long-run equilibrium

2.4 Panel ARDL Specification

To properly account for the I(1) nature of the data and disentangle short-run adjustments from long-run equilibrium relationships, we estimate a panel ARDL(1,1,1) specification cast in its error-correction representation:

ARDL Model Specification

$$\Delta ln(Exp_{it}) = \alpha_i + \varphi \cdot ln(Exp_{i,t-1}) + \beta_1 \cdot ln(NER_{t-1}) + \beta_2 \cdot ln(GDP_{i,t-1}) + \gamma_1 \cdot \Delta ln(NER_t) + \gamma_2 \cdot \Delta ln(GDP_{it}) + \varepsilon_{it}$$

The parameter phi is the speed-of-adjustment coefficient. For a stable error-correction mechanism, phi must be negative. The long-run elasticities are recovered as theta_k = -B_k/phi.

Table 6. Panel ARDL(1,1,1) error-correction estimates. FE with clustered standard errors.

Parameter	Coefficient	p-value
Error correction (phi)	-0.3064	0.000
ln(NER)t-1	0.1057	0.398
ln(GDP p.c.)t-1	0.4302	0.001
Delta ln(NER)t (short-run)	0.0092	0.986
Delta ln(GDP p.c.)t (short-run)	2.6902	0.000
R2 (within)	0.515	-
Observations	165	-

Table 7. Long-run elasticities derived from the ARDL error-correction model.

Long-Run Parameter	Estimate
Theta(NER) = -B1/phi	**0.3449**
Theta(GDP) = -B2/phi	**1.4042**
Speed of adjustment (phi)	**-0.3064**

The speed-of-adjustment parameter phi = -0.3064 is negative and highly significant (p = 0), confirming the existence of a stable error-correction mechanism. The magnitude implies that approximately 30.6% of any deviation from the long-run equilibrium is corrected within a single quarter—a moderately fast adjustment that is plausible for quarterly trade flows, where shipping schedules, contracts, and supply-chain rigidities introduce inertia.

The short-run income elasticity (gamma2 = 2.6902) is strikingly large and significant (p = 0), indicating that Romanian exports respond strongly to contemporaneous changes in partner demand. The long-run income elasticity (theta(GDP) = 1.4042) converges to a more moderate but still elastic value, consistent with the static FE estimate of 1.5242. This pattern—a large, short-run overshooting followed by partial convergence toward equilibrium—is typical in trade models and may reflect inventory-cycle effects and anticipatory ordering.

Exchange Rate Channel - Key Finding

The exchange rate channel remains economically modest and statistically weak in both horizons: the short-run NER elasticity is essentially zero (gamma1 = 0.0092, p = 0.9858), while the long-run NER elasticity (theta(NER) = 0.3449) is moderate but imprecisely estimated. This finding suggests that the nominal exchange rate, over this period, has not been a decisive driver of Romania's bilateral export performance.

06 The Exchange Rate Disconnect

Why NER elasticity is statistically insignificant

Our finding that the nominal exchange rate elasticity is statistically insignificant across all specifications—near zero in the short run (ARDL: 0.009, p = 0.986) and modest but imprecisely estimated in the long run (0.34)—is far from anomalous. It connects to a growing body of evidence on the exchange rate disconnect in economies integrated into global value chains.

GVC Integration Effects

Amiti, Itskhoki, and Konings (2014) demonstrated using Belgian firm-product-level data that import intensity of exports and market share are the primary determinants of exchange rate pass-through (ERPT). Firms with high import content in their exports—close to the profile of Romania's automotive sector—exhibit significantly lower ERPT because currency depreciation simultaneously raises the cost of imported intermediates, offsetting the competitiveness gain on the export side.

Ahmed, Appendino, and Ruta (2015) provide the most directly relevant quantitative benchmark: they show that GVC participation lowers the elasticity of manufacturing exports to the real effective exchange rate by 22% on average and by close to 30% for countries with the highest GVC participation. Romania, with its automotive sector deeply embedded in German supply chains and an intermediate goods export share of approximately 17%, would be expected to exhibit precisely this kind of dampened exchange rate response.

De Soyres et al. (2021) Finding

A higher share of foreign value added in exports reduces the responsiveness of export volumes to exchange rate changes. They also show that a greater share of exports that 'returns as imports' (re-imports of domestic value added embedded in foreign goods) has the same dampening effect—a channel particularly relevant for Romania's automotive assembly operations, where components cross the border multiple times during production.

Evidence from Trade Data

The WITS/World Bank data on Romania's trade by stage of processing shows that in 2023, intermediate goods accounted for approximately 16.8% of total exports (EUR 16.9 billion) and 25-26% of total imports (over EUR 29 billion). The asymmetry—far more intermediates imported than exported—indicates that Romania imports components, processes them, and re-exports upgraded goods.

40%	EUR 3bn+	EUR 1.5bn
Industrial FDI	**Dacia/Renault Investment**	**Ford Investment**
Goes to automotive sector	Since privatisation	Craiova platform

The product-level evidence from Trademap data is unambiguous: Romania's top bilateral exports to Germany are HS 8544 (insulated wire/wiring harnesses), HS 8708 (parts and accessories for transport vehicles), and HS 8537 (electrical control panels)—all intermediate inputs by definition. The automotive sector alone receives 40% of total industrial FDI in Romania. This FDI structure ensures that a substantial fraction of Romanian exports consists of intra-firm trade within multinational production networks.

07 Bilateral OLS Regressions

Partner-specific heterogeneity analysis

2.5 Bilateral OLS Regressions

To investigate partner-specific heterogeneity, we complement the panel estimates with individual time-series regressions for each bilateral pair. Each equation is estimated by OLS with Newey-West (HAC) standard errors to account for autocorrelation and heteroscedasticity inherent in quarterly macroeconomic data.

Table 8. Bilateral OLS regressions with HAC standard errors (4 lags). Coefficient (p-value).

Partner	Constant	B(NER)	B(GDP p.c.)	R2	Adj. R2	D-W	N
Germany	-3.485 (0.146)	-0.397 (0.658)	2.067 (0.000)	0.896	0.892	0.522	56
France	-2.695 (0.242)	0.657 (0.300)	1.714 (0.000)	0.842	0.836	1.103	56
Italy	3.917 (0.029)	0.804 (0.129)	1.035 (0.000)	0.784	0.776	0.740	56

The bilateral estimates reveal a consistent structural pattern. The income elasticity is significant and greater than unity for all three partners, though with notable variation: Germany exhibits the highest income elasticity (2.07), followed by France (1.71) and Italy (1.03). This ordering aligns with the composition of Romanian exports to each destination.

1 Germany - Highest Elasticity (2.07)

Exports to Germany are dominated by high-value automotive components and machinery—products for which demand is highly income-elastic. Model fit is strongest for Germany (R2 = 0.896), consistent with the tighter supply-chain integration and more systematic demand transmission between the two economies.

2 France - Mixed Profile (1.71)

The income elasticity reflects the mixed product profile: final Dacia vehicles (income-elastic durable consumer goods) alongside intermediate electrical components.

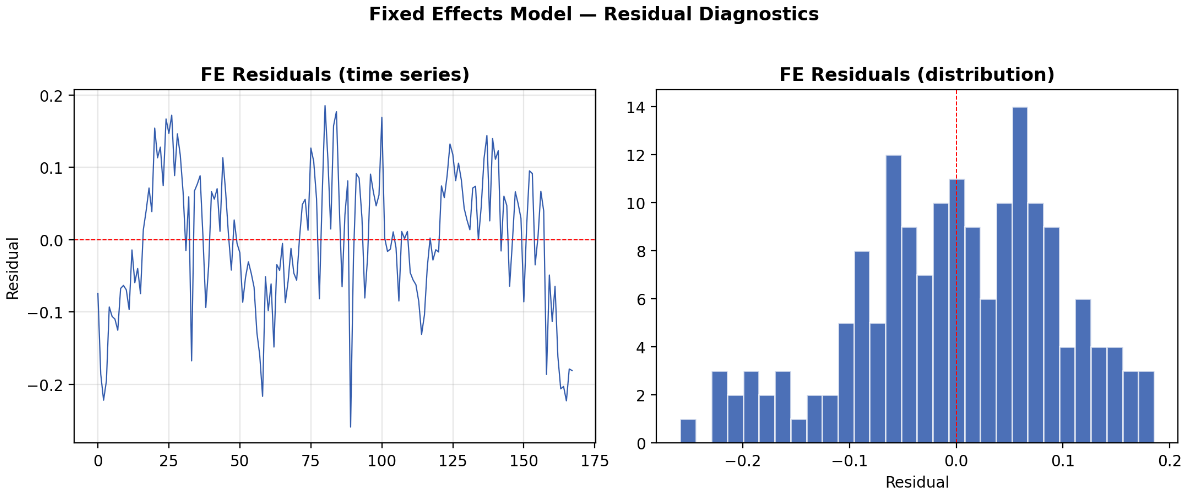
3 Italy - Traditional Goods (1.03)

Exports to Italy include a larger share of lower-value-added goods (textiles, wood products), consistent with a lower income elasticity. The lower fit (R2 = 0.784) suggests additional factors—perhaps sectoral shifts, trade diversion, or non-tariff barriers—play a larger role.

Exchange Rate Coefficient Pattern

The exchange rate coefficient is statistically insignificant across all three bilateral equations, reinforcing the panel-level finding. Interestingly, the sign varies: negative for Germany (suggesting that RON depreciation may reduce exports, possibly reflecting the import-content of automotive supply-chain trade) and positive for France and Italy. None of these estimates achieves conventional significance levels.

Figure 4. Fixed Effects residuals: time-series plot (left) and histogram (right).



08 Conclusions

Key findings and policy implications

1 Partner-country demand is the dominant driver

Across all specifications—panel FE, panel ARDL, and bilateral OLS—the income elasticity is statistically significant, greater than unity, and economically large. The long-run income elasticity ranges from approximately 1.0 (Italy) to 2.1 (Germany), with the panel estimates centering around 1.4-1.5. These magnitudes imply that Romanian exports are not merely tracking European growth but amplifying it, consistent with a deepening structural integration into EU production networks.

2 The nominal exchange rate exerts at best a marginal influence

The NER elasticity is statistically insignificant in every specification except the static FE model (where it is significant only at 10%). The ARDL model finds near-zero short-run exchange rate pass-through and a modest, imprecisely estimated long-run effect. Romania's export competitiveness is primarily determined by non-price factors—supply-chain positioning, product quality, delivery reliability—rather than by nominal exchange rate movements.

3 The error-correction mechanism operates at a meaningful pace

Approximately 30% of disequilibria corrected each quarter, implying a half-life of approximately two quarters for adjustment to the long-run equilibrium—a speed that reflects the quarterly rhythm of commercial contracts, shipping cycles, and demand adjustments in European goods trade.

4 Economically significant heterogeneity exists across trading partners

Germany stands out with the highest income elasticity, strongest model fit, and tightest supply-chain integration—suggesting that the German economic cycle is the single most important external determinant of Romanian export growth. The weaker relationships with France and Italy indicate more diffuse trade linkages and a larger role for other bilateral factors.

Policy Implications

1.4-2.1

Income Elasticity Range

Romanian exports amplify EU growth cycles, with Germany showing the strongest linkage at 2.07

~0

Exchange Rate Impact

Nominal exchange rate movements have near-zero effect on export volumes due to GVC integration

30%

Quarterly Adjustment

Speed of error correction—disequilibria adjust with a half-life of approximately two quarters

Strategic Conclusion

Romania's export trajectory is fundamentally bound to the growth performance of its core EU partners and to the depth of its supply-chain integration, not to nominal exchange rate movements. Exchange rate management—while important for macroeconomic stability—is unlikely to serve as a lever for export-led growth. Policy should focus on deepening GVC integration, improving product quality, and enhancing delivery reliability rather than relying on currency competitiveness.

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Technical Notes

Methodology

All estimations were performed in Python 3.12 using statsmodels (0.14) and linearmodels. Panel FE and Pooled OLS employ entity-clustered standard errors. Bilateral OLS uses Newey-West HAC standard errors with 4 lags. ADF tests use AIC-selected lag lengths with a maximum of 8.

Model Specification

The ARDL(1,1,1) specification was chosen based on the quarterly frequency of the data; higher-order lags were not considered given the modest time dimension (T = 56). All variables are in natural logarithms, permitting direct elasticity interpretations. The NER is common across the three bilateral pairs (EUR/RON), while exports and GDP per capita vary by partner.