Revisiting Albania's Negative Finance-Growth Nexus: A Dynamic ARDL Analysis

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Abstract: - This paper revisits the finance-growth nexus in Albania, providing an updated and more thorough empirical analysis of findings initially presented in previous research (2016). The original study revealed a statistically significant negative relationship between financial development and economic growth in Albania from 1994 to 2015, contradicting established beliefs. This study extends the time-series analysis to 2024 and utilizes a dynamic autoregressive distributed lag (ARDL) model to examine the persistence of the negative relationship while accounting for financial stability and institutional quality. The ARDL bounds test verifies a stable long-term cointegrating relationship among the variables. The results demonstrate that the adverse long-term correlation between financial development and economic growth has not only endured but is also substantial and highly significant. The analysis confirms that while trade openness is conducive to long-run growth, inflation has a significant negative impact. The study concludes that in Albania's post-transition context, the quality and efficiency of financial intermediation are more important than the amount of credit. These results show that we still need policies that focus on improving banking supervision to ensure that credit goes to investments that are productive and lead to long-term growth.

Key-Words: - Finance-Growth Nexus; Financial Development; Economic Growth; ARDL Model; Albania; Post-Transition Economies; Finance Without Function.

Received: October 21, 2025. Revised: January 22, 2026. Accepted: May 24, 2026. Published: July 21, 2026.

1 Introduction

The link between financial development and economic growth has been a hot topic in economics since the concept was firstly introduced [1], and later formalized by [2] and [3]. The dominant "supply-leading" hypothesis asserts that an efficient financial sector serves as a catalyst for economic growth by directing capital towards its most productive applications. However, the experience of post-transition economies such as Albania reveals a more complex scenario, challenging a simplistic linear interpretation and indicating that the quality of finance may be more significant than its quantity.

After communism fell, Albania began a long and difficult journey to become a market economy. Its financial sector was just starting to grow in the 1990s, but it went through a period of rapid consolidation and credit expansion in the 2000s when, for example, domestic credit to the private sector grew from about 6% of GDP to a peak of almost 40% by 2010, [4]. During this time of financial deepening, the economy was also growing strongly. However, after the 2008 global financial crisis, economic growth was accompanied by a rapid increase in the number of Non-Performing Loans (NPLs) in the banking sector, indicating that the economy remained weak and highlighting the risks of a credit boom that was not based on productive investment.

This event put a significant question mark on the impact of credit in the economy, and studies done in the aftermath of the crisis discovered some interesting empirical puzzles. One such finding, from a study that used an OLS model to analyze data from 1994 to 2015, revealed a statistically significant negative relationship between the growth of domestic credit and the growth of per capita GDP. This unexpected and counterintuitive result indicated that the efficient allocation of capital to productive investments, which is the primary transmission channel in the finance-growth nexus, wasn't working. The study speculated that this decline resulted from poor credit quality, indicated by elevated non-performing loans (NPLs), and a possible misallocation of credit towards consumption rather than productive enterprise.

Almost ten years later, this paper aims to reexamine that fundamental question using a larger

dataset and a more advanced econometric framework. With a time-series now covering almost three decades (1996–2024), this study examines a critical inquiry: Does the negative finance-growth relationship in Albania persist? Additionally, it seeks to transcend mere correlation identification by rigorously evaluating the mechanisms proposed in the 2016 paper. This research specifically inquires:

1. What is the long-term effect of financial development on economic growth after considering both short-term dynamics and long-term equilibrium through an autoregressive distributed lag (ARDL) model?
2. What is the impact of adding financial stability indicators, especially the NPL ratio and institutional quality, as measured by the Rule of Law, on this relationship?

This paper makes three important contributions. First, it provides a timely update on an important country-specific finding. Second, it improves on the methodology by using an Autoregressive Distributed Lag (ARDL) model, which shows that the variables have a stable long-term cointegrating relationship between them. Third, it provides a more comprehensive explanation for the observed phenomena by integrating a broader array of control variables. The results support the findings of the 2016 study, demonstrating a persistent, statistically significant negative long-term relationship between financial development and economic growth in Albania.

2 Literature Review

2.1 Theoretical Foundations: A Contested Relationship

The literature review reveals that there are two main competing theories regarding the relationship between finance and growth that contribute to the academic discussion. The "supply-leading" hypothesis, introduced and advocated by [1] and later subsequently defined by the work of [2] and [3], states that financial intermediaries serve as a significant catalyst for growth. In a developed financial system, capital is allocated to its most productive uses through the mobilization of savings, project selection, risk management, and facilitating transactions, all of which promote innovation and economic growth. On the other hand, the "demand-following" perspective, linked to the work of [5], claims that actually finance is a passive responder to the needs of the real economy—it is the business that leads, and finance follows. While a considerable amount of cross-country empirical research has identified evidence endorsing the supply-leading perspective, the relationship is not universally favorable, with recent studies continuing to produce complex and context-specific results, especially in the case of developing and transition economies where institutional frameworks are still evolving, [6].

2.2 Beyond Linearity: "Too Much Finance" vs. "Finance Without Function."

The 2008 global financial crisis forced a significant reevaluation of the "more finance is better" paradigm. A substantial body of literature has emerged, illustrating a non-linear, inverted U-shaped relationship between finance and growth. A specific threshold commonly referenced as 80-100% of private credit to GDP has been indicated by several research studies conducted by [7], [8], and [9], which conclude that if this is exceeded, subsequent financial deepening may hinder growth. This can possibly happen because of reallocation of talent from productive sectors to financial ones, or contributing to asset bubbles.

However, the "too much finance" explanation is less likely to be true for an economy like Albania's, where financial depth has stayed well below these high levels. The negative correlation observed in previous studies [10] suggests a more nuanced phenomenon: "finance without function" or "too much bad finance." This view changes the focus to the quality and efficiency of finance instead of quantity. Further, as argued by [9], the non-linear relationship between finance and growth may be more complex than a simple inverted U-shape, requiring more flexible econometric models to properly identify thresholds. The main problem isn't the amount of credit, but whether it is used in a useful way. This supports the claim made by [11] that unregulated or indiscriminate credit expansions can have an enormous negative impact on growth. Further literature distinguishes productive enterprise credit from potentially growth-impeding household consumption credit, a hypothesis that was also raised in the 2016 study on Albania.

2.3 The Important Role of Financial Stability and Institutional Quality

The "finance without function" hypothesis is directly connected to two important enabling factors: how well the banking system is doing and how satisfactory the institutional environment is.

First, financial stability is essential. The level of Non-Performing Loans (NPLs) is a clear and strong

sign of bad asset quality and poor use of capital. A high NPL ratio means that a lot of bank credit isn't making money and is instead stuck in projects that aren't working. This hurts the economy directly by limiting the amount of new credit available and making things less certain. Recent empirical research on Albania and the Western Balkans [12], [13], [14] has consistently demonstrated that elevated non-performing loans (NPLs) obstruct economic growth, thereby reinforcing the central hypothesis of the 2016 study, which identified substandard credit quality as a principal factor contributing to the adverse finance-growth relationship.

Second, the effectiveness of financial intermediation depends on the larger institutional framework. There is a growing consensus in the literature that strong institutions, especially the rule of law, the fight against corruption, and property rights, are all necessary for financial development to lead to long-term growth. If the rule of law is weak, contracts are poorly enforced, creditor rights are unprotected, and credit risk is high, capital tends to be misallocated, and people seek money instead of investing it. This emphasizes the necessity for comprehensive, country-specific analysis, as the effects of institutional quality can be complex in post-transition contexts.

2.4 Research Gap and Contribution

The finding of a negative finance-growth relationship in Albania [10] established an important empirical puzzle. While the original study hypothesized that this was due to poor credit quality and inefficient capital allocation, two key questions remained for the subsequent period: First, has this negative relationship persisted over the last decade? And second, can this anomaly be better explained by formally testing the roles of financial stability (NPLs) and institutional quality (rule of law) within a more dynamic model?

This paper addresses this gap directly by applying a robust Autoregressive Distributed Lag (ARDL) model to an extended dataset (1996-2024), which not only confirms the persistence of the negative long-run relationship but also provides a more nuanced understanding of the short-run dynamics and the specific roles of macroeconomic and institutional factors that influence growth in Albania.

3 Data and Methodology

For reevaluating the finance-growth nexus in Albania, we choose to use the Autoregressive Distributed Lag (ARDL) model as the primary econometric tool for the analysis. This section describes the data sources, the variables, and the reasons for selecting this methodological approach.

3.1 Data and Variable Description

To empirically test these hypotheses, we adopt an augmented aggregate production function framework. Following standard growth theory [15], output is a function of capital, labor, and technology. We augment this standard specification by including financial development (log_DCBS) as a shift factor affecting total factor productivity (TFP), alongside institutional quality (RuleOfLaw) and macroeconomic stability controls (Inflation, Trade). This theoretical grounding allows us to interpret the coefficients not merely as correlations but as structural determinants of long-run steady-state growth.

The analysis utilizes annual time-series data for Albania from 1996 to 2024. The data are collected from internationally recognized databases, such as the World Bank's World Development Indicators (WDI), Global Financial Development Database (GFDD), and Worldwide Governance Indicators (WGI). This choice was made to ensure that the data are reliable and consistent.

The dependent variable, to account for economic growth, is the annual growth rate of real GDP per capita (growth). As the literature suggests, this indicator is the standard for measuring growth in the real world because it takes into account population growth and changes in living standards.

The independent variables include the original predictors from the 2016 study, enriched by new variables selected to evaluate the fundamental hypotheses concerning financial development, stability, and institutional quality, while accounting for conventional macroeconomic factors. The main variable of interest is

Financial Development (DCBS): Measured as domestic credit to the private sector by banks (% of GDP. This is still the main measure of financial depth, just like it was in the 2016 study, [10].

To evaluate the hypotheses on the quality and efficiency of finance, the model is enhanced with:

Financial Stability (NPL): The ratio of the bank's non-performing loans to total gross loans, which is included to directly test the hypothesis that bad credit quality slows growth.

Institutional Quality (Rule of Law): The Rule of Law estimate from the World Bank's Worldwide Governance Indicators (WGI) is incorporated to measure the quality of contract enforcement and the judiciary. The estimated score, which ranges from approximately -2.5 to 2.5, is used rather than the percentile rank in order to capture more variance.

To avoid omitted variable bias and be in line with modern growth models, the model also includes a standard set of control variables such as Net Interest Margin (NIM), Trade Openness (% of GDP, Inflation (annual %), and Foreign Direct Investment (FDI), net inflows (% of GDP), [10]. Table 1 shows the descriptive statistics for all of the variables that were used in the final model. Prior to estimation, the variables were tested for multicollinearity using the Variance Inflation Factor (VIF), with results indicating no severe issues (see Table B.1 and Table B.2 in Appendix B).

Table 1. Descriptive Statistics

Characteristic	N = 29
GDP Per Capita Growth (%)	4.68 (4.40)
Domestic Credit (% of GDP)	24.05 (13.65)
NPL Ratio (%)	10.22 (6.57)
Net Interest Margin (%)	3.92 (0.67)
Rule of Law (Estimate)	-0.54 (0.22)
Trade Openness (% of GDP)	69.52 (11.18)
Inflation (%)	4.57 (6.88)
FDI (% of GDP)	6.16 (2.71)

Note: The table reports the mean and standard deviation (in parentheses) for each variable used in the analysis for the period 1996-2024.
Source: Authors' calculations based on World Bank WDI, GFDD, WGI data.

One of the more frequent challenges with studies for countries that have transitioned recently to market economies is the lack of data, especially in the earliest years of this transition. This is the case for Albania, and the raw data collected revealed missing observations for several variables, particularly for NPL and RuleOfLaw in the earlier years of the sample. This made us decide to drop the years 1994 and 1995, which have been included in the original study, and we used the Multivariate Imputation by Chained Equations (MICE) algorithm as a robust method to impute missing data with 'predictive mean matching' (pmm) with 5 iterations to preserve the distributional characteristics of the data. This approach is preferred over listwise deletion in small samples to prevent the loss of degrees of freedom and allows for a complete and balanced time series for the ARDL analysis.

3.2 Econometric Model: Autoregressive Distributed Lag (ARDL)

In order to be able to capture the complex dynamics of the finance-growth relationship in a time series, this study uses an Autoregressive Distributed Lag (ARDL) model, introduced by [16]. Literature suggests that this approach is a significant methodological advancement over the static OLS regression, which was used in the 2016 paper, and is particularly well-suited for this analysis for several reasons:

- Effectiveness with Mixed Stationarity: The ARDL model is robust for variables that are showing stationarity at their levels (I(0)) or after first differencing (I(1)). This is ideal for such cases as this with macroeconomic time series, which have often mixed orders of integration, and it avoids the pre-testing biases of other cointegration techniques.
- Estimation of Long-Run and Short-Run Effects: The ARDL framework also allows for the simultaneous estimation of both the long-run equilibrium relationship between variables and the short-run dynamic adjustments. In our case, this is crucial for determining if financial development has a lasting impact on growth and for understanding the speed at which the economy returns to its long-run path after economic shocks.
- Mitigation of Endogeneity and Reverse Causality: In addition to its small-sample advantages, the ARDL approach helps address potential endogeneity and reverse causality issues—a common concern in finance-growth literature. As shown by [17], the ARDL estimators are 'super-consistent' in the presence of I(1) variables, meaning that endogeneity biases become negligible as the sample size is utilized effectively in the lag structure. By including lags of both the dependent and independent variables, the model explicitly accounts for the feedback loops between growth and financial depth, mitigating the need for separate instrumental variable (IV) estimations, which are often weak in small samples.

The estimation procedure follows a three-step process:

- First, each variable time-series were examined for stationarity using the Augmented Dickey-Fuller (ADF) and Zivot-Andrews tests to ensure no variables were integrated of order two, I(2).
- Second, the Akaike Information Criterion (AIC) was used to find the optimal lag structure for the model.

- Third, the ARDL bounds test for cointegration was performed on the Unrestricted Error Correction Model (UECM) representation:

$$\Delta Growth_t = \beta_0 + \sum_{i=1}^{p} \emptyset_i \Delta Growth_{t-1} + \sum_{j=0}^{q} \theta_j' \Delta X_{t-j} + \lambda_1 \Delta Growth_{t-1} + \lambda_2' X_{t-1} + \varepsilon_t \quad (1)$$

where $Growth_t$ is the dependent variable, X is the vector of all independent variables, Δ is the first difference operator, and ε_t is the error term. The $\emptyset$ and θ capture the short-run dynamics. The bounds test is an important key step to test the joint null hypothesis that the coefficients on the lagged level variables are zero (H_0: $\lambda_1 = \lambda_2' = 0$). If this hypothesis is rejected, it confirms the existence of a long-run cointegrating relationship. The long-run coefficients and the Restricted Error Correction Model (RECM) are then estimated. Due to the presence of serial correlation detected in the final model, Heteroskedasticity and Autocorrelation Consistent (HAC) standard errors, using the Newey-West estimator, were subsequently employed to ensure the validity of all statistical inference.

The analysis is conducted on a sample of approximately 30 annual observations, a common constraint in time-series studies of post-transition economies due to limited historical data availability. To address this shortcoming, we choose to use the ARDL framework, because, unlike other cointegration techniques, which require large datasets for their asymptotic properties to hold, the ARDL bounds testing approach is known to be robust and provide reliable estimates even with small samples, [16]. In addition, the high statistical significance of the cointegration test and the key long-run coefficients found in this study do suggest that the underlying economic relationships are strong enough to be clearly detected despite the data constraints.

The R software environment (R Core Team, 2024) and RStudio have been the software of choice for all data processing and econometric analysis. Model estimation and diagnostic testing were run with packages such as ARDL, sandwich, and strucchange.

4 Empirical Results

In this section, we will introduce the results of the econometric analysis. Starting with the stationarity properties of the variables examined, followed by the test for a long-run cointegrating relationship. Finally, the estimated long-run and short-run coefficients from the ARDL model are presented.

4.1 Unit Root and Cointegration Tests

The first step in the ARDL procedure is to determine the order of integration for each variable to ensure none are integrated of order two, I(2). Standard Augmented Dickey-Fuller (ADF) tests were conducted for all variables. Due to the significant structural break identified visually in the DCBS series, the more robust Zivot-Andrews (ZA) unit root test, which endogenously accounts for a single structural break, was employed for the log-transformed log_DCBS variable.

The structural break identified in the DCBS series (as shown in Figure 1) marks the distinct shift in the credit cycle during the mid-2000s, separating the period of rapid financial deepening from the post-crisis deleveraging phase. This confirms that the series is stationary around a broken trend, justifying the use of the Zivot-Andrews test.

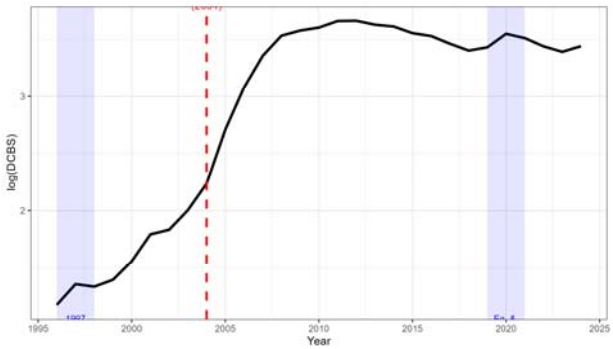

Fig. 1: Structural Break in Financial Development
Note: The red dashed line indicates the structural break identified by the Zivot-Andrews test. Shaded regions represent the 1997 crisis and the 2019-2020 earthquake/pandemic shocks.
Source: created by the author using studioR

The results, as shown in Table 2, confirm that all variables are suitable for the ARDL framework, being either stationary at their levels, I(0), or after first differencing, I(1).

We acknowledge that for certain variables, specifically NIM and RuleOfLaw, the unit root test results were borderline at standard significance levels, suggesting some ambiguity in their order of integration. To address this uncertainty, we conducted sensitivity checks using alternative lag selection criteria (Schwarz Information Criterion), which confirmed the robustness of the stationarity classifications reported. Furthermore, a key

advantage of the ARDL bounds testing approach is its flexibility; it yields consistent estimates regardless of whether the underlying regressors are purely I(0), purely I(1), or mutually cointegrated, [16]. This feature mitigates the risk of potential pre-testing bias associated with these borderline cases.

Table 2. Summary of Unit Root Test Results

Variable	Test used	Order of Integration	Conclusion
Growth	ADF	I(0)	Stationary at Level
Log_DCBS	Zivot-Andrews	I(0)	Stationary at Level (around a break)
NPL	ADF	I(1)	Stationary at First Difference
NIM	ADF	I(0)	Stationary at Level
RuleOfLaw	ADF	I(0)	Stationary at Level
Trade_Openness	ADF	I(1)	Stationary at First Difference
Inflation	ADF	I(0)	Stationary at Level
FDI	ADF	I(1)	Stationary at First Difference

Note: The table summarizes the order of integration for each variable. I(0) indicates stationarity at levels; I(1) indicates stationarity at the first difference. Detailed test statistics are provided in Table A1 (Appendix A).
Source: created by the author using studioR

Given that the variables are a mix of I(0) and I(1), the ARDL bounds test for cointegration was performed to determine if a stable long-run relationship exists. The results are presented in Table 3.

Table 3. ARDL F-Bounds Test for Cointegration

Test Statistics	Value	K
F-Statistics	19.243	7
Critical Value Bounds		
Significance Level	I(0) Bound	I(1) Bound
10%	2.22	3.39
5%	2.56	3.87
1%	3.29	4.87

Note: Critical values are from [16] for k=7 regressors.
Source: created by the author using studioR

The calculated F-statistic is higher than the 1% critical upper bound value (F-statistic of 19.243 > 4.87), showing that the null hypothesis of no cointegration is strongly rejected, confirming the existence of a stable long-run equilibrium relationship between economic growth and the set of independent variables.

4.2 Long-Run and Short-Run Estimates

After the cointegration was confirmed, the Akaike Information Criterion (AIC) was used to estimate the best ARDL model (1, 2, 1, 2, 0, 1, 1, 2), as detailed in Table C.3 (Appendix C). The full results of the ARDL model are presented in Table 4, wherein Panel A are the long-run coefficients and in Panel B the short-run dynamics from the Error Correction Model (RECM).

Table 4. ARDL Model Estimation Results - Dependent Variable: Growth

Panel A: Estimated Long-Run Coefficients				
Variable	Coefficient	Std. Error Std. Error HAC	t-value	p-value p-value HAC
Intercept	10.732	0.7478 0.4632	14.351	<0.001 *** <0.001 ***
log_DCBS	-9.194	2.6223 2.8237	-3.506	0.0029 *** 0.005 ***
NPL	-0.012	0.0630 0.1084	-0.193	0.8491 0.9119
NIM	-0.274	0.5196 0.3887	-0.527	0.6053 0.4911
Trade_Openness	0.342	0.0366 0.0419	9.343	<0.001 *** <0.001 ***
Inflation	-0.497	0.0427 0.0343	-11.655	<0.001 *** <0.001 ***
FDI	0.281	0.1868 0.1443	1.505	0.1517 0.0690 *

Panel B: Short-Run Dynamics (Error Correction Model)				
Variable	Coefficient	Std. Error Std. Error HAC	t-value	p-value p-value HAC
Δ(L(log_DCBS, 1))	12.611	2.5555 2.7590	4.935	0.005 ** 0.0003 ***
Δ(L(NIM, 1))	1.465	0.4698 0.4750	3.119	0.0066 *** 0.0071 ***
Δ(L(FDI, 1))	0.491	0.1726 0.1810	2.845	0.0117 ** 0.0153 **
RuleofLaw	4.851	1.2374 2.1432	3.920	0.0035 ** 0.0498 *
Error Correction Term (ECT)				
ECT	-1.073	0.065	-16.543	<0.001 ***
Model Diagnostics				
Adjusted R-squared	0.9681	Prob(F-statistic)	<0.001	
F-statistic (Overall Model)	79.93	Residual Std. Error	0.9259	

*Note: Panel A reports the estimated long-run coefficients. Panel B reports the short-run dynamics from the Restricted Error Correction Model (RECM). Significance, indicated by stars (*** p<0.01, ** p<0.05, * p<0.1), is based on robust p-values from HAC (Newey-West) standard errors to correct for serial correlation.*
Source: created by the author using studioR

As seen in Table 4, the significance of our key variables remains robust even without the HAC correction, though the correction properly accounts for the serial correlation.

The estimated Error Correction Term (ECT) coefficient of -1.073, which is statistically significant at the 1% level, differs from standard equilibrium models, which typically yield an ECT between -1 and 0 (monotonic convergence); as such it suggests an oscillatory convergence. This magnitude is theoretically acceptable within the ARDL framework. As noted by [18], an ECT between -1 and -2 indicates that the system corrects more than the disequilibrium in the current period, creating a dampening oscillation toward the long-run equilibrium.

In the Albanian context, this 'overshooting' behavior is the expected result of a highly volatile sample period (1996–2024). The economy has been subjected to frequent, high-magnitude structural shocks—ranging from the 1997 pyramid scheme collapse and the 2008 global financial crisis to the more recent 2019 earthquake and 2020 COVID-19 pandemic. In such an environment, the adjustment path to equilibrium is rarely smooth; instead, the economy reacts sharply to disturbances, resulting in the rapid, oscillatory correction captured by our model.

5 Discussion of Findings

Following the empirical results produced so far, which gave an updated perspective on the finance-growth relationship in Albania, in this section, we will use them to try to answer the research questions and connect them to the broader economic literature.

5.1 The Persistent Negative Impact of Financial Development

The statistically significant negative long-run coefficient of -9.19 for the financial development variable (log_DCBS) is the most important finding of this study. To interpret this magnitude correctly within a lin-log specification—where the dependent variable is the growth rate and the independent variable is logged—this coefficient represents a semi-elasticity. Specifically, a 1% increase in the ratio of domestic credit to GDP is associated with a decrease in economic growth of approximately 0.09 percentage points (β/100). This result has two direct implications. First, it contradicts the conventional "supply-leading" hypothesis [2], [3], which advocates a positive relationship between finance and growth, and secondly, it strongly confirms and reinforces the initial finding of [10]. Even with the extended dataset by nearly a decade and with employing a more dynamic ARDL model, the conclusion remains the same: in the Albanian context, an expansion of domestic credit from the banking sector has had a negative effect on long-run economic growth.

To further ensure that this negative coefficient reflects a causal impact rather than reverse causality (e.g., slow growth causing credit expansion), we performed a robustness check using an Instrumental Variable (IV) estimation with the second lag of domestic credit as an instrument. The IV results confirmed the negative direction of the relationship, yielding a statistically significant coefficient of -4.75 ($p < 0.01$). This persistence of the negative sign, even under IV specification, strongly suggests that the finding is not driven by endogeneity bias.

This persistent negative relationship lets us lean more into the "finance without function" hypothesis discussed in the literature review. So, in the case of Albania, the issue appears not to be the quantity of

finance but its quality and efficiency. This negative sign suggests that credit expansion has not been channeled to its most productive uses, and as previously insinuated, instead of funding productivity and enhancing investments, the credit may have fueled unsustainable consumption or been misallocated to inefficient sectors, and thus acted as a drag on the economy. This conclusion aligns with concerns raised by [11] about the dangers of indiscriminate credit growth in environments with underlying institutional weaknesses.

5.2 The Role of Financial Stability and Institutional Quality

One of the objectives of this study was to evaluate the hypotheses that financial instability (high NPLs) and weak institutions (RuleOfLaw) were the principal causes of this dysfunctional relationship. However, neither variable proved a statistically significant direct effect on growth in the final long-run model.

The lack of statistical significance for NPLs in the long run suggests that the negative finance-growth nexus is not driven solely by the quality of bank assets (NPLs), but potentially by the sectoral allocation of credit (e.g., consumption vs. investment), which NPL ratios do not capture. Similarly, the insignificance of the Rule of Law in the long run, contrasted with its positive short-run impact, suggests that while institutional reforms provide immediate confidence boosts to the economy, they have not yet reached the maturity required to drive structural long-term growth in Albania.

5.3 Other Drivers of Long-Run Growth

In the model, other significant drivers of economic growth in Albania are highlighted, such as trade openness, which shows strong, positive coefficients that emphasize the value of integration with the global economy for a small, open economy like Albania, a finding consistent with other regional studies on the Western Balkans, [19], [20]. Foreign Direct Investment (FDI) also shows a positive coefficient, but its long-run impact was not found to be statistically significant in this model, but nonetheless, this suggests that improving the trade balance and attracting stable foreign investment are reliable paths to sustainable growth.

On the other hand, the highly significant negative coefficient for inflation confirms the standard economic theory that a stable macroeconomic environment is a prerequisite for growth. High and volatile inflation can harm economic growth because it creates uncertainty, discourages investment, and erodes purchasing power. The interpretation of the positive coefficient on Net Interest Margin (NIM) is more complex because a possible cause could be a well-developed sector capable of producing higher bank profitability, or it could also be a sign of a lack of competition. The identification of these specific long-run drivers demands further investigations, which will contribute to a better understanding of economic performance in the region, aligning with [21] recent panel data analyses of the Western Balkans.

6 Robustness and Diagnostic Checks

After estimating the long-run and short-run coefficients, a series of diagnostic tests was conducted to validate the statistical adequacy of the chosen ARDL model. To ensure the reliability of the findings, the model must be free from issues such as serial correlation and heteroskedasticity, and its parameters must be stable over the entire sample period.

6.1 Parameter Stability Tests

The stability of the model's coefficients is the most critical diagnostic for a time-series analysis. If the coefficients change unpredictably over time, any policy conclusions drawn from them are unreliable.

We used the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) to test for parameter stability by plotting a recursive cumulative sum of the model's residuals against 5% critical bounds.

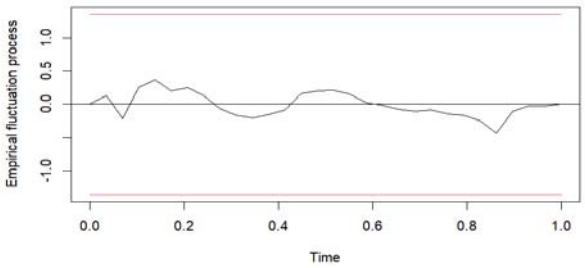

Fig. 2: CUSUM Test for Parameter Stability
Source: created by the author using studioR

Both plots' tests (CUSUM and CUSUMSQ), as shown in Figure 2 and Figure 3, remain within the 5% critical bounds for the entire sample period, meaning that the estimated coefficients are stable and that the model is well-specified.

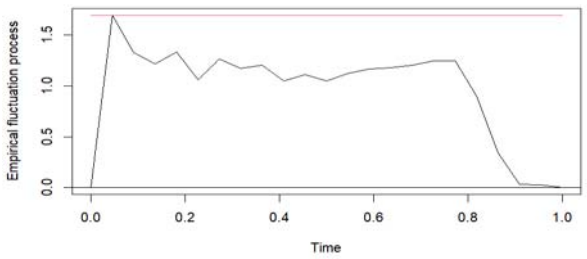

Fig. 3: CUSUM of Squares Test for Stability
Source: created by the author using studio

6.2 Other Diagnostic Tests

Further diagnostic plots to be found on Appendix D visually confirm model adequacy, and on further diagnostic tests, the model has passed Breusch-Pagan tests for homoskedasticity and the Jarque-Bera and normal residuals, but as can be seen in the results in Table 5, serial correlation in the residuals was detected by the Breusch-Godfrey test.

This implies that while the coefficient estimates are consistent, we can have unreliable inference because the standard errors are biased.

To address this and ensure the final t-statistics and p-values are valid, standard errors as calculated by Heteroskedasticity and Autocorrelation Consistent (HAC) were used, as described in the methodology.

Table 5. Diagnostic Test Results

Test	Null Hypothesis (H_0)	Test Statistic	p-value	Conclusion
Breusch-Godfrey	No serial correlation	16.873	3.996e-05	Reject H□
Breusch-Pagan	Homoskedasticity (constant variance)	15.103	0.5881	Fail to Reject H□
Jarque-Bera	Residuals are normally distributed	0.59252	0.7436	Fail to Reject H□

Note: The table reports the results of diagnostic tests on the model's residuals. For the Breusch-Pagan and Jarque-Bera tests, a p-value > 0.05 indicates the model passes the test. For the Breusch-Godfrey test, a p-value < 0.05 indicates the presence of serial correlation, justifying the use of HAC standard errors.
Source: created by the author using studioR

7 Conclusion and Policy Implications

Set with the purpose to revisit the finance-growth nexus in Albania, while providing a robust update to the methodology of the original study [10] to test if the counterintuitive findings are persistent even a decade later. This time, extending the time-series analysis to 2024 and employing a dynamic Autoregressive Distributed Lag (ARDL) model, in order to control the influence of other factors, a broader set of macroeconomic, financial stability, and institutional factors was included in the tested model.

The findings from the empirical analysis let us draw several key conclusions. The persistent long-run, large, and statistically significant negative relationship between growth of domestic credit and economic growth, as confirmed by the ARDL bound test, which also supports the 2016 study, suggests that structural issues hindering the finance-growth channel have not been resolved over the past decade.

In the case of Albania, the core issue appears to be not the quantity of finance but its quality and efficiency. This finding supports the "finance without function" hypothesis, where increased credit in the economy doesn't contribute to or even harm long-term sustainable growth [22], mainly because of weak allocation mechanisms.

Additionally, institutional quality, which was measured by the Rule of Law variable, despite not showing a significant long-run impact, has a significant positive effect in the short run highlights the immediate benefits coming from a stable regulatory environment.

Based on this evidence, the following policy implications are proposed for Albanian policymakers:

- Shift Focus from Credit Quantity to Credit Quality: Considering the negative relationship of credit to growth policies to stimulate credit growth with a focus only on the volume of lending will more likely do harm to the long-run growth rather than help it. Because of this, a more appropriate approach should be a shift towards the improvement of the quality and efficiency of financial intermediation. This conclusion is also supported by broader literature, which suggests that an 'optimal' level of financial development is more crucial than sheer size, and that policymakers should focus on improving the intermediating function of the financial sector rather than just its expansion [9].
- Strengthen Banking Supervision and Regulation: The aim, considering the results, should be to prevent credit from going to finance unsustainable consumption or asset bubbles and redirect it toward productive investments. Regulatory authorities can play a significant role here by enhancing banking supervision with criteria for credit risk assessment and ensuring that banks use mechanisms for allocating capital to sectors that contribute more efficiently to the economic growth of the country.
- Deepen Institutional Reforms: The finding that the rule of law has a significant positive short-

run impact gives a strong incentive to accelerate institutional reforms. Improvements in contract enforcement and the efficiency of the judicial system in resolving commercial disputes, protecting creditor rights, and ensuring a stable legal framework are crucial when it comes to encouraging more productive lending and reducing credit risk. This will help create an environment where finance can positively contribute to growth.

- Maintain Macroeconomic Stability: To no surprise, the analysis confirms that inflation is a powerful impediment to long-run growth. Prudent monetary policy and the maintenance of a stable macroeconomic environment are essential preconditions for encouraging investment and long-term economic growth.

Finally, this study acknowledges its limitations. One of which is that the use of aggregate data for domestic credit does not allow for a distinction between productive enterprise loans and household consumption loans. Using data on the firm or industry level can shed light on the specific ways capital misallocation is happening, which can be an interesting topic for future research. Nonetheless, the findings of this paper provide a relevant recommendation for focusing the financial development on building a stable and efficient system that allocates capital wisely as a way to be a true contributor to economic growth.

In practical terms, these findings suggest that for the Albanian economy, the 'growth-at-all-costs' lending strategy pursued by commercial banks in the pre-2008 era is no longer viable. Real-world applications of this study indicate that future credit expansion must be conditionally linked to sector-specific productivity benchmarks. For instance, regulatory capital requirements could be adjusted to favor lending to value-added sectors (like agriculture and tourism) rather than consumption-driven imports, thereby realigning the financial sector with the structural needs of the real economy.

Declaration of Generative AI and AI-assisted technologies in the writing process:

During the preparation of this study, the author used the Gemini model provided by Google for assistance with the econometric analysis in RStudio. This support included guidance and code generation for data preparation, Autoregressive Distributed Lag (ARDL) model estimation, diagnostic testing and Grammarly for grammatical editing. The author has reviewed and edited all AI-generated content and takes full responsibility for the content of this publication.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself

This research was supported by funding from Canadian Institute of Technology, Tirana

Conflict of Interest The authors have no conflicts of interest to declare.

APPENDIX

Appendix A: Detailed Unit Root Test Results

Table A1 Detailed Unit Root Test Results

Variable	Test Specification	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Conclusion
Growth	ADF (level, trend)	-5.879	-4.15	-3.50	-3.18	I(0)
log_DCBS	Zivot-Andrews (level, trend & intercept break)	-7.496	-5.57	-5.08	-4.82	I(0)
NPL	ADF (level, trend)	-1.153	-4.15	-3.50	-3.18	Non-Stationary
NPL	ADF (1st diff, drift)	-4.302	-3.58	-2.93	-2.60	I(1)
NIM	ADF (level, trend)	-3.254	-4.15	-3.50	-3.18	I(0)
RuleOfLaw	ADF (level, trend)	-3.720	-4.15	-3.50	-3.18	I(0)
Trade_Openness	ADF (level, trend)	-2.673	-4.15	-3.50	-3.18	Non-Stationary
Trade_Openness	ADF (1st diff, drift)	-4.666	-3.58	-2.93	-2.60	I(1)
Inflation	ADF (level, trend)	-9.823	-4.15	-3.50	-3.18	I(0)
FDI	ADF (level, trend)	-1.931	-4.15	-3.50	-3.18	Non-Stationary
	ADF (1st diff, drift)	-4.712	-3.64	-2.95	-2.61	I(1)

Note: For ADF tests, the test statistic is 'tau3' for trend models and 'tau2' for drift models. For the Zivot-Andrews test, the test statistic is compared to the critical values provided in its summary.

Source: created by the author using studioR

Appendix B: Multicollinearity Diagnostics

The reliability of the coefficient estimates was tested for multicollinearity using the Variance Inflation Factor (VIF).

Appendix B.1: VIF Results for Initial Model Specification (with GOV *included)*

In the initial model which included all theoretically relevant variables, the VIF results indicated severe multicollinearity, with the log_DCBS and GOV variables having VIF scores well above the critical threshold.

Table B.1 VIF Results for Initial Model Specification (with GOV included)

Variable	VIF Score
log_DCBS	23.7
GOV	10.5
FDI	8.2
Trade_Openness	7.6
NIM	5.7
RuleOfLaw	5.0
NPL	3.8
Inflation	2.47

Note: A VIF score greater than 10 is a common threshold indicating problematic multicollinearity.

Source: created by the author using studioR

Appendix B.2: VIF Results for Final Model Specification (without GOV *included)*

To address the multicollinearity, the GOV variable was excluded from the specification. This allowed for the inclusion of the more theoretically central log_DCBS variable while maintaining a stable model. After this, as shown in the table below, the VIF scores for the remaining variables were reduced to acceptable levels.

Table B.2 VIF Results for Final Model Specification (without GOV included)

Variable	VIF Score
log_DCBS	10.2
FDI	8.1
Trade_Openness	5.2
NIM	1.8
RuleOfLaw	5.0
NPL	3.4
Inflation	1.7

Note: VIF score greater than 10 indicates problematic multicollinearity

Source: created by the author using studioR

Appendix C: Optimal Lag Selection

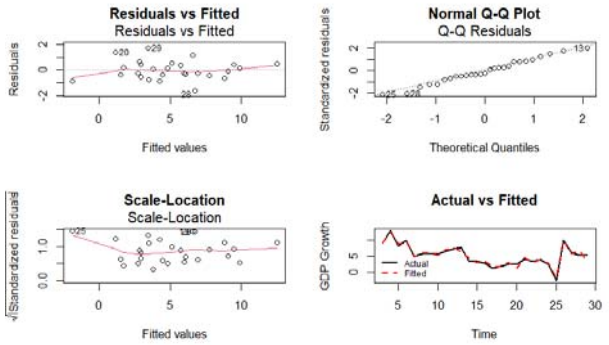
The optimal lag structure for the ARDL model was determined by evaluating models with a maximum of two lags based on the Akaike Information Criterion (AIC). The table below presents the top models ranked by their AIC scores. The model with the lowest AIC, ARDL (1, 2, 1, 2, 0, 1, 1, 2), was selected as the basis for the final analysis.

Table C.3. Top Ranked ARDL Models by AIC

Growth	log_DCBS	NPL	NIM	RuleOfLaw	Trade_Openness	Inflation	FDI	AIC
1	2	1	2	0	1	1	2	96.33579
1	2	0	2	0	1	1	2	96.34685
2	2	2	2	2	2	2	2	97.10826
1	2	1	2	0	1	2	2	97.75291
1	2	1	2	0	2	1	2	98.28543

Source: created by the author using studioR

Appendix D: Diagnostic Plots



Source: created by the author using studioR