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Credit Allocation to Private Sector and Growth: An ARDL Analysis for a Transitional Economy

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Abstract

This study examines the role of credit allocation to the private sector in driving economic growth in Vietnam's transitional economy. The primary objective is to evaluate whether bank credit allocation fosters sustainable output expansion or, conversely, produces diminishing returns when it surpasses optimal levels. Employing the Autoregressive Distributed Lag (ARDL) bounds testing framework, the analysis uses annual data for 1990–2024 and compares three specifications: credit to the private sector, aggregate credit to the economy, and credit to the state sector. Findings indicate a robust long-run cointegration between credit and output, but with a clear nonlinear pattern: private credit enhances growth up to a threshold of roughly 91% of GDP, beyond which its marginal effect declines. While capital formation and moderate inflation consistently support long-term growth, foreign direct investment exerts mainly short-term benefits, and state-directed credit shows no significant contribution. The novelty of this paper lies in extending previous studies through a longer time horizon, updated post-GDP-revision data, and explicit disaggregation between private and state credit. By highlighting threshold effects and sectoral inefficiencies, this research improves understanding of the credit–growth nexus in transitional economies and underscores the need to prioritize credit quality, efficiency, and SME access in credit policy.

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1- Introduction

Since the launch of the renovation policy in 1986, Vietnam has transitioned from a centrally planned system to a socialist-oriented market economy. A central outcome of this transformation has been the formal emergence and institutionalization of the private sector as a key growth driver. Once marginalized, the private sector gradually gained constitutional and legal legitimacy throughout the 1990s and 2000s. Its pivotal role was reaffirmed by Resolution No. 68-NQ/TW, issued by the Politburo in 2025, which identified the private sector as one of the main engines of the national economy [1]. By the early 2020s, it accounted for about 50% of GDP and more than 80% of total employment [2, 3], while also contributing to export diversification, innovation, and poverty reduction [4].

Accompanying this structural shift was a sharp expansion of bank credit to the private sector. Credit allocation to the private sector rose from under 10% of GDP in 1990 to more than 120% by 2023, placing Vietnam among the most credit-intensive economies in the region [5]. Yet access remains uneven: large corporate groups benefit from preferential lending due to stronger collateral and established bank ties, whereas small and medium-sized enterprises (SMEs)—which constitute about 98% of registered firms [6]—face persistent barriers such as high interest rates and complex borrowing procedures [7]. This indicates that the challenge lies not only in credit volume but also in its allocation and effective use across enterprise types.

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The effectiveness of bank credit in stimulating growth therefore remains an open empirical question in Vietnam. Such questions are grounded in the broader finance–growth nexus literature, which generally posits that financial development fosters economic growth by channeling capital toward its most productive uses [8]. Yet, this nexus remains contested across three long-standing theoretical perspectives. The supply-leading view argues that finance actively drives growth by mobilizing savings, allocating capital efficiently, managing risk, and fostering innovation [9-13]. In contrast, the demand-following view holds that financial development simply responds to the evolving needs of the real economy [14]. A third position emphasizes a bi-directional relationship: finance stimulates growth in the early stages of development, while economic expansion subsequently drives further financial deepening [15-17]. By contrast, Lucas [18] downplays the importance of finance, arguing that financial development plays only a limited role in explaining long-term economic growth. In his view, the primary drivers of growth stem from fundamental factors such as technological progress and productivity improvements, rather than from credit expansion or financial deepening.

Many empirical studies provide cross-country evidence broadly supporting the positive contribution of bank credit to economic growth [19, 20]. Nevertheless, the literature also cautions against overlooking potential downsides. Some studies emphasize the importance of financial stability as a condition for sustained growth [21], while others highlight the risks associated with excessive or poorly regulated credit expansion, including heightened volatility and resource misallocation. In particular, empirical studies conducted for developing economies reveal that the finance–growth relationship is not strictly linear. Arcand et al. [22] demonstrate that once private sector credit exceeds 100% of GDP, its marginal contribution to growth diminishes and may even turn negative due to inefficiencies and rising debt burdens. Cecchetti & Kharroubi [23] similarly argue that overly large financial systems can hinder productivity growth, especially when credit flows disproportionately into non-productive sectors. In line with these concerns, Prochniak & Wasiak [24] provide evidence that excessive credit expansion contributes to instability and resource misallocation—trends that became evident during the 2008 global financial crisis.

More recent evidence reinforces concerns about the downside of expanding credit to the private sector. The International Monetary Fund [25] warns of systemic risks as private credit rises globally and shifts outside the perimeter of regulated banks. Avalos et al. [26] highlight the global drivers of private credit growth and their implications for financial vulnerability, while Berrospide et al. [27] emphasized the potential spillovers from bank exposures to private credit. Gizaw et al. [28] provide evidence that domestic credit in Ethiopia is often misallocated to unproductive sectors, thereby exerting a negative effect on long-term economic growth. Similarly, Andrieș et al. [29] document the link between sectoral credit allocation and systemic risk. Collectively, these studies suggest again that it is not only the volume but also the allocation of credit that matters for ensuring long-term sustainability.

In transitional economies like Vietnam, where the financial system is still evolving and credit allocation reflects both market forces and institutional legacies, the question of how credit affects growth becomes particularly salient for assessing long-run development prospects. With the private credit-to-GDP ratio now exceeding 120% [5], concerns about over-financialization and misallocation are more pronounced than in earlier stages of reform.

Domestic studies examining this issue remain limited and fragmented. For example, using provincial panel data for 1997–2006, Anwar & Nguyen [30] find that a high ratio of credit to gross provincial product accelerated economic growth across provinces. Similarly, Pham & Nguyen [31] identify a bidirectional relationship between credit and GDP growth but emphasize that marginal impacts decline in the absence of institutional and structural reforms. More recent studies attempt to provide broader perspectives with updated data and methods. Duc [32], using time-series data from 2005 to 2021 and applying Johansen cointegration and error correction models, shows that credit to the private sector has a statistically significant long-run impact on Vietnam's economic growth. Phan et al. [33] find that banking deepening, proxied by the credit-to-GDP ratio, promotes economic growth in both the short and long run, thus providing support to the supply-leading hypothesis. Likewise, Pham & Nguyen [31], employing a state-dependent framework with quarterly data from 2008 to 2022, find that the extent to which excessive credit reduces growth depends on prevailing financial-cycle conditions. Complementing these macroeconomic findings, Bui [34] provides evidence that credit strongly influences housing prices in Hanoi and Ho Chi Minh City, raising concerns about the concentration of credit in speculative sectors rather than in productive ones.

Although the existing domestic studies provide useful insights, significant research gaps remain. Several studies suffer from methodological weaknesses, particularly the use of less rigorous analytical approaches. Others rely on relatively short time periods, aggregate credit without distinguishing between state-owned and private-sector lending, or omit the GDP rebasing conducted by the General Statistics Office of Vietnam (GSO) in 2015, which substantially altered Vietnam's macro ratios. Moreover, while threshold effects have been documented, few examine how they interact with the structural features of a transitional economy—where private firms dominate but state-owned enterprises retain significant influence. As a result, the literature still lacks a comprehensive, long-horizon, sector-disaggregated analysis of Vietnam's credit–growth nexus that accounts for both linear and nonlinear dynamics under the revised GDP base. Filling this gap is essential to determine whether credit deepening continues to foster sustainable growth, or whether it has already crossed into diminishing returns and systemic risk.

In view of existing research gaps and the strategic priorities outlined in Resolution No. 68-NQ/TW—which underscores the pivotal role of the private sector in fostering sustainable economic growth—there is a pressing need for updated empirical investigation. Such research should systematically evaluate the impact of credit allocation to the private sector, not only in isolation but also in comparison with credit to the overall economy and to the state-owned sector. Crucially, the analysis must account for both short-run and long-run dynamics of the credit-growth nexus and explore the potential presence of nonlinearities or threshold effects—such as inverted U-shaped relationships—that may arise in credit-saturated contexts. A rigorous understanding of these dynamics is essential for advancing economic theory within transitional economies and, more importantly, for informing the design of evidence-based credit policies that align with Vietnam's post-renovation development agenda.

The remainder of the paper is structured as follows. Section 2 presents stylized facts on Vietnam's credit allocation patterns and macroeconomic performance, emphasizing the shift from state to private sector lending. Section 3 reviews the theoretical foundations and empirical literature on the finance–growth nexus, highlighting gaps in previous studies. Section 4 outlines the empirical methodology, including model specification, variable selection, and the rationale for applying the ARDL bounds testing approach. Section 5 discusses the estimation results, focusing on long-run and short-run effects of credit across different sectors, and identifies nonlinear dynamics. Section 6 interprets the findings in the context of Vietnam's policy environment and institutional features. Finally, Section 7 concludes and offers policy recommendations to enhance credit efficiency, support SMEs, and promote sustainable, inclusive growth.

2- Stylized Facts about Credit Allocation to Private Sector and Economic Growth in Vietnam

Since the initiation of the comprehensive renovation policy in the late 1980s, Vietnam's banking system has undergone substantial restructuring, transitioning from a mono-tier to a two-tier system. This institutional reform marked a significant milestone in embedding market mechanisms into banking operations [35]. During the pre-reform period, credit was predominantly channeled to SOEs, accounting for approximately 90% of total bank lending. However, the period from 1990 to 1995 witnessed a fundamental realignment in credit allocation. The proportion of credit directed to SOEs declined significantly, from 81% in 1990 to 57% by 1995. In contrast, credit to the non-state sector—particularly the private sector—expanded rapidly, growing at an average annual rate of 43% between 1991 and 1996, far outpacing the growth of the real economy during the same period [35]. This upward trend in credit allocation to the private sector has been sustained and further strengthened in subsequent decades (see Figure 1), highlighting a radical shift in financial resource allocation. Both statistical data and graphical analyses indicate a continuous rise in the private sector's share of total domestic credit: from 19% in 1990 to 43% in 1995, reaching 72% in 2021. Recent estimates suggest this figure rose further to approximately 95% by 2024, thus underscoring a decisive shift in credit policy orientation. This trend not only reflects the increasing trust in the private sector's capacity to drive economic activity but also highlights its emerging centrality in Vietnam's economic modernization and development strategy.

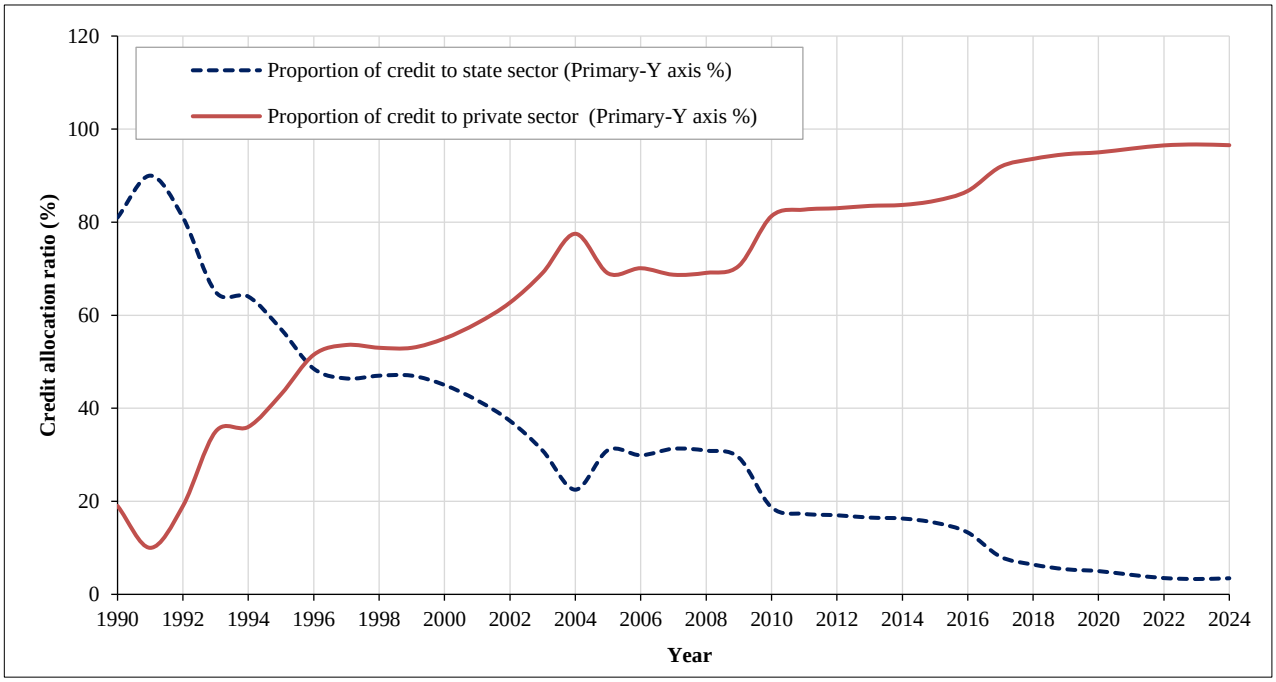


Figure 1. Credit allocation between private sector and public sector (1990-2024)

The acknowledgment of the private economic sector as a pivotal driver of Vietnam's growth is firmly enshrined in the 2013 Constitution and further reinforced by the recent Resolution No. 68-NQ/TW of the Politburo [1], which

explicitly designates the private sector as "one of the leading important driving forces of the economy." Such policy pronouncements underscore a robust strategic reorientation aimed at fostering endogenous capacity within the private economic sphere. However, the relationship between credit expansion to the private sector and economic growth warrants closer examination. Figure 2 reveals a remarkable and continuous rise in the private credit-to-GDP ratio, escalating from approximately 19.3% in 1995 to exceed 130% of GDP by 2024. This level surpasses the critical 100% of GDP threshold, a point where, according to the research by Arcand et al. [22], the marginal growth efficiency derived from credit may diminish or even turn negative. This phenomenon is often attributed to issues such as capital oversaturation or misallocation of funds, which may lead to a rise in bad debt and systematic financial risk. In fact, since 2011, the State Bank of Vietnam (SBV) has implemented a credit growth quota mechanism as a macro-prudential tool to manage inflation and control systemic financial risk, particularly in sectors such as real estate and securities. Under this policy, annual credit growth targets are set for the entire banking sector, and individual credit ceilings are allocated to commercial banks based on factors such as capital adequacy, asset quality, and risk management capacity. While this approach has contributed to macroeconomic stability, it has also drawn criticism for distorting market mechanisms and constraining the efficient allocation of credit, prompting ongoing discussions about reforming or phasing out the system.

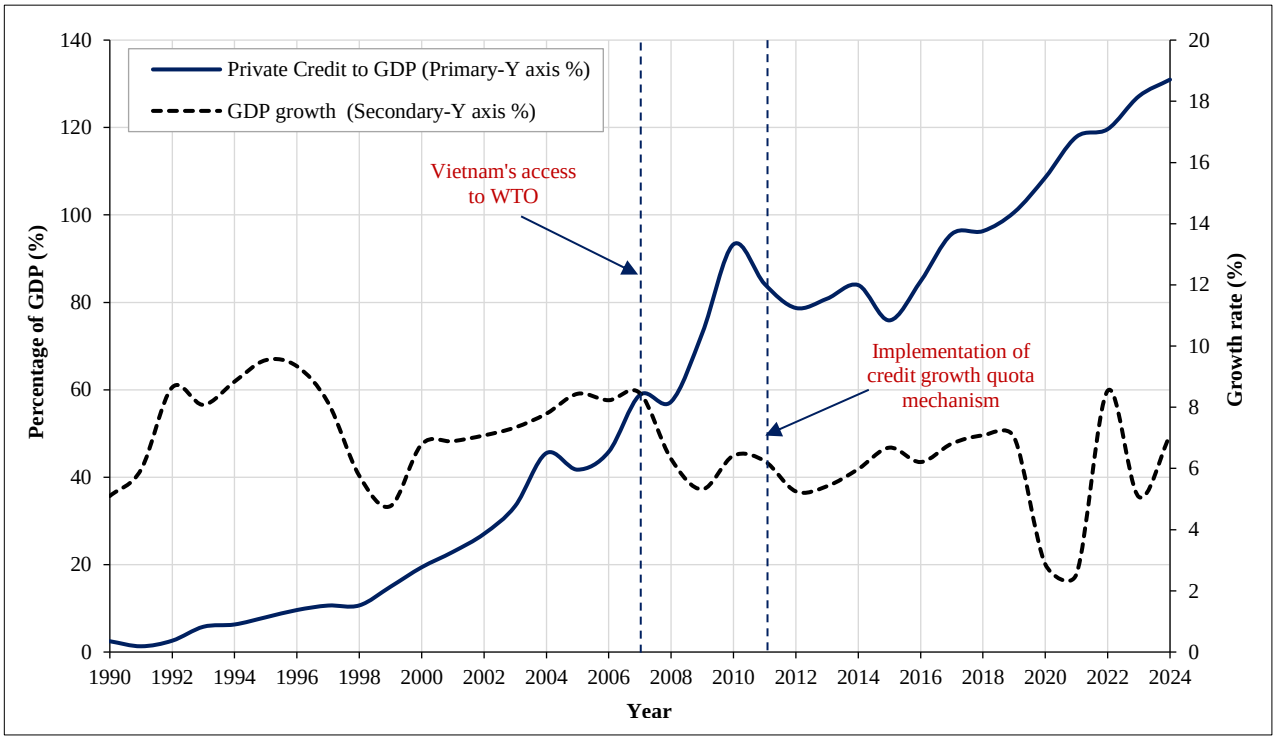


Figure 2. Dynamics of credit expansion and economic growth (1990-2024)

Furthermore, Figure 2 also indicates that economic expansion has not maintained a linear correspondence with the pace of credit growth. Over numerous years, particularly spanning 2007-2010 and then 2015-2024, GDP growth has exhibited inconsistencies, despite substantial and sustained credit expansion. Although Vietnam has made notable strides in expanding credit access for the private sector over 35 years or so, this observation prompts critical questions regarding the quality of credit allocation, effectiveness of loan utilization, and the overall quality of economic growth achieved. First, the rate of credit expansion has significantly outpaced real economic growth, raising concerns about unsustainable credit booms. This rapid growth, often decoupled from productivity considerations, reflects a system where credit decisions are still predominantly quantity-driven rather than efficiency-oriented [35]. As a result, Vietnam continues to operate under a growth model that prioritizes input accumulation over productivity, as evidenced by its persistently high ICOR (Incremental Capital-Output Ratio), ranging between 6 and 7 [5, 36], which is substantially higher than the average of other more competitive economies in the Asian region [5]. Without stringent oversight to ensure that credit is channeled toward productive sectors, the risk of credit misallocation, rising non-performing loans (NPLs), and resource wastage becomes more pronounced—especially when large portions of credit are funneled into speculative real estate or underperforming conglomerates [37].

Second, access to credit remains a significant challenge for small and medium-sized enterprises (SMEs) in Vietnam. Representing approximately 97% of all registered businesses, SMEs form the backbone of the economy and are vital to employment and growth. However, despite their importance, they continue to face substantial obstacles in securing formal financial resources. While many depend on bank financing, strict collateral requirements and limited credit histories often prevent them from obtaining loans. Recent studies show that as many as 70% of Vietnamese SMEs are

unable to access bank credit, underscoring a persistent structural constraint [38]. This financing gap not only restricts their ability to expand but also impedes innovation—at a time when digital transformation is increasingly crucial to maintaining competitiveness in the private sector.

These concerns underscore the inadequacy of relying solely on stylized facts or visual correlation analyses to understand the credit–growth relationship. A more rigorous and comprehensive econometric investigation is warranted to disentangle the dynamics. Specifically, such analysis should: (i) identify short-run vs. long-run effects using ARDL or VECM models; (ii) examine potential threshold or nonlinear effects (e.g., U-shaped relationships); distinguish the impacts of private vs. state credit; control for other growth drivers. Only through such empirical investigation can we generate robust policy-relevant insights that help ensure credit to the private sector contributes meaningfully to sustainable and inclusive economic growth, in alignment with Vietnam's long-term strategic objectives.

3- Theoretical Framework and Literature Review

The theoretical and empirical examination of the impact of credit to the private sector on economic growth is grounded in the broader literature on financial development and economic performance. This investigation originates with Schumpeter's assertion [39] that financial institutions are essential to economic innovation, as they mobilize savings, allocate capital efficiently, and finance productive investment. Specifically, financial institutions act as active agents in the process of "creative destruction," which Schumpeter viewed as the engine of capitalist development. They enable the disruptive innovations that lead to new products, processes, markets, and organizational forms, ultimately driving economic growth. Within this framework, three main theoretical perspectives have emerged. The supply-leading view argues that financial development drives growth by channeling resources more efficiently, reducing information costs, managing risks, and supporting innovation [9-13]. By contrast, the demand-following view holds that financial development simply responds to the evolving needs of a growing economy [14]. A third perspective, the two-way causality view, suggests a dynamic interaction: finance spurs growth in the early stages of development, but as economies mature, growth itself propels further financial deepening [15-17]. Lucas [18], meanwhile, questions the overall significance of financial development as a primary driver of long-term economic growth. Instead, he emphasizes the pivotal role of human capital accumulation, arguing that sustained improvements in education, skills, and knowledge formation are the fundamental sources of productivity gains and technological progress. This perspective suggests that while finance may facilitate resource allocation, it is ultimately investments in human capital that underpin the capacity of economies to innovate and maintain growth trajectories over time.

Based on the mentioned seminal finance–growth nexus literature, many empirical studies provide evidence supporting the beneficial role of finance in promoting growth. For example, Goldsmith [9] and McKinnon [10] provided early empirical support for the view that financial deepening—manifested through the expansion of credit to the private sector—stimulates capital formation and enhances economic output. King & Levine [40] provided econometric evidence from a cross-country analysis showing that measures of financial depth, such as the ratio of private sector credit to GDP, are significantly and positively associated with long-term economic growth. They argue that financial intermediaries enhance resource allocation efficiency and foster technological innovation, thereby boosting productivity and income levels. In bank-based financial systems, particularly in developing countries, the banking sector is the primary conduit for capital allocation. Therefore, the availability and growth of credit to the private sector are often seen as proxies for financial sector performance and a critical enabler of private investment and entrepreneurship [19]. Studies by Levine et al. [41] and Rajan & Zingales [42] further affirm that countries with more developed banking sectors experience faster economic growth, especially when credit is channeled effectively to the private sector rather than state-owned enterprises or unproductive uses. Arestis et al. [43], using time-series evidence from developing countries, also confirm that bank-based credit to the private sector has a positive long-run effect on output, highlighting the crucial role of financial intermediaries in the growth process.

However, some studies emphasize that financial stability is equally critical [21], while others caution that excessive financial expansion may generate risks such as heightened volatility and inefficient allocation of resources [22, 24, 44]. In particular, there is a view that the relationship between private sector credit and growth is not unambiguously linear or monotonic. Recent literature has begun to highlight that "too much finance" can be counterproductive. For example, Arcand et al. [22], analyzing a panel of over 100 countries, found that the marginal contribution of private sector credit to economic growth diminishes when credit exceeds approximately 100% of GDP. This suggests a threshold effect where beyond a certain point, credit growth may lead to inefficient capital allocation, excessive risk-taking, or the build-up of financial vulnerabilities. Cecchetti & Kharroubi [23] similarly argue that when the financial sector becomes excessively large, it diverts talent and resources away from productive sectors, potentially hampering growth. Their empirical findings show that financial development is beneficial only up to a certain point and may become a drag on growth if it fuels credit booms without corresponding improvements in productivity. This broader evidence reinforces the idea that more credit does not always translate into sustainable growth.

The quality and allocation of credit also play a crucial role in the way it affects growth. Beck et al. [45] emphasize that the impact of private sector credit on firm performance and growth depends critically on the efficiency of credit allocation—specifically, whether credit is directed toward productive investment or channeled into speculative

consumption and real estate. In many emerging markets, credit often flows disproportionately to large corporations or politically connected firms, while small and medium-sized enterprises (SMEs), which are key drivers of innovation and employment, remain underserved. Furthermore, Hasan et al. [46] find that the effect of financial development on growth is stronger when institutions support transparent and efficient credit markets. In weak institutional environments, financial deepening may simply magnify existing distortions, leading to inefficient use of credit and increasing systemic risk. Moreover, the utilization of credit is influenced by borrowers' managerial capabilities, absorptive capacity, and the broader economic context. De la Torre et al. [47] argue that in many developing countries, financial systems exhibit "partial reform syndromes," where financial liberalization proceeds without the accompanying institutional strengthening needed to ensure productive credit allocation. As a result, credit expansion may not translate into sustained economic growth unless it is accompanied by improvements in governance, financial literacy, and legal enforcement mechanisms. Similarly, Ang [48], using time-series data from Malaysia, shows that while credit to the private sector initially promotes growth, its effect diminishes unless complemented by human capital development and infrastructure investment.

Recent empirical evidence further challenges the assumption that financial development is unconditionally beneficial. The International Monetary Fund [25] warns that as private credit expands rapidly worldwide and intermediation increasingly shifts outside regulated banks, systemic vulnerabilities accumulate in less transparent parts of the financial system. Expanding on this concern, Avalos et al. [26] identify global drivers of private credit growth—such as investor demand for yield, regulatory arbitrage, and looser financial conditions—while underscoring the fragility such trends may introduce. Similarly, Berrospide et al. [27] show that banks' exposures to private credit create spillovers that transmit shocks back into the traditional financial system, illustrating how risks in nonbank finance are not isolated but deeply interconnected. Beyond overall volume, the composition and allocation of credit are increasingly recognized as critical. Gizaw et al. [28] show that sectoral allocation of credit in Ethiopia shapes growth outcomes, with some types of lending enhancing development while others hinder it. Similarly, Andrieş et al. [29] link concentrated sectoral lending patterns to systemic risk, emphasizing how misdirected credit flows can amplify fragility. Likewise, Luo et al. [49] demonstrate that lending to consumer finance companies can redirect bank resources away from more productive investment activities, weakening long-term growth prospects.

Overall, the international literature suggests that while the expansion of private sector credit is theoretically and empirically linked to growth, the relationship is conditional and context-specific. While banks are expected to channel resources efficiently [8], and much of the earlier empirical literature confirms positive credit–growth links [19, 20], more recent findings highlight potential nonlinearities. The stage of financial system development, the soundness of allocation mechanisms, institutional quality, and the productive utilization of credit all mediate the outcome. Consequently, policy frameworks must not only increase the volume of credit but also improve its quality, composition, and governance to secure sustainable growth benefits.

Empirical studies examining the relationship between credit to the private sector and economic growth in Vietnam reveal similarly nuanced dynamics. Several empirical studies support the view that credit expansion positively influences long-term growth, but others emphasize nonlinear effects and diminishing returns at higher penetration levels. Duc [32], using time-series data from 2005–2021 and Johansen cointegration with error correction models, finds that private sector credit has a significant long-run impact on economic growth. Specifically, a 1 percentage point increase in real private sector credit is associated with a 0.40 percentage point rise in real GDP. Yet this study is limited by its relatively short time horizon—just 17 years—which restricts the ability to capture long-run structural dynamics, and it omits key growth drivers such as capital accumulation and labor. Pham & Nguyen [31], applying an ARDL approach with quarterly data from 2004–2017, report a bidirectional Granger causality between credit and output but also a negative long-run impact of credit on growth. This study indicates that excessive credit expansion may undermine macroeconomic stability. However, like Duc [32], their study is limited by the short data span and narrow treatment of macroeconomic determinants. Nguyen [50] adopts a multivariate ARDL model covering 1990–2020, using indicators such as M2-to-GDP and total credit-to-GDP. His analysis confirms a positive long-run association between banking development and growth but also reveals an inverted U-shaped relationship, suggesting diminishing returns beyond a certain threshold.

A key limitation is the lack of disaggregation between credit extended to private firms and to state-owned enterprises, preventing a more nuanced understanding of sectoral efficiency differences. Phan et al. [33], using data from 1990–2022, analyze the interplay between trade openness, GDP growth, inflation, and banking development. Their results confirm positive long- and short-run relationships between banking development and GDP growth, but their model omits fundamental growth determinants such as capital, government expenditure, and labor, limiting its alignment with established growth theory. Nguyen Khac Quoc & Pham Duy [51] apply a state-dependent framework with quarterly data from 2008–2022 to explore nonlinear effects. Their findings suggest that excessive credit may reduce growth depending on financial-cycle conditions, though the reported coefficients do not clearly support an inverted U-shape. This highlights the need for explicit threshold estimation, which the present study seeks to address. Bui [34] investigates the effect of credit on housing markets using quarterly data from 2009–2022 and a VECM approach. Results suggest that bank credit exerts a positive long-term impact on housing prices, indirectly influencing growth. However, the omission of the error correction term makes it difficult to assess the speed and stability of long-run adjustment. Combined with the short sample period, this renders the long-run evidence tentative and underscores the need for further research with longer time series and explicit adjustment dynamics.

The review of previous studies highlights several methodological and contextual limitations that raise concerns about the reliability and generalizability of existing findings on Vietnam's credit–growth nexus. The most pressing issue is the limited time horizon: most datasets span fewer than 20 years, insufficient for detecting robust long-run relationships. As econometric theory emphasizes, cointegration analysis requires a sufficiently long dataset to account for structural, policy, and cyclical changes [52, 53]. Vietnam-focused studies, often starting only in the early 2000s, therefore risk missing deeper historical trends. The second concern is the aggregation of credit data. By relying on total credit to the economy, existing studies obscure differences between credit allocated to private firms and that directed to state-owned enterprises, despite their divergent efficiency and productivity levels [54]. This conflation masks the distinct role of private sector credit as a driver of growth in Vietnam's transitional economy. The third limitation arises from the 2019 GDP rebasing conducted by the General Statistics Office, which substantially increased nominal GDP by incorporating the contributions of the informal sector and accounting for structural changes in the economy. This revision significantly altered key macroeconomic ratios, most notably the credit-to-GDP ratio [55], which is central to interpreting potential threshold effects of credit on growth. Table 1 compares credit-to-GDP ratios before and after the rebasing for 2015–2024. Because both pre- and post-rebasing GDP data are only available for 2015–2020, the table illustrates how rebasing lowered the reported ratio by around 15–20 percentage points in those years.

Table 1. Credit-to-GDP ratio before and after rebasing in 2015

Year	Credit-to-GDP ratio before rebasing (%)	Credit-to-GDP ratio after rebasing (%)
2015	111.04	89.69
2016	122.27	97.81
2017	130.08	104.07
2018	130.11	102.88
2019	135.75	106.33
2020	146.07	114.27
2021	n.a	123.05
2022	n.a	123.96
2023	n.a	131.48
2024	n.a	135.65

As the comparison shows, rebasing shifted Vietnam's credit-to-GDP ratio substantially downward, with important implications for identifying thresholds beyond which credit may hinder growth. Consequently, empirical estimates relying on pre-revised GDP data may no longer be reliable, and policy recommendations derived from them risk being outdated or misleading. Therefore, while prior studies provide valuable insights—some documenting positive, others mixed effects of credit on growth—their findings must be interpreted with caution. Short time horizons, aggregated credit measures, and outdated GDP baselines weaken their empirical robustness. Future research must employ updated datasets, disaggregate credit between private and state sectors, and adopt methods robust to structural breaks and threshold effects to deliver more credible and policy-relevant evidence.

4- Methodology: Empirical Model, Method of Estimation and Data

4-1- Empirical Model

The empirical model employed to examine the impact of credit to the private sector on economic growth is grounded in seminal growth theories and enriched by insights from prior empirical studies. Drawing from the neoclassical growth model [56] and its endogenous extensions [57, 58], the framework assumes that economic growth is influenced by capital accumulation, labor input, and productivity-enhancing factors, including financial development. In this context, the expansion of credit to the private sector is posited as a key financial intermediary function that channels savings into productive investment, thereby supporting long-term growth [40, 41].

In addition, the present study explicitly anchors its empirical model in the nonlinear finance–growth literature. While the supply-leading view predicts a positive link between credit expansion and growth, more recent empirical contributions caution that financial development is not unconditionally beneficial. Arcand et al. [22] and Cecchetti & Kharroubi [23] argue that once private sector credit surpasses a certain threshold, additional lending may fuel inefficiencies, rising debt burdens, and resource misallocation. This duality motivates the inclusion of both the linear and squared terms of private sector credit, which allows for direct testing of the inverted U-shaped hypothesis. Moreover, the use of an ARDL framework reflects theoretical expectations that credit may influence growth in both the long run—through capital accumulation and structural transformation—and the short run—through demand effects and cyclical adjustments [59]. Thus, the empirical specification is firmly grounded in theory, linking classical arguments on financial intermediation with recent insights on threshold effects in transitional economies. The empirical model in this study is therefore specified as follows:

$$rgdp_t = \alpha + \beta_1 rgdp_{t-1} + \beta_2 cp + \beta_3 cps + \beta_4 capform + \beta_5 fdi + \beta_6 govexp + \beta_7 lab + \beta_8 cpi + \beta_9 pandamic + \varepsilon_t \quad (1)$$

The empirical growth model specified in Equation 1 is employed to investigate the determinants of economic growth in Vietnam, with real GDP (*rgdp*) as the dependent variable, measured as the natural logarithm of GDP at constant 2010 prices to control for inflation. The lagged value of real GDP ($rgdp_{t-1}$) is included to capture dynamic effects, reflecting the persistence and inertia characteristic of growth processes [60]. The primary variable of interest is credit to the private sector (*cp*), expressed as a percentage of GDP. To account for potential nonlinearities in the finance-growth relationship, the model incorporates the squared term of this variable (*cps*). This specification is motivated by both theoretical considerations and empirical observations as outlined earlier. In particular, while there may be a generally positive correlation between economic growth and credit to the private sector over the period 1990–2024, the relationship is not strictly monotonic. Notably, certain sub-periods reveal a weakening of this positive association: during intervals where credit to the private sector rose sharply as a share of GDP, economic growth concurrently slowed or stagnated. Such patterns are indicative of nonlinear dynamics—specifically, the possibility of diminishing returns or threshold effects in credit expansion—whereby excessive credit growth may lead to inefficiencies, misallocation of resources, or heightened financial fragility [23].

By including the squared term of private credit, the model explicitly allows for the estimation of such nonlinear effects. This approach enables the identification of a turning point or optimal level of credit beyond which its marginal contribution to growth diminishes or becomes negative. The corresponding threshold can be derived analytically from the first derivative of Equation 1 with respect to the credit variable, as shown in Equations 2 and 3:

$$\frac{\partial rgdp}{\partial cp} \approx \beta_2 + 2\beta_3 cp \tag{2}$$

$$cp_{turning\ point} = \frac{\beta_2}{-2\beta_3} \tag{3}$$

Equation 2 represents the long-run marginal effect of credit to private sector: at any given level of the credit-to-GDP ratio, it measures the impact of a one percentage point (pp) increase in the credit-to-GDP ratio. Equation 3 is the formula to calculate the credit to the private sector at the turning point (threshold) where the long-run marginal effect changes sign, shifting from positive to negative.

In addition, the total long-run effect of moving the credit-to-GDP ratio from one level (cp_0) to another (cp_1) can be computed using Equation 4:

$$\Delta rgdp \approx \beta_2(cp_1 - cp_0) + \beta_3(cp_1^2 - cp_0^2) \tag{4}$$

This framework provides an empirically grounded benchmark for evaluating the sustainability and efficiency of credit expansion. This is particularly relevant in the context of Vietnam, where episodes of rapid credit growth—especially in the 2007–2010 and 2016–2020 periods—coincided with concerns about declining credit efficiency, rising non-performing loans, and macroeconomic instability.

In addition to credit dynamics, the model incorporates a set of control variables grounded in economic theory and empirical literature. Gross fixed capital formation (*capform*), measured as a percentage of nominal GDP, captures physical investment as a fundamental engine of long-term growth [58]. Government expenditure (*govexp*), measured as a percentage of nominal GDP, reflects the role of fiscal policy in influencing aggregate demand and infrastructure development. Foreign direct investment (*fdi*), measured as a percentage of GDP, is included for its potential to facilitate technology transfer and capital inflows [61]. Labor force participation (lab), measured as a percentage of total population, serves as a proxy for human capital input, while the consumer price index (*cpi*) is introduced to control for inflationary pressures and macroeconomic stability. Finally, a binary variable (*pandemic*) is included to capture the impact of the COVID-19 pandemic during the years 2021–2022, isolating the exogenous shock to growth associated with this global crisis and mitigating the possible structural break.

In order to compare the effect of credit to the private sector on growth, we also run regressions by systematically altering the measure of credit: total domestic credit to the economy, credit to state-owned enterprises, and credit to the private sector. This lets us examine closely how credit allocation affects different sectors in different ways. This is especially important in transitional economies like Vietnam, where state-owned companies were once provided with a large volume of bank credit, but its efficient utilization was always questioned [62].

The adopted empirical model design is consistent with the findings of earlier studies on Vietnam and other developing economies. For instance, Pham & Nguyen [31] report that excessive credit expansion may undermine macroeconomic stability and hinder sustainable growth, while Beck et al. [19] provide cross-country evidence that financial development—measured by credit to the private sector—generally supports long-run growth. However, the strength of this relationship has been shown to depend critically on institutional quality and the efficiency of credit allocation. Building on these insights, the present study advances the literature by explicitly incorporating a nonlinear specification that includes both the linear and squared terms of private sector credit. This allows us to estimate threshold effects and identify the turning point beyond which the growth contribution of credit diminishes or turns negative. In doing so, the empirical model not only extends the conventional finance–growth nexus but also aligns directly with recent theoretical arguments that the benefits of financial deepening are conditional and may be subject to diminishing returns.

4-2- Method of Estimation

To analyze the specified empirical model assessing the impact of credit to the private sector on growth for the transitional economy of Vietnam, this study adopts the Autoregressive Distributed Lag (ARDL) approach. Originally developed by and later extended by Pesaran, Shin & Smith [62] and Pesaran & Shin [63], the ARDL framework is widely regarded as an effective approach for shedding light on both short-run dynamics and long-run equilibrium relationships within time series data. Compared to traditional cointegration techniques—such as the Engle-Granger or Johansen methods—the ARDL model offers notable advantages, especially in situations where the regressors exhibit mixed integration orders (i.e., a combination of I(0) and I(1)), provided none of the series are integrated of order two [I(2)].

The reason the ARDL model is suited for this investigation is based on several points. First, it permits the inclusion of both level and first-difference lags of variables, thereby supporting a detailed analysis of both the short-run and long-run effects of credit to the private sector on growth. Second, the model is suitable for small data samples—which is especially crucial in the context of annual macroeconomic data in Vietnam. Third, the bounds testing method in ARDL does not require rigorous unit root testing as other traditional cointegration methods do, thereby minimizing the risk of biased inference due to errors in determining the order of integration of the data series [59].

The ARDL estimation follows a procedure of several steps as outlined in Figure 3. First, unit root tests (such as ADF or PP tests) are conducted to ensure that none of the variables are integrated of order two, which would invalidate the ARDL framework. Next, the optimal lag length of the model is determined based on criteria such as Akaike Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC) to ensure that the dynamic structure of the model fully reflects the underlying data generation process. Then, the boundary test in the ARDL framework is applied to test the existence of a long-run cointegration relationship between the variables. If the calculated F statistic exceeds the upper limit of the critical value, it can be concluded that a long-run cointegration relationship exists.

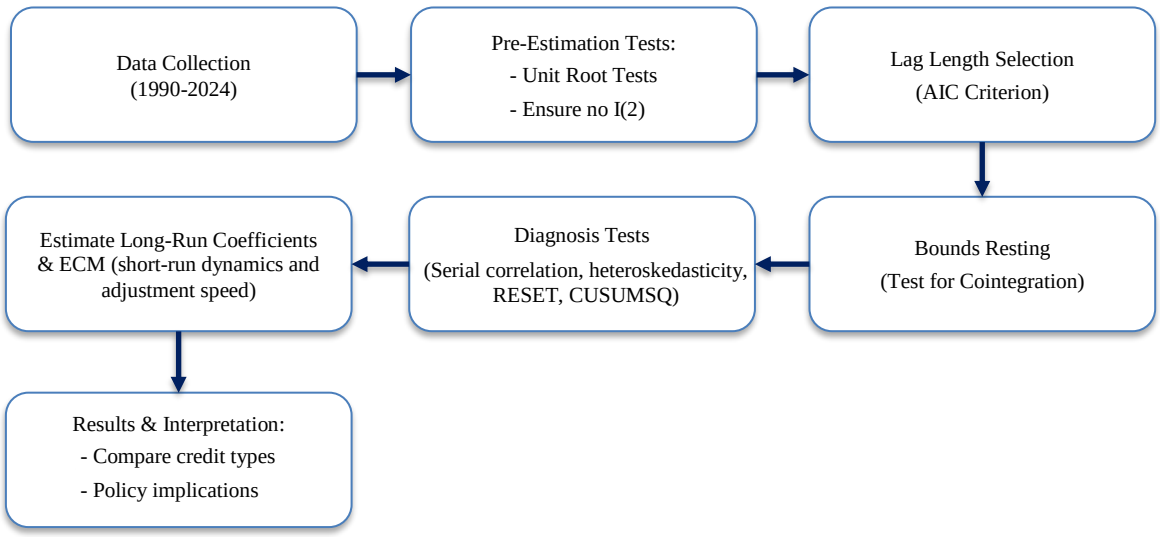


Figure 3. Flow of estimation methodology

As long as the cointegration relationship among variables is confirmed by the boundary test, the long-run coefficients corresponding to each driver of growth are derived, followed by the estimation of an Error Correction Model (ECM), which is based to interpret the short-run impacts of variables. The ECM includes the lagged error correction term, which measures the speed of adjustment back to the long-run equilibrium after a short-run shock. A statistically significant and negatively signed error correction term provides further evidence of long-run stability.

Robustness of the ARDL results is assessed through several diagnostic checks. These include tests for serial correlation (Breusch-Godfrey LM test), heteroskedasticity (White or Breusch-Pagan test), and model specification (Ramsey RESET test). Stability of the model coefficients over time is examined using CUSUM and CUSUMSQ tests, ensuring the structural integrity of the estimated relationships. Additionally, alternative specifications using different measures of credit—such as total domestic credit, credit to SOEs, and credit to the private sector—are estimated to validate the consistency and sector-specific effects of credit on growth.

In summary, the ARDL methodology offers a flexible and robust framework for analyzing the complex relationship between credit to the private sector and economic growth in Vietnam, accommodating non-linearities, lagged dependencies, and sectoral credit differences within a unified empirical strategy.

4-3- Data

The data used for estimation primarily come from the World Bank's open data repository, the International Monetary Fund's Country Reports for Vietnam [37, 55, 64-70], and the General Statistics Office of Vietnam [6, 71-73], with additional figures regarding credit allocation drawn from the State Bank of Vietnam's publication "The History of the Vietnamese Banking Sector 1951–2021" [35], particularly for the early 1990s (covering years 1990-1995). A potential concern is that this early period (1990-1995) may be subject to measurement limitations due to the transitional context of Vietnam's economy during the early 1990s. Nevertheless, these data are obtained from a reliable source—the State Bank of Vietnam—which, as a government organization, regularly provides reports to constitute official datasets regarding Vietnam compiled by the International Monetary Fund and the World Bank. The percentages of credit allocation to the private sector and to the state sector for the year 2024 are estimated based on the outstanding credit balance extended to the state sector provided by Do [74] and the total credit to the economy reported in the Statistical Yearbook for the year 2024 of the General Statistics Office of Vietnam [6].

5- Estimation Results

5-1- Results of Unit Root Tests

To ensure the validity of the ARDL bounds testing approach, it is essential that none of the variables included in the model are integrated of order two (I(2)). Therefore, the stationarity properties of each variable were assessed using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, following the procedures of Dickey & Fuller [75] and Phillips & Perron [76]. The tests were conducted at the level and first difference forms of the variables, using appropriate lag selection based on the Schwarz Information Criterion (SIC). The results are summarized in Table 2. The results of the unit root tests reveal a consistent pattern across both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methodologies. Core macroeconomic variables—including real GDP (*rgdp*), credit to the economy (*ce*), credit to the private sector (*cp*), credit to the state sector (*cs*), Government expenditure (*govexp*) and the consumer price index (*cpi*)—are found to be non-stationary in levels, as indicated by statistically insignificant test statistics. However, after first differencing, these variables exhibit strong evidence of stationarity, with test statistics significant at the one percent level in most cases. For example, the ADF statistic for the first-differenced real GDP is -5.0587, and for credit to the economy it is -5.3714—both well beyond the critical threshold values. This confirms that these series are integrated of order one, I(1).

Table 2. Results of unit root tests

Variables	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)	
	Level	1st difference	Level	1st difference
Real GDP (rgdp)	-1.2366	-5.0587***	-1.4542	-5.0560***
Credit to economy (ce)	0.4867	-5.3714***	0.7099	-5.7916***
Squared credit to economy (ces)	0.6132	-5.3928***	0.7472	-5.7916***
Credit to private sector (cp)	0.48867	-5.3714***	0.7099	-5.7916***
Squared credit to private sector (cps)	1.7393	-5.0429***	1.7393	-5.0258***
Credit to state sector (cs)	-0.9665	-3.4446**	-0.9665	-5.4127***
Squared credit to state sector (css)	-1.6490	-6.3165***	-1.6216	-6.2876***
Gross capital formation (capform)	-3.3566**	-5.3596***	-3.4169**	-5.2445***
Foreign direct investment (fdi)	-3.7815***	-4.3308***	-2.3769	-4.3308***
Government expenditure (govexp)	-1.4612	-3.4169**	-1.4420	-6.2810***
Consumer price index (cpi)	0.3614	-3.2553**	0.2847	-3.3502**
Labor (lab)	-4.5651***	-9.5568***	-4.5612***	-19.6814***

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Similarly, the squared terms of the credit variables (such as squared credit to the economy and squared credit to the private sector) exhibit the same integration properties, further underscoring the necessity of employing econometric models that are appropriate for I(1) series, such as cointegration frameworks or autoregressive distributed lag (ARDL) models with error correction representations.

A few variables, however, display stationarity in levels. Notably, the labor force (*lab*) is stationary at level, with both ADF and PP statistics significant at the one percent level (−4.5651 and −4.5612, respectively). Gross capital formation (*capform*) also appears stationary in levels, with significance at the five percent level in both tests. Similarly, foreign direct investment (*fdi*) yields a borderline result—significant at the one percent level under the ADF test but not under the PP test—suggesting some ambiguity. Nonetheless, these variables can reasonably be assumed to be integrated of order zero, I(0).

Crucially, no variable appears to be integrated of order two, I(2), which satisfies the key precondition for applying the ARDL bounds testing approach. Therefore, the use of the ARDL model is appropriate in this empirical context, enabling the simultaneous examination of both long-run equilibrium relationships and short-run dynamic adjustments among the variables [59, 77].

5-2- Results of Selecting Optimal Lag Length

Lag length selection is a critical step in ARDL modeling, as it determines the structure of both the short-run dynamics and the long-run relationship. In this study, the optimal lag structure for each ARDL model was selected using the Akaike Information Criterion (AIC), which is widely recommended for small and moderate sample sizes due to its efficiency and tendency to avoid underfitting [59, 77].

Three ARDL models were estimated to investigate the effects of credit on economic growth in Vietnam. The first model serves as the baseline, focusing on credit to the private sector. The second and third models are used for comparative purposes, examining credit to the economy as a whole and credit to the state sector, respectively. For Model 1 (Credit to the Private Sector), the optimal lag structure selected by AIC is ARDL(1, 2, 0, 2, 1, 2, 1, 1), indicating one lag of the dependent variable (real GDP-*rgdp*), two lags for credit to the private sector (*cp*), zero lags for its squared term (*cps*), two lags for capital formation (*capform*), one lag for foreign direct investment (*fdi*), two lags for government expenditure (*govexp*), one lag for consumer prices (*cpi*), and one lag for labor (*lab*). This specification reflects complex dynamics in capital formation and credit variables while maintaining parsimony for others. For Model 2 (Credit to the Economy), the AIC-selected structure is ARDL(1, 2, 1, 2, 1, 2, 1, 2), with one lag of the dependent variable (real GDP - *rgdp*), two lags for credit to the economy (*ce*), one lag for its squared term (*ces*), two lags for capital formation (*capform*), one lag for foreign direct investment (*fdi*), two lags for government expenditure (*govexp*), one lag for consumer price index (*cpi*), and two lags for labor (*lab*). This lag configuration captures the potential persistence and nonlinear impact of aggregate credit. For Model 3 (Credit to the State Sector), the optimal specification is ARDL(1, 2, 2, 2, 2, 2, 2), covering one lag for real GDP (*rgdp*), two lags for credit to the state sector (*csgdp*), two lags for all other control variables. Notably, the squared term of state credit is not included due to its limited economic significance (given the small share of state sector credit in total credit in recent years) and the lack of statistical significance for a nonlinear effect in prior estimations. These optimal lag structures ensure that each model balances dynamic complexity and estimation efficiency, enabling robust inference on both short- and long-run relationships between credit variables and economic growth.

5-3- Results of Bound Tests for Cointegration

The ARDL bounds testing approach was employed to investigate the existence of long-run cointegration relationships between real GDP and a set of explanatory variables under three distinct model specifications: credit to the private sector (Model 1), total credit to the economy (Model 2), and credit to the state sector (Model 3). The results, presented in Table 3, indicate strong evidence of cointegration across all three models, though the nature and potential implications of these relationships vary considerably. In Model 1, which includes credit to the private sector (*cp*) and its squared term (*cps*), the calculated F-statistic of 28.76 substantially exceeds the 1% upper bound critical value, providing clear confirmation of a long-run cointegrating relationship. In comparison, Model 2 replaces private credit with aggregate credit to the economy (*ce*) and its squared term (*ces*). The corresponding F-statistic of 25.01 also surpasses the 1% upper bound, indicating the presence of a long-run relationship. Model 3 focuses on the role of credit to the state sector (*cs*), and the estimated F-statistic of 21.58 likewise exceeds the critical value at the one percent level, further affirming cointegration. These results collectively suggest that credit dynamics—whether disaggregated by sector or considered in aggregate—exhibit stable long-run associations with economic output, though the sectoral differences warrant closer interpretative analysis.

Table 3. Bounds test results

Model	F-statistics	k	Sample size	I(0)	I(1)	Cointegration	Non-linearity	Interpretation
Model 1	28.76	7	33	3.86	5.69	Yes (***)	Yes	Strong private credit-growth link with diminishing return
Model 2	25.01	7	33	3.86	5.69	Yes(***)	Yes	Aggregate credit supports growth, but non-linearity present
Model 3	21.58	6	33	3.98	5.69	Yes (***)	No	State credit not significant for growth

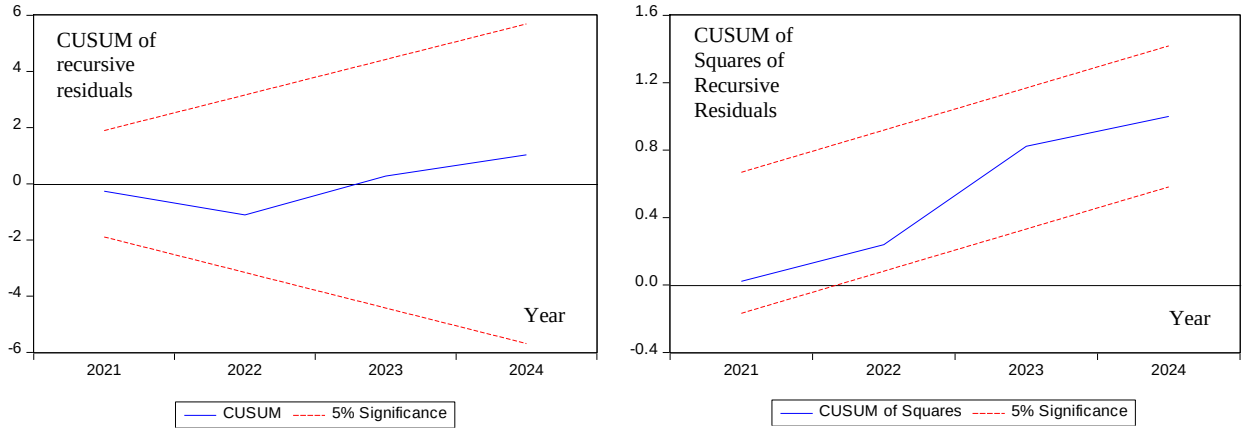
Notes: Critical value at the 1% level for the upper bound is 5.69 (Pesaran et al. [62]). *** denotes significance at the 1% level.

5-4- Diagnostic and Robustness Testing

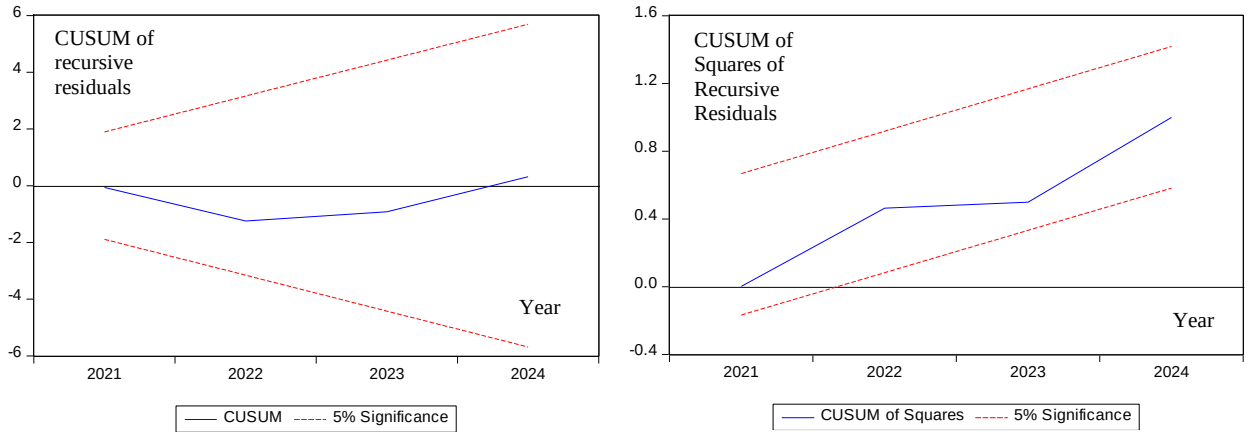
To ensure the reliability and stability of the estimated ARDL models, a series of diagnostic and robustness tests were performed. These include tests for model stability, serial correlation, heteroskedasticity, and residual normality. The results confirm that the models are statistically well-specified and suitable for inference. Concretely, the CUSUM and CUSUM of Squares (CUSUMSQ) tests were applied to assess the parameter stability of the ARDL models over time.

For each model, the test plots show that the cumulative sum of recursive residuals and their squared values lie entirely within the 5% confidence bands, as illustrated in Figure 4. This implies that the null hypothesis of parameter stability (H_0 : model is stable) cannot be rejected. Consequently, all three ARDL models are considered stable throughout the sample period, and their estimates can be reliably interpreted. The Breusch-Godfrey LM test was employed to detect any autocorrelation in the residuals of each model. The results indicate that no significant serial correlation is present, as the p-values exceed conventional significance levels. To examine whether the variance of the residuals is constant (homoscedasticity), both the White and Breusch-Pagan tests were conducted. The outcomes show no evidence of heteroskedasticity, confirming that the error variances are stable and the models are not misspecified in this regard. The Jarque-Bera (JB) test was performed to test for the normal distribution of residuals. For each ARDL model, the test does not reject the null hypothesis of normality, indicating that residuals are approximately normally distributed.

Model 1 (Credit to the Private Sector)



Model 2: (Credit to the Economy)



Model 3 (Credit to the State Sector)

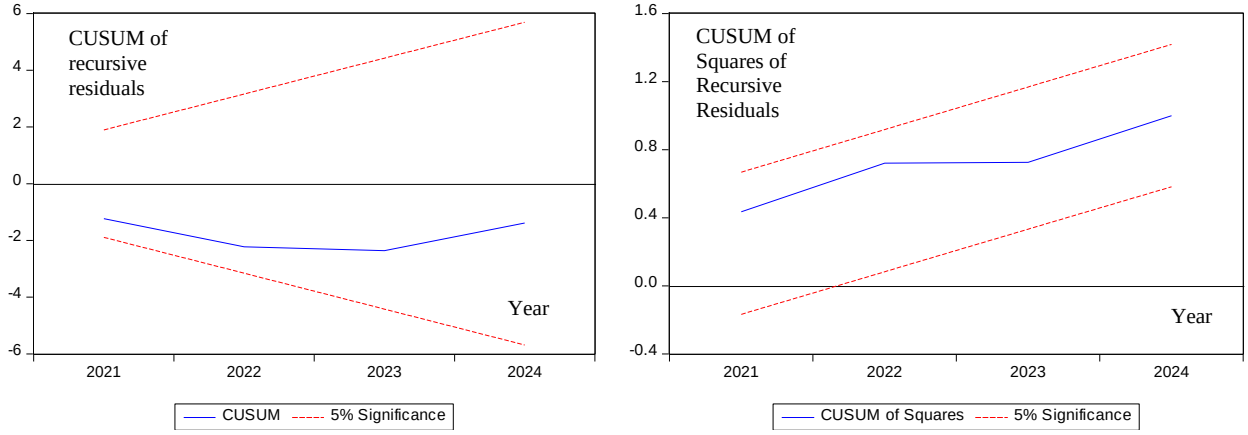


Figure 4. Results of the CUSUM and CUSUMSQ tests for parameter stability

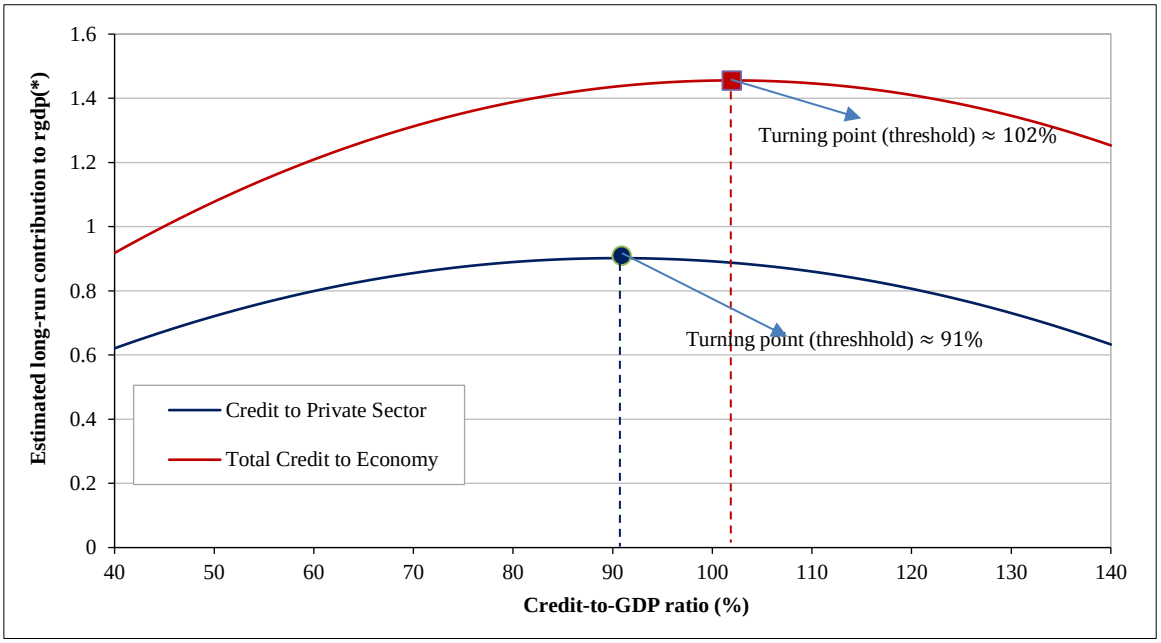
5-5- Results of Estimating the Long-Run Relationship and Error Correction Model

The long-run relationships estimated through the ARDL bounds testing approach are presented in Table 4, which highlight significant nonlinearities in the relationship between credit and growth. As shown, the results from Model 1 indicate that the coefficient on credit to the private sector (*cp*) is positive (0.01992) and statistically significant at the one percent level, suggesting that private sector credit contributes positively to economic growth in the long-run. However, the coefficient of its squared term (*cps*) is negative (-0.00011) and also statistically significant at the one percent level, confirming a nonlinear (inverted U-shaped) relationship. Figure 5 illustrates the nonlinear relationship between credit and economic growth for two aggregates: credit extended to the private sector and total credit to the economy. Based on Equation 3, the threshold, at which the long-run marginal effect (of credit to private sector) changes sign, shifting from positive to negative, is around 91% ($= \frac{0.01992}{-2\times(-0.00011)}$). The marginal long-run effect of a one percentage point increase in the private credit-to-GDP ratio depends on the prevailing level of credit: at 80% of GDP it is about 0.23%, falls to zero at around 91% (the turning point), and become negative thereafter (calculated using Equation 4). At 120%, the same increase in the private credit-to-GDP ratio is associated with a negative marginal long-run effect of about -0.63%. Importantly, however, the overall contribution of private credit to the level of real GDP remains positive until around 180% of GDP. Thus, this result supports the hypothesis of diminishing returns, whereby the marginal contribution of private credit to output declines after surpassing the threshold of about 91% of GDP.

Table 4. Long-run relationship derived from the three ARDL models

Variable	Model ARDL1: Credit to Private Sector	Model ARDL2: Credit to Economy	Model ARDL3: Credit to State Sector
Credit (linear)	0.01992***	0.02855***	–0.0611
Credit (squared)	–0.00011***	–0.00014***	—
Gross Capital formation (*capform*)	0.0432***	0.0348***	0.0639**
Foreign direct investment (*fdi*)	–0.0208	–0.0101	0.1052
Government expenditure (*govexp*)	–0.0099*	–0.0188	0.0481
Consumer price index (*cpi*)	0.0080***	0.0073***	0.0064
Labor (*lab*)	–0.0008	0.0014	–0.0030

Notes: *** p < 0.01, ** p < 0.05, * p<0.10. All models include a constant and are estimated under Case 2 (restricted constant, no trend).



Note (*): *rgdp* is the natural logarithm of real GDP, measured in billions of Vietnamese dongs.

Figure 5. Nonlinear effect (Inverted-U) effect of credit on growth

For total credit to the economy (Model 2), the estimation results indicate that the coefficient on total credit to the economy (*ce*) is positive (0.02855) and statistically significant at the one percent level while the coefficient of its squared term (*ces*) is negative (-0.00014) and also statistically significant at the one percent level, similarly implying a nonlinear (inverted U-shaped) relationship and diminishing returns (Figure 4). The threshold (the turning point) of the marginal long-run effect is at approximately 102% of GDP. Below this level, the marginal effects remain positive—for instance, raising credit from 90% to 100% of GDP is associated with a 2.5% gain in output. However, beyond the threshold, the

marginal contribution becomes negative: an additional 10pp increase from 100% to 110% of GDP reduces output by about 0.3%**.** Similarly, the estimated results support the hypothesis of diminishing returns, whereby the marginal contribution of private credit to output declines after surpassing the threshold of 102% of GDP.

In contrast, Model 3, which focuses on credit to the state sector (*cs*), yields different results. The long-run coefficient on *cs* is negative and statistically insignificant, suggesting that state-directed credit does not have a meaningful impact on long-run GDP growth. The squared term for *cs* was excluded from the model specification, reflecting the relatively limited role of state sector credit in the current structure of Vietnam's economy.

Other control variables generally perform in line with theoretical expectations, with clear indications of statistical significance. Gross capital formation (*capform*) exerts a consistently positive and highly significant long-run impact across all specifications. The estimated coefficients range across the three models are all significant at the one percent or five percent level, implying that a one-percentage-point (pp) increase in the investment-to-GDP ratio is associated with an increase in real GDP of about 4%, depending on the model. This strong and robust effect confirms the central role of capital accumulation as a fundamental driver of long-term growth.

The consumer price index (*cpi*) also shows a small but statistically significant positive coefficient in Models 1 and 2, with estimates around 0.007–0.008 (1% level). This suggests that moderate inflation, within a controlled range, may be growth-supportive, yielding roughly a 0.7–0.8% increase in real GDP per 1pp rise in consumer price index. This aligns with the view that mild inflation can stimulate demand and investment without undermining macroeconomic stability.

By contrast, government expenditure (*govexp*), foreign direct investment (*fdi*), and labor force (*labor*) are statistically insignificant in the long-run estimations, as indicated by their non-significant coefficients. Government expenditure carries weak negative signs in some models (significant only at the tent percent level in one case), which may reflect inefficiencies in fiscal allocation. Similarly, while *fdi* is positive in one model and negative in others, none of these results reach statistical significance, implying that the long-run growth impact of foreign direct investment in Vietnam may be transitory or conditional on absorptive capacity and institutional quality. Labor force participation also fails to show significance, possibly due to already high participation rates and limited variability over time, which weakens its explanatory power for growth dynamics in the long-run models.

The short-run dynamics and the estimated ECM terms of all the ARDL models are presented in Table 5. The table indicates that all ECM terms are negative and significant at the one percent level, confirming the presence of stable long-run relationships across models. In Model 1 (the private credit model), the coefficient of ECM term is –0.4060, indicating that approximately 41% of any short-run disequilibrium is corrected within one year**.** This means it takes about 2.5 years for any deviation in the current year to return to the long-run equilibrium level. Model 2 (the total credit model) shows a slightly slower adjustment but still robust. The coefficient associated with the ECM term is 0.3770 (38%). This means it takes roughly 2.7 years for any deviation in the current year to return to the long-run equilibrium level. Model 3 (the state credit model) has the smallest coefficient of ECM term, which is estimated to be 0.1896, indicating that only 19% of disequilibrium is corrected each year or it would take over five years for any deviation in the current year to return to equilibrium. These estimated coefficients of ECM terms demonstrate that while all models converge back to equilibrium after a shock, the speed of adjustment varies substantially, with the private credit model converging fastest and the state credit model slowest.

Other control variables reveal a consistent pattern of divergence between short-run and long-run effects. Gross capital formation (*capform*) generally has negative coefficients in one-period lagged terms, which are significant at the one percent level. These coefficients indicate that a one percentage point rise in the gross-capital-formation-to-GDP ratio lowers growth by about 0.8%-1.0% in the following year. These near-term contractions, however, stand in contrast to the robust and significant positive long-run coefficients, where the gross-capital-formation-to-GDP ratio raises GDP by about 4-6% per one percentage point increase, underscoring its fundamental role in growth once the capital formation become productive. Foreign direct investment (*fdi*) displays positive and significant coefficients in some models in contemporaneous terms—for example, a +1.2% effect in Model 1 (at the one percent significance level) and a +4.4% effect in Model 3 (at the one percent significance level)—but these benefits are temporary, as FDI does not show significance in the long-run specifications. Government expenditure (*govexp*) produces negative contemporaneous coefficients (significant at the five percent level), but some lagged terms turn positive, hinting at delayed fiscal multipliers rather than immediate effects; yet in the long run, its effects remain insignificant or weakly negative, pointing to limited effectiveness in supporting durable growth. Inflation (*cpi*) has consistently negative and significant coefficients in the short run (around –0.8%, significant at the one percent level**),** reflecting its distortionary effect on purchasing power, consumption, and investment when price rises are rapid**.** Labor force (*lab*) does not show statistically significant short-run effects in contemporaneous terms, but some lagged terms turn negative and significant at the one percent level, consistent with its lack of explanatory power in the long run. Finally, the pandemic dummy variable is strongly negative (–5% to –7%, highly significant at the one percent level), capturing the severe contraction in output during the COVID-19 years.

Table 5. Error correction models and short-run impacts of growth determinants

Variables	Model ARDL1: Credit to Private Sector	Model ARDL2: Credit to Economy	Model ARDL3: Credit to State Sector
D(cp)	0.0047*** (10.1559)		
D(cp(-1))	0.00150** (2.8948)		
D(ce)		0.0158*** (10.4784)	
D(ce(-1))		0.000728 (1.5693)	
D(ces)		-0.0009*** (-11.1737)	
D(cs)			-0.0148*** (-8.6240)
D(cs(-1))			-0.0066*** (-4.2928)
D(capform)	-0.0020	-0.0027* (-2.0644)	-0.0038* (-1.9707)
D(capform(-1))	-0.0102*** (-7.2322)	-0.0078*** (-5.8846)	-0.0082*** (-4.3921)
D(fdi)	0.0122*** (3.8604)	0.0054 (1.7490)	0.0442*** (8.003)
D(fdi(-1))			0.0116*** (3.6195)
D(govexp)	-0.0023** (-2.2930)	-0.0009 (-0.9296)	-0.0040** (-2.9179)
D(govexp(-1))	0.0051*** (5.6939)	0.0082*** (8.8890)	-0.0044** (-3.0843)
D(cpi)	-0.0082*** (-9.7052)	-0.0077*** (-9.2475)	-0.0113*** (-7.3789)
D(cpi(-1))			0.0049*** (3.9917)
D(labor)	0.0003 (1.4618)	0.0004 (1.3824)	-0.0005 (-1.5606)
D(labor(-1))		-0.0010*** (-3.5340)	-0.0013*** (-3.5402)
Pandemic	-0.0684*** (-5.5529)	-0.0684*** (-5.4700)	-0.0507*** (-3.4511)
CointEq(-1)	-0.4060*** (-20.1682)	-0.3770*** (-19.3702)	(-0.1896)*** (-16.5314)
R-squared	0.9362	0.9486	0.9165
Adjusted R-squared	0.9073	0.9178	0.8694
Durbin-Watson	2.0102	2.4823	2.1874
F-Bounds test	28.7604***	25.0137***	21.5753***

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

6- Discussion

This section discusses key findings in relation to prior studies and economic context. The results of the ARDL estimations are broadly consistent with both empirical literature and Vietnam's credit allocation patterns and institutional context. Regarding the threshold effect of credit on growth, the finding of a significant inverted-U relationship between credit and growth in Models 1 and 2 aligns with the literature that suggests the positive effects of credit expansion may diminish beyond a certain threshold. Specifically, the estimated thresholds for the credit to the private sector and credit to the economy are approximately 91% and 102%, respectively. These thresholds are consistent with earlier empirical studies such as Arcand et al. [22], who found that the positive effect of credit on growth diminishes once credit exceeds roughly 100% of GDP. Similarly, Cecchetti & Kharroubi [23] emphasized that oversized financial systems can impede productivity growth through resource misallocation. Law & Singh [78] similarly argue that financial development is only beneficial if supported by efficient credit allocation—a point that resonates strongly with Vietnam, where large firms enjoy preferential access to bank lending while SMEs continue to face barriers.

At the domestic level, these findings extend earlier Vietnamese studies. Anwar & Nguyen [30] showed that credit expansion supported provincial growth in the early liberalization period, while Pham & Nguyen [31] identified a bidirectional credit–growth nexus but noted declining marginal benefits in the absence of institutional reform. More recent contributions, such as Cung [32], found only a positive long-run effect of credit on growth, while Nguyen [50]

finds a nonlinear effect, though their reliance on shorter data spans and aggregate measures limited their generalizability. By contrast, the present study—using a longer time series, sectoral disaggregation, and explicit threshold estimation—provides stronger empirical evidence for the inverted-U relationship and quantifies turning points concretely. Furthermore, by employing updated post-rebasing figures, this study provides more accurate threshold estimates and ensures that the analysis reflects Vietnam's revised macroeconomic baseline. This adjustment not only strengthens the validity of the findings but also differentiates the present work from earlier research that overlooked the implications of rebasing.

The findings also echo literature highlighting the importance of credit composition. Gizaw et al. [28] and Andrieș et al. [29] demonstrate that the allocation of credit across sectors has systemic consequences, while Bui [34] shows that bank credit in Vietnam disproportionately fuels housing price inflation rather than productive investment. Our findings confirm this concern: state-sector credit has an insignificant or negative association with growth, while private credit supports growth only up to a threshold beyond which returns diminish. This suggests that Vietnam's challenge is not simply the size of credit relative to GDP but also its allocation efficiency across enterprise types and sectors.

Given that Vietnam's credit to the private sector has already exceeded this threshold in recent years (reaching around 130% in 2024), this finding warns of potential diminishing returns unless credit efficiency is improved. This finding aligns with the stylized facts presented in Section 2 regarding Vietnam's experience during the study period. Economic growth in Vietnam has not exhibited a linear relationship with the rate of credit expansion. Notably, during periods such as 2007–2010 and 2015–2024, GDP growth demonstrated considerable volatility despite sustained increases in credit supply. This suggests that Vietnam's growth model has been more reliant on input accumulation than on productivity gains.

Within the private sector, credit allocation remains disproportionately skewed toward large private corporations and conglomerates. Despite accounting for more than 95% of all registered enterprises [6] and playing a pivotal role in employment generation and local innovation, small and medium-sized enterprises (SMEs) face structural barriers in accessing formal credit, with surveys indicating that only around 30% successfully secure financing from banks [79]. This gap is not just a matter of quantity but of quality: recent firm-level evidence shows that SMEs with greater access to external financing—including both bank and informal loans—are more likely to engage in innovation, particularly in developing new products and technologies [80]. The limited flow of credit to SMEs therefore undermines their innovative capacity and weakens the transmission channel through which financial deepening could stimulate sustainable economic growth. In the context of rapid digital transformation and growing demands for innovation-led competitiveness, unless Vietnam fundamentally reforms its credit allocation mechanisms, further credit expansion is unlikely to serve as a primary driver of long-term growth. On one hand, this finding is consistent with the international "too much finance" literature, while also reinforcing Vietnam-specific evidence that stresses the role of institutional context and credit distribution in shaping growth outcomes. On the other hand, it underscores the need for future empirical models to move beyond the current dichotomy of state versus private credit and to incorporate credit distribution by firm size in order to better capture how SME financing constraints shape aggregate growth.

Regarding the adjustment to the long-run equilibrium, the reported results suggest that the economy adjusts fastest when private credit is the primary source of growth dynamics, and slowest when state sector credit dominates. In Model 1, the ECM coefficient of –0.41 indicates that about 41% of disequilibria are corrected within a year, implying that shocks are absorbed in roughly 2.5 years. This relatively rapid speed of adjustment highlights the efficiency of private credit in transmitting financial resources to productive uses. By contrast, the ECM coefficient for state credit (–0.19) implies that only 19% of deviations are corrected annually, meaning that more than five years are needed for full convergence back to equilibrium. This sluggish adjustment is consistent with the statistically insignificant and negative long-run coefficient of credit to the state sector (*cs*), indicating it does not contribute meaningfully to economic growth. This finding aligns with evidence from Vietnam and other transition economies where state-owned enterprise (SOE) credit often suffers from low productivity, political interference, and weak accountability [6, 62]. Although the share of credit to SOEs in Vietnam has drastically declined (to under 5% by 2024), its limited economic contribution in both the short and long run supports ongoing reforms to reallocate capital more efficiently. These findings also fit in the broader literature regarding the conditions upon which credit allocation supports growth. Levine [8] and Beck et al. [54] argue that financial systems with efficient intermediation accelerate the adjustment to long-run equilibrium by channeling funds effectively, reducing information costs, and minimizing misallocation. Moreover, the slow speed of adjustment under state credit resonates with concerns raised by Hasan et al. [46] that weak institutional environments exacerbate distortions in credit allocation, prolonging recovery and dampening growth. By highlighting these differences, the present study adds to the evidence that Vietnam's growth dynamics are increasingly tied to the efficiency of private credit, while state-directed credit remains a drag on both equilibrium adjustment and sustainable long-term growth.

Gross capital formation consistently exerts a positive and significant impact on growth in the long-run across all model specifications. This finding reinforces classical and endogenous growth theories, which identify investment as a primary engine of capital accumulation and economic expansion [56, 81]. Empirical studies in the Vietnamese context (e.g., [82, 83]) also confirm the fundamental role of capital in driving growth. In the short run, while capital formation has weak contemporaneous effects, its lagged values are significant and negative across models, suggesting that investments take time to materialize but eventually boost output—consistent with Jorgenson's adjustment cost model [84]. In other words, higher investment does not translate into immediate growth gains and may even have short-run contractionary effects.

This pattern is consistent with adjustment costs and implementation lags**,** where resources are reallocated to capital formation before the productivity benefits are realized. These negative short-run effects stand in marked contrast to the strong and positive long-run coefficients, which highlight the central role of investment in sustaining economic growth once adjustment is complete.

While our analysis finds that FDI is not statistically significant in any long-run specification, this aligns with the broader literature suggesting that the benefits of FDI may be transitory or conditional on factors such as human capital [61] or local financial market development [85]. In contrast to its long-run insignificance, FDI exhibits positive and statistically significant short-run effects in Models 1 and 3, suggesting that it may boost employment and exports in the short term. However, these short-term gains may not be sustained over time without strong domestic linkages and absorptive capacity. This limitation has been widely documented in the Vietnamese context: weak local supply chains, limited technological absorptive capacity, and institutional weaknesses have constrained FDI spillovers into domestic productivity. For example, Anwar & Nguyen [86] found that technology transfer from foreign to domestic firms is modest and highly dependent on absorptive capacity. Similarly, Vu & Le [87] found no evidence of horizontal spillovers, suggesting that the presence of a foreign firm in the same industry as a domestic firm does not improve the domestic firm's productivity through competition, imitation, or other channels. Reflecting this view, Dao et al. [85] highlighted FDI as a driver of employment growth across Vietnamese provinces, while Duong et al. [88] reported a positive relationship between FDI and Vietnam's trade flows. Nonetheless, the lack of long-run significance highlights the importance of fostering stronger domestic supply chains, upgrading local technological capabilities, and implementing institutional reforms to maximize the enduring benefits of FDI.

Similarly, government expenditure is statistically insignificant in the long-run specification. Inefficient public investment and recurrent expenditure may dilute the growth-enhancing effect of government spending [89]. The results of estimation further indicate that government spending is negative in contemporaneous terms but positive in the lagged period in Models 1 and 2, hinting at delayed fiscal multipliers. However, its role remains unclear and potentially inefficient, especially when directed to SOEs. Weak planning and public investment management have been flagged in the reviews by the World Bank [89].

CPI shows a positive and statistically significant effect in Models 1 and 2, which could reflect that moderate inflation supports growth in developing countries by stimulating consumption and reducing real interest rates [90]. However, in Model 3, the coefficient is positive but insignificant. In contrast, CPI has a negative and significant short-run impact, reflecting the distortionary impact of inflation on purchasing power and investment in the short run. This aligns with traditional monetary theory and evidence from Senhadji Semlali & Senhadji [90], who show that high inflation undermines growth, particularly in developing countries.

Labor inputs do not show statistically significant effects in the long run. One possible reason is measurement limitations: our proxy (labor force as a share of population) captures mainly the quantity of workers, which varies only marginally over time and does not reflect differences in quality, education, or skills. This lack of variation, combined with persistent productivity constraints, may explain the absence of statistical significance. The finding resonates with previous studies [50], which suggest that without substantial improvement in human capital, employment expansion alone does not translate into output growth. Some negative lagged impacts of the labor force in the short run may reflect structural mismatches or underemployment—an issue frequently cited in policy discussions on Vietnam's human capital [91].

7- Conclusions and Recommendations

This study has examined the dynamic nexus between bank credit allocation to the private sector and economic growth in Vietnam, with particular attention to the evolving role of the private sector within the framework of a socialist-oriented market economy. Drawing on annual data from 1990 to 2024 and applying the ARDL bounds testing methodology, the analysis disaggregated credit into three channels: credit to the private sector, total domestic credit, and credit to the state sector. The results indicate robust evidence of long-run cointegration between credit and economic growth, albeit following a nonlinear pattern—specifically, an inverted U-shaped relationship—suggesting that beyond a certain threshold, financial deepening may lead to diminishing or even negative growth returns.

Credit to the private sector exerts a statistically significant and positive long-run effect on output, but only up to a credit-to-GDP ratio of approximately 91%. Beyond this point, the marginal impact declines, consistent with theoretical literature on excessive credit expansion and resource misallocation. This finding has important policy implications given that Vietnam's private sector credit reached around 130% of GDP in 2024. By contrast, credit to the state sector shows no statistically significant effect on output, underscoring persistent inefficiencies in public credit allocation, particularly where directed toward underperforming state-owned enterprises (SOEs).

Other macroeconomic variables—such as gross capital formation and inflation (proxied by the consumer price index -CPI)—demonstrate consistent positive effects across all models, reaffirming their importance in sustaining investment-led growth and macroeconomic stability. Foreign direct investment (FDI) shows a significant short-run impact, contributing to capital accumulation and employment generation; however, its long-run effect appears limited, likely due to constrained technology spillovers and weak domestic linkages. The effects of government expenditure and labor input remain mixed, pointing to ongoing inefficiencies in public spending and labor market utilization.

Taken together, the findings highlight that credit expansion to the private sector is not uniformly beneficial or linear in its impact on growth. Its effectiveness depends critically on the quality of credit allocation, institutional robustness, and the economy's capacity to absorb and transform credit into productivity gains. In Vietnam, episodes of rapid credit growth have not always translated into proportional economic performance, reflecting a growth model still driven by input accumulation rather than productivity enhancement. This calls for a structural shift in financial policy—from a focus on aggregate credit targets toward prioritizing efficiency, innovation, and inclusiveness.

A major constraint lies in the asymmetric distribution of credit resources. Although the private sector now absorbs the majority of domestic credit, this financing remains heavily concentrated among large conglomerates with privileged access to capital. In contrast, small and medium-sized enterprises (SMEs)—despite comprising over 97% of registered businesses and playing a critical role in employment generation and local innovation—face chronic barriers to accessing formal finance. These barriers include high collateral requirements, limited credit histories, and exclusion from digital financial services. As a result, the credit system continues to underutilize the productivity potential of the SME sector, thereby constraining the broader economic transformation.

Resolution No. 68-NQ/TW, issued by the Politburo in 2025, represents a strategic shift in national development priorities by positioning the private sector as a key engine of growth. However, achieving this vision requires substantial reforms in credit policy and financial infrastructure. Improving the credit allocation process involves integrating risk-based lending frameworks that consider both quantitative and qualitative firm-level performance indicators. Financial institutions should be incentivized—through regulatory adjustments and risk-sharing instruments—to expand their lending portfolios beyond traditional, large-scale borrowers. At the same time, differentiated credit products should be designed to address the unique needs of SMEs, including unsecured working capital loans based on cash flow projections, partial credit guarantee schemes, and concessional lending for enterprises in high-tech and strategic sectors.

Equally important is the promotion of digital transformation among SMEs. Blended finance mechanisms that leverage both public and private capital can reduce lending risks and expand outreach. These efforts should be supported by fiscal incentives, such as tax deductions for R&D and accelerated depreciation for digital assets. Moreover, the effectiveness of credit expansion must be reinforced by improvements in credit infrastructure—namely, expanding credit information systems, deploying electronic Know Your Business (e-KYB) and alternative credit scoring tools, and ensuring interoperability between fintech platforms and traditional banks. Legal and institutional reforms are also needed to streamline contract enforcement, simplify insolvency proceedings, and provide cost-effective mechanisms for dispute resolution.

In sum, if Vietnam is to harness the full developmental potential of private sector credit—particularly in an era of digital transformation and increasing global competition—its financial policies must transition from a focus on volume to one on quality, from preferential access to inclusive financing, and from fragmented interventions to coordinated, innovation-oriented strategies. Such a paradigm shift will not only strengthen the link between credit and economic growth but also align financial sector development with Vietnam's long-term structural transformation goals.

8- Declarations

8-1- Data Availability Statement

The data presented in this study are available in the article.

8-2- Funding

The author received no financial support for the research, authorship, and/or publication of this article.

8-3- Institutional Review Board Statement

Not applicable.

8-4- Informed Consent Statement

Not applicable.

8-5- Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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