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Assessment of the Relationship Between Financial and Business Cycles Considering Heterogeneity in Budget Deficits, Financing Methods, and Current Account Status

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Highlights

- **This study investigates the relationship between financial and business cycles using a Panel VAR model.**
- **Countries are classified into six groups based on budget deficits, financing methods, and current account status to capture heterogeneity.**
- **Results show bidirectional causality between financial and business cycles across all groups.**
- **The intensity of this relationship depends on financing methods, fiscal conditions, and external balances.**
- **In Iran, with its severe budget deficit and bank-based financing, financial cycles significantly affect real economic activity and growth.**

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Abstract

The occurrence of business cycles and economic fluctuations is a central issue in economics. The emergence of business cycles has often led to challenges for economies, creating unwanted periods of inflation or recession that result in adverse economic conditions. Among the factors that can influence business cycles is the performance of the financial sector. This study employs a Panel VAR model to evaluate the relationship between financial and business cycles in developing countries over the period from 1990 to 2021. The study divides 68 developing countries into six groups based on their budget deficit status, predominant financing method, and current account status to identify potential heterogeneity in the relationship between financial and business cycles. The findings indicate a bidireectional causality between financial and business cycles across all six groups of countries (characterized by high or low budget deficits, bank-based or market-based financing, and current account surpluses or deficits). Additionally, the results suggest that financing methods, budget deficit status, and current account balances influence the intensity of the impact of financial cycles on business cycles in developing countries. Given the severe budget deficit and the significant role of banks in financing enterprises in Iran, it can be argued that financial cycles have a substantial effect on the real sector of the Iranian economy, with a thriving financial sector likely to expand activities and stimulate economic growth.

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1. Introduction

The presence of business cycles and economic fluctuations is a central issue in any economy. Business cycles often lead to problems, bringing about unwanted periods of inflation or recession that result in further adverse economic conditions. Thus, studying this phenomenon, understanding its causes, and identifying ways to mitigate it are among the primary concerns of economic policymakers (Mehrara et al., 2020).

Recent developments in the global economy have prompted a reevaluation and expansion of certain economic concepts. One notable shift in economic thought is the increased importance placed on examining the relationship between the real and financial sectors. Evidence from the past two decades clearly demonstrates the significance of financial cycles worldwide. For instance, Japan experienced a massive drop in asset prices in the early 1990s following the largest housing bubble in its history. Many emerging Asian economies faced severe financial crises in the late 1990s after consecutive booms in bank credit. Similarly, the late 1990s stock market boom in some advanced economies ended with concurrent recessions. Economists did not fully acknowledge the importance of financial cycles within the wider economic system until the global financial crisis of 2007. Pre-crisis economic models largely regarded financial variables and their influence on macroeconomic fluctuations as secondary concerns. Before the 2007 crisis, monetary policy was implemented in a relatively predictable, rule-based manner, with its transmission process well understood. Within this framework, it was expected that financial imbalances would be swiftly corrected, and stability in the real sector would not be threatened, as posited by the efficient markets hypothesis. The 2007 global financial crisis, however, revealed the inadequate comprehension of the connections between the real and financial sectors and underscored the dangers of overlooking the significance and effects of financial cycles. In other words, if financial cycles are not driven by business cycles but rather cause them, rule-based monetary policy loses effectiveness, and macroeconomic stability faces serious threats (Taheri Bazkhane et al., 2018).

Financial markets tend to experience long-term cyclical swings and imbalances due to the rapid expansion of bank credit and asset prices increasing faster than inflation. As a result, market adjustments frequently occur in the form of sharp corrections and financial crises (Borio, 2014). These boom-and-bust cycles, also known as financial cycles, are significant drivers of business cycles and exacerbate both internal and external imbalances. This hypothesis provides a complementary yet somewhat distinct view from the “financial accelerator” literature, which posits that financial markets may simply amplify real economic shocks rather than serve as dynamic driving forces for business cycles (Mendoza, 2010). Additionally, shocks initially affecting a relatively limited segment of the financial market can quickly spread to other sectors, causing widespread damage not only nationally but globally. For instance, the excessive expansion of the U.S. housing market in 2007 led to a crisis in the subprime mortgage market, which then spread to other countries, resulting in a global recession (Adarov, 2021).

While the empirical investigation of financial cycles' inherent instability and dynamic nature is not a new concept—it has been addressed in studies by Minsky (2016) and Kindleberger (1978)—recent financial crises have renewed interest in this topic (Li et al., 2020; Ha et al., 2020). The findings of these studies generally point to observed long-term cyclical patterns in the dynamics of asset prices, credit market activities, and the housing sector, as well as their close interconnections. Moreover, crisis periods highlight the need for further macroeconomic analysis of financial cycles' effects (Adarov, 2021). A key question arises: What is the relationship between financial and business cycles, and is this relationship influenced by various economic indicators such as budget deficits, current account balances, and other factors?

In this regard, recent literature increasingly emphasizes that fiscal conditions—particularly the level of budget deficits and the way governments finance these deficits—can significantly affect the amplitude and persistence of financial and business cycles. For example, higher budget deficits financed through domestic credit expansion may intensify credit booms, while market-based financing may transmit shocks differently (Jordà et al., 2013). Similarly, a country's external position, reflected in its current account balance, can also alter the nature of interactions between financial and real cycles by changing the degree of exposure to global financial shocks and capital flow volatility (Adarov, 2021). Therefore, understanding these channels is crucial when evaluating how financial cycles translate into business cycle fluctuations.

The aim of this research is to evaluate the relationship between financial and business cycles. To address the heterogeneity highlighted above, this study explicitly incorporates differences in fiscal stance (budget deficit levels), dominant financing structures (bank-based vs. market-based), and external balance (current account surplus or deficit). Given that heterogeneity in government financial status, predominant corporate financing methods, and current account balance may influence the connection between financial and business cycles, this study categorizes the sample based on these three structural features. The relationship between financial and business cycles is estimated for each category, and the results are compared.

The main contribution of this study is its systematic examination of the relationship between financial and business cycles while incorporating structural heterogeneity across countries—an element largely neglected in previous empirical work. Unlike earlier studies that rely on aggregate analyses, this research classifies developing economies by fiscal stance, financial intermediation structure, and current account position, enabling a more accurate assessment of how these structural factors shape the transmission of financial cycles to real activity.

The findings show that structural characteristics significantly influence the strength and persistence of financial–business cycle co-movements, particularly in bank-based economies with sizable fiscal deficits. By identifying these asymmetries, the study fills an important gap in the literature on cycle

synchronization and offers refined policy implications for fiscal, monetary, and macroprudential design.

Relative to earlier work (Adarov, 2021; Jordà et al., 2013; Schularick & Taylor, 2012), this study contributes by:

(i) focusing exclusively on 68 developing economies over 1990–2021;

(ii) providing the first unified empirical framework that incorporates fiscal stance, financial structure, and external balance; and

(iii) demonstrating that while bidirectional causality between the cycles persists, its magnitude and persistence are strongly conditioned by these structural features.

2. Theoretical Framework

2.1. Business Cycles

A business cycle is a type of regular and systematic fluctuation in a country's overall economic activities, largely organized by business enterprises. A cycle begins with a period of economic expansion occurring simultaneously across multiple economic activities and culminates in a phase of recession and contraction (Zare & Azhdarnia, 2019). Lucas defines business cycles as recurrent deviations in real gross domestic product (GDP) from its long-term trend, often referred to as growth cycles. In this context, expansion periods occur when real output is above trend, while recession periods occur when output is below trend (Gholami Heydariani et al., 2021). The business cycle largely determines whether real GDP is growing or contracting.

According to Kydland & Prescott (1977), business cycles are represented by deviations from real GDP (Soleimani et al., 2023). Estimating business cycles involves defining the cycle, outlining criteria for distinguishing business cycles from other similar fluctuations, determining approaches for identifying business cycles, and establishing methods for measuring them (Škare & Stjepanović, 2016).

Many researchers attribute a large share of business cycle fluctuations to monetary shocks and argue that monetary expansion stimulates real economic activity, where expansionary monetary policy can lead to economic booms and contractionary monetary policy can result in recessions. Hypotheses from different economic schools regarding the effects of monetary shocks on output and inflation indicate that monetary shocks can generate or amplify business cycle fluctuations (Abdollahzade & Zare,2020).

A business cycle comprises two stages: expansion and recession (Broadberry et al., 2023). An expansion phase refers to periods when real GDP begins to grow. The peak is the point at which this upward trend in GDP halts, and a downward trend begins. A recession or contraction is defined as a period marked by a decline in real GDP, and a trough or crisis occurs when the economy faces high unemployment, declining annual income, and excess supply. A cycle typically starts with a near-simultaneous expansion across most economic activities, followed by a recession and contraction. This definition is known as the classical business cycle, wherein a recession spans the time between a peak and a trough,

and an expansion spans the time between a trough and a peak (Gholami Heydariani et al., 2021).

Identifying turning points in economic activity is relatively straightforward. However, describing intervals between successive peaks or troughs is more complex due to various definitions of business cycles. While most studies define business cycles as the intervals between successive peaks or troughs (Broadberry et al., 2012; Jordà et al., 2013; Martínez-García et al., 2015), some researchers focus on deviations of variables from their potential levels (Romer & Romer, 2020).

2.2 Financial Cycles

The concept of financial cycles is employed to describe financial imbalances and the boom-and-bust dynamics in financial and credit markets. Peaks in financial cycles often coincide with periods of financial crises, and financial cycle indicators can provide valuable predictive information regarding such crises (Mandler & Scharnagl, 2022). These cycles represent the expansion and contraction phases within financial markets, which can amplify macroeconomic fluctuations and, in some cases, trigger financial instability (Adrian & Shin, 2010; Soleimani et al., 2023). They reflect the emergence and subsequent correction of market imbalances driven by shifts in risk perception, liquidity conditions, and other supply-and-demand factors (Adarov, 2021). Financial cycles are commonly illustrated through the co-movement of key financial indicators, such as credit and housing prices, which tend to move together and signal overall booms or busts in the financial system (Oman, 2019). Accordingly, credit levels and asset prices are widely recognized as primary indicators for defining and characterizing financial cycles. Empirical studies often utilize variables such as stock prices, housing prices, and credit to capture these dynamics (Soleimani et al., 2023). Moreover, Adarov (2017) demonstrated that stock prices and long-term interest rates are closely associated with credit levels and housing prices, highlighting their suitability for identifying financial cycles. In particular, bank credit is frequently employed as a core variable for analyzing financial cycles, as it constitutes the primary channel linking investment and savings within the economy (Tsiakas & Zhang, 2023).

Interest in studying financial cycles has grown since the global financial crisis and the expansion of post-Keynesian monetary theory, particularly following Minsky's work. Minsky's Financial Instability Hypothesis (1975, 1986, 1992) provides an analysis of how financial instability arises, encompassing changes in acceptable debt levels, the resulting shifts in financial structures, the role of interest rates, and portfolio composition changes from boom to bust as investors reassess risk (Stockhammer & Gouzoulis, 2023).

The concept of financial cycles, as distinct from business cycles, originates from studies conducted by the Bank for International Settlements (BIS, 2014). Financial cycles differ from business cycles in several ways. First, financial cycles are longer and broader than business cycles (Borio, 2014; Drehmann et al., 2012). Financial cycles, measured by credit and asset prices, can last up to 30 years, while a business cycle typically lasts a maximum of eight years (Drehmann et al., 2012).

Similarly, Hiebert et al. (2018) found that financial cycles last, on average, 15 years, compared to the average 6.5-year duration of business cycles. Business cycles maintain price stability, a short- to medium-term objective of monetary policy, whereas financial cycles aim for financial stability, the long-term goal of macroprudential policy (Agenor & Da Silva, 2019).

Several factors differentiate financial and business cycles, including financial frictions and policy regimes. For example, the shift toward financially liberalized economies since the 1980s has amplified the length and scope of financial cycles. This is because financial constraints are reduced with greater financial liberalization, facilitating full interaction between financial markets. As a result, strong capital flows are often associated with intense financial booms (Borio et al., 2014; Cagliarini & Price, 2017).

Fisher argued that excessive debt reduces the velocity of money, ultimately leading to declines in aggregate spending and price levels. This occurs because high debt levels reduce the rate at which deposit transactions occur, thereby decreasing the money velocity. This reduction in price levels, in turn, increases real debt burdens, exerting further downward pressure on aggregate spending and prices; thus, excessive debt can contribute to deflation. On the other hand, Minsky (2016) suggested that cyclical credit supply could destabilize the financial system and increase the likelihood of a financial crisis. This is because credit expansion may encourage investment in riskier assets, which seem safe during boom periods but can exacerbate financial imbalances. Indeed, evidence indicates that credit and asset price booms and busts have coincided with deteriorating global financial conditions. This explains why many economies, including South Africa, have adopted macroprudential policies to prevent excessive credit and asset price growth that could destabilize their financial systems (Dlamini & Ngalawa, 2022).

Bernanke & Gertler (1995), illustrated the impact of borrowers' balance sheets on macroeconomic conditions. Their framework assumes information asymmetry between borrowers and lenders, resulting in welfare losses because the financial contract reached is suboptimal compared to a scenario without such asymmetry. They suggest that this welfare loss is related to the net worth of firms. When firms' net worth varies with the business cycle, agency costs become countercyclical, intensifying fluctuations in borrowing and, in turn, investment, consumption, and production. Additionally, if an independent shock affects net worth outside of general economic conditions, the financial system itself can generate real economic fluctuations. Overall, the model indicates that the financial system can both amplify macroeconomic shocks (financial accelerator mechanism) and serve as a source of such shocks (Cagliarini & Price, 2017).

Kiyotaki & Moore (1997), employed a dynamic general equilibrium model to illustrate how credit constraints impact macroeconomic conditions. Unlike Bernanke & Gertler's (1995), model, where changes in net worth arise from cash flow changes, in Kiyotaki and Moore's model, changes in asset prices drive net worth variations. In their model, durable assets serve both as production inputs and collateral, creating a dynamic relationship between credit constraints and asset

prices. In this model, a temporary shock affecting asset prices increases borrowing constraints, leading to a reduction in both production and asset prices (Cagliarini & Price, 2017).

Expanding on these two theoretical models, Bernanke et al. (1999), developed a framework addressing credit market frictions, which includes price stickiness, the influence of monetary policy, delays in investment decisions, and firm heterogeneity. Consistent with earlier studies, they found that financial accelerators have a substantial effect on macroeconomic conditions. In this model, the amplifying effect of the financial accelerator on the business cycle is reduced when monetary policy can stabilize output; however, for policy to effectively stabilize production, adjustments must be implemented very smoothly (Cagliarini & Price, 2017).

2.2.3 Connections Between Financial Markets and Business Cycles

A common characteristic of recessions is their association with various financial disruptions, such as sharp declines in credit and asset prices. These developments have sparked intense discussions about the relationship between macroeconomic and financial factors and have prompted studies to examine the correlation between business and financial cycles (Soleimani et al., 2023).

Financial variables have long been recognized as potential drivers of business cycle fluctuations, dating back at least to the Great Depression. General equilibrium models highlight their crucial role in production volatility, showing that the financial system can both amplify shocks and serve as a source of shocks that trigger business cycles. The balance sheets of households, firms, and banks generate cyclical mechanisms such as the financial accelerator. For instance, demand shocks may be magnified through changes in collateral values (e.g., residential or commercial properties) and the real value of nominal debt. These theories indicate that credit- and asset price-driven cyclical fluctuations, often spanning extended periods of boom and bust, can significantly affect business cycles (Gertler & Karadi, 2011).

The primary tool through which the banking system and monetary authorities affect economic activity is not through trade but by controlling access to credit (Stiglitz & Weiss, 1988). Banks, as one of the main components of the money market and the largest and most influential financial institutions in this domain, play a crucial role as financial intermediaries. This role is even more significant in bank-based economies like Iran. Banks facilitate commerce and transactions by organizing receipts and payments, thereby expanding markets. They also mobilize savings, large and small, directing them toward productive sectors, which fosters economic growth and development. By providing loans, banks contribute to creating and growing value-added across various sectors of the economy (Fatahi Aghababa et al., 2020; Awad & Karaki, 2019).

In demand-driven analytical approaches, emphasis is placed on the process of mobilizing savings, injecting them into economic units, and ultimately strengthening aggregate demand. Banks, as lenders to classes of borrowers, increase

loans that in turn boost investment spending and consumer expenditures. Consequently, expansionary monetary policies that increase bank deposits lead to a rise in bank resources, followed by increased lending. This, in turn, injects bank resources into various economic sectors through loans and credit facilities, stimulating investment, production, and economic growth. More precisely, the mobilization of savings and provision of credit to economic entities by banks spurs both consumer and capital demand. As demand increases, production rises accordingly, leading to higher demand for production factors and intermediate goods. This increased demand for intermediate goods further boosts production activities, resulting in the production of more goods and higher incomes for the owners of production factors. These individuals then spend part of their earned income on consumption, which increases production and income proportionally to the increase in consumption. This process continues indefinitely, with each cycle leading to progressively smaller increases. The multiplier effect thus represents the cumulative increases in expenditures resulting from increased demand within a dynamic system. The production effects may vary depending on whether credit is extended for consumption or investment (Shakeri Bastan Abad & Ansari, 2023).

Various theories have been proposed to explain the synchronization between business cycles and credit cycles. Economists such as Eichengreen and Minsky (2016), within the framework of post-Keynesian theory, consider financial cycles to be the driving force behind business cycles. However, empirical evidence suggests that this perspective alone cannot fully explain the underlying causes of business cycle formation (Seifi Kashki et al., 2020). Recent studies suggest that credit shocks are significant factors in the creation of business cycles. Peersman & Wagner (2014), argue that shocks to bank lending, risk-taking, and securitization activities explain over 30 percent of U.S. output fluctuations. Alterations in the financial system can significantly affect economic conditions. In particular, the reallocation of financial resources promotes investment, which in turn raises income and asset prices. Changes in asset prices then affect household consumption and investment via household net worth, business net worth, and equity replacement value. Consequently, credit and asset price booms can influence the economy, amplifying periods of expansion and contraction (Cagliarini & Price, 2017).

2.2.4 How Fiscal and External Imbalances Shape the Link between Financial and Business Cycles?

A high fiscal deficit can influence the interaction between financial and business cycles through two primary channels. First, by stimulating aggregate demand and expanding economic activity, it amplifies the business cycle. Second, by increasing the government's need for financing, it exerts upward pressure on credit markets and interest rates, thereby altering financial conditions. During financial booms, when asset prices and credit grow rapidly, fiscal deficits can exacerbate overheating in the economy, while in downturns, they may intensify pressure on public balances and debt sustainability. This bidirectional interaction implies that financial and business cycles may mutually reinforce or dampen each

other. Moreover, persistent fiscal imbalances reduce the flexibility of fiscal policy; when government debt is high, the ability to respond to financial shocks (e.g., through countercyclical stimulus packages) becomes constrained, likely increasing the depth and duration of recessions following financial busts (Adarov, 2021). In this context, Adarov (2021) finds that the expansion of the financial cycle is typically associated with growing macroeconomic imbalances. While financial upturns may temporarily alleviate the public debt-to-GDP ratio, they simultaneously raise the risk of crises and subsequent deterioration in fiscal conditions. Thus, fiscal deficits and financial cycles exhibit dynamic, two-way interactions (Adarov, 2021).

In bank-based economies, credit channels and the loan-to-GDP ratio play a crucial role in amplifying or dampening financial cycles. Rapid bank credit expansion can fuel asset and credit booms, while reversals often create balance-sheet problems for banks, reducing credit and policy flexibility. In such systems, banking crises have a direct impact on investment and output (Mendoza & Terrones, 2014). In contrast, in market-based economies, fluctuations in asset prices and the access of investment institutions and capital markets to financing are more influential. In these systems, bubbles in equity or corporate bond markets create distinct transmission channels—sharp declines in asset prices can affect output through the wealth channel and through firms' cost of capital (Borio, 2014). In this regard, Jordà, Schularick, & Taylor (2013) demonstrate that credit-driven expansions are typically followed by deeper recessions and slower recoveries. The structure of financial intermediation determines the type of crisis—banking, market-based, or hybrid—and the intensity of spillovers from the financial to the real sector. Hence, a country's financial architecture shapes the sensitivity of the co-movement between financial and business cycles (Jordà et al., 2013).

A deteriorating current account (a large external deficit) increases a country's vulnerability to fluctuations in external capital and foreign shocks. Financial booms driven by short-term capital inflows—such as foreign borrowing or surges in direct investment—can magnify economic upswings; however, sudden reversals of these flows often lead to sharp contractions, asset price collapses, and combined financial–trade crises. Conversely, a current account surplus may serve as a partial cushion but may also indicate reliance on commodity exports, making the economy sensitive to external price shocks (Borio, 2014). In this context, Adarov (2021) shows that external imbalances, such as current account deficits combined with credit booms, tend to amplify cyclical volatility and complicate the return to equilibrium. In effect, current account deficits and external financing increase the likelihood that local financial stress evolves into broader international crises (Adarov, 2021).

Overall, when high fiscal deficits, expanding bank or external financing, and large current account deficits occur simultaneously, a country's vulnerability to a "large-amplitude financial cycle" rises significantly. Credit expansion accelerates, asset prices increase, and governments become more dependent on financial markets to sustain fiscal policy or stimulate growth. Ultimately, the unwinding of

such dynamics may involve concurrent banking crises, asset price collapses, and capital flight, culminating in a deep recession. This reinforcing and simultaneous feedback loop strengthens and intensifies the connection between financial and business cycles (Borio, 2014).

3. Literature Review

Empirical studies in this research area can be classified based on several aspects, including methods for extracting cycles, measures of cycles, methods for assessing the relationship between business and financial cycles, and study findings.

Most empirical studies have used the Hodrick-Prescott filter to extract the cyclical component. Examples include researchers such as Garg and Sah (2024), Soleimani et al. (2023), Mozaffari-Nia et al. (2023), Khosravi et al. (2022), Seifi Kashki et al. (2020). It can be argued that the use of the Hodrick-Prescott filter has gained relative consensus among researchers due to its ease and speed in measuring cycles.

A review of various empirical studies reveals that GDP and economic growth are commonly used as reference variables for measuring business cycles, with a consensus among researchers on this approach. For example, scholars such as Garg & Sah (2024), Stockhammer & Gouzoulis (2023), Tsiakas & Zhang (2023), Soleimani et al. (2023), Mandler & Scharnagl (2022), Li et al. (2021), Adarov (2021), Yan & Huang (2020), Mozaffari-Nia et al. (2023), Ameri (2023), Khosravi et al. (2022), Gholami Heydariani et al. (2021), Seifi Kashki et al. (2020), and Taheri Bazkhane et al. (2018) have used GDP in their studies to extract business cycles. Furthermore, Awad & Karaki (2019), Fatahi Aghababa et al. (2020), and Shakeri Bastan Abad & Ansari (2023) utilized economic growth as an indicator of the real sector when evaluating the relationship between real and financial sector variables.

Unlike the real sector and the business cycle component, which most researchers measure using a relatively unified variable, various metrics are used to assess financial cycles in empirical literature, and there is no consensus on this matter. Many researchers, such as Garg & Sah (2024), Tsiakas & Zhang (2023), Li et al. (2021), Yan & Huang (2020), Awad & Karaki (2019), Ameri (2023), Shakeri Bastan Abad & Ansari (2023), Khosravi et al. (2022), Seifi Kashki et al. (2020), and Fatahi Aghababa et al. (2020), use banking indices, particularly bank credit, to measure financial cycles. Some researchers use capital market variables to extract financial cycles, such as Mozaffari-Nia et al. (2023) and Gholami Heydariani et al. (2021). Additionally, some empirical studies use multiple indicators to measure financial cycles. For instance, Adarov (2021) employed a Dynamic Factor Model to extract a hidden common factor representing financial cycles from four datasets, including credit, housing, bonds, and stock markets. Stockhammer & Gouzoulis (2023) utilized debt growth and mortgage loans, Mandler & Scharnagl (2022) used bank credit, stock prices, housing prices, and interest rates, and Soleimani et al.

(2023) used housing prices, stock price indices, and public and private sector lending to extract financial cycles.

The econometric method of assessing the relationships between business and financial cycles is another issue that has been both a common and distinctive feature of empirical studies. Researchers like Garg & Sah (2024), Tsiakas & Zhang (2023), Adarov (2021), Yan & Huang (2020), Awad & Karaki (2019), Ameri (2023), and Khosravi et al. (2022) have employed VAR family methods. In empirical literature, other methods such as the Generalized Method of Moments (Fatahi Aghababa et al., 2020), wavelet analysis (Mandler & Scharnagl, 2022; Taheri Bazkhane et al., 2018), Social Accounting Matrix approach (Shakeri Bastan Abad & Ansari, 2023), Diebold & Yilmaz spillover approach (Mozaffari Nia et al., 2023; Gholami Heydariani et al., 2020), and Bayesian averaging (Soleimani et al., 2023) have been used to analyze the relationship between financial and business cycles. Nevertheless, the VAR family methods appear to be more widely used compared to other econometric approaches.

A review of study findings reveals that most researchers report a positive, bidirectional relationship between business and financial cycles. Examples of such findings include studies by Ameri (2023), Gholami Heydariani et al. (2021), Garg & Sah (2024), Tsiakas & Zhang (2023), Stockhammer & Gouzoulis (2023), Mandler & Scharnagl (2022), Adarov (2021), Li et al. (2021), and Yan & Huang (2020). Some studies have shown that the influence flows from financial cycles to business cycles. In this regard, studies by Shakeri Bastan Abad & Ansari (2023), Fatahi Aghababa et al. (2020), Soleimani et al. (2023), and Awad & Karaki (2019) report that increased lending, liquidity, and stock price indices positively and significantly impact business cycles and economic growth. Meanwhile, some empirical studies demonstrate a potentially contradictory relationship between financial and business cycles. Seifi Kashki et al. (2020) find that financial cycles directly influence business cycles, while business cycles have an inverse effect on credit cycles. Among empirical studies, only Adarov (2021) differentiates sample countries based on various criteria to examine the relationship between business and financial cycles, focusing specifically on developed nations. Based on existing research, it can be argued that no prior studies have investigated the relationship between financial and business cycles in developing countries. Furthermore, dividing the sample according to budget deficit levels, financing methods, and current account status, and estimating the model for each subgroup, constitutes another novel contribution of this study.

4. Methodology

4.1. Method

This research is applied in its purpose and has a descriptive-analytical nature. Data analysis was performed using Stata software, version 14. The statistical population of this study comprises all developing countries. Based on the availability of data for all variables during the period from 1990 to 2021, a sample of 68 developing countries was ultimately selected. Given that heterogeneity in

debt, current account balance, and financing methods (bank-based or market-based) are expected to influence the relationship between financial and business cycles, these 68 countries were categorized into different groups based on their budget deficit levels, current account balance, and predominant financing methods. These classifications are presented in Table 1.

Countries are classified into bank-based and market-based economies according to their primary mode of project financing, following Demirgüç-Kunt et al. (2012). Bank-based economies rely primarily on banks for capital allocation and savings mobilization, while market-based economies utilize developed capital markets in addition to banks. Countries above the global sample average in financial structure ratios are classified as market-based. Additionally, countries are grouped by budget deficit levels (2% of GDP threshold) and external balance (positive average trade balance over 1990–2021 for surplus, otherwise deficit).

To identify business and financial cycles, the Hodrick-Prescott (HP) filter was applied to the time series of GDP and financial indicators for each country. Despite the heterogeneity among developing countries, the HP filter is widely used in empirical macroeconomic studies for extracting cyclical components because it provides a clear separation between long-term trends and short- to medium-term fluctuations (Ravn & Uhlig, 2002; Borio, 2014). In this study, the filter allows for a consistent extraction of cycles across countries with varying fiscal, financial, and external characteristics, facilitating the subsequent analysis of interactions between financial and business cycles under different economic conditions.

Table 1. Classification of Countries Included in the Study

Classification	Time	N.Countries	Duration	Number of Observations
High Budget Deficit	1990-2021	41	32	1312
Low Budget Deficit	1990-2021	27	32	864
Current Account Deficit	1990-2021	57	32	1824
Current Account Surplus	1990-2021	11	32	352
Bank-Based	1990-2021	52	32	1664
Market-Based	1990-2021	16	32	512

***Source**: research findings*

The data collection of this research is in the form of a library and the use of databases that will use the data of the World Bank and the International Monetary Fund. The research variables are introduced in Table 2.

Table 2. Introduction of research model variables

Symbol	Variable	Data Source	Method of Extraction
FC	Financial gap (bank credit as a % of potential GDP)	IMF and research calculations	The financial gap is calculated as the deviation of actual bank credit from its long-term trend, estimated using the Hodrick–Prescott filter (λ = 100). This separates short-term fluctuations in bank credit from the long-term trend, allowing identification of periods of financial expansion and contraction.
YGAP	Output gap (% of potential GDP)	World Bank and research calculations	The output gap is calculated as the deviation of actual GDP from potential GDP using the Hodrick–Prescott filter (λ = 100), separating cyclical fluctuations from the long-term trend.
BUDGET	Budget deficit ratio to GDP	World Bank	-
CA	Current account balance ratio to GDP	World Bank	-

***Source**: research findings*

To extract the financial & output gap, the Hodrick–Prescott filter with a smoothing parameter of λ = 100 was employed. This method enables the separation of short-term fluctuations from long-term trends and is considered one of the standard approaches in macroeconomic studies (Hodrick & Prescott, 1997; Ravn & Uhlig, 2002).

4.2. Data analysis methods

Panel VAR models bypass many of the detailed microstructures present in DSGE models and, similar to standard VAR models, aim to capture the interrelationships and dynamics within the data while imposing minimal restrictions. In these models, identifying shocks allows the transformation of reduced-form models into structural ones (Canova & Ciccarelli, 2013). VAR models are now well known in applied macroeconomics. For the first time, Sims used a VAR model to analyze the dynamic relationships between multiple variables. In VAR models, all variables are considered as endogenous and interdependent. Let Y_t be a G×1 vector of endogenous variables. In this case, the VAR model for Y_t is defined as follows (Canova & Cicarelli, 2013):

$$Y_t = A_0(t) + A_0(l)Y_{t-1} + u_t \quad (1)$$

Panel VAR models have the same structure as VAR models, in the sense that all variables are assumed to be endogenous and interdependent, but a cross-sectional dimension is added to the model:

$$y_{it} = A_{0i}(t) + A_i(l)Y_{t-1} + u_{it} \quad , i = 1, \dots, N \quad t = 1, \dots, T \tag{2}$$

In general, if N represents country i=1, ..., N and T represents time t= 1, ..., T, the PVAR model is defined as follows:

$$\mathrm{x}_{it} = \mu_i + \Theta(L)\mathrm{x}_{it} + \varepsilon_{it} \tag{3}$$

The vector xitx_{it}xit includes the financial cycle indicator—bank credit as a percentage of GDP (FC), the output gap as a percentage of potential GDP (YGAP), the current account balance as a percentage of GDP (CA), and the budget deficit as a percentage of GDP (BUDGET). Θ(L) is a polynomial matrix containing the lag operator L, μi is the vector of country-specific effects, and ε represents the error term. Including variables in the model with a one-period lag ensures their exogeneity. The panel VAR model is estimated using the GMM method.

Panel Vector Autoregression (PVAR) models are particularly well-suited for analyzing dynamic interactions among multiple macroeconomic or financial variables because they treat all variables as endogenous, allowing each to both influence and be influenced by the others. This endogenous framework directly addresses potential endogeneity issues, which in traditional panel regressions could lead to biased and inconsistent estimates due to simultaneity or reverse causality. In PVAR estimation, lagged values of the endogenous variables are used as instruments within a system GMM or forward orthogonal deviations framework, providing valid exogenous instruments that help control for feedback effects. Additionally, country-specific fixed effects are removed to account for unobserved heterogeneity, and residuals are often orthogonalized through Cholesky decomposition or structural identification to isolate shocks and mitigate contemporaneous correlations. By combining these strategies, PVAR models yield robust and consistent estimates of dynamic interdependencies, making them particularly effective for studies where financial and business cycles are mutually reinforcing and conventional panel approaches would be vulnerable to endogeneity bias.

In estimating the Panel Vector Autoregression (Panel VAR) model, the selection of an appropriate lag length is a crucial step that directly affects the validity and robustness of the results. The lag structure determines the dynamic interdependencies among variables across both time and cross-sectional dimensions. Typically, the optimal lag length is chosen based on statistical information criteria such as the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC or Schwarz criterion), and the Hannan–Quinn Criterion (HQIC), with preference often given to the model minimizing these criteria. In panel settings, due to relatively shorter time dimensions compared to cross-sections, using one or two lags is generally recommended to balance model complexity and degrees of freedom (Love & Zicchino, 2006). Based on the aforementioned

considerations and the results obtained from the Bayesian Information Criterion (BIC) in this study, two lags were selected for estimating the Panel VAR model. To analyze the dynamic interactions between business and financial cycles, Impulse Response Functions (IRFs) were derived from a Panel VAR model. In this study, shocks applied to the business cycle and financial cycle variables were orthogonalized using Cholesky decomposition, allowing the effect of each shock to be identified separately and without correlation with other variables. This approach enables the examination of how variables respond to temporary shocks, illustrating how changes in the financial sector can affect the real sector and vice versa. To estimate confidence intervals for the IRFs, Monte Carlo simulations with 50 repetitions were employed, enhancing the reliability and stability of the results in the presence of stochastic variation in the data. This combination of orthogonalization and simulation provides a precise and robust framework for analyzing the dynamic interactions between financial and real cycles.

5. Research Results

The study employs a panel data approach using the PVAR methodology, which enables the analysis of dynamic relationships among variables across several countries over time. Since the research covers the period from 1990 to 2021, it is crucial to examine the stationarity of the variables before estimation to prevent misleading results. Accordingly, the Im, Pesaran, and Shin (IPS) panel unit root test was conducted, with results presented in Table 3. The outcomes show that all variables are stationary at their levels, indicating the absence of unit roots and confirming that estimating long-term relationships and dynamic interactions among the variables is both suitable and statistically robust.

Table 3. IPS unit root test Results

Variables	Test Statistic	Significance Level	Result
Current account balance ratio to GDP	-9.985	0.000	I(0)
Budget deficit ratio to GDP	-7.948	0.000	I(0)
Financial cycle	-15.057	0.000	I(0)
Business cycle	-10.625	0.000	I(0)

***Source**: research findings*

Given that the objective of this study is to examine the interactions between business and financial cycles, the analysis focuses on estimating the dynamic interrelationships between these two cycles. Table 4 presents the estimation results of the research model based on the budget deficit classification using the Panel Vector Autoregression (PVAR) methodology. It is important to note that the lag length for the model was selected according to the Schwarz Bayesian Criterion (SBC) to ensure optimal model specification. Additionally, in this study, the volume of banks' payment loans is employed as a proxy to capture the dynamics of financial cycles, providing a relevant measure of credit expansion and contraction within the banking sector.

Table 4. Estimation results of the research model according to the budget deficit level

Group	Dependent Variable	Explanatory Variable	Coefficient	Standard Error	Z Statistic	Significance Level
Relatively High Budget Deficit	Business Cycle	Lag of Business Cycle	0.4227	0.0477	9.710	0.000
		Lag of Financial Cycle	0.3274	0.0365	8.980	0.000
		Lag of Budget Deficit	-0.0359	0.0707	-0.510	0.612
		Lag of Current Account Balance	-0.0397	0.0417	-0.950	0.341
	Financial Cycle	Lag of Business Cycle	0.3161	0.0482	6.560	0.000
		Lag of Financial Cycle	0.5965	0.1026	5.810	0.000
		Lag of Budget Deficit	-0.0077	0.0729	-0.106	0.915
		Lag of Current Account Balance	-0.0196	0.0197	-1.000	0.318
Relatively Low Budget Deficit	Business Cycle	Lag of Business Cycle	0.5117	0.0513	9.980	0.000
		Lag of Financial Cycle	0.2979	0.0376	7.920	0.000
		Lag of Budget Deficit	0.0007	0.0235	0.030	0.977
		Lag of Current Account Balance	0.0151	0.0218	0.690	0.489
	Financial Cycle	Lag of Business Cycle	0.3468	0.0708	4.900	0.000
		Lag of Financial Cycle	0.5377	0.1415	3.800	0.000

	Lag of Budget Deficit	0.0646	0.0341	1.900	0.058
	Lag of Current Account Balance	0.0257	0.0260	0.990	0.323

***Source**: research findings*

As shown in Table 4, for the 41 countries with relatively high budget deficits, the previous period's business cycle has a positive and significant effect on the current business cycle at the 95% confidence level, indicating persistence in economic expansions or recessions. Similarly, the previous period's financial cycle exerts a significant positive impact on the current business cycle, highlighting a strong interdependence between financial and real sectors in these economies. The bidirectional nature of this relationship is further confirmed, as the lagged business cycle also positively influences the current financial cycle, and the previous financial cycle significantly affects its current state. Notably, lagged budget deficit and current account balance variables do not have a significant direct effect on either cycle. In the 27 countries with relatively low budget deficits, the results are qualitatively similar: past business and financial cycles positively and significantly affect both current cycles, while fiscal and external variables remain largely insignificant. A comparison between the two groups reveals that financial cycles exert a stronger influence on business cycles in high-deficit countries, suggesting that elevated budget deficits may amplify the transmission of financial fluctuations to the real economy. This pattern implies that in economies facing greater fiscal constraints, interventions that support financial sector activity could play a critical role in stabilizing economic growth and sustaining development processes.

Table 5. Granger Causality Test Results Between Financial and Business Cycles Based on Budget Deficit Levels

Group	Null Hypothesis	Chi-Square Statistic	Degrees of Freedom	Significance Level
Relatively High Budget Deficit	Financial cycle does not Granger-cause business cycle	80.561	1	0.000
	Business cycle does not Granger-cause financial cycle	43.008	1	0.000
Relatively Low Budget Deficit	Financial cycle does not Granger-cause business cycle	62.791	1	0.000
	Business cycle does not Granger-cause financial cycle	23.963	1	0.000

***Source**: research findings*

Table 5 reports the outcomes of the Granger causality analysis between the variables according to budget deficit levels. The results indicate that, at a 95% confidence level, financial cycles Granger-cause business cycles in countries with both relatively high and low budget deficits. Likewise, business cycles also Granger-cause financial cycles, suggesting a bidirectional causality between financial and business cycles in developing countries from 1990 to 2021, irrespective of budget deficit levels. These findings are consistent with previous empirical studies. For example, Taheri Bazkhane et al. (2018) found a two-way relationship between financial and business cycles in Iran's economy in both the short and long run, while Mehrara et al. (2020), reported that rises in stock prices and liquidity contribute to economic growth in Iran.

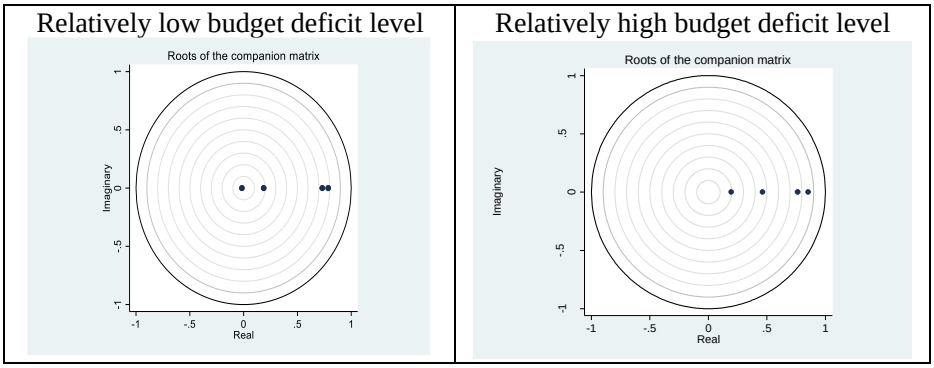

Figure 1. The results of the model stability condition test according to the budget deficit level

Source: *Research Findings*

Figure (1) shows the results of checking the stability condition of the estimated model according to the budget deficit level. Based on the evidence presented and taking into account that the absolute value of all computational special values in both groups of countries with a relatively high and low level of budget deficit is smaller than unity, as a result, the condition of stability is established in these two models and it has the necessary validity.

Impulse Response Functions between variables according to the budget deficit level are presented in Figure 2. In this figure, CYCLE_GDP refers to the ratio of business cycles to GDP and CYCLE_FINC refers to the ratio of financial cycles to GDP1.

[1] We performed robustness checks by changing the lag length (from 2 to 1 and 3) and adjusting the HP filter parameter (λ from 100 to 400). The results show that the overall patterns of IRFs and causality remain essentially the same, with only a slight reduction in amplitude when λ is increased. The variance decomposition also shows that the ranking of the groups does not change. All data are complete, with no missing values. Overall, these findings suggest that our results are not an artifact of the estimation method, but rather reflect the real economic conditions of developing countries.

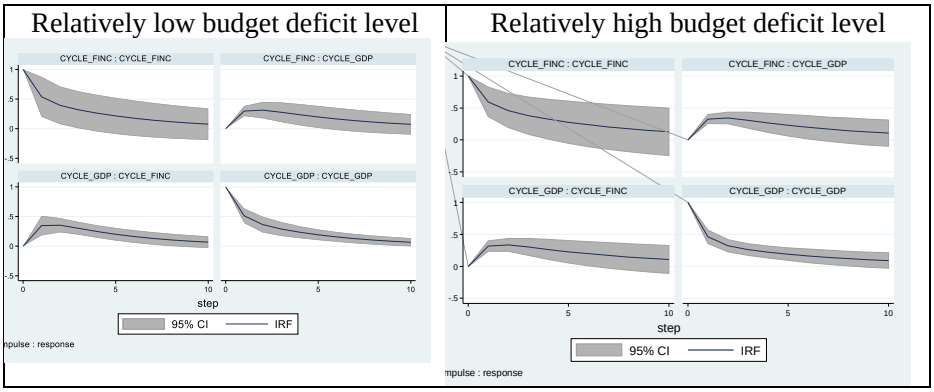

Figure 2: Impulse Response Functions Between Business and Financial Cycles Based on Budget Deficit Levels
Source: *Research Findings*

As illustrated in Figure 2, over the period from 1990 to 2021, positive shocks to the business cycle (CYCLE_GDP) lead to increases in the financial cycle (CYCLE_FINC), regardless of the level of fiscal deficit across countries. This finding suggests that improvements in economic growth in developing countries—whether they have high or low fiscal deficits—tend to stimulate financial sector development. Conversely, positive shocks to the financial cycle also result in an expansion of the business cycle in both groups of countries. These results indicate a bidirectional and mutually reinforcing relationship between financial and real economic activity, highlighting the dynamic interdependence between economic growth and financial development across varying fiscal contexts. These results have several important implications. First, they confirm the complementarity between financial and real sectors, consistent with post-Keynesian and Minskyan perspectives, which emphasize that credit and asset market dynamics can amplify economic fluctuations. Second, the persistence of this interaction across countries with varying fiscal deficits implies that even in economies with high fiscal constraints, financial development responds positively to improvements in real economic activity, suggesting that growth-led financial deepening is a robust phenomenon. Third, the reciprocal effect of financial shocks on business cycles highlights the potential for financial accelerators, where rapid expansion in credit and assets feeds back into production and investment decisions, thereby reinforcing cyclical fluctuations. From a policy perspective, these findings underscore the importance of monitoring financial cycles in parallel with macroeconomic indicators, as neglecting financial dynamics may underestimate the amplitude of business cycle fluctuations. Moreover, they suggest that in countries with high fiscal deficits, policymakers should be particularly cautious, as financial expansions may amplify growth temporarily but also increase systemic vulnerabilities when reversals occur.

As shown in Table 6, for the 11 market-based developing countries, the previous period's business cycle has a positive and significant effect on the current

business cycle at a 95% confidence level. In other words, in market-based countries, if a country experienced a recession (or boom) in the previous year, it is expected to remain in a recession (or boom) in the current year. Moreover, in these countries, the previous period's financial cycle positively and significantly impacts the current business cycle at a 95% confidence level. This implies that if a country was in a financial recession (or boom) in the previous year, it is expected to be in a similar state in terms of business cycles in the current year. Additionally, for these market-based countries, the previous period's financial cycle has a positive and significant impact on the current financial cycle at a 95% confidence level, suggesting that financial booms or recessions are relatively stable. The previous period's business cycle also positively affects the current financial cycle, indicating that if a country experienced a business recession (or boom) in the previous year, it is expected to be in a financial recession (or boom) this year. Evidence also shows that, at a 95% confidence level, the lagged budget deficit does not significantly affect financial and business cycles for these market-based countries. However, at a 95% confidence level, the current account balance has a negative and significant impact on financial cycles, implying that as the current account surplus increases in market-based developing countries, a financial recession is expected.

Table 6. Research Model Estimation Results Based on Financing Method

Group	Dependent Variable	Explanatory Variable	Coefficient	Standard Error	Z Statistic	Significance Level
11 Market-Based Countries	Business Cycle	Lag of Business Cycle	0.4821	0.0750	6.430	0.000
		Lag of Financial Cycle	0.2729	0.0705	3.870	0.000
		Lag of Budget Deficit	-0.1493	0.2658	-0.560	0.574
		Lag of Current Account Balance	-0.085	0.0674	-1.260	0.207
	Financial Cycle	Lag of Business Cycle	0.3023	0.0563	5.370	0.000
		Lag of Financial Cycle	0.6144	0.1391	4.420	0.000
		Lag of Budget Deficit	0.1647	0.1668	0.990	0.324
		Lag of Current Account Balance	-0.0767	0.0340	-2.230	0.026

57 Bank-Based Countries	Business Cycle	Lag of Business Cycle	0.4789	0.0392	12.230	0.000
		Lag of Financial Cycle	0.3219	0.0284	11.350	0.000
		Lag of Budget Deficit	0.0097	0.0194	0.500	0.616
		Lag of Current Account Balance	-0.0024	0.0206	-0.120	0.907
	Financial Cycle	Lag of Business Cycle	0.3252	0.0436	7.440	0.000
		Lag of Financial Cycle	0.5765	0.0922	6.250	0.000
		Lag of Budget Deficit	0.0588	0.0301	1.950	0.051
		Lag of Current Account Balance	0.0157	0.0177	0.890	0.375

***Source**: research findings*

For the 57 bank-based developing countries, the analysis reveals that, at a 95% confidence level, the previous period's business cycle exerts a positive and significant effect on the current business cycle. This indicates persistence in real economic activity, such that a recession (or boom) in one year increases the likelihood of a similar state in the following year. Similarly, the previous period's financial cycle significantly influences the current business cycle, implying that financial expansions or contractions are closely linked to real economic performance. In other words, if a country experienced a financial boom or recession in the previous year, its real output is likely to reflect a similar trajectory in the current year, highlighting the strong coupling between financial and real sectors in bank-oriented economies.

The results further indicate that the previous period's financial cycle positively affects the current financial cycle, demonstrating temporal stability in financial fluctuations, while the prior business cycle also exerts a positive influence on the current financial cycle. This underscores the bidirectional nature of the relationship: not only do financial cycles impact real output, but business cycles also feed back into financial conditions. These dynamics suggest the presence of a self-reinforcing mechanism, where booms or recessions in one sector amplify similar trends in the other, creating the potential for prolonged cyclical volatility. Interestingly, the analysis shows that, in these bank-based countries, budget deficits and current

account balances do not significantly affect either cycle, indicating that cyclical persistence is primarily driven by domestic financial and real sector interactions rather than fiscal or external imbalances .A comparison with market-based economies reveals that the influence of financial cycles on business cycles is more pronounced in bank-based countries, suggesting that the structure of the financial system mediates the strength of cyclical transmission. In economies where banks dominate project financing, the linkage between financial conditions (e.g., credit availability, loan growth, interest rates) and real output is stronger. This may be due to the limited development of other financial intermediaries, such as capital markets, which reduces alternative channels for investment financing. Consequently, in bank-based developing economies, financial cycles play a central role in driving real economic fluctuations, and policymakers should carefully monitor banking sector conditions, as shocks in credit markets can have amplified effects on overall economic activity.

Table (7) shows the results of the Granger causality test between the variables according to the method of financing. As can be seen at the 95% confidence level, regardless of the major financing method of developing countries, financial cycles are Grangerian causality of business cycles. Also, at the confidence level of 95%, the business cycle is Granger causality of the financial cycle; Therefore, it can be argued that taking into account the heterogeneity in the way of financing in developing countries between 1990 and 2021, there is still a two-way causality relationship between financial and business cycles.

Table 7. Granger Causality Test Results Between Financial and Business Cycles Based on Financing Method

Group	Null Hypothesis	Chi-Square Statistic	Degrees of Freedom	Significance Level
Market-Based	Financial cycle does not Granger-cause business cycle	14.976	1	0.000
	Business cycle does not Granger-cause financial cycle	28.796	1	0.000
Bank-Based	Financial cycle does not Granger-cause business cycle	128.755	1	0.000
	Business cycle does not Granger-cause financial cycle	55.381	1	0.000

***Source**: research findings*

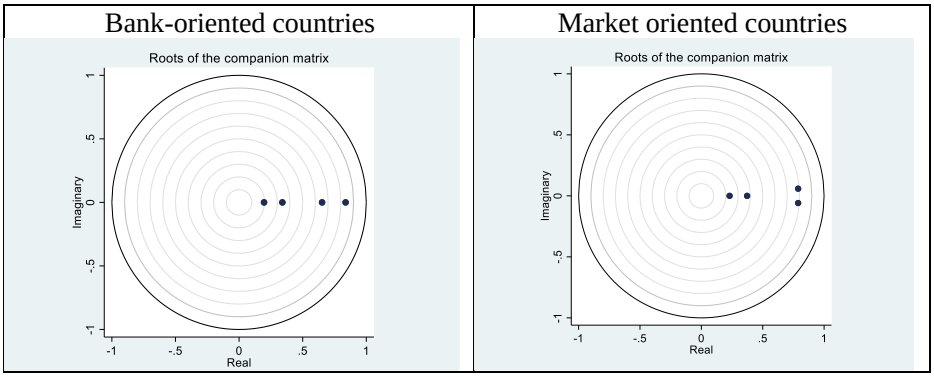

Figure 3. Stability Condition Test Results Based on Financing Method
Source: *Research Findings*

Figure 4 illustrates the impulse response functions for countries categorized by their financing systems. The results indicate that, from 1990 to 2021, positive shocks to the business cycle (CYCLE_GDP) stimulate growth in financial cycles (CYCLE_FINC) in both market-oriented and bank-based economies. The impact typically lasts for about three periods before gradually fading, suggesting that economic expansion promotes financial development regardless of the underlying financing structure. Growth in the real economy likely drives higher credit demand, increased investment, and more active financial markets, generating a reinforcing feedback mechanism between the real and financial sectors. Similarly, positive shocks originating from financial cycles trigger expansions in the business cycle for both groups. This implies that developments in the financial sector—through channels such as greater credit provision, rising asset values, and improved capital allocation—can support and amplify real economic growth. Overall, the findings underscore a two-way and mutually reinforcing interaction between the financial and real sectors, showing that while the type of financial intermediation shapes the transmission of shocks, it does not fundamentally change the cyclical interplay between finance and growth. From a policy standpoint, these results highlight the necessity of closely tracking financial conditions alongside macroeconomic indicators. In bank-based economies, the credit channel is particularly influential, as rapid lending expansions can intensify both booms and busts. In market-based economies, asset price fluctuations and access to market financing serve as critical mechanisms influencing real economic activity. Therefore, the structure of financial intermediation should be taken into account when designing countercyclical policies aimed at mitigating cyclical volatility in both the real and financial sectors.

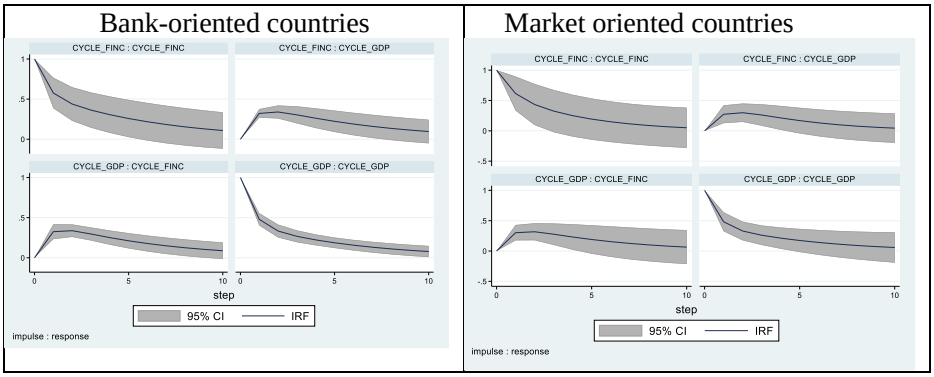

Figure 4. Impulse Response Functions Between Business and Financial Cycles Based on Financing Method

Source: *Research Findings*

Table 8. Research Model Estimation Results Based on Current Account Status

Group	Dependent Variable	Explanatory Variable	Coefficient	Standard Error	Z Statistic	Significance Level
11 Countries with Current Account Surplus	Business Cycle	Lag of Business Cycle	0.4642	0.0713	6.510	0.000
		Lag of Financial Cycle	0.3048	0.0478	6.380	0.000
		Lag of Budget Deficit	-0.0200	0.0351	-0.570	0.569
		Lag of Current Account Balance	0.0378	0.0202	1.870	0.061
	Financial Cycle	Lag of Business Cycle	0.3742	0.1316	2.840	0.004
		Lag of Financial Cycle	0.4769	0.2209	2.160	0.031
		Lag of Budget Deficit	0.0857	0.0269	3.190	0.001
		Lag of Current Account Balance	0.0182	0.0162	1.120	0.262
57 Countries with	Business Cycle	Lag of Business Cycle	0.4758	0.0392	12.120	0.000

Current Account Deficit		Lag of Financial Cycle	0.3281	0.0371	10.670	0.000
		Lag of Budget Deficit	0.0262	0.0415	0.630	0.528
		Lag of Current Account Balance	-0.0824	0.0439	-1.880	0.061
	Financial Cycle	Lag of Business Cycle	0.3135	0.0391	8.020	0.000
		Lag of Financial Cycle	0.5967	0.0863	6.920	0.000
		Lag of Budget Deficit	0.0066	0.0435	0.150	0.879
		Lag of Current Account Balance	-0.0223	0.0268	-0.830	0.407

***Source**: research findings*

As presented in Table 8, for the 11 developing countries with a current account surplus, the previous period's business cycle exerts a positive and statistically significant effect on both the current business and financial cycles at the 95% confidence level. This finding implies that in surplus countries, an economic recession or boom in the preceding year tends to persist in the current period, reinforcing similar dynamics in both real and financial indicators. Moreover, the lagged budget deficit exhibits a positive and significant influence on the current financial cycle at the 95% confidence level, suggesting that a fiscal surplus (or deficit) in the previous year is likely to translate into a financial boom (or downturn) in the subsequent year. However, in these 11 countries, neither the budget deficit nor the current account balance significantly affects the business cycle. In contrast, for the 57 developing countries with a current account deficit, the previous period's business cycle exhibits a positive and significant effect on both the current business and financial cycles at the 95% confidence level. This suggests that a recession or expansion in the prior year tends to carry over into both production and financial performance in the current period. Likewise, the lagged financial cycle has a positive and significant impact on both current cycles, indicating strong persistence and synchronization between real and financial dynamics. Overall, in these deficit countries, budget deficit and current account balance variables do not have a statistically significant effect on either financial or business cycles.

The comparison of regression results between countries with current account deficits and surpluses shows that the effect of financial cycles on business cycles is significantly stronger in deficit countries. This suggests that the interplay between

financial and business cycles depends on a country's current account position. As the current account deficit widens, the influence of financial fluctuations on real economic activity tends to increase. This pattern may reflect the fact that growing current account deficits are often accompanied by reductions in foreign exchange reserves and export earnings, leading the financial sector to adjust—potentially through changes in credit conditions or exchange rate movements—to counterbalance these imbalances.

As reported in Table 9, at the 95% confidence level, financial cycles are found to Granger-cause business cycles in developing countries, irrespective of their current account status. Likewise, business cycles Granger-cause financial cycles in both groups of countries—those with current account surpluses and those with deficits. Hence, it can be concluded that, despite the heterogeneity in current account positions among developing economies over the 1990–2021 period, a bidirectional causal relationship persists between financial and business cycles.

Table 9. Granger Causality Test Results Between Financial and Business Cycles Based on Current Account Status

Group	Null Hypothesis	Chi-Square Statistic	Degrees of Freedom	Significance Level
Current Account Surplus	Financial cycle does not Granger-cause business cycle	40.691	1	0.000
	Business cycle does not Granger-cause financial cycle	8.089	1	0.004
Current Account Deficit	Financial cycle does not Granger-cause business cycle	113.787	1	0.000
	Business cycle does not Granger-cause financial cycle	64.365	1	0.000

***Source**: research findings*

In figure (5), the results of checking the condition of stability of estimation models are presented according to current account status. Based on the evidence presented and taking into account that the absolute value of all eigenvalues calculated for the estimated model in both groups of countries with current account surplus and deficit is smaller than unity, as a result, the condition of stability is established in these two groups.

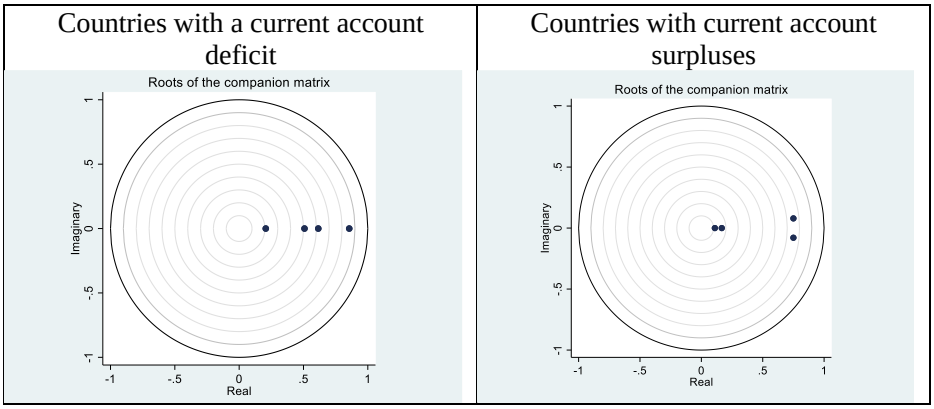

Figure 5: The results of the model stability condition test according to the current account status

Source: *Research Findings*

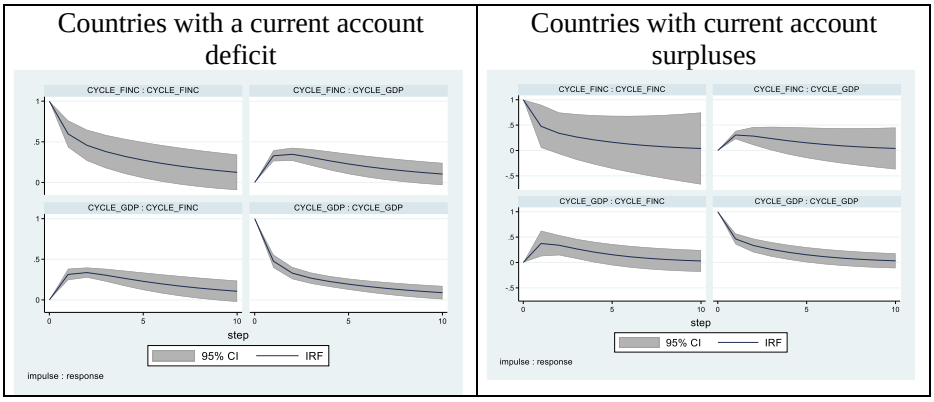

Figure 6. Impulse Response Functions between the business and financial cycles in terms of current account status

Source: *Research Findings*

The impulse response functions for countries classified by current account position are presented in Figure 6. Over the period 1990–2021, positive shocks to the business cycle (CYCLE_GDP) induce increases in financial cycles (CYCLE_FINC) in both countries with current account surpluses and deficits. The effect persists for approximately three periods before gradually dissipating. This finding suggests that, irrespective of external balance, improvements in economic growth in developing countries promote financial sector development. Economic expansions likely increase the demand for credit, encourage investment, and stimulate financial market activity, creating a positive feedback loop between the real and financial sectors. Conversely, positive shocks to financial cycles also lead to expansions in business cycles in both groups. This indicates that growth in the financial sector—through mechanisms such as increased credit availability, higher asset prices, and improved capital allocation—translates into higher investment and

production, thereby amplifying economic growth. The results highlight the bidirectional and mutually reinforcing nature of financial and real sector dynamics, consistent with the financial accelerator hypothesis and post-Keynesian perspectives on cyclical interactions. From a macroeconomic policy standpoint, these findings underscore the importance of monitoring both domestic financial conditions and external imbalances. While a current account surplus may provide some cushion against external shocks, the persistence of strong financial-real interactions in deficit countries suggests that excessive reliance on external financing could amplify vulnerabilities during financial downturns. Policymakers should therefore integrate financial cycle indicators into macroeconomic surveillance and design countercyclical policies that consider both domestic growth and external balance conditions, aiming to stabilize the transmission of shocks across real and financial sectors.

Table 10. Results of variance analysis of research models

Horizon	Shock Variable	Response Variable	Explained Variance - Percentage					
			Bank-oriented	Market-oriented	Low budget deficit	High budget deficit	Current account deficit	Current account surplus
1	Financial Cycle	Business Cycle	0.00	0.00	0.00	0.00	0.00	0.00
5	Financial Cycle	Business Cycle	0.062	0.029	0.138	0.153	0.141	0.175
10	Financial Cycle	Business Cycle	0.192	0.072	0.16	0.185	0.171	0.187
1	Business Cycle	Financial Cycle	0.028	0.032	0.051	0.018	0.027	0.039
5	Business Cycle	Financial Cycle	0.294	0.415	0.328	0.279	0.306	0.257
10	Business Cycle	Financial Cycle	0.33	0.445	0.355	0.317	0.347	0.269

***Source**: research findings*

Table 10 reports the variance decomposition of business and financial cycles, providing insights into the relative importance of each cycle in explaining fluctuations in the other. Overall, the results indicate that business cycles generally account for a larger share of the variance in financial cycles than vice versa. This highlights the central role of real economic activity in driving financial sector dynamics in developing countries. However, the magnitude of these effects varies across different country characteristics, reflecting the influence of structural and macroeconomic conditions on cyclical interactions. In market-based economies, business cycles explain a particularly large portion of the variance in financial cycles (44.5%), suggesting that improvements in output, investment, and consumption directly stimulate credit growth, asset market activity, and broader

financial development. In contrast, in bank-based economies, financial cycles contribute more substantially to explaining the variance of business cycles, implying that fluctuations in credit availability, lending standards, and bank balance sheets can significantly influence real economic activity. These findings indicate that the structure of financial intermediation shapes how shocks propagate: market-oriented systems amplify the effects of real sector fluctuations on finance, whereas bank-oriented systems strengthen the reverse channel from finance to the real economy.The results also underscore the importance of fiscal and external balances in moderating the transmission of shocks. Higher fiscal deficits amplify the role of financial cycles in explaining real sector variance, as government borrowing increases pressure on credit markets and interest rates, which in turn can magnify the impact of financial shocks on output. Similarly, countries with larger current account surpluses display a stronger influence of financial cycles on business cycles, reflecting that external positions can either cushion or intensify domestic financial shocks depending on the availability of foreign financing and capital flows. From a macroeconomic policy perspective, these findings have several important implications. First, policymakers in developing countries should consider both the structure of financial intermediation and the fiscal and external positions when designing countercyclical measures, as these factors shape the intensity and direction of interactions between financial and real cycles. In bank-based economies with large fiscal deficits, for instance, regulatory oversight of credit expansion is critical to prevent excessive booms and mitigate the risk of prolonged recessions. In market-based economies, monitoring asset price dynamics and capital market conditions is essential to avoid overheating and maintain macro-financial stability. Moreover, ensuring prudent fiscal and external balances can enhance the resilience of the economy by moderating the transmission of financial shocks to the real sector. In sum, the variance decomposition results emphasize that the interaction between financial and real cycles is context-dependent: it is shaped by institutional structures, fiscal policy, and external balance conditions. Policies aimed at stabilizing the economy must therefore be tailored to the specific configuration of these factors to effectively dampen volatility and support sustainable growth.

The analysis of developing countries, considering budget deficit levels, current account positions, and financing methods, revealed a positive and bidirectional relationship between financial and business cycles, in line with previous studies (Antonakakis et al., 2015; Shen et al., 2019; Karagol & Dogan, 2021). Nevertheless, financial cycles account for a smaller portion of the variance in business cycles, possibly due to the faster adjustment of financial variables compared to real variables, as noted by Claessens et al. (2011). The observed bidirectional causality between financial and business cycles in developing economies carries important implications for economic theory, indicating that financial sectors are not neutral and that changes within them can influence real economic outcomes, including consumption, investment, and notably economic growth.

Since the empirical model produces relatively consistent results across different country classifications — in terms of financial structure, budget deficit, and current account position — it can be concluded that the model exhibits a satisfactory level of robustness. Moreover, the fundamental assumptions of the panel vector autoregression (PVAR) model are satisfied, and the estimations are conducted using cluster-robust standard errors. Therefore, the results can be considered statistically robust.

6. Conclusion, Recommendations, and Study Limitations

The aim of this study was to investigate the relationship between financial and business cycles in selected developing countries. The analysis revealed a bidirectional causal link between financial and business cycles across these economies, although variations were observed across different country groups.

The results demonstrated a positive and reciprocal influence between financial and business cycles in countries with both high and low (or surplus) budget deficits, with financial cycles having a substantially greater impact on the variance of business cycles in high-budget-deficit countries. These outcomes are consistent with Adarov (2021), who reported that economies with higher debt levels exhibit fundamentally different dynamics between financial and business cycles compared to those with lower debt levels.

Similarly, the study found a positive and bidirectional relationship between financial and business cycles in both bank-oriented and market-oriented economies. However, financial cycles accounted for a significantly larger share of the variation in business cycles in bank-oriented economies relative to market-oriented ones, reinforcing the observations of Adarov (2021). This underscores that the influence of financial cycles varies depending on the structure of the financial system.

In comparison to Adarov (2021), which examines dynamic interactions among financial cycles, business cycles, and macroeconomic imbalances across a wide set of countries, the present study specifically focuses on developing economies over the period 1990–2021. This narrower focus allows for a more detailed analysis of structural heterogeneities—such as financial systems, fiscal deficits, and current account positions—that shape interactions between financial and real sectors in these countries. Methodologically, both studies employ Panel VAR models and impulse response functions to capture dynamic effects; however, this study further incorporates variance decomposition analysis to quantify the relative contributions of financial and business cycles under varying structural conditions. Additionally, the application of Cholesky-orthogonalized shocks along with Monte Carlo simulations provides robust confidence intervals for the IRFs, enhancing the reliability of the estimates in a developing country context.

Regarding findings, both studies confirm a bidirectional and mutually reinforcing relationship between financial and business cycles, consistent with the financial accelerator framework. However, this study extends Adarov's results by showing that the strength and persistence of these interactions are highly context-dependent. Specifically, business cycles tend to drive financial cycles more strongly

in market-based developing economies, whereas financial cycles exert a greater influence on business cycles in bank-based economies. Furthermore, fiscal deficits and current account positions further shape these dynamics, with higher deficits and surpluses amplifying the effects of financial shocks on the real economy. These structural nuances are less emphasized in Adarov (2021), which primarily focuses on cross-country averages rather than the heterogeneity among developing countries.

Overall, while both studies highlight the crucial role of financial cycles in influencing business cycle dynamics, the present research provides additional policy-relevant insights tailored for developing countries. It emphasizes that the institutional setup of financial intermediation, fiscal sustainability, and external balances are key determinants of the transmission mechanisms between financial and real sectors. Consequently, policymakers in developing economies could benefit from more targeted strategies that account for these structural differences, rather than relying solely on generalized policy recommendations derived from global averages.

The findings of this study indicate that the interactions between financial and business cycles in developing economies are highly context-dependent, shaped by structural characteristics such as the orientation of the financial system, fiscal position, and current account status. In bank-oriented economies, the banking sector plays a central role in mediating credit flows and cushioning mild downturns, but during simultaneous financial crises, procyclical lending and balance sheet vulnerabilities can amplify recessions, making contractions more severe and persistent than in market-oriented economies, where capital markets and asset-based financing dominate. Fiscal and external positions further influence resilience: countries with higher fiscal or current account surpluses possess greater buffers to implement countercyclical policies and stabilize output, whereas economies with large deficits are more exposed to amplified shocks. These findings underscore the importance of structural and macroeconomic heterogeneity in determining the transmission and persistence of cyclical shocks, suggesting that policymakers should tailor stabilization strategies to the financial system, fiscal space, and external balance of each economy. Strengthening bank capital, improving risk management, monitoring asset price volatility, and maintaining prudent fiscal and external balances can all enhance economic resilience, reducing the likelihood that financial disturbances lead to severe recessions. Overall, the study highlights that the severity, duration, and propagation of cyclical shocks are not uniform across developing countries but are contingent on the interplay between financial structure, fiscal health, and external conditions, offering important guidance for macroeconomic policy design.

Based on the results, the dynamic interactions between financial and business cycles show remarkable consistency across different country classifications, including financial system orientation, fiscal deficit level, and current account position. Granger causality tests confirm bidirectional relationships in all six samples, and impulse response functions display similar patterns across groups,

indicating a robust and persistent linkage between the real and financial sectors. The only noticeable variation appears in the variance decomposition of the cycles, which reflects quantitative differences rather than qualitative ones. In developing countries, these differences can be attributed to structural heterogeneity in financial depth, credit availability, and institutional development: economies with deeper capital markets or more developed banking sectors show a slightly larger contribution of financial cycles to business cycle variance, whereas in less developed systems, business cycles dominate the variance of financial fluctuations. Nonetheless, the fundamental dynamic interaction remains consistent, likely due to shared vulnerabilities such as reliance on external capital flows, limited fiscal and monetary buffers, and high sensitivity of credit markets to output fluctuations. These common characteristics tend to standardize the propagation of shocks, making the mutual reinforcement between financial and business cycles a pervasive feature across developing economies. Consequently, policymakers should recognize that, while the magnitude of effects may differ, the bidirectional linkage between finance and the real economy is a general characteristic, necessitating stabilization measures that address both sectors simultaneously.

Given that financing methods, budget deficit levels, and current account statuses influence the intensity of financial cycles' impact on business cycles in developing countries, this factor should be considered when evaluating the influence of financial sectors on the real economy. In the case of Iran, which has experienced significant budget deficits recently and relies heavily on banks for financing firms, financial cycles are likely to have a considerable effect on the real economy, with financial sector growth potentially leading to economic expansion and growth. Consequently, the financial sector in Iran is not neutral and has real impacts; thus, if the financial sector faces a downturn, the real economy may experience recession in subsequent periods. Therefore, policymakers should adopt strategies to boost financial sectors to achieve stable economic growth. It is crucial for the government to develop mechanisms to enhance the effectiveness of project financing policies, as securing funding and liquidity are key challenges in increasing production levels. In Iran, these challenges are further exacerbated by severe currency volatility and uncertainty in securing raw materials and stabilizing prices.

Study Limitations This study has several limitations. First, business and financial cycles for all countries were extracted using the Hodrick-Prescott filter. Although some studies indicate that filter choice does not significantly affect cycle extraction for Iran's economy (Mojab & Barakchian, 2014), the results might be impacted if this does not hold for other countries. Moreover, due to time constraints or lack of data, only 68 developing countries were analyzed. Expanding the sample size could potentially alter the results of the study.

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