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***Research Article***

# Financial and Business Cycles in Turkey

*Türkiye'de Finansal Çevrimler ve İş Çevrimleri*

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***Abstract***

*The 2008 Global Financial Crisis has drawn attention to the interaction between the financial sector and the real sector. In this study, the relationship between financial cycles and business cycles in Turkey is analyzed for the period 1987:1-2021:3. Industrial production index is used as a proxy for business cycles; and credit, stock prices, real effective exchange rate (REER) and foreign portfolio investments are used as proxies for financial cycles. Financial and business cycles are measured using turning point analysis, Hodrick-Prescott (HP) filter and Baxter-King (BK) filter, and then the synchronization and causality between the cycles are examined. Finally, the time-variation of the relationship between cycles is estimated with the DCC-GARCH model. According to the findings, while stock prices and foreign portfolio investments exhibit leading behavior, credit exhibits lagging behavior and REER exhibits coincident or lagging behavior. According to the results of Granger Causality Analysis, there is causal flow from all variables used to represent financial cycles to business cycles. However only the one between the credit-to-GDP ratio and business cycles is bidirectional. The results of the DCC-GARCH analysis suggest that the ability of financial cycles and business cycles to comove increases during crisis periods. The variable with the highest co-movement ability with business cycles is foreign portfolio investments. Considering all the results, it is concluded that financial cycles lead business cycles and are the cause of business cycles in Turkey.*

***Keywords:*** *financial cycle, business cycle, financial-real transmisson channels, DCC-GARCH, filtering*

***Öz***

*2008 küresel finans krizinin yaratmış olduğu olumsuz etkiler, finansal sektör ile reel sektör arasındaki etkileşime dikkatleri çekmiştir. Bu çalışmada, Türkiye'deki finansal çevrimler ile iş çevrimleri arasındaki ilişki 1987:1-2021:3 dönemi için incelenmiştir. İş çevrimlerini temsilen sanayi üretim endeksi ve finansal çevrimleri temsilen krediler, hisse senedi fiyatları, reel efektif döviz kuru (REDK) ve yabancı portföy yatırımlarına dair büyüklükler kullanılmıştır. Finansal çevrimler ve iş çevrimlerinin ölçümü dönüm noktası analizi, Hodrick-Prescott (HP) filtresi ve Baxter-King (BK) filtresi ile gerçekleştirilmiş, daha sonra çevrimler arası senkronizasyon ve nedensellik ilişkileri incelenmiştir. Son olarak ise çevrimler arasındaki ilişkinin zamana göre değişimi DCC-GARCH modeli ile tahmin edilmiştir. Elde edilen bulgulara göre, hisse senedi fiyatları ve yabancı portföy yatırımları öncül, krediler takipçi, REDK çevrimleri ise eş anlı veya öncül olma davranışı sergilemektedir. Granger nedensellik analizinin sonuçlarına göre finansal çevrimleri temsilen kullanılan tüm değişkenlerden iş çevrimlerine doğru bir nedensellik ilişkisi mevcutken, iş çevrimlerinden yalnızca kredi-GSYH oranına doğru bir nedensellik mevcuttur.*

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*DCC-GARCH analizinin sonuçları, finansal çevrimler ve iş çevrimlerinin birlikte hareket etme kabiliyetinin kriz dönemlerinde yükseldiğini göstermektedir. İş çevrimleri ile ortak hareket kabiliyeti en yüksek olan değişken yabancı portföy yatırımlarıdır. Tüm bu sonuçlar değerlendirildiğinde, Türkiye'de finansal çevrimlerin iş çevrimlerini önceledeği ve iş çevrimlerinin nedeni olduğu sonucuna ulaşılmaktadır.*

***Anahtar Kelimeler:*** *finansal çevrim, iş çevrimi, finansal-reel aktarım kanalları, DCC-GARCH, filtreleme*

## 1. Introduction

The interaction of the financial sector with the real economy has been on the agenda of macroeconomic debates in different periods. In the early 20th century, this relationship was mostly considered as a subtopic of research on the business cycle. However, as a result of the devastating effects of the financial sector on economies during the 2008 global financial crisis, research on the financial sector has come into prominence. Fluctuations in the financial sector have started to be defined as a separate phenomenon from business cycles. In this context, many studies have been conducted to shed light on the empirical properties of financial cycles and their relationship with business cycles. These studies have focused on the effects of financial cycles on the duration of business cycles, the synchronization of financial cycles and business cycles, and the lead-lag relationship between financial cycles and business cycles. Analyzing the different dimensions of this relationship is important in terms of contributing to macroeconomic stability by ensuring financial stability and providing a basis for the research of policies that can be implemented to prevent possible economic collapses.

In the aftermath of the crisis, the issue of financial stability came to the fore in Turkey, and the central bank adopted a monetary policy that targets financial stability as well as price stability. Investigating the main characteristics of financial cycles in Turkey and their relationship with business cycles is critical in ensuring the effectiveness of these policies.

The focus of this study is to investigate the co-movement reflex of financial cycles and business cycles. This will be done by analyzing the time and causality dimensions. More precisely, the change in the relationship between financial cycles and business cycles over time and whether this relationship has a causality dimension will be investigated for various financial aggregates. The study contributes to the literature in three aspects. First, in this study, classical cycle and growth cycle approaches are not evaluated as alternatives to each other, but as perspectives that offer different information. Measurements based on these two different cycle concepts are used to make inferences about the short-term and long-term dynamics of the relationship between business and financial cycles. Second, in this study, wide-ranging variables are used to represent financial cycles. Finally, unlike other studies for Turkey, the variable of "foreign portfolio investments" was included in the study. Foreign portfolio investments are an important factor in financing domestic investments in an economy like Turkey where domestic savings are insufficient and the need for external financing is high.

In this study, first, the theoretical background of the relationship between financial cycles and business cycles is presented through financial-real sector transmission channels. In this context, borrower balance sheet channel, bank balance sheet channel and liquidity and leverage channel are explained by emphasizing financial imperfections.

Finally, the relationship between financial cycles and business cycles in Turkey is analyzed for the period 1987:1-2021:3. The analysis uses the industrial production index as a proxy for business cycles and the aggregates of credit, equity prices, REER and foreign portfolio investments as proxies for financial cycles. Business and financial cycles are measured; synchronizations and causal relationships are examined.

## 2. Conceptual Framework and Literature Review

The origins of the relationship between financial cycles and business cycles can be traced back to the pre-war period, when there was no separate definition of financial cycles, and the financial sector was seen as a mere veil over the real economy. The view on the relationship between the real economy and the financial sector has been one of the main points of divergence in many macroeconomic theories throughout the 20th century.

In the 20th century, Fisher (1933), Gurley and Shaw (1955) and Minsky (1977) were the most prominent researchers who argued that the financial structure is important for the real economy. Fisher's debt-

deflation theory states that deflation occurring in a period of high indebtedness would have devastating effects on the economy. Gurley and Shaw (1955) argued that a theory of interest and income that includes financial intermediaries is a more useful tool for economic analysis and emphasized that previous analyses had overlooked the importance of finance for economic development. Minsky's (1977) approach is that a financial crisis is necessary and sufficient for a deep depression. The emergence of financial crises does not require a combination of unusual circumstances or wrong policy actions. According to Minksy, the normal functioning of the economy leads to financial fragility and financial crises are periodically triggered in this fragile environment.

n understanding the relationship between financial cycles and the real economy, it is important to understand the channels through which this relationship is realized.

### 2.1 Transmission Channels Between Financial Sector and Real Economy

Financial imperfections and frictions play an important role in the functioning of transmission channels between the financial sector and the real economy. In the literature, the concepts of financial imperfections and financial frictions are often used interchangeably. This has the consequence that violations of complete market assumptions that cause frictions are presented as frictions themselves. To avoid this confusion, this paper will refer to deviations from complete market assumptions as “financial imperfections”; and to the measures taken by market agents to avoid the costs of these imperfections as “financial frictions”.

Frictions in financial markets are often caused by imperfections such as asymmetric information or enforcement problems. Lenders do not know whether the people or firms they are lending to have good qualifications, whether they are making sufficient efforts to ensure the success of the project, or whether they are selecting economically efficient projects (Claessens and Kose, 2017). To protect themselves from the costs of these problems, lenders may refrain from lending (Claessens and Kose, 2018) or monitor the projects they finance at some cost.

The transmission channels between the financial sector and the real economy can be analyzed in three sections: the borrower balance sheet channel, the bank balance sheet channel and the liquidity and leverage channel.

#### 2.1.1 Borrower Balance Sheet Channel

Balance sheets play an important role in real-financial transmission as most financial decisions are made based on balance sheets (Broer and Antony, 2010). The borrower balance sheet channel, which applies to both firms and households, arises from lenders' inability to (i) fully assess borrowers' risks and solvency, (ii) fully monitor their investments, and/or (iii) ensure the repayment of their loans. To overcome these problems, lenders require collateral from borrowers. Thus, borrowers' access to credit and hence their investments are tied to their balance sheets (BCBS, 2011a). Therefore, any factor affecting borrowers' balance sheets will have real effects on the economy by changing investment.

The balance sheet variable that Bernanke and Gertler (1989) emphasize in explaining the impact of borrower balance sheets on business cycles is “net worth. "Net worth", which is the difference between assets and liabilities, substitutes for incomplete information about the borrower and lenders demand an external finance premium based on the net worth of the borrower to compensate for the costs they may have to face due to this incomplete information. Borrowers with high net worth face low external finance premiums, while borrowers with low net worth face high external finance premiums.

Bernanke et al. (1994) explained the debtor balance channel by introducing the concept of “financial accelerator. The financial accelerator concept provides a theoretical explanation of how shocks are amplified through the financial sector and affect aggregate output. Specifically focusing on the role of borrower balance sheets in business cycles, the financial accelerator mechanism is based on Fisher's (1933) debt-deflation theory.

The basic mechanism of the financial accelerator is that rising asset prices during an economic expansion increase investment and output by boosting the net worth of borrowers, , which in turn pushes asset prices even higher, creating a self-reinforcing cycle (Bijlsma et al., 2010). In this mechanism, the higher

the procyclicality of net worth, the higher the countercyclicality of the external finance premium (Bernanke et al., 1999).

### 2.1.2 Bank Balance Sheet Channel

Financial intermediation, which can be seen as an attempt to overcome financial market failures, can itself generate amplification and propagation effects. Financial market failures also affect the activities of financial intermediaries and markets, allowing the supply side of finance to be a source of shocks and spillovers in its own right, leading to specific macro-financial linkages (Claessens and Kose, 2017).

The composition of a bank's balance sheet has a significant impact on bank lending activities. This effect may arise due to maturity mismatches or a capitalization effect. In a maturity mismatch, the bank faces a liquidity problem, while in a capitalization effect, bank capital falls short of bank liabilities because of return risk on bank assets (Broer and Antony, 2010). Accordingly, bank balance sheet channel can be decomposed into the traditional "bank lending channel" and the "bank capital channel". In both channels, shocks to the bank balance sheet lead to significant contractions in credit, which in turn can lead to a severe contraction in economic activity. A necessary condition for such large impacts is that some borrowers are heavily dependent on banks for credit. This dependence means that when there is a significant reduction in bank lending, these borrowers face significant difficulties and costs in establishing relationships with new lenders, forcing them to cut back on their spending (BCBS, 2011a).

Studies on the bank lending channel, first conceptualized by Bernanke and Blinder (1988), emphasize the effects of real and financial shocks that change the supply of bank credit on the real economy through the spending of bank-dependent borrowers. The bank lending channel, also referred to as the "narrow credit channel", focuses on the health of financial intermediaries and its impact on the lending ability of financial institutions (Gilchrist and Zakrajšek, 2008). Most models with asymmetric information emphasize the importance of intermediaries in the provision of credit and the special place of bank credit (Bernanke and Blinder, 1988). The basic idea is that for a large class of borrowers, especially households and small firms, there are no close substitutes for bank credit. For these borrowers, issuing securities is too expensive because of informational imperfections (Gertler and Gilchrist, 1993). Since banks can partially overcome the problems arising from information asymmetry by developing long-term relationships with borrowers (Sharpe, 1990) and investing in information gathering and monitoring (Claessens and Kose, 2017), this class of borrowers becomes dependent on banks. This dependence underlies the real effects of the bank lending channel. The percentage of borrowers dependent on banks in the economy (how much of the total volume of transactions they account for) is important for the magnitude of the impact.

The bank capital channel refers to the real consequences of a deterioration in the capital structure of banks by affecting borrowers' expenditures. As with the bank lending channel, the functioning of this channel depends on the special role of banks in borrowing and hence the existence of borrowers who are dependent on banks.

A bank may experience a decline in its capital due to a decline in credit quality or the value of its tradable assets. In this case, the bank may reduce the supply of credit to maintain capital adequacy ratios. Through this channel, a capital shock affecting many banks can lead to a reduction in overall economic activity or even a recession (Claessens and Kose, 2017).

### 2.1.3 Liquidity and Leverage Channels

Leverage is the degree to which a firm finances its assets with debt rather than equity (Ingves, 2014). High leverage ratios and large maturity mismatches in banks' balance sheets play an important role in the spread of liquidity shocks to bank loans and the real economy. When a liquidity or solvency shock occurs, banks quickly start selling assets. With the increase in supply in asset markets, asset prices start to fall. Thus, a downward cycle in asset prices emerges. As a result, balance sheets deteriorate (BCBS, 2011b).

Changes in leverage affect asset prices, which in turn affect borrowers' access to external financing. Thus, the leverage channel strengthens the bidirectional linkages between the real and financial sectors, leading to more pronounced real and financial cycles (Claessens and Kose, 2018). The functioning of

this channel is intertwined with the functioning of the balance sheet channel. Changes in leverage affect the real economy through balance sheets.

### 2.2 Review of Literature

In the literature, the relationship between financial cycles and business cycles has been analyzed by focusing on different dimensions of this relationship. Some studies have examined the effect of the simultaneous occurrence of certain phases of financial and business cycles on the duration and amplitude of business cycle phases, while others have interpreted the correlations of series representing business cycles and financial cycles. Different cycle measurement methods have been used in the studies according to the cycle definition adopted. For the robustness of the results, there are also studies that measure cycles with several different methods and evaluate the findings comparatively.

Claessens et al. (2011b) adopt the classical definition of cycles and use turning point analysis to identify the main characteristics of business and financial cycles and show how these characteristics vary across different cyclical phases and between developed and developing countries. They then analyzed the interaction between financial cycles and business cycles using the Weibull Model. They find that output cycles are highly synchronized with credit and house price cycles but have little in common with stock price cycles. They also find that recessions accompanied by periods of financial deterioration, particularly house price declines, tend to be longer and deeper, while economic recoveries accompanied by rapid growth in credit and house prices tend to be stronger. Drehmann et al. (2012), who use both the turning point analysis and the frequency-based filter of Christiano and Fitzgerald (2003) to identify the characteristics of financial cycles, similarly find that business cycle recessions are much deeper when they coincide with the contraction phase of the financial cycle. Moreover, the findings of this study suggest that the length and amplitude of the financial cycle have increased significantly since the mid-1980s. It is argued that this is due to financial liberalization and changes in monetary policy frameworks. The results of Strohsal et al. (2015) and Galati et al. (2016) also support the finding that the length of financial cycles has increased over time. Moreover, according to both studies, financial cycles last longer than business cycles. This result is a common finding in the financial cycle literature (see also Cagliriani and Price (2017), Koopman et al. (2016)). Strohsal et al. (2015) use spectral analysis to characterize financial cycles. Galati et al. (2016) use the unobservable component model to measure cycles.

Yan and Huang (2020) analyzed the US financial and business cycles between 1970 and 2018 and found that the financial cycle is closely related to the business cycle, especially at medium-term frequencies (8-30 years), and that the business cycle leads the financial cycle with a high positive correlation. The findings also suggest that the volatility of the financial cycle has a strong explanatory power for the volatility of the business cycle.

Binici et al. (2018) examine the relationship between financial cycles and business cycles for Turkey, covering the period 1987-2015, using turning point analysis and HP filter simultaneously. The results of the turning point analysis show that the expansion phases last longer than the contraction phases for all the cycles analyzed. For business cycles, the expansion phase lasted 13 quarters on average, while the contraction phase averaged 3.7 quarters. For credit cycles, expansions lasted 14.6 quarters on average, while contractions lasted 6.1 quarters on average. Based on the results obtained from the turning point analysis, they calculate the concordance index between past and future values of financial cycles and business cycles. Accordingly, the simultaneous synchronization between credit and business cycles is higher than the lagged values. The situation is quite different for the BIST100 and the REER. The synchronization between business cycles and past periods of BIST100 and REER is higher.

Akar (2016), like Binici et al. (2018), used both turning point analysis and HP filter to measure financial and business cycles for Turkey. The study found high synchronization between these cycles. In 68% of the period, these cycles are in the same phase. The cross-correlation coefficients show that credit is a leading indicator for business cycles and the BIST100 is a leading indicator for credit. A strong relationship between credit and business cycles is also confirmed by the dynamic conditional correlation coefficients between these cycles.

In the literature analyzing the relationship between financial cycles and business cycles for Turkey, foreign portfolio investments are not included in the analysis. In an economy like Turkey, where domestic savings are insufficient and external financing needs are high, foreign portfolio investments

are an important factor in financing domestic investments. In this study, foreign portfolio investments are included in the analysis. The inclusion of this factor in the analysis representing financial cycles is very important in terms of providing information for the policy frameworks to be implemented to ensure financial stability.

## 3. Methodology

In terms of the methodology to be used in analyzing the relationship between financial cycles and business cycles, it is important to provide operational definitions that enable the theoretical definitions to be represented by the data. There are two distinct cycle definitions that stand out from an operational point of view: (I) The classical cycle refers to fluctuations in the level of economic activity and is based on Burns and Mitchell (1946). (II) The growth cycle refers to deviations in the level of economic activity from trend and is based on Lucas (1977).

In this study, both classical cycles and growth cycles were measured. This is because these cycle types offer different perspectives. While classical cycles include both short-run dynamics and long-run dynamics, growth cycles include only short-run dynamics since they are derived from trend-free series. The relationship between financial and business cycles is analyzed for both classical and growth cycles and results are compared. This comparison provides information on the role of short- and long-run dynamics in the relationship between financial and business cycles.

Cycles based on the classical definition are obtained by applying "Turning Point Analysis" to level data. This technique was developed by Bry and Boschan (1971) and a version of this technique applicable to quarterly data was developed by Harding and Pagan (2002).

Various filtering techniques are used to obtain the growth cycle. Among these, the Hodrick-Prescott (1981) filter and the band-pass filters of Baxter and King (1999) and Christiano and Fitzgerald (2003) are nonparametric methods. As an alternative parametric method to these approaches, an econometric model-based trend-cycle decomposition approach has been developed in the ARIMA (autoregressive integrated moving average) modeling literature. Unobserved component models are used to implement this method (Koopman, Lit and Lucas, 2016). In this study, turning point analysis, HP filter and BK filter are used to identify cycles.

After measuring the cycles, the synchronization relationship between financial cycles and business cycles is analyzed. For this purpose, the Coherence Index calculated based on the Bry-Boschan Quarterly (BBQ) algorithm is used. In addition, the DCC-GARCH (Dynamic conditional correlation-Generalized autoregressive conditional heteroskedasticity) model developed by Engle (2002) is used to analyze how the relationship between financial cycles and business cycles changes over time.

### 3.1 Data

In this study, the relationship between business cycles and financial cycles for Turkey is analyzed using quarterly data for the period 1987:1-2021:3. The choice of variables is based on representativeness and accessibility. GDP is the most widely used indicator for business cycles in the literature. However, the GDP series for Turkey is not available as a single series for the period 1987-2021. Therefore, Industrial Production Index (IPI) data is used to represent business cycles. There is no single indicator for financial cycles used in the literature. However, the most commonly used variables are credit, equity prices and house prices (see Drehman et al. (2012), Claessens et al. (2011a), Cagliarini and Price (2017), Schüler et al. (2015), Egert and Sutherland (2012)). Since house price data for Turkey are not available for the entire research period, the house price series could not be included in the analysis as a proxy for financial cycles. The variables of foreign portfolio investments due to the intensive use of foreign capital in production in Turkey and REER due to the significant share of imported inputs in production are included in the analysis to represent financial cycles. As a result, credit, credit-to-GDP ratio, stock prices, foreign capital flows, foreign capital flows and exchange rates are used for financial cycles. Total loans to the private sector and the credit-to-GDP ratio are used to represent credit, BIST100 index is used to represent stock prices, foreign portfolio investments are used to represent foreign capital flows, and the CPI (Consumer Price Index) based REER series is used to represent the exchange rate. All data are obtained from the Central Bank of the Republic of Turkey (CBRT) and the real series for credit are calculated using the "livelihood index". The BIST100 index, on the other hand, is expressed in dollar

terms using the dollar buying rate due to the high foreign share and included in the analysis in this way. All data are seasonally adjusted.

## 4.Results

### 4.1 Concordance Index

In order to examine the relationship between financial cycles and business cycles, we first obtain the synchronization of these cycles through the concordance index. Synchronization refers to how much of the research period the series are in the same phase. Determining how much of the time these cycles are in the same phase is important both to reveal the coherence between these cycles and to assess the feasibility of policies that target both cycles at the same time. Since there may be a lagged relationship between financial cycles and business cycles, considering only simultaneous synchronization may result in an underestimation of the coherence. Therefore, the synchronization between lagged values of financial cycles and business cycles is also calculated.

The indices calculated for level data are shown in Table 1. The highest synchronization among the non-lagged series is between business cycles and credit. This finding is an expected result since credit is the source of investments. This result is important since it is widely accepted in the literature that credit is highly representative of financial cycles. However, the lag period with the highest synchronization between financial cycles and business cycles is not always zero. This is particularly evident in the case of credit. According to business cycles, credit exhibits lagging behavior while BIST100 and REER exhibit coincident behavior. The fact that BIST100 is a leading factor is consistent with the literature on leading and lagging indicators of business cycles.

**Table 1: Synchronization of Lagged Financial Cycles and Business Cycles (Concordance Indices Calculated Using the BBQ Turning Point Algorithm) (level data)**

| | **IPI (1987:1-2021:3)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lag period** | **-4** | **-3** | **-2** | **-1** | **0** | **1** | **2** | **3** | **4** |
| BIST100 | 0.48 | 0.56 | **0.62** | **0.68** | **0.65** | 0.58 | 0.50 | 0.44 | 0.43 |
| REER | 0.58 | 0.59 | 0.61 | **0.67** | **0.68** | **0.67** | 0.61 | 0.56 | 0.53 |
| Credit | 0.58 | 0.57 | 0.61 | 0.70 | **0.73** | **0.75** | **0.73** | 0.73 | 0.75 |
| Credit-to-GDP ratio | 0.66 | 0.64 | 0.61 | 0.62 | 0.67 | **0.68** | **0.68** | **0.68** | **0.70** |
| Foreign portfolio investments | 0.56 | 0.57 | **0.60** | **0.62** | **0.62** | 0.59 | 0.53 | 0.49 | 0.47 |

Concordance indices calculated for the series filtered with HP are shown in Table 2. For the non-lagged series, the highest synchronization is between IPI and BIST100. This is followed by the synchronization between the IPI and credit. Credit and asset prices are among the financial variables that are commonly found to be most synchronized with business cycles in the literature. In this respect, the findings are consistent with the literature. When the indices in the table are considered in terms of lead-lag relationships, the results are as follows: BIST100 and foreign portfolio investments are leading, while credit and REER are lagging with respect to business cycles.

**Table 2: Synchronization of Lagged Financial Cycles and Business Cycles (Concordance Indices Calculated Using the BBQ Turning Point Algorithm) (HP-filtered data)**

| | **IPI (1987:1-2021:3)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lag period** | **-4** | **-3** | **-2** | **-1** | **0** | **1** | **2** | **3** | **4** |
| BIST100 | 0.47 | 0.55 | **0.63** | **0.69** | **0.66** | 0.59 | 0.51 | 0.43 | 0.41 |
| REER | 0.50 | 0.51 | 0.50 | **0.51** | **0.50** | **0.53** | **0.53** | 0.51 | 0.49 |
| Credit | 0.40 | 0.40 | 0.44 | 0.54 | **0.60** | **0.61** | 0.58 | 0.54 | 0.53 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Credit-to-GDP ratio | 0.42 | 0.46 | **0.50** | **0.51** | **0.51** | 0.49 | 0.47 | 0.50 | 0.54 |
| Foreign portfolio investments | **0.57** | 0.54 | **0.55** | **0.55** | **0.56** | 0.54 | 0.47 | 0.44 | 0.43 |

Table 3 shows concordance indices calculated for each series that are detrended with the BK filter. The highest synchronization between the non-lagged series is calculated for the BIST100 and credit variables, respectively. In terms of lead-lag relationships, business cycles are highly synchronized with the prior period values of BIST100 and foreign portfolio investments, while the opposite is true for credit and REER. In other words, while BITS100 and foreign portfolio investments are leading, credit and REER is lagging with respect to business cycles.

**Table 3: Synchronization of Lagged Financial Cycles and Business Cycles (Concordance Indices Calculated Using the BBQ Turning Point Algorithm) (BK-filtered data)**

| | **IPI (1987:1-2021:3)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lag period** | **-4** | **-3** | **-2** | **-1** | **0** | **1** | **2** | **3** | **4** |
| BIST100 | 0.45 | 0.55 | **0.65** | **0.68** | **0.65** | 0.55 | 0.43 | 0.38 | 0.39 |
| REER | 0.43 | 0.49 | **0.57** | **0.62** | **0.63** | 0.56 | 0.48 | 0.43 | 0.41 |
| Credit | 0.40 | 0.45 | 0.51 | **0.60** | **0.64** | **0.66** | 0.57 | 0.54 | 0.50 |
| Credit-to-GDP ratio | 0.48 | 0.50 | 0.50 | 0.51 | 0.50 | **0.54** | **0.57** | **0.58** | **0.54** |
| Foreign portfolio investments | **0.59** | 0.57 | **0.59** | **0.58** | 0.53 | 0.50 | 0.45 | 0.46 | 0.46 |

The synchronization analyses conducted so far do not provide insight into the causality between variables. Therefore, in the next section, the causality between variables is analyzed by Granger Causality Analysis.

### 4.2 Granger Causality Analysis

Augmented Dickey-Fuller (ADF) Unit Root Test was conducted to assess stationarity for the time series data under investigation. According to the findings (Appendix A, B, C), it is concluded that all the level data has unit root, while each of the series detrended using HP and BK filters hasn't unit root. Granger causality analysis was performed to examine the causal relationship between financial cycles and business cycles for the cycles detrended with HP and BK filters. The results of the causality analysis for detrended series using HP filter are presented in Table 4. According to the results, there is causal flow from BIST100 and REER series to business cycles.

**Table 4: Granger Causality Test Results of HP-Filtered Series**

| **Null Hypothesis** | **Akaike information criterion** | | **Schwarz information criterion** | | **Decision** |
|---|---|---|---|---|---|
| | **Lag** | **P-value** | **Lag** | **P-value** | |
| BIST100 does not Granger cause IPI | 8 | **0.0014** | 4 | **0.0002** | **BIST100 Granger cause IPI**** |
| IPI does not Granger cause BIST100 | 8 | 0.2028 | 4 | 0.0894 | IPI, does not Granger cause BIST100 |
| REER does not Granger cause IPI | 8 | 0.0998 | 1 | **0.0188** | **REER Granger cause IPI*** |

| | | | | | |
|---|---|---|---|---|---|
| IPI does not Granger cause REER | 8 | 0.1095 | 1 | 0.1524 | IPI, does not Granger cause REER |
| Credit does not Granger cause IPI | 3 | 0.1173 | 3 | 0.1173 | Credit, does not Granger cause IPI |
| IPI does not Granger cause credit | 3 | 0.8789 | 3 | 0.8789 | IPI, does not Granger cause credit |
| Credit-to-GDP ratio does not Granger cause IPI | 8 | 0.2970 | 3 | 0.8579 | Credit-to-GDP ratio, does not Granger cause IPI |
| IPI does not Granger cause credit-to-GDP ratio | 8 | 0.5549 | 3 | 0.2428 | IPI, does not Granger cause credit-to-GDP ratio |
| Foreign portfolio investments does not Granger cause IPI | 5 | 0.2763 | 4 | 0.1517 | Foreign portfolio investments does not Granger cause IPI |
| IPI does not Granger cause foreign portfolio investments | 5 | 0.3251 | 4 | 0.3315 | IPI does not Granger cause foreign portfolio investments |

**Notes:** *indicates causality according to a single information criterion, **indicates causality according to both information criteria.

The results of the causality analysis for the detrended series using BK filter, are presented in Table 5. According to the results, there is causal flow from BIST100, credit, credit-to-GDP ratio and foreign portfolio investment series to IPI. However, IPI Granger cause only credit-to-GDP ratio.

**Table 5: Granger Causality Test Results of BK-Filtered Series**

| **Null Hypothesis** | **Akaike information criterion** | | **Schwarz information criterion** | | **Decision** |
|---|---|---|---|---|---|
| | **Lag** | **P-value** | **Lag** | **P-value** | |
| BIST100 does not Granger cause IPI | 8 | **0.0005** | 6 | **4.E-05** | **BIST100 Granger cause IPI**** |
| IPI does not Granger cause BIST100 | 8 | 0.3278 | 6 | 0.3117 | IPI, does not Granger cause BIST100 |
| REER does not Granger cause IPI | 5 | 0.2665 | 5 | 0.2665 | REER, does not Granger cause IPI |
| IPI does not Granger cause REER | 5 | 0.2515 | 5 | 0.2515 | IPI, does not Granger cause REER |
| Credit does not Granger cause IPI | 6 | **0.0269** | 6 | **0.0269** | **Credit, Granger cause IPI**** |
| IPI does not Granger cause credit | 6 | 0.1715 | 6 | 0.1715 | IPI, does not Granger cause credit |
| Credit-to-GDP ratio does not Granger cause IPI | 6 | **0.0496** | 5 | 0.0683 | **Credit-to-GDP ratio Granger cause IPI*** |
| IPI does not Granger cause credit-to-GDP ratio | 6 | **0.0046** | 5 | **0.0005** | **IPI Granger cause credit-to-GDP ratio **** |

| | | | | | |
|---|---|---|---|---|---|
| Foreign portfolio investments does not Granger cause IPI | 7 | 0.3280 | 4 | **0.0472** | **Foreign portfolio investments Granger cause IPI*** |
| IPI does not Granger cause foreign portfolio investments | 7 | 0.4173 | 4 | 0.6654 | IPI does not Granger cause foreign portfolio investments |

**Notes:** *indicates causality according to a single information criterion, **indicates causality according to both information criteria.

All causal relationships obtained from the causality tests applied to the series detrended using HP or BK filter are as follows: All variables used to represent financial cycles Granger cause business cycles. However, business cycles Granger cause only credit-to-GDP ratio.

None of the analyses conducted up to this point in the study provides information on the time dimension of the relationship between financial cycles and business cycles. The DCC-GARCH model is used to determine how the relationship between financial cycles and business cycles evolves over time.

### 4.3 DCC-GARCH

The DCC-GARCH model is based on the ARCH model, which models the volatility of a series with varying variance. The variance of many series representing financial markets is not constant. Therefore, analyses with models based on the assumption of constant variance lead to incorrect results. Since volatility is a measure of risk, it is important to determine how periods of high volatility in financial markets are related to periods of high volatility in the real economy and to measure the level of this relationship. Because this measurement is the basis for deciding whether intervention in financial market fluctuations is necessary or not.

In this section, time-varying correlations between business cycles and financial cycles estimated by the DCC-GARCH model. Thus, the course of the relationship between financial cycles and business cycles was evaluated. While making this assessment, the following questions were sought to be answered:

(I) Is there a clear pattern of correlation between financial cycles and business cycles across periods?

(II) How has the correlation between cycles changed during crisis periods?

In order to answer these questions, we interpret both the findings from the DCC-GARCH analysis for the level values of the series and the findings from the DCC-GARCH analysis for the detrended series using HP filter.

Table 6 presents the estimated dynamic conditional correlations between financial cycles and business cycles in the analysis with level data and in the analysis with detrended series using the HP filter.

**Table 6: Dynamic Conditional Correlations of HP-Filtered Data and Level Data**

| **Variables** | **DCC** | **HP-filtered data** | **Level Data** |
|---|---|---|---|
| IPI-BIST100 | Average correlation value over the period | 0.1391 | 0.1668 |
| | Variation range of correlation values | -0.1361-0.2998 | -0.3215-0.5164 |
| | Highest correlation values in crises | **1994:** 0.2795 | **1994:** 0.4770 |
| | | **2001**: 0.2173 | **2001**: 0.3563 |
| | | **2008**: 0.2998 | **2008**: 0.5164 |
| | | **2020**: 0.1359 | **2020**: 0.1444 |
| | Average correlation values in crises | **1994:** 0.1576 | **1994:** 0.2103 |
| | | **2001**: 0.1407 | **2001**: 0.1633 |

| | | | |
|---|---|---|---|
| | | **2008**: 0.1559 | **2008**: 0.2029 |
| | | **2020**: 0.0559 | **2020**:-0.0135 |
| IPI-REER | Average correlation value over the period | 0.0469 | 0.0827 |
| | Variation range of correlation values | -0.4079-0.6685 | -0.5060-0.9766 |
| | Highest correlation values in crises | **1994:** 0.1259 | **1994:** 0.1745 |
| | | **2001**: 0.1356 | **2001**: 0.1667 |
| | | **2008**: 0.1472 | **2008**: 0.1957 |
| | | **2020**: 0.6685 | **2020**: 0.9766 |
| | Average correlation values in crises | **1994:** 0.0286 | **1994:** 0.0612 |
| | | **2001**: -0.0383 | **2001**: -0.0101 |
| | | **2008**: 0.0192 | **2008**: 0.0590 |
| | | **2020**: 0.3297 | **2020**: 0.4506 |

**Table 6: (continued) Dynamic Conditional Correlations of HP-Filtered Data and Level Data**

| **Variables** | **DCC** | **HP-filtered data** | **Level Data** |
|---|---|---|---|
| IPI-Credit | Average correlation value over the period | 0.0364 | 0.1391 |
| | Variation range of correlation values | -0.4693-0.9845 | -0.0017-0.5835 |
| | Highest correlation values in crises | **1994:** 0.1274 | **1994:** 0.2443 |
| | | **2001**: 0.9845 | **2001**: 0.3404 |
| | | **2008**: 0.1627 | **2008**: 0.1733 |
| | | **2020**: 0.2460 | **2020**: 0.5835 |
| | Average correlation values in crises | **1994:** -0.0456 | **1994:** 0.1379 |
| | | **2001**: 0.2317 | **2001**: 0.1393 |
| | | **2008**: -0.0038 | **2008**: 0.1303 |
| | | **2020**: 0.1641 | **2020**: 0.2084 |
| IPI-Credit-to-GDP ratio | Average correlation value over the period | -0.0695 | -0.0852 |
| | Variation range of correlation values | -0.3474-0.7657 | -0.3397-0.6547 |
| | Highest correlation values in crises | **1994:** 0.3385 | **1994:** 0.2518 |
| | | **2001**: 0.4932 | **2001**: 0.3023 |
| | | **2008**: -0.1372 | **2008**: -0.1126 |
| | | **2020**: 0.7657 | **2020**: 0.6547 |
| | Average correlation values in crises | **1994:** -0.1061 | **1994:** -0.0865 |
| | | **2001**: 0.0751 | **2001**: -0.0320 |
| | | **2008**: -0.1824 | **2008**: -0.1344 |

| | | | |
|---|---|---|---|
| | | **2020**: 0.2634 | **2020**: 0.1259 |
| IPI-Foreign portfolio investments | Average correlation value over the period | 0.2163 | 0.2644 |
| | Variation range of correlation values | -0.4020-0.3865 | 0.1362-0.3960 |
| | Highest correlation values in crises | **1994:** 0.1872 | **1994:** 0.1705 |
| | | **2001**: 0.3732 | **2001**: 0.2970 |
| | | **2008**: 0.3209 | **2008**: 0.3645 |
| | | **2020**: 0.3865 | **2020**: 0.3960 |
| | Average correlation values in crises | **1994:** 0.1637 | **1994:** 0.1531 |
| | | **2001**: 0.2605 | **2001**: 0.2726 |
| | | **2008**: 0.2189 | **2008**: 0.3253 |
| | | **2020**: -0.1789 | **2020**: 0.2425 |

The average correlations of the level data are higher for variables other than the credit-to-GDP ratio. The only negative average correlation is the average correlation between the IPI and the credit-to-GDP ratio. This is because the change in credit is lower than the change in GDP, except for crisis periods. The higher correlation between financial cycles and business cycles for level data suggests that the relationship between these cycles is not driven by short-term dynamics only. In other words, there is also co-movement between the trend components of financial cycles and business cycles.

In order to determine the long-run dynamics in the financial cycle-business cycle relationship, the difference between the correlation estimated for level data and the correlation estimated for HP data is calculated for each financial variable (Table 7). These values are 20% for the BIST100, 76% for the REER, 82% for credit, 23% for the credit-to-GDP ratio and 22% for foreign portfolio investments. According to these values, the role of long-term dynamics in the relationship between credit and IPI is higher than for all other variables. In terms of the role of long-term dynamics in the financial cycle-business cycle relationship, credit is followed by REER and finally BIST100.

**Table 7: Difference of the Correlation Estimated for Level Data from the Correlation Estimated for HP-Filtered Data**

| | **Difference** |
|---|---|
| BIST100 | %20 |
| REER | %76 |
| Credit | %82 |
| Credit-to-GDP ratio | %23 |
| Foreign portfolio investments | %22 |

Except for credit and foreign portfolio investments, the range of variation of correlations is wider for level data. For credit and foreign portfolio investments, the range of variation of correlations is wider for HP-filtered series. Only for BIST100 and REER, the highest correlation values of the level data in crises are higher than the highest correlation values of the HP-filtered series in crises. For credit, while the correlation of level data is high in most of the crisis periods, the correlation of HP-filtered series is higher only in 2001. For the credit-to-GDP ratio, the correlation is higher for HP-filtered series except for the 2008 crisis. For foreign portfolio investments, the correlation is higher for HP-filtered series in 1994 and 2001, while the correlation is higher for level data in the 2008 crisis and pandemic period.

Average correlation values in crises are generally higher for level data. However, the average correlation of HP-filtered series is higher for the BIST100 during the pandemic, for credit during the 2001 crisis,

for the credit-to-GDP ratio during the 2001 crisis and the pandemic, and for foreign portfolio investments during the 1994 crisis.

## 5.Conclusion and Discussion

The relationship between the dynamics of the financial sector of the economy and the real economy did not receive enough attention until the 2008 global crisis. This crisis showed that the stability of the real economy alone is not enough and drew attention to the relationship between the financial sector and the real economy. Shedding light on this relationship is important in determining whether policy interventions in financial markets are necessary to prevent possible economic collapses.

In this study, the relationship between financial cycles and business cycles in Turkey is analyzed for the period 1987:1-2021:3 within the framework of existing theoretical predictions and empirical studies. For this, both classical cycles and growth cycles were measured and then the relationship between these cycles was analyzed with the concordance index, Granger Causality Analysis and DCC-GARCH model.

Concordance indices calculated in this study yield similar results for both level data and filtered cycles regarding the lead-lag relationship between financial cycles and business cycles. According to these results, stock prices and foreign portfolio investments exhibit leading behavior, credit exhibit lagging behavior, and REDK cycles coincident or lagging behavior. These findings are broadly consistent with the literature on leading-following behavior for Turkey.

After examining the synchronization between financial cycles and business cycles, Granger causality analysis was conducted to investigate the existence of a causality relationship between financial cycles and business cycles. According to the results, there is a causal flow from business cycles only to the credit-to-GDP ratio, whereas there is a causal flow from all variables used to represent financial cycles to business cycles. These results confirm the financial-real sector transmission channels proposed in this study. In other words, the approach that stock prices affect the real economy through borrower balance sheets and loans affect the real economy through both bank balance sheets and borrower balance sheets is also valid for Turkey.

Following the causality analysis, DCC-GARCH analysis is used to examine the time-varying relationship between financial cycles and business cycles. The results of the DCC-GARCH analysis show that the correlations between financial cycles and business cycles increase especially during crisis periods. In other words, comovement ability of financial cycles and business cycles increases during crisis periods. Foreign portfolio investments, which is one of the variables representing financial cycles, has the highest average correlation with business cycles for both level data and HP filtered data.

The correlation between foreign portfolio investments and business cycles shows a significant upward trend over the study period. This shows that the dependence on external financing in production has increased. A comparison within crisis periods also reveals that the correlation between foreign portfolio investments and business cycles increased. The correlation between stock prices and business cycles shows a downward trend across crisis periods. Although the correlation in crisis periods is higher than the overall average of the period, this correlation has decreased over time when crisis periods are compared with each other. This decline is attributed to the financial deepening of Borsa Istanbul and its increased resilience to crises. In order to gain insights into the short- and long-term dynamics of the relationship between financial cycles and business cycles, DCC-GARCH analyses with level data and HP data are compared. This comparison is based on the difference between the average correlations between financial cycles and business cycles for level data and the average correlations between financial cycles and business cycles for HP filtered data. In the study, it was found that this difference was the highest in the credit variable. This suggests that the role of long-term dynamics in the relationship between credit and business cycles is higher than in all other financial cycle-business cycle relationships. In the role of long-term dynamics in the financial cycle-business cycle relationship, credit is followed by REER, foreign portfolio investments and finally stock prices.

For foreign portfolio investments and stock prices, the role of long-run dynamics is much lower than for other variables. This implies that the relationship between these financial variables and business cycles is driven more by short-term dynamics than other relationships.

When all these results are evaluated, it is concluded that financial cycles precede business cycles and are the cause of business cycles in Turkey. Therefore, stabilization of financial markets seems to support the stability of real markets to a large extent. Macroprudential measures to be taken by policymakers will not only stabilize financial markets but also the real sector. Given the higher volatility of the financial sector relative to the real sector during downturns and the time inconsistency arguments, policymakers should also take into account the fact that financial cycles are leading factors for business cycles. The fact that the crises experienced by the Turkish economy are generally financial crises and that the financial sector transfers its stress to the real sector during crisis periods reinforces the existence of this leading behavior. Therefore, the leading behavior of financial cycles requires more emphasis on monetary policies in Turkey. What kind of policies will be implemented within the framework of the existence of this feature of financial cycles emerges as one of the important issues to be addressed. In this area, especially policies aimed at controlling the effects of the movements of foreign portfolio investments should be analyzed in terms of their effectiveness and the externalities they create. Such an endeavor, which is beyond the scope of this study, obviously constitutes the next step of this study.

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## Appendix

### Appendix A. ADF Unit Root Test Results (level data)

| Variable | Intercept | | Intercept and trend | |
|---|---|---|---|---|
| | t-statistic | p-value | t-statistic | p-value |
| **IPI** | 0.106151 | 0.9652 | -2.637524 | 0.2646 |
| **BIST100** | -2.209104 | 0.2041 | -2.249869 | 0.4579 |
| **REER** | -1.884000 | 0.3390 | -1.617514 | 0.7813 |
| **Credit** | -0.239210 | 0.9293 | -2.871093 | 0.1753 |
| **Credit-to-GDP ratio** | -0.367909 | 0.9102 | -2.457287 | 0.3488 |
| **Foreign portfolio investments** | -7.933701 | 0.0000 | -7.963180 | 0.0000 |

### Appendix B. ADF Unit Root Test Results (HP-filtered data)

| Variable | Intercept | | Intercept and trend | |
|---|---|---|---|---|
| | t-statistic | p-value | t-statistic | p-value |
| **IPI** | -9.694900 | 0.0000 | -9.661507 | 0.0000 |
| **BIST100** | -9.929790 | 0.0000 | -6.899978 | 0.0000 |
| **REER** | -9.632918 | 0.0000 | -9.600485 | 0.0000 |
| **Credit** | -7.172522 | 0.0000 | -7.146383 | 0.0000 |
| **Credit-to-GDP ratio** | -7.713486 | 0.0000 | -7.682708 | 0.0000 |
| **Foreign portfolio investments** | -8.358277 | 0.0000 | -8.344772 | 0.0000 |

### Appendix -C. ADF Unit Root Test Results (BK-filtered data)

| Variable | Intercept | | Intercept and trend | |
|---|---|---|---|---|
| | t-statistic | p-value | t-statistic | p-value |
| **IPI** | -3.607618 | 0.0071 | -3.596233 | 0.0347 |
| **BIST100** | -3.142171 | 0.0265 | -3.122710 | 0.1065 |
| **REER** | -4.335534 | 0.0007 | -4.344542 | 0.0040 |
| **Credit** | -3.874553 | 0.0031 | -3.917990 | 0.0145 |
| **Credit-to-GDP ratio** | -3.307753 | 0.0169 | -3.278539 | 0.0753 |
| **Foreign portfolio investments** | -4.828682 | 0.0001 | -4.837207 | 0.0008 |

***Araştırma Makalesi***

# Türkiye'de Finansal Çevrimler ve İş Çevrimleri

*Financial and Business Cycles in Turkey*


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## Genişletilmiş Özet


Finansal çevrimlerin temeli, iş çevrimlerine ilişkin tartışmalara dayanmaktadır. Finansal sektörün reel ekonomi ile etkileşimine dair görüşler, iş çevrimine ilişkin bakış açılarının birbirinden ayrılma noktalarından birini oluşturmaktadır. Fisher (1933), iş çevrimi dalgalanmalarını belirleyen en önemli faktörler olarak aşırı borçluluk ve ardından gelen deflasyonu göstermiştir. Keynes'in teorisinde ise finansal sistemin merkezi bir rolü yoktur. İş çevrimi dalgalanmalarını yaratan unsur, yatırımcıların beklentilerinde meydana gelen değişikliklerdir. Yatırımcıların beklentileri, iş adamlarının değişen iyimser veya karamsar ruh hallerinden kaynaklandığı için oldukça değişkendir. Monetaristler, paranın reel ekonomideki değişimlerin bir yansıması olmadığını hatta tersine ekonomik dalgalanmaların para arzında meydana gelen değişiklikler nedeniyle ortaya çıktığını iddia etmiştirler. Ancak Monetaristlerin finansal kesime ilişkin incelemeleri para arzı ile sınırlı kalmıştır. Gurley ve Shaw (1955) finansın ekonomik gelişim için öneminin gözden kaçırıldığını vurgulasa da finansın makroekonomi için önemine vurgu yapan diğer görüşler gibi geri planda kalmıştır. Modigliani ve Miller (1958)'in, reel ekonomik kararlar ile finansal yapının alakasız olduğunu ifade eden "finansman yapısının ilgisizliği teoreminden (irrelevance theory)" sonra, finans ve makroekonomi arasındaki ayrışma, giderek daha belirgin bir hale gelmiştir. Ancak daha sonra Minsky (1977), sistemik finansal kırılganlığın derin depresyonlarla sonuçlanacağını ifade ederek, finansın reel ekonomi için kilit öneme sahip olduğunu belirtmiştir. Minksy'ye göre bu finansal kırılganlıkları sistem kendisi yaratmaktadır. 1980'lerde, finansal olguların nedensel rolünü reddeden reel iş çevrimi teorisi geliştirilmiştir. Reel iş çevrimi teorisine göre, konjonktürel dalgalanmaların ana kaynağı ekonomiyi etkileyen reel şoklardır. Mikro temelli makroekonomik modellerin, koordinasyon hataları, reel ve nominal katılıklar gibi Keynesyen özelliklerle genişletilmesiyle ortaya çıkan Yeni Keynesyen modellerin ise iş çevrimlerine dair altını çizdiği tek bir sebep yoktur. Bu modeller daha çok piyasa aksaklıklarına vurgu yapmıştırlar. Piyasa aksaklıklarının ekonomiye yönelik şokların gücünü artırarak reel üretimde ve istihdamda büyük dalgalanmalara yol açtığını savunmuşturlar. Bernanke, Gertler ve Gilchrist (1999), literatürde öne çıkan yaklaşımların bir sentezini yaparak, kredi piyasasındaki aksaklıkları standart modellere dahil etmiştir. Böylece, çevrimsel olguların daha fazla kısmını açıklayabilme yeteneğine sahip bir model ortaya çıkmıştır. Kredi piyasasındaki içsel gelişmelerin, ekonomiye yönelik şokların etkisini artığı ve bu şokların yayılmasına neden olduğu bir "finansal hızlandırıcı" mekanizmasının var olduğu iddia edilmiştir. Finansal sektörün konjonktür yönlü yapısına vurgu yapan çalışmaların yaygınlık kazanmasıyla finansal çevrim kavramı öne çıkmıştır. 2008 küresel krizinin finansal sektördeki dalgalanmaların önemini gözler önüne sermesiyle de finansal çevrim araştırmaları hız kazanmıştır. Bu alanda yapılan çalışmalarda finansal çevrimlerin reel ekonomik etkileri araştırılmış, finansal sistemde

kırılganlıkların birikmesinin önüne geçilmesinin gerekliliği gündeme gelmiştir. Kriz sonrasında Türkiye'de de finansal istikrar konusu gündeme gelmiş ve merkez bankası, politika çerçevesinde yaptığı değişikliklerle finansal istikrarı da yakından gözeten bir para politikası uygulamasına geçmiştir. Türkiye'deki finansal çevrimlerin temel özelliklerinin ve bu çevrimlerin iş çevrimleri ile olan ilişkisinin araştırılması, uygulanacak olan politikaların etkinliğinin sağlanmasında kritik öneme sahiptir.

Çalışmanın amacı finansal çevrimler ve iş çevrimlerinin ortak hareket etme refleksinin araştırılmasıdır. Çalışmada, finansal çevrimler ve iş çevrimleri arasındaki ilişkinin zaman içindeki değişimi ve bu ilişkinin bir nedensellik boyutu taşıyıp taşımadığı çeşitli finansal büyüklükler için incelenmiştir. Bu çalışmada öncelikle finansal çevrimler ile iş çevrimleri arasındaki ilişkinin teorik alt yapısı, finansal-reel sektör aktarım kanalları üzerinden sunulmaktadır. Bu kapsamda borçlu bilanço kanalı, banka bilanço kanalı ve likidite kanalı finansal aksaklıklara vurgu yapılarak açıklanmaktadır. Hem firmalar hem de hane halkları için geçerli olan borçlu bilançosu kanalı, borç verenlerin (i) borçluların risklerini ve ödeme gücünü tam olarak değerlendirememesinden, (ii) yatırımlarını tam olarak izleyememesinden ve / veya (iii) verdikleri borcun geri ödenmesini sağlayamamasından kaynaklanmaktadır. Bu problemlerin üstesinden gelebilmek için borç verenler, borçlulardan teminat talebinde bulunmaktadır. Böylece borçluların krediye erişimleri ve dolayısıyla yapacağı yatırımlar bilançolarına bağlanmış olur (BCBS, 2011a). Bu nedenle, borçlu bilançolarını etkileyen her unsur, yatırımları değiştirmek suretiyle ekonomide reel etkilere sahip olacaktır. Banka bilançosu kanalı ise, geleneksel "banka borç verme kanalı (bank lending channel)" ve "banka sermayesi kanalı (bank capital channel)" olarak ayrıştırılabilir. Her iki kanalda da banka bilançosuna yönelik şoklar kredilerde önemli daralmalara yol açar ve bunun sonucunda ekonomik faaliyette ciddi bir daralma ortaya çıkabilir. Bu kadar büyük etkilerin ortaya çıkabilmesi için gerekli olan şart, bazı borçluların kredi için büyük ölçüde bankalara bağımlı olmalarıdır. Bu bağımlılık, banka kredisinde ciddi bir düşüş olduğunda bu borçluların yeni kredi verenlerle ilişki kurma konusunda büyük zorluklar ve maliyetlerle karşılaşacakları anlamına gelir ve bu da bu borçluların harcamalarını kısmak zorunda kalmasına neden olur (BCBS, 2011a). Son olarak likidite ve kaldıraç kanalı, likidite şoklarının banka kredilerine ve reel ekonomiye yayılması ile ilgilidir. Bir likidite veya ödeme gücü şoku ortaya çıktığında, bankalar hızla varlık satmaya başlar. Varlık piyasalarında arzın artışıyla birlikte varlık fiyatları düşmeye başlar. Böylece varlık fiyatlarında aşağı doğru döngü ortaya çıkar. Bunun sonucunda bilançolarda bozulma meydana gelir (BCBS, 2011b). Kaldıraçtaki değişikliklerin varlık fiyatlarını etkilemesi, borçluların dış finansmana erişimini etkiler. Böylece kaldıraç kanalı, reel ve finansal sektörler arasındaki çift yönlü bağlantıları güçlendirerek daha belirgin reel ve finansal çevrimlere neden olur (Claessens ve Kose, 2018). Bu kanalın işleyişi, bilanço kanalının işleyişi ile iç içe geçmiştir. Kaldıraçtaki değişikliklerin reel ekonomiye etkisi bilançolar üzerinden gerçekleşmektedir.

Son olarak çalışmada, Türkiye'deki finansal çevrimler ve iş çevrimleri arasındaki ilişki 1987:1-2021:3 dönemi için ampirik olarak analiz edilmektedir. Analizde iş çevrimlerini temsilen sanayi üretim endeksi ve finansal çevrimleri temsilen krediler, hisse senedi fiyatları, reel efektif döviz kuru ve yabancı portföy yatırımlarına dair büyüklükler kullanılmıştır. Çevrimlerin ölçümünde hem "klasik çevrim" hem de "büyüme çevrimi" tanımları esas alınmıştır. Klasik çevrim, ekonomik aktivitenin düzeyindeki dalgalanmaları ifade eder ve Burns ve Mitchell (1946)'e dayanmaktadır. Büyüme çevrimi ise ekonomik aktivite düzeyinin trendden sapmalarını ifade eder ve Lucas (1977)'a dayanmaktadır. Klasik tanıma dayanan çevrimler, düzey verilerine "Dönüm Noktası Analizi" uygulanmasıyla elde edilmiştir. Bu teknik, Bry and Boschan (1971) tarafından geliştirilmiş ve Harding ve Pagan (2002) tarafından bu tekniğin çeyreklik veriye uygulanabilir bir versiyonu oluşturulmuştur. Büyüme çevrimlerini elde etmek için ise Hodrick-Prescott (1981, 1997) (HP) filtresi ve Baxter ve King (1999) (BK) filtresi kullanılmıştır. Çevrimlerin ölçümü yapıldıktan sonra finansal çevrimler ve iş çevrimleri arasındaki ilişki analiz edilmiştir. Bunun için Bry-Boschan Quarterly (BBQ) algoritmasına dayalı olarak hesaplanan Uyum Endeksi'nden yararlanılmıştır. Daha sonra iş çevrimleri ile finansal çevrimler arasındaki nedensellik ilişkisinin incelenmesi için Granger nedensellik analizi yapılmıştır. Son olarak ise çevrimler arasındaki ilişkinin zaman içinde nasıl değiştiği, Engle (2002) tarafından geliştirilen DCC-GARCH (Dynamic conditional correlation-Generalized autoregressive conditional heteroskedasticity) modeli kullanılarak analiz edilmiştir.

Elde edilen bulgulara göre, hisse senedi fiyatları ve yabancı portföy yatırımları öncül, krediler takipçi, REDK çevrimleri ise eş anlı veya öncül olma davranışı sergilemektedir. Granger nedensellik analizinin sonuçlarına göre finansal çevrimleri temsilen kullanılan tüm değişkenlerden iş çevrimlerine doğru bir nedensellik ilişkisi mevcutken, iş çevrimlerinden yalnızca kredi-GSYH oranına doğru bir nedensellik mevcuttur. DCC-GARCH analizinin sonuçları, finansal çevrimler ve iş çevrimlerinin birlikte hareket etme kabiliyetinin kriz dönemlerinde yükseldiğini göstermektedir. İş çevrimleri ile ortak hareket kabiliyeti en yüksek olan değişken yabancı portföy yatırımlarıdır. Tüm bu sonuçlar değerlendirildiğinde, Türkiye'de finansal çevrimlerin iş çevrimlerini öncelediği ve iş çevrimlerinin nedeni olduğu sonucuna ulaşılmaktadır. Bu nedenle, finansal piyasalarda istikrarın sağlanması, reel piyasalardaki istikrar ile yakından ilişkili görünmektedir. Finansal çevrimlerin iş çevrimlerinin öncülü olduğu gerçeği, politika yapıcılar tarafından dikkate alınması gereken önemli husulardandır. Türkiye ekonomisinin yaşadığı krizlerin genellikle finansal kriz niteliği taşıması ve kriz dönemlerinde finansal kesimin stresini reel kesime aktarması, bu öncül ilişkinin varlığını kuvvetlendirmektedir. Bu öncül ilişkinin varlığı çerçevesinde, özellikle yabancı portföy yatırımlarının hareketlerinin meydana getirdiği etkileri kontrol almaya yönelik politikalar etkinlik açısından ve yarattığı dışsallıklar açısından incelenmelidir.