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FACTORS AFFECTING LOANS TO MSMES BY THE BANKING SECTOR: AN EMPIRICAL APPLICATION ON TÜRKİYE

BANKACILIK SEKTÖRÜNÜN KOBİ'LERE KULLANDIRDIĞI KREDİLERİ ETKİLEYEN FAKTÖRLER: TÜRKİYE ÜZERİNE AMPİRİK BİR UYGULAMA

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ABSTRACT

Despite their significant contribution to innovation, employment, and economic growth, micro, small, and medium-sized enterprises (MSMEs) face numerous challenges in accessing finance, particularly bank loans. In many countries, including Türkiye, MSMEs have been able to partially mitigate this issue through government support and incentive programs.

In this study, gross domestic product (GDP), the consumer confidence index (CCI), and the real sector confidence index (RSCI) were selected as factors hypothesized to influence the loans extended to MSMEs by the banking sector on a scale basis. The relationships between these variables and MSME loans were analyzed using the ARDL bounds test for the period between 2013Q2 and 2023Q2.

Empirical findings from the study reveal a long-term relationship between MSME bank loans and the selected variables. In the long term, while GDP and RSCI negatively affect micro-scale business loans, the CCI has a positive impact. For MSME loans at other scales, RSCI has a negative influence, whereas GDP and CCI exert a positive effect.

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ÖZET

İnovasyon, istihdam ve ekonomik büyümeye önemli katkılarına rağmen, mikro, küçük ve orta ölçekli işletmeler (KOBİ'ler) finansmana, özellikle banka kredilerine erişim konusunda birçok zorlukla karşılaşmaktadır. Türkiye dâhil birçok ülkede, KOBİ'ler bu sorunu kısmen de olsa hükümet destekleri ve teşvik programları sayesinde aşabilmektedir.

Bu çalışmada, bankacılık sektörü tarafından KOBİ'lere ölçek bazında sağlanan kredileri etkilediği düşünülen faktörler olarak gayri safi yurt içi hasıla (GSYİH), tüketici güven endeksi (TGE) ve reel sektör güven endeksi (RSGE) belirlenmiştir. Bu değişkenler ile KOBİ kredileri arasındaki ilişkiler, 2013 yılının ikinci çeyreğinden 2023 yılının ikinci çeyreğine kadar olan dönemde ARDL sınır testi yöntemiyle analiz edilmiştir.

İlgili çalışmadan elde edilen ampirik bulgular KOBİ banka kredileri ile seçilen değişkenler arasında uzun dönemli bir ilişki olduğunu göstermektedir. Uzun dönemde, GSYİH ve RSGE mikro ölçekli işletme kredilerini olumsuz etkilerken, TGE bu krediler üzerinde olumlu bir etki yapmaktadır. Diğer ölçeklerdeki KOBİ kredileri ise uzun vadede RSGE'den olumsuz etkilenirken, GSYİH ve TGE'den olumlu etkilenmektedir.

1. INTRODUCTION

The role of MSMEs in the economy, both in Türkiye and worldwide, is essential. Reflecting this essential, MSMEs are often referred to in the literature with various names, such as the backbone of the economy, the locomotive of economic growth, the architects of innovation, and the main drivers of employment. Numerous studies confirm MSMEs' positive effects on both the economy and social life, affirming that they deserve these titles.

MSMEs play a dynamic role in ensuring sustainable economic growth and expanding employment opportunities. Despite this critical role, MSMEs have faced many challenges in Türkiye and around the globe. Among these challenges, access to finance is a significant issue. One of the primary financing methods for MSMEs is bank loans, yet MSMEs also encounter difficulties with this method.

This study aims to identify the selected macroeconomic factors affecting MSMEs' access to bank loans. GDP, CCI, and RSCI were chosen as the macroeconomic factors potentially influencing MSME bank loans. The relationship between loans extended to MSMEs by the banking sector and certain macroeconomic factors thought to impact these loans was examined using the ARDL bounds test, and the empirical findings obtained were objectively presented. The findings were subsequently interpreted, and suggestions were made based on these insights. The primary motivation behind choosing these factors is that they are closely monitored variables in economic circles. Analyzing how these variables impact MSMEs' access to finance can provide valuable insights for banks in their credit allocation processes and governments in shaping public support policies for MSMEs.

1.1. Definition of MSMEs in Türkiye

A consensus on the definition of MSMEs has yet to be reached worldwide. Typically, criteria such as net sales or financial balance sheet size and the number of employees are used in defining MSMEs, and based on these criteria, MSMEs are classified into specific categories such as micro, small, and medium (Yalçın & Çil, 2023:1-2).

The definition, characteristics, and classification of MSMEs in Türkiye were initially established with the "Regulation on the Definition, Characteristics, and Classification of Small and Medium-Sized Enterprises," which was put into effect by the Council of Ministers Decision dated 19.10.2005 and numbered 2005/9617. With the Presidential Decree published in the Official Gazette dated May 25, 2023, and numbered 32201, the regulation dated 19.10.2005 and numbered 2005/9617 was repealed, and instead, the "Regulation on Small and Medium-Sized Enterprises" came into effect. The concept of MSMEs in the relevant regulations represents micro, small, and medium-sized enterprises.

Table 1 and **Table 2** present the definitions of MSMEs for Türkiye and the European Union (EU), respectively. As seen in the respective tables, Türkiye's definitions of MSMEs show similarity with the criteria

applied in the EU. However, this similarity is valid in terms of employment criteria in the year 2023, while significant differences exist in the scale of financial criteria.

Table 1. Definitions of MSMEs in Türkiye

The Scale of MSMEs	Number of Employees	Financial Criterion (Net Sales Revenue or Total Assets on the Balance Sheet)
Micro	<10	<10 million ₺
Small	10-49	≥10 million ₺-<100 million ₺
Medium	50-249	≥100 million ₺-<500 million ₺

Source: Official Gazette of the Republic of Türkiye, dated May 25, 2023, issue number 32201.

Table 2. Definitions of MSMEs the in European Union

The Scale of MSMEs	Number of Employees	Financial Criteria (Revenue or Total Assets)
Micro	<10	≤2 million €
Small	10-49	>2 million €-≤10 million €
Medium	50-249	>10 million €-≤50/43 million €[1]

Source: Official Journal of the European Union dated May 20, 2003, issue number L124/36.

In today's world, the criteria for the number of employees in defining MSMEs, as presented in **Table 1** and **Table 2**, can lead to some problems. In this context, while the qualitative needs for labor in businesses are increasing, quantitatively, they may decrease. For example, a business that conducts sales transactions through its own stores may decide to start selling via e-commerce and subsequently close its physical stores. With this decision, the business may employ fewer workers while generating more revenue. Therefore, the number of employees may not be a very reliable criterion within the criteria set for defining MSMEs (Diken, 2020:50). The number of employees within MSME definition criteria can be determined specifically for each sector, similar to what is done in the United States and Japan (Diken, 2020:48-49). This way, MSME definitions can be made more accurately.

1.2. An Overview of MSMEs

According to the Organisation for Economic Co-Operation and Development (OECD) Report (2019), MSMEs constitute 99% of all businesses and approximately 60% of employment. In addition, approximately 50% to 60% of the added value produced in OECD countries is produced by MSMEs (OECD, 2019:3). In the EU, in 2020, MSMEs constituted 96.2% of all businesses and 52.5% of employment. In addition, 64.3% of the added value produced in the EU is produced by MSMEs (European Union Statistical Office [Eurostat], 2023). According to the Turkish Statistical Institute (TÜİK) data for 2022 in Türkiye, MSMEs constitute 99.7% of all businesses and approximately 70.6% of employment. Additionally, MSMEs in Türkiye constitute 47.5% of personnel costs, 42.5% of turnover, 36.3% of production value, and 36.4% of added value with factor cost (TÜİK, 2023).

Notably, the share of MSMEs in employment in Türkiye is higher than in OECD countries. In **Graph 1** below, the share of MSMEs in employment is grouped based on scale. In addition, the total employment provided by MSMEs is shown in **Table 3** as a percentage, again on a scale basis.

In **Table 3**, the enterprises that provided employment at a rate of approximately 95% in the relevant period are micro-sized enterprises with an employee size between 0 and 9. From this perspective, micro-sized

[1] The relevant amount for turnover is €50 million, and for the balance sheet total, it is €43 million.

enterprises have a more significant positive impact on employment. In this context, ensuring the sustainability of micro-scale enterprises will contribute to the country socially and economically.

Graph 1. Classification of MSMEs Based on Number of Employees

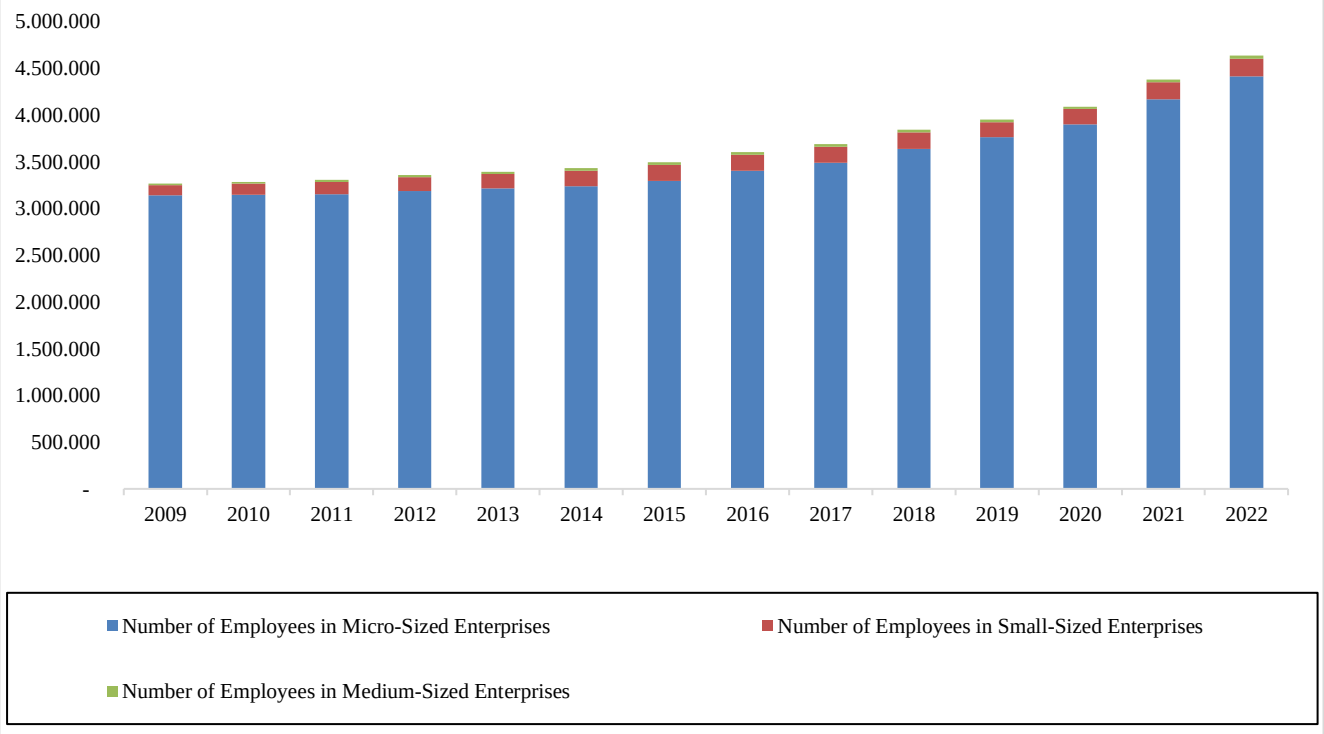


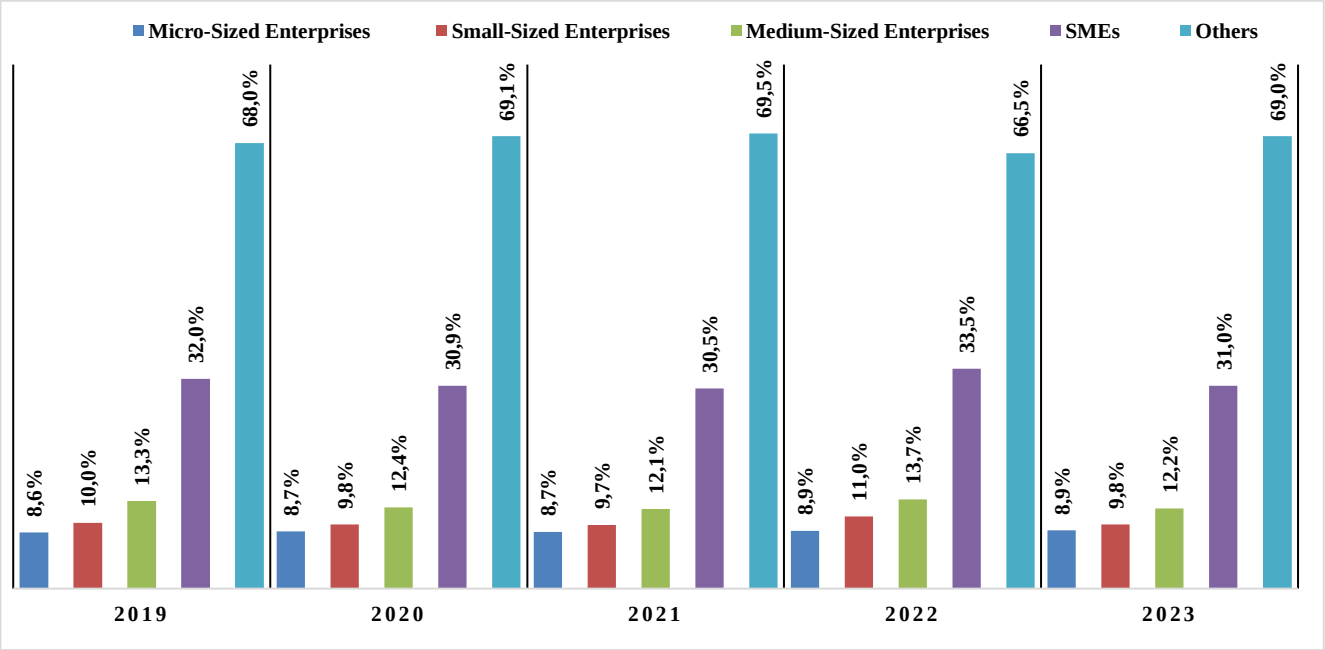
Table 3. Percentage of MSMEs Based on Number of Employees

Date	Share of Employment in Micro-Sized Enterprises	Share of Employment in Small-Sized Enterprises	Share of Employment in Medium-Sized Enterprises
2009	96,16	3,34	0,49
2010	95,82	3,63	0,54
2011	95,28	4,10	0,62
2012	94,83	4,49	0,68
2013	94,68	4,59	0,73
2014	94,43	4,80	0,78
2015	94,27	4,93	0,81
2016	94,48	4,74	0,78
2017	94,49	4,72	0,79
2018	94,71	4,54	0,75
2019	95,29	4,04	0,67
2020	95,31	4,04	0,65
2021	95,12	4,21	0,67
2022	95,16	4,17	0,67

1.3. A General Overview of Loans Provided to MSMEs by the Banking Sector in Türkiye

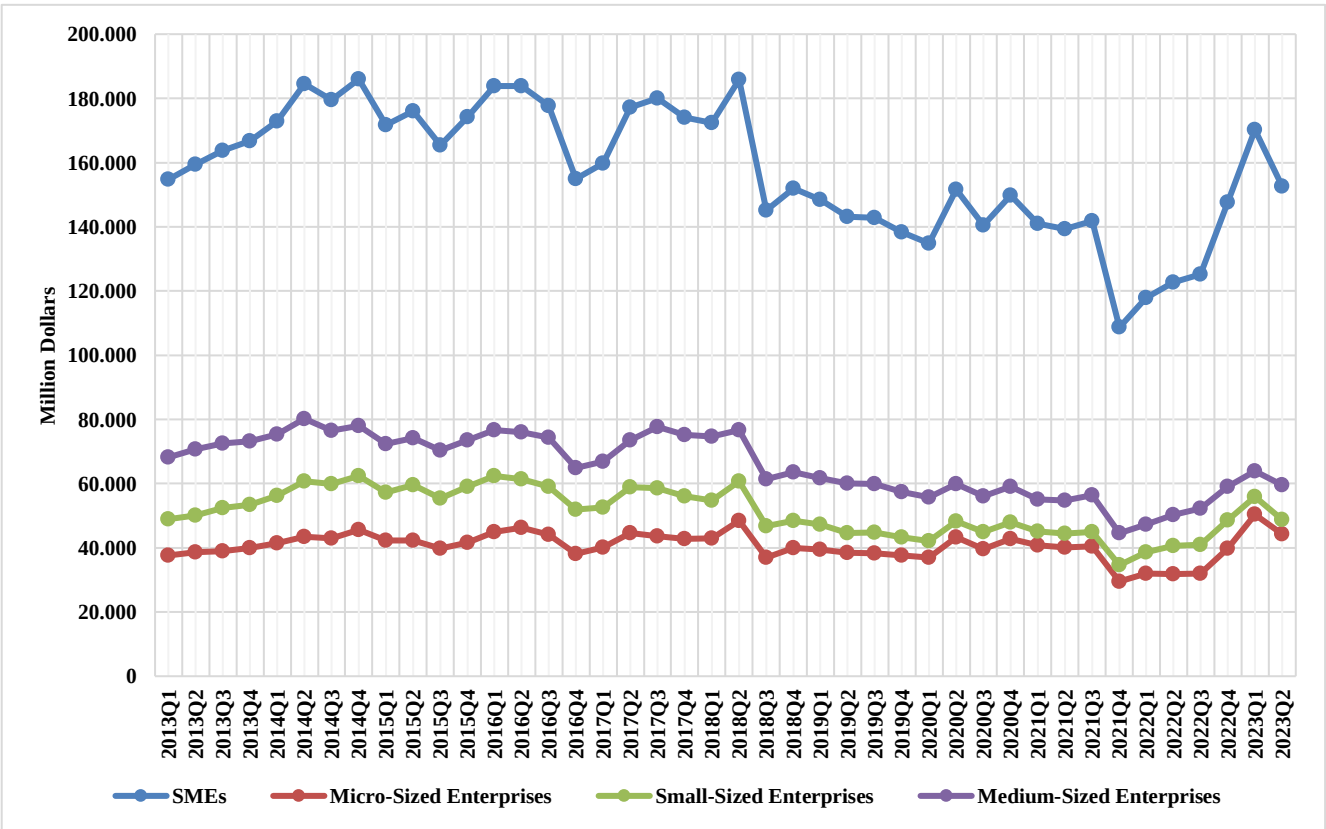
In **Graph 2**, the proportion of loans obtained by MSMEs within the total credit volume extended by the banking sector for the period 2019-2023 is presented on a scale basis. As seen in the relevant graph, MSMEs, which constitute 99.7% of businesses in the Turkish economy, receive considerably fewer loans from the banking sector. Remarkably, there has been a noticeable decrease in MSME loans, especially from 2020 to 2021. During economic fluctuations, MSME loans decrease. In this context, increasing government support and incentives for MSMEs during economic downturns can alleviate the difficulties MSMEs face in accessing finance.

Graph 2. The Share of MSME Bank Loans in Total Banking Loan Volume



Additionally, **Graph 3.** Quarterly MSME Bank Loan Volume by Scale (2013Q1-2023Q2) presents the scale-based MSME loan volumes in dollar terms for the period from 2013Q1 to 2023Q2. In the relevant graph, it can be observed that overall, MSME loans experienced a decline from 2018Q3 to 2022Q3, followed by a generally horizontal trend. It is presumed that the exchange rate fluctuations and inflation spiral experienced during the period from 2018Q3 to 2022Q3, along with the global COVID-19 pandemic, had an impact on MSME loans.

Graph 3. Quarterly MSME Bank Loan Volume by Scale (2013Q1-2023Q2)



2. THE EMPIRICAL LITERATURE

This section examines studies on factors affecting loans extended to MSMEs by the banking sector to the extent they could be identified. Due to relatively few studies on MSME loans, research on factors influencing other types of bank loans has also been reviewed.

The relevant literature observes that GDP emerges as the primary factor affecting MSME loans and other types of loans. Empirical studies have mostly found that this effect is positive. The GDP variable has been used to indicate economic growth in these studies and has been employed to identify the relationships between loans and economic growth. Similarly, the industrial production index (IPI) is also commonly used as an indicator of economic growth in literature.

Among the factors influencing loan volume, variables such as inflation, interest rates, unemployment, exchange rates, and exports are relatively frequently used in empirical studies. While a negative relationship between loans and inflation, unemployment, and interest rates has been identified, a positive relationship between loans and exchange rates and exports has been found.

In this study, relatively few studies on factors such as CCI and RSCI that are considered to influence MSME loans have been identified in the literature. In these studies, while findings suggest that CCI positively affects loans, there are findings indicating that there is no relationship between RSCI and loans.

Based on the literature review, GDP, CCI, and RSCI have been selected as factors affecting MSMEs in this study. Due to the relatively limited coverage of CCI and RSCI in the relevant literature, these indices have been included as factors affecting MSME loans along with GDP in this study and examined within the framework of the ARDL (autoregressive distributed lag) bounds test.

Summary information of relevant studies is presented in **Table 4**.

Table 4. Studies on Factors Affecting Loans

Study	Sample and Period	Method	Results
Tuna & Bektaş (2013).	Türkiye, 2007-2013.	The Johansen Juselius Cointegration, Granger Causality Analysis.	There is no relationship between MSME loans and IPI.
Tutar & Ünlüleblebici (2014).	Türkiye, 2006-2011.	The Johansen Juselius Cointegration, Granger Causality Analysis.	There is a long-term relationship between business loan volume and GDP, and there is a one-way causality from business loans to GDP.
Jenkins & Hussain (2014)	Türkiye, 2007-2013.	Regression Analysis.	MSME loans have a positive impact on economic growth, while inflation and public debt have a negative impact.
Arsoy & Aytun (2014).	Türkiye, 2005-2012.	Toda-Yamamoto Causality Analysis Regression Analysis.	CCI is the Granger cause of consumer loans.
Rabab'ah (2015)	Jordan, 2005-2013.	Regression Analysis.	Bank loans have a positive effect on economic growth, while inflation has a negative impact.
Yiğitbaş (2015).	Türkiye, 2003-2012.	Regression Analysis, Granger Causality Analysis.	A bidirectional causality relationship exists between business loans, IPI, and interest rates. Interest rates negatively affect business loans, while IPI has a positive impact.
Alimi, Olorunfemi, & Atanda (2016).	Nigeria, 1970-2013.	The Johansen Juselius Cointegration, Granger Causality Analysis.	MSME loans have an impact on economic growth.
Manole, Petrescu, & Vlada (2016).	Romania, 2008-2015.	Autoregressive Moving-Average Model.	The consumer price index (CPI) and the unemployment rate have a negative effect on consumer loans.
Apan & İslamoğlu (2017).	Türkiye, 2009-2017.	The Johansen Juselius Cointegration, Granger Causality Analysis.	There is a long-term relationship between MSME loans, exports, and interest rates. In terms of Granger causality, there is a one-way causality from exports and interest rates to MSME loans.
Yüksel & Adalı (2017).	Türkiye, 2008-2017.	Toda-Yamamoto Causality Analysis.	There is a causal relationship between individual and MSME loans and economic growth.
Demirci (2018).	Türkiye, 2006-2016.	The Johansen Juselius Cointegration, Granger Causality Analysis.	Micro-enterprise loans and the IPI have a positive relationship. There is a one-way causality from economic growth to micro-enterprise loans.
Dewi, Majid, Aliasuddin, & Kassim (2018).	Indonesia, 1995-2015.	The Johansen Juselius Cointegration, Error Correction Model.	In the long run, a causality relationship exists between MSME loans, economic growth, non-performing loans, and interest rates. In the short run, there is a bidirectional causality between loan demand and interest rates, while there is a one-way causality from economic growth to loan demand.
Borowski, Jaworski, & Olipra	European Zone (23 Countries),	Panel Regression Analysis	There is a positive relationship between GDP and consumer loans.

Study	Sample and Period	Method	Results
(2019).	1997-2014.		
Durmuş & Şahin (2019).	Türkiye, 2006-2018.	Toda-Yamamato Causality Analysis.	Consumer loans and interest rates exhibit a bidirectional causality, while there is a one-way causality from money supply to consumer loans.
Živkov, Poparić, & Ilić (2020).	Serbia, 2005-2018.	Regression Analysis.	Entrepreneurs' long-term loans are negatively affected by EURIBOR and inflation, while they are positively affected by GDP. According to the study, no variable influences entrepreneurs' short-term loans. Long-term loans for individuals are negatively affected by EURIBOR, while short-term loans are negatively affected by the reference interest rate and positively affected by EURIBOR.
Eryüzlü (2020).	Türkiye, 2007-2019.	Toda-Yamamoto Causality Analysis, Hatemi-J Asymmetric Causality Analysis.	According to the Toda-Yamamoto causality test, there is no causality relationship between consumer loans and CCI. In contrast, according to the Hatemi-J asymmetric causality test, there is a bidirectional causality.
Ünal & Ocak (2020).	Türkiye, 2003-2018.	The Johansen Juselius Cointegration, Granger Causality Analysis.	The interest rate has a negative impact on consumer loans.
Manzoor, Wei, & Siraj (2021).	Pakistan, 1990-2019.	ARDL Bounds Test.	Indeed, in the long term, economic growth is positively impacted by MSME outputs, MSME loans, and the Human Development Index. Additionally, in the short term, along with the factors influencing long-term economic growth, the annual export rate contributes positively.
Kariuki & Nasieku (2023).	Kenya, 2008-2021.	Regression Analysis.	Interest rates and inflation negatively impact MSME loans, while they are positively affected by GDP and exchange rates.
Vurur & Yıldız (2023).	Türkiye, 2013-2022.	Multivariate Adaptive Regression Spline.	The factors affecting business loans are the exchange rate, producer price index (PPI), and commercial loan interest rates, in descending order of significance.

3. DATASET AND DESCRIPTIVE STATISTICS

This section briefly explains the dataset used in the study, descriptive statistics of the dataset, tests to be used for stationarity detection, and the ARDL bounds test to identify the long and short-term relationships between variables. Subsequently, the empirical findings obtained are shared.

3.1. Dataset

In this study, the relationship between GDP, CCI, and RSCI, believed to affect loans extended to MSMEs by the banking sector in Türkiye was investigated using quarterly data from 2013:01 to 2023:02. The data used in the study were obtained from the Banking Regulation and Supervision Agency (BRSA), the Central Bank of the Republic of Türkiye (CBRT), and the Turkish Statistical Institute (TurkStat) data distribution platforms.[2]

Four dependent variables were selected as the loan volume extended by the banking sector to MSMEs, micro-sized enterprises, small-sized enterprises, and medium-sized enterprises. Thus, the aim was to investigate the factors affecting loans extended to MSMEs by the banking sector in terms of scale.

The independent variables selected, believed to affect the loan volume extended to MSMEs by the banking sector, are GDP, CCI, and RSCI. Since the GDP data obtained from TurkStat's data distribution platform were in Turkish Lira (TRY), to avoid inconsistency among the variables analyzed, the quarterly USD selling exchange rate data obtained from the CBRT data portal were converted to USD.

In this study, the variables to be used were included in the analysis by taking their natural logarithms. Additionally, summary information for all variables to be used in the study is presented in **Table 5**, along with explanations.

[2] The relevant web addresses are as follows: https://www.bddk.org.tr/BultenAylik/tr/Home/Gelismis, CBRT: https://evds2.tcmb.gov.tr/ and https://biruni.tuik.gov.tr/medas/?locale=tr. Additionally, the relevant data are in US dollars (USD).

Table 5. Summary Information on the Variables Used in the Study

The Variables Used in the Relevant Study	Abbreviation	Abbreviation (Natural Logarithm)	Explanation
Total Credit Volume Granted to Micro-scale Enterprises by the Banking Sector (USD).	MSE	LnMSE	It represents the total of cash and non-cash loans.
Total Credit Volume Granted to Small-scale Enterprises by the Banking Sector (USD).	SSE	LnSSE	It represents the total of cash and non-cash loans.
Total Credit Volume Granted to Medium-scale Enterprises by the Banking Sector (USD).	MeSE	LnMeSE	It represents the total of cash and non-cash loans.
Total Credit Volume Granted to MSMEs by the Banking Sector (USD).	MSME	LnMSME	It represents the total of cash and non-cash loans.
Gross Domestic Product (USD).	GDP	LnGDP	Gross Domestic Product (GDP) is calculated using the production approach (seasonally adjusted at current prices).
Consumer Confidence Index.	CCI	LnCCI	The index ranges from 0 to 200. A value above 100 indicates optimism in consumer confidence, while a value below 100 indicates pessimism.
Real Sector Confidence Index.	RSCI	LnRSCI	The index ranges from 0 to 200. A value above 100 indicates optimism in businesses operating in the real sector confidence, while a value below 100 indicates pessimism.

3.2. Descriptive Statistics

Descriptive statistics for the dataset used in the study are provided in **Table 6**. The maximum values taken by the dependent variables MSME, MSE, SSE, and MeSE between the relevant periods are as follows: for MSE, it is for 2023Q1, and for MSME, SSE, and MeSE, it is for the period 2023Q2. The minimum values taken by all dependent variables for the study are 2021Q4. The period 2021Q4 corresponds to approximately 2 years after the first occurrence of the virus case named COVID-19 in Türkiye, which was observed on March 11, 2020. Additionally, the relevant period coincides with expectations regarding the Federal Reserve's (FED) tightening of monetary policy, which were also high. Following these expectations, the FED increased its policy interest rate by 25 basis points by lowering it to 0.25-0.50 on March 16, 2022. It is considered that the minimum values of the variables included in the study occurred due to the contraction in global economic activities during the relevant period and the beginning of a period in which the FED would tighten monetary policy because of occurring approximately two years after the spread of the global pandemic COVID-19 to Türkiye.

The average and standard deviation values of the dependent variables increase from small to large according to the size of the enterprise.

The maximum values of the independent variables GDP, CCI, and RSCI for the relevant period are 2023Q1, 2023Q1, and 2023Q2, respectively, while the minimum values of the relevant variables are 2020Q2, 2022Q2, and 2020Q2, respectively. Additionally, the minimum values of the relevant variables correspond to the times when the impact of the COVID-19 pandemic was intensely felt globally.

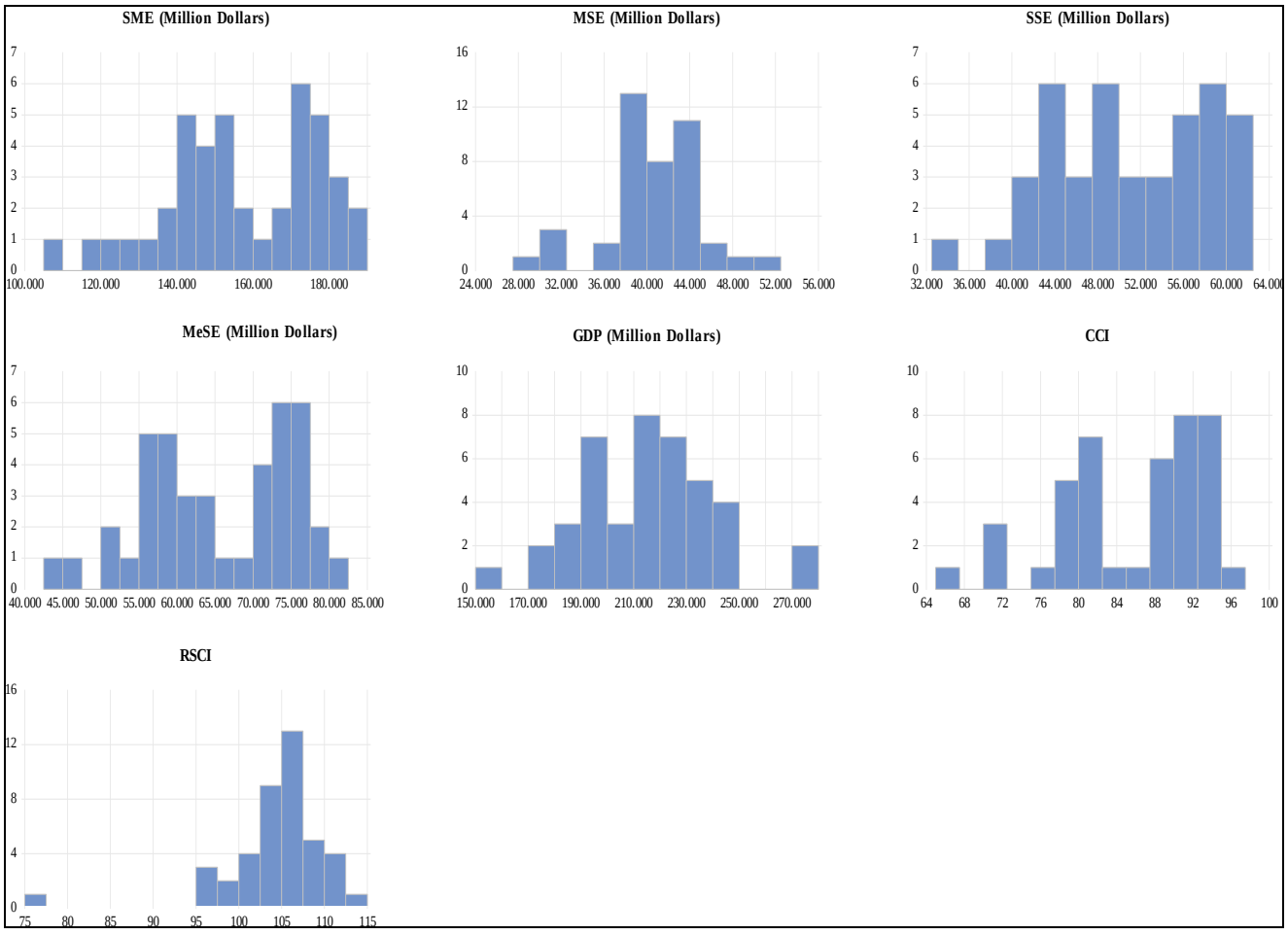
Skewness values for all variables in the relevant period except GDP are negative. In this context, it is observed that the variables are left-skewed and mostly clustered around the right tail. GDP values, on the other hand, are clustered around the left tail, opposite to the other variables. Kurtosis values are positive for all variables, indicating that the variables are steeper compared to a normal distribution. This phenomenon is clearly observed in the histogram graphs in **Graph 4**, parallel to the skewness and kurtosis values of the relevant variables. According to the Jarque-Bera (JB) normality test results, all variables except the RSCI variable exhibit the property of a normal distribution.

Table 6. Descriptive Statistics

	MSME (Million Dollars)	**MSE (Million Dollars)**	**SSE (Million Dollars)**	**MeSE (Million Dollars)**	**GDP (Million Dollars)**	**CCI**	**RSCI**
Mean	157.566,7	40.590,9	51.270,3	65.705,4	215.019,5	85,5	104,2
Maximum	185.966,5 *(2023Q2)*	50.352,8 *(2023Q1)*	62.382,0 *(2023Q2)*	80.210,8 *(2023Q2)*	275.840,1 *(2023Q1)*	95,3 *(2023Q1)*	112,5 *(2023Q2)*
Minimum	108.676,3 *(2021Q4)*	29.523,7 *(2021Q4)*	34.611,4 *(2021Q4)*	44.541,0 *(2021Q4)*	156.892,2 *(2020Q2)*	66,1 *(2022Q2)*	75,2 *(2020Q2)*
Standard Deviation	20.112,3	4.279,7	7.311,5	9.576,4	25.153,2	7,498	6,080
Skewness	-0,418	-0,449	-0,189	-0,322	0,179	-0,641	-2,688
Kurtosis	2,391	3,629	2,049	1,970	3,194	2,539	13,568
Jarque-Bera (JB)	1,873	2,109	1,832	2,584	0,291	3,252	**246,052*****
Probability	0,391	0,348	0,400	0,274	0,864	0,196	**0,000**
Observation	42	42	42	42	42	42	42

The notation *, **, and *** represent statistical significance at 10%, 5%, and 1%, respectively.

Graph 4. In The Relevant Study, Histograms of the Variables Used Were Created



4. METHODOLOGY

4.1. Extended (Augmented) Dickey-Fuller (ADF) and Phillips and Perron (PP) Unit Root Tests

Unit root test for the dependent variable y_t can be expressed according to the random walk model as shown in equation **(1)** (Sarıkovanlık, Koy, Akkaya, Yıldırım, & Kantar, 2020:17).

$$y_t = \mu + \Phi y_{t-1} + \varepsilon_t \quad \textbf{(1)}$$

Dickey and Fuller (1979) test the case where the coefficient Φ in Equation (3.13) equals 1 against the case that is less than 1. In this context, with $\psi = 0$ and $\Phi - 1 = \psi$, Dickey and Fuller (1979) have formulated the model numbered **(2)** to determine the unit root, where the test statistic of the model is calculated as $\frac{\psi}{SE(\psi)}$ and the term SE in the formulation represents the error term of the coefficient ψ.

$$\Delta y_t = \psi y_{t-1} + \varepsilon_t \quad \textbf{(2)}$$

To address the autocorrelation problem not considered in the unit root test developed by Dickey and Fuller (1979), lagged values of the dependent variable were added to the relevant model. Dickey and Fuller (1981) developed the ADF unit root test considering the autocorrelation problem.

The ADF unit root test is based on the estimates of equations **(3)**, **(4)** and **(5)**. Equation **(3)** represents the model without a constant and trend, equation **(4)** represents the model with a constant, and equation **(5)** represents the model with both a constant and trend.

$$\Delta y_t = \psi y_{t-1} + \sum_{i}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t \quad \textbf{(3)}$$

$$\Delta y_t = \mu + \psi y_{t-1} + \sum_{i}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t \quad \textbf{(4)}$$

$$\Delta y_t = \mu + \beta t + \psi y_{t-1} + \sum_{i}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t \quad \textbf{(5)}$$

The notation in models **(3)**, **(4)** and **(5)** is expressed as follows:

Δy_t	The first difference of the dependent variable
μ	Constant term
y_{t-1}	Lagged value of the dependent variable by one period
p	Represents the optimal lag length
t	Trend

The critical values for the ADF unit root test are the same as those for the DF unit root test (Çelik & Kahyaoğlu, 2021).

The unit root test developed by Phillips and Perron (1988) is a non-parametric unit root test that extends the assumptions about the distribution of errors (residuals) in the models created for the DF test. The PP unit root test is created by adding moving average (MA) terms to the ADF unit root test, which includes lagged values of the dependent variable (Çil, 2018; Çelik & Kahyaoğlu, 2021). The regression model for the PP test is shown in equation **(6)**.

$$y_t = \alpha y_{t-1} + \varepsilon_t \; (t = 1,2, \dots)$$

$$y_t = \hat{\mu} + \hat{\alpha} y_{t-1} + \hat{\varepsilon_t}$$

$$y_t = \tilde{\mu} + \tilde{\beta}\left(t - \frac{1}{2}T\right) + \tilde{\alpha} y_{t-1} + \varepsilon_t \quad \textbf{(6)}$$

In equation **(6)**, T and ε_t, respectively, represent the number of observations and the error process.

The PP test is developed under the assumption that the expected values of the error terms are 0, without requiring the absence of autocorrelation and changing variance problems in the error term. In this sense, the PP test allows for weakly distributed error terms and is less restrictive than the ADF unit root test (Çil, 2018).

Phillips and Perron (1988) derived test statistics and characterized their distributions to test hypotheses about the coefficients $\tilde{\mu}$, $\tilde{\beta}$, and $\tilde{\alpha}$. The critical values of the PP test statistics are the same as those of the DF unit root test. Suppose the critical value of the respective test statistic is exceeded. In that case, the null hypothesis that the series is non-stationary is rejected, and it is concluded that the series is stationary (Nedim, 2018).

4.2. ARDL Bounds Test

In this study, the ARDL model developed by Pesaran and Shin (1995), a suitable method for examining short- and long-term relationships between variables, is utilized. In this context, the bounds test developed by Pesaran, Shin, and Smith (2001) based on the ARDL model is employed.

Considering the advantages of the bounds test application, it was deemed suitable for determining the relationship between the relevant variables in this study. Applying the ARDL Bounds test provides three significant advantages for exploring relationships between variables (Çil, 2018). These advantages are as follows:

In the Engle-Granger (1987) cointegration test, series must be stationary and conducted based on stationary series. In the Johansen (1988) cointegration test, the variables can be applied when they are stationary at the first degree, or in other words, when the variables are at the I(1) level (Sarıkovanlık, et al., 2020). However, the bounds test can be applied regardless of whether the variables are stationary at I(0) or I(1) levels.

According to Monte Carlo simulations, the Boundary test provides better results for small samples than the Engle-Granger (1987) and Johansen (1989) cointegration tests.

Finally, the Boundary test allows for estimating both long and short-term coefficients.

Pesaran, Shin, and Smith (2001) established 5 models for the ARDL boundary test. These include models with no constant and trend, restricted constant and no trend, unrestricted constant and no trend, unrestricted constant and restricted trend, and unrestricted constant and unrestricted trend (Pesaran, Shin, & Smith, 2001:295-296). In the context of the ARDL model, the models to be established for detecting the interrelationship between variables are represented by models **(7)**, **(8)**, **(9)**, and **(10)**.

$$\Delta LnSME_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnSME_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \alpha_5 LnSME_{t-1} + \alpha_6 LnGDP_{t-1} + \alpha_7 LnCCI_{t-1} + \alpha_8 LnRSCI_{t-1} + \varepsilon_t \quad \textbf{(7)}$$

$$\Delta LnMSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnMSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSI_{t-i} + \alpha_5 LnMSE_{t-1} + \alpha_6 LnGDP_{t-1} + \alpha_7 LnCCI_{t-1} + \alpha_8 LnRSCI_{t-1} + \varepsilon_t \quad \textbf{(8)}$$

$$\Delta LnSSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnSSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \alpha_5 LnSSE_{t-1} + \alpha_6 LnGDP_{t-1} + \alpha_7 LnCCI_{t-1} + \alpha_8 LnRSCI_{t-1} + \varepsilon_t$$

(9)

$$\Delta LnMeSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnMeSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \alpha_5 LnMeSE_{t-1} + \alpha_6 LnGDP_{t-1} + \alpha_7 LnCCI_{t-1} + \alpha_8 LnRSCI_{t-1} + \varepsilon_t$$

(10)

In models **(7)**, **(8)**, **(9)**, and **(10)** the notation Δ represents first-order differences, while the notation k denotes the maximum lag length of variables in the models. The notation c_0 represents the deterministic constant coefficient in the models, α_{1i}, α_{2i}, α_{3i}, and α_{4i} represent the short-term parameters, and α_5, α_6, α_7, and α_8 represent the long-term parameters. Finally, ε_t denotes the error term representing the pure error process (Nkoro & Uko, 2016:80-81; Paudel & Jayanthakumaran, 2009:134-135; Pesaran, Shin, & Smith, 2001:291-296).

The null hypothesis (H_0) and the alternative hypothesis (H_1) regarding the absence or presence of cointegration in models **(7)**, **(8)**, **(9)**, and **(10)** are as follows:

$$H_0: \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0 \rightarrow No\ cointegration.$$

$$H_1: \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 \neq 0 \rightarrow Cointegration\ exists.$$

The relevant hypotheses are tested using the F-statistic. The F-statistics are compared with the significance levels derived asymptotically by Pesaran, Shin, and Smith (2001). If the calculated F-statistic falls below the lower bound, the null hypothesis H_0 cannot be rejected. If the relevant F-statistic exceeds the upper bound, the null hypothesis H_0 will be rejected, and the alternative hypothesis H_1 will be accepted. If the calculated F-statistic falls within the range of the lower and upper bounds, no interpretation can be made regarding the cointegration relationship (Esen, Yıldırım, & Kostakoğlu, 2012:256-263).

In case of rejecting the null hypothesis, models (**11)**, **(12)**, **(13)**, and **(14)**, are used for the analysis of the long-term relationship between the relevant variables.

$$LnSME_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} LnSME_{t-i} + \sum_{i=0}^{k} \alpha_{2i} LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} LnRSCI_{t-i} + \varepsilon_t$$

(11)

$$LnMSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} LnMSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} LnRSCI_{t-i} + \varepsilon_t$$

(12)

$$LnSSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} LnSSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} LnRSCI_{t-i} + \varepsilon_t$$

(13)

$$LnMeSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} LnMeSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} LnRSCI_{t-i} + \varepsilon_t$$

(14)

In models (**11**), **(12)**, **(13)**, and **(14)**, the explanatory variables $LnSME_{t-i}$, $LnMSE_{t-i}$, $LnSSE_{t-i}$, $LnMeSE_{t-i}$, $LnGDP_{t-i}$, $LnCCI_{t-i}$, and $LnRSCI_{t-i}$ represent the lagged values of respective variables. The terms c_0, ε_t, and k, respectively, represent the constant term, error term, and optimal lag length (Nkoro & Uko, 2016:82-83).

Error Correction Models (ECM) established for the analysis of short-term relationships between variables are shown in the following models denoted as **(15)**, **(16)**, **(17)**, and **(18).**

$$\Delta LnSME_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnSME_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \mu ECM_{t-1} + \varepsilon_t$$

(15)

$$\Delta LnMSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnMSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{5i} \Delta LnRSCI_{t-i} + \mu ECM_{t-1} + \varepsilon_t$$

(16)

$$\Delta LnSSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnSSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \mu ECM_{t-1} + \varepsilon_t$$

(17)

$$\Delta LnMeSE_t = c_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta LnMeSE_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta LnGDP_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta LnCCI_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta LnRSCI_{t-i} + \mu ECM_{t-1} + \varepsilon_t$$

(18)

In models **(15)**, **(16)**, **(17)**, and **(18)**, the term ECM_{t-1} represents the error correction term, while the notation μ denotes the error correction coefficient (ECC). This coefficient, in other words, indicates the speed at which the model converges to equilibrium in the long run.

5. EMPIRICAL FINDINGS

This section of the study presents the empirical findings from the ADF and PP unit root tests, as well as the ARDL bounds test. The empirical findings were obtained using Eviews 13.

5.1. Unit Root Test Results

One of the assumptions for the implementation of the ARDL bounds test is that the relevant variables are stationary at levels of I(0) or I(1). In this context, ADF and PP unit root tests were used to determine the stationarity levels of the variables used in the study. For the ADF and PP unit root tests, three models were applied: with constant, with constant and trend, and without constant and trend. The results of the ADF and PP unit root tests for the variables used in the study are presented in **Table 7**.

According to the results of the ADF and PP unit root tests, it was found that all relevant variables do not contain a unit root at the I(1) level, indicating they are stationary. Since none of the relevant variables have a stationary degree different from levels I(0) and I(1), the ARDL bounds test could be applied specifically to this study.

Table 7. ADF and PP Unit Root Test Results

	ADF Test Results						PP Test Results					
	I(0)			I(1)			I(0)			I(1)		
Variables	**C**	**C&T**	**Without C&T**	**C**	**C&T**	**Without C&T**	**C**	**C&T**	**Without C&T**	**C**	**C&T**	**Without C&T**
LnMSME	-2,1031	**-3,2077***	-0,0481	**-7,5087*****	**-7,4052*****	**-7,6109*****	-2,0269	**-3,2061***	-0,0488	**-7,5087*****	**-7,4052*****	**-7,6109*****
LnMSE	-3,2973**	**-3,4933***	0,2132	**-7,4798*****	**-7,3820*****	**-7,5663*****	**-3,3193****	**-3,5437****	0,2763	**-7,5291*****	**-7,4273*****	**-7,6190*****
LnSSE	-2,0189	-3,1283	-0,0324	**-7,6812*****	**-7,5739*****	**-7,7867*****	-1,9757	-3,099	-0,0324	**-7,6955*****	**-7,5867*****	**-7,8021*****
LnMeSE	-1,5173	-2,9747	-0.3052	**-7,1777*****	**-7,0819*****	**-7,2509*****	-1,4417	-2,9885	-0,3285	**-7,1828*****	**-7,0865*****	**-7,2509*****
LnGDP	-2,9202*	-2,8227	0,4623	**-2,7916***	**-7,7369*****	**-2,8241*****	**-2,9737****	-2,9133	0,4706	**-8,2716*****	**-9,9097*****	**-8,4488*****
LnCCI	-1,6338	-3,1304	-0,1864	**-5,8837*****	**-5,8803*****	**-5,9543*****	-1,5848	-2,1012	-0,1959	**-3,9480*****	**-3,8750****	**-4,0092*****
LnRSCI	-4,6875***	**-4,6311*****	-0,0796	**-6,7716*****	**-6,6825*****	**-6,8641*****	-1,7665	-2,1788	-0,1865	**-5,8835*****	**-5,8783*****	**-5,9541*****

The notations *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

- With constant (C)
- With constant and trend (C&T)
- Without constant and trend (Without C&T)

5.1. ARDL Bounds Test Results

The appropriate lag lengths for the ARDL models used in the study were determined using the Schwarz information criterion (SIC) (1978). The models established for the dependent variables LnMSE, LnSSE, LnMeSE, and LnMSME are as follows: ARDL (1, 0, 3, 0, 0)[3], ARDL (1, 0, 0, 0, 0), ARDL (1, 0, 0, 0, 0), and ARDL (1, 0, 0, 0). While the unrestricted constant and restricted trend model were applied to the dependent variable LnMeSE, the restricted and trendless models were applied to the other dependent variables. Additionally, the lower and upper critical values established by Narayan (2004) for relatively small samples (with observation counts of 30 and 80) were utilized in the study. The critical values were determined based on the ones closest to the sample size of the study.

Table 8 presents the results of the ARDL bounds tests. Upon examining the F statistics associated with the models in the table, it is observed that the F statistic values for all models are higher than the I(1) critical values at the 5% significance level. In this context, the null hypothesis (H_0), indicating no cointegration relationship among the relevant variables in the models, is rejected, and the alternative hypothesis (H_1), indicating the existence of a cointegration relationship among the relevant variables, is accepted.

Table 8. ARDL Bounds Test Results

ARDL (1, 0, 3, 0, 0) Model Results					
Dependent Variable	**Number of Independent Variables**	**Sample Size**	**F-statistic**	**Lower Bound I(0)**	**Upper Bound I(1)**
LnMSE	4	41	**6,8613****	3,967	5,455
ARDL (1, 0, 0, 0, 0) Model Results					
Dependent Variable	**Number of Independent Variables**	**Sample Size**	**F-statistic**	**Lower Bound I(0)**	**Upper Bound I(1)**
LnSSE	4	41	**4,414****	2,893	4
ARDL (1, 0, 0, 0, 0) Model Results					
Dependent Variable	**Number of Independent Variables**	**Sample Size**	**F-statistic**	**Lower Bound I(0)**	**Upper Bound I(1)**
LnMeSE	4	41	**5,382****	3,512	4,587
ARDL (1, 0, 0, 0) Model Results					
Dependent Variable	**Number of Independent Variables**	**Sample Size**	**F-statistic**	**Lower Bound I(0)**	**Upper Bound I(1)**
LnMSME	3	41	**5,929****	4,31	5,544

The notations *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

[3] The optimum lag lengths determined for the respective dependent variables and the independent variables LnGDP, LnCCI, LnRSI, and Dummy Variable are shown in parentheses.

After detecting the cointegration relationship in **Table 8**, an ARDL long-run model was constructed for the analysis of the long-term relationship between the relevant variables.

When examining the long-term coefficients in **Table 9**, it is observed that the independent variables LnGDP and LnCCI positively affect the dependent variables. In contrast, the variable LnRSCI has a negative effect. Among these coefficients, only the coefficients related to the LnCCI variable are statistically significant. LnMSE, LnSSE, LnMeSE

The dummy variables included in the models for LnMSE, LnSSE, and LnMeSE dependent variables are found to negatively impact the respective dependent variables. While the coefficients of the dummy variables in the models for LnSSE and LnMeSE dependent variables are statistically significant, the coefficient associated with the dummy variable in the model for the LnMSE dependent variable is statistically insignificant.

A notable finding in **Table 9** is that the CCI has a significantly positive impact on all MSME credit volumes measured on a scale basis in the long term, while the RSCI has a negative impact. Additionally, the GDP variable positively affects MSME credit volumes, which is consistent with the literature and expectations.

Furthermore, the fact that the error terms of the relevant regression models in **Table 9** fall within a specific confidence interval indicates that the parameters in these models are stable within the respective period. To verify the stability of these coefficients, cusum and cusum^2 tests developed by Brown, Durbin and Evans (1975) were applied to the models presented in **Table 9**. The results of these tests are shared in **Graph 5**. The red dashed lines in the graphs in **Graph 5** represent the 95% confidence intervals, while the solid blue lines represent the error terms obtained from the long-term ARDL model. Accordingly, based on the graphs in **Graph 5**, it can be concluded that the parameters of the relevant models remain stable within the respective time interval.

Table 9. Long-Run Coefficients of the Respective ARDL Models

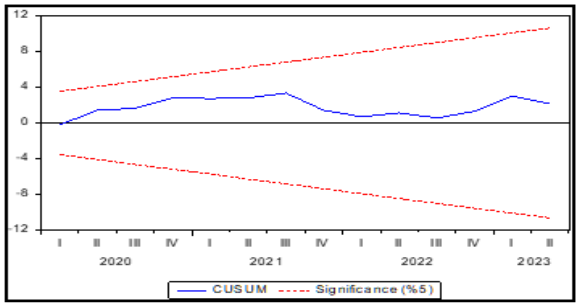
ARDL (1, 0, 3, 0, 0) Model Long-Run Coefficients (Dependent Variable: LnMSE)		
Variables	**Coefficient**	**T-stats**
Constant	10,095	**3,941****
LnGDP	-0,109	-0,767
LnCCI	0,694	**4,221*****
LnRSCI	-0,099	-0,443
Dummy_variable[4]	-0,019	-0,529
ARDL (1, 0, 0, 0, 0) Model Long-Run Coefficients (Dependent Variable: LnSSE)		
Variables	**Coefficient**	**T-stats**
Constant	5,025	**1,832***
LnGDP	0,113	-0,767
LnCCI	1,164	**4,221****
LnRSCI	-0,327	-0,443
Dummy_variable	-0,100	**-0,529****
ARDL (1, 0, 0, 0, 0) Model Long-Run Coefficients (Dependent Variable: LnMeSE)		
Variables	**Coefficient**	**T-stats**
Trend	-0,002	-1,408
LnGDP	0,082	-0,686
LnCCI	1,060	**4,671*****
LnRSCI	-0,214	-0982
Dummy_variable	-0,092	**-2,549****
ARDL (1, 0, 0, 0) Model Long-Run Coefficients (Dependent Variable: LnMSME)		
Variables	**Coefficient**	**T-stats**
Constant	4,834	**2,442****
LnGDP	0,179	1,432
LnCCI	1,231	**7,975****
LnRSCI	-0,384	-1,560

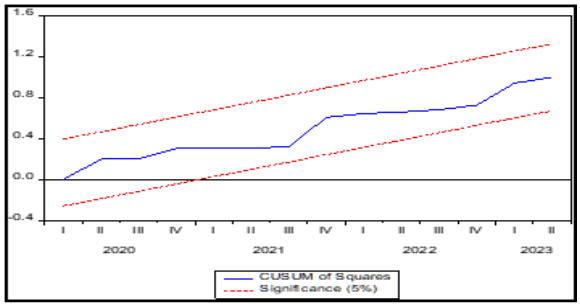
The notations *, **, and *** represent statistical significance at 10%, 5%, and 1%, respectively.

[4] The coefficients obtained from the ARDL models constructed without dummy variables were unstable based on the cusum and cusum^2 tests applied for the relevant period. Consequently, dummy variables were added to the models and reconstructed. These dummy variables take 1 from Q4 2019 to Q4 2021 and 0 for other periods. The periods where these dummy variables take the value of 1 correspond to the onset of the COVID-19 virus outbreak globally (November 2019, Wuhan, China) and the periods when the measures and restrictions taken globally to prevent the spread of the virus started to decrease. Additionally, it can be clearly observed in **Graph 3**.Quarterly MSME Bank Loan Volume by Scale (2013Q1-2023Q2) that MSME bank loans were on a declining trend during these periods.

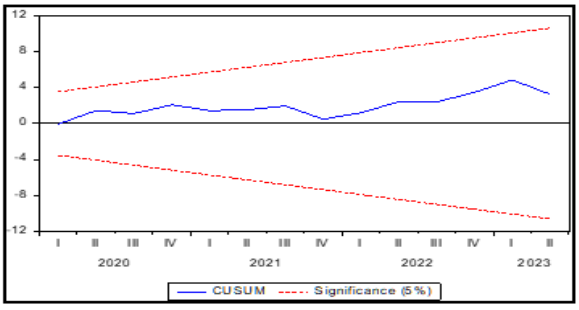
Graph 5. Plots of the Cusum and Cusum Square

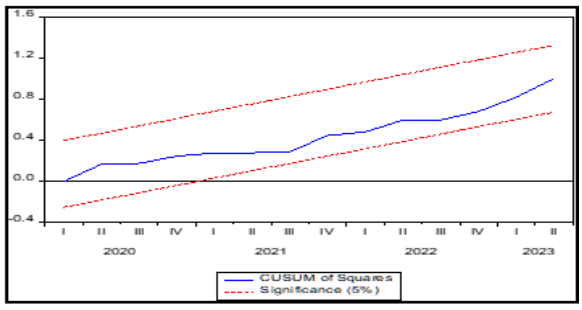
Plots of the Cusum and Cusum^2 for the ARDL (1, 0, 3, 0, 0) Model (Dependent Variable: LnMSE)



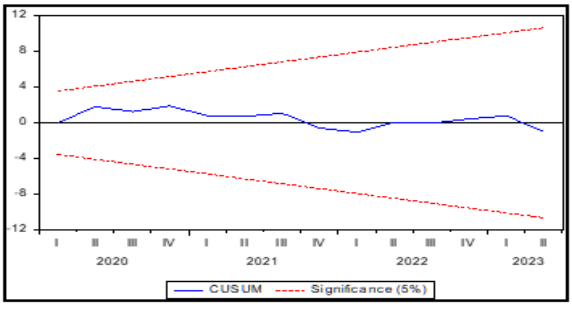


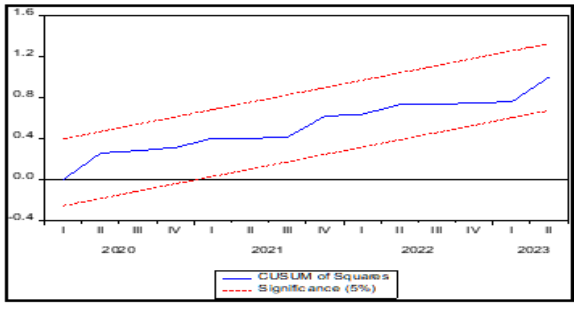
Plots of the Cusum and Cusum^2 for the ARDL (1, 0, 0, 0, 0) Model (Dependent Variable: LnSSE)



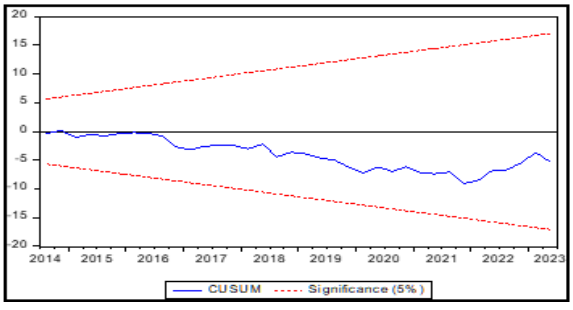


Plots of the Cusum and Cusum^2 for the ARDL (1, 0, 0, 0, 0) Model (Dependent Variable: LnMeSE)





Plots of the Cusum and Cusum^2 for the ARDL (1, 0, 0, 0) Model (Dependent Variable: LnSME)



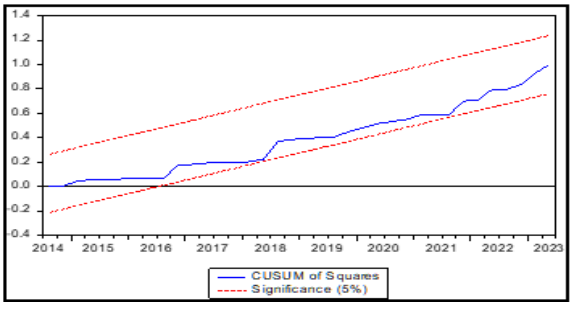


Table 10 presents the coefficients obtained from the ECM used to examine short-term relationships, along with the diagnostic test results. For the ECMs established for the ARDL models to be valid, the ECM coefficients should fall between -1 and 0 and be statistically significant. In this regard, **Table 10** observes that the ECM coefficients fall within the range of -1 and 0 and are statistically significant. The results indicate that the ECMs are functioning correctly and validate the cointegration relationships identified through the respective ARDL models.

When examining the short-term coefficients for the dependent variable LnMSE in **Table 10**, it is evident that the ECM coefficient is very close to -1 with a value of -0.993. In absolute terms, -0.993 is considerably higher than the ECM coefficients in other models. Thus, within the framework of the ARDL model established for the dependent variable LnMSE, it can be observed that shocks or deviations occurring in the short term between the variables will converge to equilibrium approximately one[5] quarter later. In other words, deviations from equilibrium in the short term will dissipate by approximately 99.3% in the next period. Additionally, in the ECM established for LnMSE, it is observed that the current period, as well as the lagged one and two periods, have a positive and statistically significant effect on LnMSE.

In the ECMs established for LnSSE, LnMeSE, and LnMSME, the ECM coefficients are -0.693, -0.759, and -0.793, respectively. It is observed that the short-term shocks' effects for LnSSE, LnMeSE, and LnMSME will dissipate after approximately 1.44, 1.31, and 1.26 quarters, respectively.

Moreover, **Table 10** contains the diagnostic tests for all ARDL models established in this study. The error correction terms are normally distributed, and there are no issues with autocorrelation or heteroscedasticity. Additionally, according to the Ramsey Reset test results, the respective models have no specification errors.

[5] $\left(\frac{1}{|-0{,}993|} \cong 1\right)$

Table 10. Short-Run Coefficients of the Respective ARDL Models

ARDL (1, 0, 3, 0, 0) Model Short-Term Coefficients (Dependent Variable: LnMSE)		
Variable	**Coefficient**	**T-stats**
ECT	-0,993	**-6,930*****
D(LnCCI)	1,160	**4,585*****
D(LnCCI(-1))	0.937	**3,425*****
D(LnCCI(-2))	0.571	**1,961***
Diagnostic Test Results		
Normality		0,396
JB		(0,820)
Autocorrelation		4,098
Breusch-Pagan-Godfrey LM		(0,128)
Heteroscedasticity		8,663
Breusch-Pagan-Godfrey Test		(0,371)
Specification		2,075
Ramsey Reset Test		(0,160)
Adjusted R-squared		0,635
ARDL (1, 0, 0, 0, 0) Model Short-Term Coefficients (Dependent Variable: LnSSE)		
Variable	**Coefficient**	**T-stats**
ECT	-0,693	**-5,501*****
Diagnostic Test Results		
Normality		2,140
JB		(0,342)
Autocorrelation		0,178
Breusch-Pagan-Godfrey LM		(0,914)
Heteroscedasticity		3,176
Breusch-Pagan-Godfrey Test		(0,672)
Specification		0,229
Ramsey Reset Test		(0,635)
Adjusted R-squared		0,43
ARDL (1, 0, 0, 0, 0) Model Short-Term Coefficients (Dependent Variable: LnMeSE)		
Variable	**Coefficient**	**T-stats**
ECT	-0,759	**-6,086*****
Constant	4,446	**-6,081*****
Diagnostic Test Results		
Normality		5,578
JB		(0,061)
Autocorrelation		0,657
Breusch-Pagan-Godfrey LM		(0,719)
Heteroscedasticity		6,781
Breusch-Pagan-Godfrey Test		(0,341)
Specification		1,134
Ramsey Reset Test		(0,294)
Adjusted R-squared		0,474
ARDL (1, 0, 0, 0) Model Short-Term Coefficients (Dependent Variable: LnMSME)		
Variable	**Coefficient**	**T-stats**
ECT	-0,793	**-5,739*****
Diagnostic Test Results		
Normality		2,044
JB		(0,359)
Autocorrelation		0,165
Breusch-Pagan-Godfrey LM		(0,920)

Heteroscedasticity	5,629
Breusch-Pagan-Godfrey Test	(0,228)
Specification	0,200
Ramsey Reset Test	(0,657)
Adjusted R-squared	0,451

The notations *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

5. CONCLUSION

The main actors in today's industrial economy are households, businesses, and the state, which acts as a regulatory authority (Shaun, 2015). In this context, businesses within economic units play a crucial role as producers of goods and services. Globally, as well as in Türkiye, most businesses are represented by MSMEs. Approximately 99.7% of businesses in Türkiye are classified as MSMEs. This fact alone underscores how valuable MSMEs are for Türkiye.

In this study, the importance of MSME bank loans in the world and Türkiye, and their interaction with GDP, CCI, and RSCI were empirically examined using the ARDL bounds test. As a result of the empirical findings, a long-term interaction was found between bank loans to micro, small, and medium-sized enterprises and GDP, CCI, and RSCI.

Bank loans to micro-enterprises were found to be negatively affected by GDP, whereas GDP positively influenced loans to SMEs. Given that micro-enterprises contribute more to employment compared to other-sized enterprises, the importance of government support and incentive programs for micro-enterprises in periods of GDP growth becomes evident. Moreover, it is thought that with their innovative perspectives within the economy, micro-enterprises added value will surpass the incentives and support programs provided, leading to further economic growth.

The CCI, which interacts with MSME bank loans, was found to have a positive effect on all sizes of MSME loans. With positive expectations about future economic conditions, consumers may increase their demand for bank loans to invest in their businesses, leading to the observed positive relationship between MSME bank loans and CCI.

Conversely, RSCI was found to have a negative effect on MSME loans in the long run. This negative effect may be attributed to the positive expectations of representatives from the real sector about the future economic situation, leading to a decrease in MSMEs' demand for bank loans.

In addition, a dummy variable representing the period from 2019:Q4 to 2021:Q4 was added to the ARDL models for MSMEs. As a result, a negative effect of this period on bank loans to MSMEs was found. This period coincides with the severe impact of the global COVID-19 pandemic. The negative effect of this period on bank loans to MSMEs may stem from both demand and supply-side decreases in bank loans. Economic disruptions, such as disruptions in production and supply chains during this global pandemic, have created numerous problems. Given that MSMEs are more vulnerable than large enterprises, government support and incentive programs aimed at MSMEs during such economic crises may yield positive results.

Many government support and incentive programs exist for MSMEs worldwide and in Türkiye. Considering the necessity of MSMEs for sustainability, it is inevitable that they always need such programs due to the problems they face in accessing finance. These support and incentive programs are granted based on many criteria, such as the sector in which the business operates, the business's size, and the business's income. In addition to these criteria, the timing of the relevant support and incentive programs may also be critical, as suggested by the empirical findings of this study.

Based on the empirical findings obtained in the study, some policy recommendations and example scenarios for MSMEs have been presented below, according to GDP and CCI.

During periods of GDP decline, public support measures such as increasing credit guarantee funds or interest rate reductions can be provided to MSMEs. Additionally, based on this study's empirical findings, it is suggested that policies should focus more on micro-sized enterprises during periods of GDP growth, considering that micro-sized business bank loans tend to decrease when GDP is rising.

Scenario 1: Impact of GDP Decline on MSMEs

In 2024, the country's economy enters a severe recession, and GDP begins to shrink. During this period, MSMEs need help to secure financing and avoid significant challenges in obtaining bank loans. Small businesses ' access to bank loans is minimal as banks implement more cautious lending policies to reduce risk.

The government takes steps to address this issue by implementing public support measures such as increasing credit guarantee funds and offering interest rate reductions. These measures make it easier for micro-sized enterprises to access bank loans. Additionally, to increase short-term access to finance for micro enterprises, the volume of credit guarantee funds is increased, and low-interest loan options are offered.

Scenario 2: Impact of GDP Increase on MSMEs

By 2025, the national economy will recover, and GDP will rise. Consumer confidence will improve, and real sector confidence will be revived. During this period, micro-sized enterprises will demand more credit and become more willing to invest. However, the volume of micro-business bank loans is expected to decrease compared to the previous low period, as banks, driven by higher profit expectations, may focus more on larger enterprises.

Based on the empirical findings, it would be more beneficial for public support programs to focus on micro-sized enterprises during periods of GDP growth. Specifically, when GDP rises, it is crucial to implement support programs that help micro-enterprises overcome financing challenges. These programs, through measures such as interest rate reductions, low-cost loans, and investment incentives, can provide financial support to micro-enterprises, helping them contribute more effectively to economic growth.

The decline in CCI signals weaker consumer spending and increased uncertainty in business conditions. During periods when there is a decline in the CCI, similar to periods of GDP decline, public support measures such as increasing credit guarantee funds or offering interest rate reductions can be provided to MSMEs. Despite the decline in consumer confidence limiting access to credit, MSMEs can overcome these challenges through government support measures such as increased credit guarantee funds and reduced interest rates. With more favorable financing terms, MSMEs can continue their operations effectively. Banks, encouraged by government-backed guarantees, become more willing to lend.

According to the empirical findings, it has been observed that RSCI negatively affects the volume of MSME bank loans compared to the other two macroeconomic factors, GDP and CCI. The policies to be implemented could be similar to those applied during periods of decline in GDP and CCI, but specifically during periods of RSCI increase. It is also crucial to assess whether the decrease in MSME bank loan volumes is negative or not. Because the contraction in MSME bank loan volumes during RSCI increase may not have a negative impact on MSMEs, the contraction in MSME bank loan volumes during periods of RSCI increase may be due to the following situations:

- An increase in the Real Sector Confidence Index indicates that the real sector has more confidence and that economic conditions are improving. In such a situation, MSMEs may need to borrow less. When RSCI is high, MSMEs, anticipating general economic improvement and higher demand, may prefer to take on less risk. With the rise in economic confidence, MSMEs often seek external financing not from local banks but through investors and capital markets. This can reduce the demand for bank loans.

- In periods when large investors and venture capital funds show more interest, MSMEs may prefer alternative financing sources over bank loans. If the rise in RSCI signals accelerated economic growth and high

growth expectations, banks may offer lower interest rates. This could reduce borrowing rates, as MSMEs may turn to alternative financing options instead of taking loans at higher interest rates.

- Furthermore, with the increase in RSCI, MSMEs may perceive a more stable market environment, which could shift their risk-taking preferences. Risk-averse businesses may prefer to remain less indebted and seek lower-cost financing, resulting in reducing demand for bank loans.

In future studies on factors affecting MSME bank loans, examining interactions with factors other than GDP, CCI, and RSCI may be beneficial. Furthermore, including different countries in the study and applying econometric methods other than the ARDL bounds test could enrich the literature.

Ethics Committee Declaration
Ethics committee declaration is not required for the study.

Author Contribution Rate Declaration
The entire study was written by Yunus Emre YILDIRIM.

Conflict Statement
There is no conflict of interest between the authors.

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