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The impact of service and consumer confidence indices on service production

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Abstract

This study aims to draw conclusions about social welfare through service production and confidence indices, based on the increasing share of the service sector in the total economy. To this end, the effects of service confidence and consumer confidence on service production in Türkiye have been examined. In this study, an ARDL bounds test was applied using monthly data on the service confidence index, consumer confidence index, and service production index obtained from the Turkish Statistical Institute for the period 2018:01–2024:11.The study estimated the long- and short-run causal relationships among the variables and the coefficients of the error correction model. According to the long-run findings, service production was negatively affected by an increase in consumer confidence but positively affected by an increase in service confidence; in the short run, service confidence was found to have a strong effect on service production, while consumer confidence had a weak effect. The findings indicate that consumer confidence and service confidence have different effects on service production, demonstrating that trust is not one-dimensional in market systems. The results show that service production is shaped by institutional trust and consumer expectations, in addition to income and demand determinants. Furthermore, it points to the importance of trust for sustainable production growth in the service sector.

Keywords: Service Confidence, Consumer Confidence, Macro Marketing, ARDL Boundary Test

Hizmet ve tüketici güven endekslerinin hizmet üretimine etkisi

Öz

Bu çalışma, hizmet sektörünün toplam ekonomi içerisindeki artan payından hareketle, hizmet üretimi ve güven endeksleri aracılığıyla toplumsal refaha ilişkin çıkarımlarda bulunmayı amaçlamaktadır. Bu amaç doğrultusunda Türkiye'de hizmet güveni ve tüketici güveninin hizmet üretimi üzerindeki etkileri incelenmiştir. Çalışmada, 2018:01–2024:11 dönemi için Türkiye İstatistik Kurumu'ndan (TÜİK) alınan hizmet güven endeksi, tüketici güven endeksi ve hizmet üretim endeksi aylık verileri kullanılarak ARDL sınır testi uygulanmıştır. Çalışmada, değişkenler arasındaki uzun ve kısa vadeli nedensel ilişkiler ile hata düzeltme modelinin katsayıları tahmin edilmiştir. Uzun vadeli bulgulara göre, hizmet üretimi tüketici güvenindeki artıştan olumsuz etkilenirken, hizmet güvenindeki artıştan olumlu etkilenmiştir. Kısa vadede ise hizmet güveninin hizmet üretimi üzerinde güçlü bir etkiye sahip olduğu, tüketici güveninin ise zayıf bir etkiye sahip olduğu bulunmuştur. Elde edilen bulgular tüketici güveni ve hizmet güveninin hizmet üretimi üzerinde farklı etkiler meyda getirdiğini ve bu durumun pazar sistemlerinde güvenin tek boyutlu bir yapı olmadığını ortaya koyduğunu göstermektedir. Sonuçlar ayrıca, hizmet üretiminin gelir ve talep belirleyicilerine ek olarak kurumsal güven ve tüketici beklentileri tarafından şekillendiğini göstermekte; hizmet sektöründe sürdürülebilir üretim artışı için güvenin önemine işaret etmektedir.

Anahtar Kelimeler: *Hizmet Güveni, Tüketici Güveni, Makro Pazarlama, ARDL Sınır Testi*

INTRODUCTION

Macro-marketing is a field that examines which products and services are produced and sold, as well as the mutual interaction between marketing systems and society. It considers economic and social systems as a whole. Hunt (1981) defines macro-marketing as the study of marketing systems, the effects and consequences of marketing systems on society, and the effects and consequences of society on marketing systems. Layton (2007) has treated the marketing system as a fundamental concept of macro-marketing and emphasized its complex and holistic nature. Consequently, the macro-marketing approach emphasizes that economic indicators must be evaluated not only at the micro level but also in terms of social welfare, quality of life, and sustainability. Economic confidence indicators measure households' and businesses' perceptions and expectations regarding economic conditions and provide the ability to make forward-looking predictions.

The service sector, which enhances the standard of living in societies, is expanding its product range and increasing its production volume day by day, in tandem with rapid advancements in manufacturing, communication, and information

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technologies. Factors such as the effects of globalization, the rise in female employment, increasing household income, technological advancements, changing individual preferences and needs, the influence of social media, and the emergence of a consumption-driven social structure have all contributed to increased demand for the service sector. With this growing demand, the service sector—which holds a significant share in both employment and value added in the economies of developed and developing countries—must continuously renew and diversify its marketing strategies to influence consumer preferences in a highly competitive environment.

Services, defined as an activity that is abstract, non-storable, does not result in ownership, and therefore cannot be transferred, hold a significant share within national economies and constitute an increasingly larger proportion of economic activities as economies develop (Kotler & Keller, 2012, p. 5). In our country, the sector, which accounts for approximately 55% of GDP, forms the foundation of the economy through its contribution to foreign exchange inflows, employment, and the value added it generates (T.C.Ticaret Bakanlığı, 2026). An increase in the share of the service sector in a country's economy will lead to growth in production, consumption, employment, and trade volume, as well as the development of other sectors producing intermediate goods, thereby fostering economic growth. Parallel to economic growth, the rise in per capita income and, consequently, household income will increase individuals' demand for the services sector. (Özgün, 2023, p. 74). The services sector operates across a diverse and broad spectrum, including communication, transportation, logistics, entertainment, culture, and tourism. Market demand for services—which are consumed at the moment of production—and consequently service production provide insights into consumers' habits and economic well-being. This study examines the impact of service confidence and consumer confidence on service production in Türkiye using monthly data covering the period from 2018:01 – 2024:11 and the ARDL boundary test. Economic confidence indicators measure households' and businesses' perceptions and expectations regarding economic conditions and provide insights into future trends. The study utilized the Service Confidence Index to represent service confidence, the Consumer Confidence Index to represent consumer confidence, and the Service Production Index to represent service production. The service confidence index is calculated through a trend survey designed to measure current conditions and expectations regarding the near future in the service sector (Ergin Ünal & Süsay, 2021). It is an indicator used to assess the overall performance of service activities in an economy, measuring the assessments of businesses operating in the service sector regarding their current conditions and short-term expectations. The index generally provides information on the overall outlook of the service sector, the sector's stability, and growth potential, and reflects consumers' confidence in the sector. Demirel and Artan (2017) noted that the services sector confidence index accounts for 30% of the Economic Sentiment Indicator, which assesses the six-month economic outlook for the Eurozone and is published by the European Commission's Directorate-General for Economic and Financial Affairs. This proportion underscores the undeniable importance of the index's share within the overall economy. In our country, the Service Confidence Index, developed within the framework of trend surveys conducted by the Turkish Statistical Institute and the Central Bank of the Republic of Türkiye, is used. However, since the service confidence index is constructed using limited data, it is not considered sufficient on its own to explain sectoral and general economic conditions. For this reason, when reviewing the literature on the service confidence index, it is most often evaluated in conjunction with the consumer confidence index. The Consumer Confidence Index is defined as "an indicator summarizing the responses to various questions in the Consumer Sentiment Survey, which is conducted to monitor consumers' assessments of their personal financial situation and the general economy, as well as their spending and saving trends" (Zeybek et al., 2023). A consumer confidence index, which ranges from 0 to 200, indicates that a reading above 100 suggests consumers have a positive outlook on the future and are inclined to spend, while a reading below 100 indicates they are more cautious and inclined to save (TÜİK, 2026). The Service Confidence Index and the Consumer Confidence Index provide important insights into the performance of the economy's service sector and consumers' economic expectations. The Consumer Confidence Index can influence consumers' interest in shopping, which directly impacts business operations, the industry, and consequently the economic growth rate (Ilmiah & Wonoseto, 2021). The service production index, on the other hand, is defined as a business indicator measuring monthly changes in price-adjusted output across service sectors, excluding financial and public services (Eurostat, 2005). The index covers service activities listed under NACE (Rev. 2) codes H–N (excluding K), including transportation and storage, accommodation and food service activities, information and communication, real estate activities, professional, scientific, and technical activities, veterinary services, and administrative and support service activities. It aims to calculate the volume of output produced during a specific period and is therefore adjusted for price effects.

According to the Inflation Report 2024-II, the share of value added from services in national income was approximately 57% between 1998 and 2023, while spending on services accounted for roughly half of final household consumption (an average of 45.9% for the 2009–2023 period) (TCMB, 2024). According to the Inflation Report 2025-III, it was reported that the services sector continues to be the primary driver of annual growth from a production perspective (TCMB, 2025). The production volume in sectors active across a wide range of fields—such as education, health, entertainment, tourism, food and beverage, logistics, information technology, transportation, and communication—provides important insights into consumers' habits, lifestyles, and economic well-being.

Aiming to encourage ideas that serve the public interest in a way that benefits both society and the sectors represented by marketing (Dziak, 2025), macro-marketing—which focuses on social responsibility and economic development (Hunt, 1981)—analyzes marketing systems based on the market and the voluntary exchange of economic goods, rather than individual consumers or firms. (Mittelstaedt et al. 2006; Layton, 2011). The Consumer Confidence Index and the Services Confidence Index,

which reflect the psychological state of the supply and demand sides of the marketing system, are indicators that reflect participants' expectations for the future.

The macro-marketing approach takes into account both the structural and functional components of marketing systems. Within this framework, confidence indices are among the factors that shape participants' expectations for the future. In their studies examining the developmental stages of macro-marketing, Layton (2007) and Hunt et al. (2021) highlight factors such as economic development, quality of life, and market efficiency. This holistic perspective ensures that confidence indicators are evaluated as an integral part of the marketing system. From this perspective, it is believed that analyzing service-oriented consumption trends and service production will be effective in developing marketing strategies and making macroeconomic policy decisions.

The following sections of this study present a literature review on the subject. Additionally, the data to be used in subsequent sections, the model established based on these data, and the methodology will be explained, with the results presented in the final section. Finally, conclusions and an evaluation are drawn based on the findings.

LITERATURE

The effects of consumer and service confidence on economic activities have become a significant area of research, particularly given the service sector's increasingly larger share of the economy. Below, studies that directly or indirectly resemble the subject of this study—primarily those using primary data—are first presented, followed by a compilation of studies utilizing secondary data.

In the compiled studies, variables were analyzed using various methods and tests. Among the studies using primary data, Rinaldi et al. (2022) investigated the effect of service and consumer confidence on consumer loyalty. The study concluded that service and consumer confidence have a significant and positive effect on consumer loyalty. Instead of conceptualizing consumer confidence as a single construct, Hampson et al. (2021) distinguished between national consumer confidence and personal consumer confidence; they examined the psychological mechanisms through which consumer confidence influences consumer behavior. They concluded that personal consumer confidence mediates the relationship between national consumer confidence and perceived financial fragility, and that this leads to an increase in price-conscious behavior among consumers. Voorhees et al. (2020) investigated the effects of variability in service quality on consumer confidence and concluded that variability in a service relationship negatively affects consumer confidence. In studies using secondary data, Eyüboğlu and Eyüboğlu (2018) examined the relationship between the service confidence index and the sub-indices of the service sector within the BIST in Türkiye. According to the test results, they found that there was cointegration only between the service confidence index and the BIST Tourism sub-index, that the tourism sub-index was correlated with service confidence, and that an increase in confidence positively affected the tourism sub-index. The findings also revealed a bidirectional causal relationship between service confidence and the tourism index. In their study, Ergin Ünal and Süsay (2021) investigated the relationships between confidence indices, economic growth, and tourism revenues. The study utilized monthly data on tourism sector revenues alongside indices related to service confidence, consumer confidence, and industrial production. According to the research findings, there is a causality from service confidence to tourism revenues and industrial production. Additionally, they concluded that tourism revenues influence industrial production. In her study on confidence indices covering the period from May 2012:05–2020:9, which includes the COVID-19 pandemic, Kılcı (2021) analyzed trends in confidence indicators, including consumer, financial services, and real sector confidence indices. He concluded that confidence indicators exhibited varying patterns over time and that each index followed a unique trajectory during the normalization process. In their study, Zeybek et al. (2023) examined the relationships between the BIST Services Index, service revenues, the service producer price index, direct foreign investments in the service sector, U.S. dollar and Euro exchange rates, and the service confidence index. According to the results of the study, a reciprocal causal relationship was found between confidence in the service sector and service revenues; it was also found that exchange rates for the euro and the U.S. dollar are influenced by confidence in the service sector when it comes to direct investments in the sector. They concluded that the BIST services sector also influences service confidence. Yamak et al. (2019) examined the effect of the consumer confidence index in both the short- and long-term using data on real income, interest rates, inflation, real consumption expenditures, and the consumer confidence index. According to the study's findings, they determined that the consumer confidence index could explain household consumption expenditures in both the short and long term. Baştürk (2019) investigated the potential relationship between the consumer confidence index and the BIST-100 index in Türkiye. The results of the study indicate that no relationship was found between consumer confidence and the BIST-100 index in the long term. In the short term, however, a unidirectional causality was found, with a directional flow from the BIST-100 index to consumer confidence. Layton (2009) examined the link between marketing systems and economic growth and quality of life; he demonstrated that sufficiently developed marketing systems are a critical factor in supporting economic growth and creating prosperity.

DATA AND METHODOLOGY

Data and research model

This study aims to determine the relationship between the service production index, the service confidence index, and the consumer confidence index using monthly data from Türkiye for the period 2018:01–2024:11. Data for the Service Production Index (SPI), Consumer Confidence Index (CCI), and Service Confidence Index (SCI) were obtained from the official website of

the Turkish Statistical Institute, and the data set was constructed by taking the logarithms of the data. Information regarding the variables is presented in Table 1.

Table 1. Description of variables

Variables	Description	Period	Source
LHUE	Service Production Index	2018:01 – 2024:11	Turkish Statistical Institute
LTGE	Consumer Confidence Index	2018:01 – 2024:11	Turkish Statistical Institute
LHGE	Service Confidence Index	2018:01 – 2024:11	Turkish Statistical Institute

The equation for the model 1 used in the analysis is as follows:

$$LHUE_t = \beta 0 + \beta 1 LTGE_t + \beta 2 LHGE_t + \varepsilon t \quad (1)$$

In the model, $\beta 0$ represents the constant term; LHUE represents the service production index; LTGE represents the consumer confidence index; and LHGE represents the service confidence index. Additionally, L indicates that the logarithms of the variables are taken; t = 1,2,3, … , n denotes the time dimension; and εt denotes the error term.

Methodology

Phillips-Perron (1988) and Kwiatkowski-Phillips-Schmidt-Shin (1992) Unit Root Tests

In time series analysis, the stationarity of the series must first be determined before any analysis can be conducted. By determining the levels at which the series are stationary—in other words, the absence of a unit root—it is ensured that the effects of potential shocks in the series do not lead to misleading results. In this study, the Phillips-Perron (1988) and Kwiatkowski-Phillips-Schmidt-Shin (1992) unit root tests will be conducted to determine the levels of stationarity.

The Phillips-Perron (1988) test is a more flexible test that does not consider the error term restriction. In its simplest form, the Phillips-Perron test is modeled as an AR(1) process, as shown in Model 2.

$$y_t = \mu + \alpha y_{t-1} + \varepsilon_t$$
$$(1 - \alpha L) y_t = \mu + \varepsilon_t \quad (2)$$

In the model, t = 1, 2, ..., T, and a unit root of 1/α is identified for the model. The fact that α equals one indicates the presence of a unit root in the series. The Phillips-Perron unit root test yields a distribution of T(α-1).

The hypotheses being tested are stated as:

H_0: The series have a unit root (non-stationary);

H_1: The series have no unit root (stationary).

The tests are repeated until the level at which the series are stationary is determined, and the process continues by taking the difference of the series.

The Kwiatkowski-Phillips-Schmidt-Shin (1992) unit root test (KPSS) is designed based on a non-parametric estimate of the long-run variance of the residuals (Çağlayan & Saçaklı, 2006, p. 124). In this test, the null hypothesis and alternative hypothesis are the opposite of those in the Phillips-Perron (PP) test. The test equation is as shown in Model 3. It is assumed that is stationary.

$$y_t = x_t \mu + \varepsilon_t \quad (3)$$

H_0: There is no unit root in the series (stationary)

H_1: There is a unit root in the series (non-stationary).

In the equation, represents the deterministic component, which is either constant or constant plus a trend. The equation allows for the calculation of the residual test statistic. The test statistic is the same as in Model 4. In Model 4, the number of observations is denoted by T, the cumulative residual function by, and the residual spectrum at zero frequency by.

$$LM = T^{-2} \sum_{t=1}^{T} S_t^2 / f_0 \quad (4)$$

$$f_0 = \gamma_0 + 2\sum_{j=1}^{T-1} K\left(\frac{q}{j}\right)\gamma_j \quad (5)$$

The test function is as shown in Model 5. The kernel function is denoted by K, and the bandwidth by q. This model can also be used as a quadratic spectral kernel function, as proposed by Andrews (1991) (Çağlayan & Saçaklı, 2006, p. 125).

ARDL Boundary Test

For the Engle and Granger (1987) and Johansen and Juselius (1990) cointegration tests—which are the first tests that come to mind in cointegration analysis—the variables used in the tests must be stationary at the same order. Pesaran et al. (2001) developed the ARDL test, which allows for analysis without considering the stationarity condition required in the Engle-Granger and Johansen and Juselius cointegration tests when estimating long- and short-run relationships between variables. A key feature of the test is that it permits cointegration analysis even if the variables are stationary at the level, at the first difference, or at different levels (Pata et al., 2016: 265). In applying the ARDL boundary test, the variables are tested if they are stationary at the level and first-difference levels; however, the tests cannot be applied if they are stationary at the I(2) level. As illustrated in Model 6, the ARDL boundary test represents the dependent variable "y" and k independent variables "Xj." The "" denotes the error term, "" the constant term, " , , , " the coefficients of the variables, and "p" indicates the lag length.

$$\Delta Y_t = \theta_0 + \sum_{i-1}^{p} \gamma_i \Delta y_{t-1} + \sum_{j-1}^{k}\sum_{i-0}^{p} \delta_{j,i}\Delta X_{j,t-i} + \alpha_0 y_{t-1} + \sum_{i-0}^{p} \alpha_j \Delta X_{j,t-1} + \varepsilon_t \quad (6)$$

If cointegration exists among the variables, it is necessary to estimate the long-run elasticity coefficients and incorporate them into the model. As shown in Model 7, the error term " " represents the error term, " " represents the model's constant term, " , " represent the variable coefficients in the model, "p" represents the dependent variable, and " " represents the lag lengths of the jth independent variable in the model.

$$y_t = \emptyset_0 + \sum_{i=1}^{p} \theta_i y_{t-i} + \sum_{j=1}^{k}\sum_{i=0}^{q_j} \rho_{j,i} X_{j,t-i} + \varepsilon_t \quad (7)$$

The error correction coefficient for short-run flexibility in the variables is calculated in the ARDL model in the same way as in Model 8. In Model 8, "EC" represents the error correction term, " " represents the model's constant term, " , " represents the variable coefficients, and " " represents the model's equilibrium rate of adjustment.

$$\Delta y_t = \pi_0 + \sum_{i=1}^{p} \lambda_i \Delta y_{t-1} + \sum_{j=1}^{k}\sum_{i=0}^{q_j} \omega_i \Delta X_{j,t-i} + \psi EC_{t-1} + \varepsilon_t \quad (8)$$

In the model, the error correction coefficient is calculated using the long-run equation expressed in Model 9. The error correction coefficient, denoted by " ", must take a value between "-1" and "0" and must also be statistically significant (Samut, 2016, p. 41).

$$EC_t = y_t - \alpha - \sum_{j=1}^{k} \beta_j X_{j,t-i} \quad (9)$$

FINDINGS

All data used in the analysis of this study were obtained from the open-source database of the Turkish Statistical Institute; therefore, no ethics committee approval is required. Throughout the study, due attention was paid to the requirements of scientific ethical guidelines.

Table 2. Descriptive statistics

	Observations	Mean	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis	Jarque-Bera
LHUE	83	2,003	2,219	1,766	0,099	-0,083	2,300	1,788 (0,40)
LTGE	83	1,901	1,968	1,802	0,033	-0,210	3,596	1,844 (0,39)
LHGE	83	2,049	2,097	1,768	0,057	-2,230	9,754	226,574 (0,00)

There are 83 observations for all variables. The mean of the logarithm of the service production index (LHUE) is 2.003, and its standard deviation is 0.099. The mean of the logarithm of the consumer confidence index (LTGE) is 1.901, and its standard deviation is 0.033. The mean of the logarithm of the service confidence index (LHGE) is 2.049, and its standard deviation is 0.057. When examining the Skewness value, which indicates the skewness of the data distributions, it can be said that the distributions are left-skewed because all variable values are less than 0. According to the kurtosis value, which indicates the flatness of the data distribution, the LHUE variable exhibits a flat distribution, while the LTGE and LHGE variables exhibit a peaked distribution. According to the Jarque-Bera statistic, which indicates the distribution of the data, the LHUE and LTGE variables follow a normal distribution, whereas the LHGE variable does not follow a normal distribution.

Table 3. Results of the Phillips-Perron (PP) unit root test

Variables	**LHUE**		**ΔLHUE**	
	Constant	Constant+Trend	Constant	Constant+Trend
t-ist.	-3,573	-6,176	-15,256	-15,146
p.v.	(0,00)***	(0,00)***	(0,00)***	(0,00)***
Variables	**LTGE**		**ΔLTGE**	
	Constant	Constant+Trend	Constant	Constant+Trend
t-ist.	-2,968	-2,993	-9,222	-9,344
p.v.	(0,04)**	-0,14	(0,00)***	(0,00)***
Variables	**LHGE**		**ΔLHGE**	
	Constant	Constant+Trend	Constant	Constant+Trend
t-ist.	-3,25	-3,407	-10,063	-9,974
p.v.	(0,02)**	(0,05)*	(0,00)***	(0,00)***

Note: *The values ***, **, and * indicate the stationarity of the series at the 1%, 5%, and 10% significance levels, respectively. The values in parentheses represent the p-values. The critical values from MacKinnon (1996) were used as a reference for the Phillips-Perron test.*

According to the results of the Phillips-Perron unit root test, it was concluded that in the constant model, the LHUE variable is stationary at the 1% significance level, while the LTGE and LHGE variables are stationary at the 5% significance level. In the constant and trend model, it was found that the LHUE variable is stationary at the 1% significance level, the LHGE variable is stationary at the 10% significance level, and the LTGE variable is not stationary. It was found that the first differences of all variables (LHUE, LTGE, and LHGE) were stationary at the 1% significance level in both the constant model and the constant and trend model.

Table 4. Results of the Kwiatkowski, Phillips, Schmidt, Shin (KPSS) unit root test

Variables	**LHUE**		**ΔLHUE**	
	Constant LM-ist.	Constant + Trend LM-ist.	Constant LM-ist.	Constant + Trend LM-ist.
Critical Value	1.081.648	0.128887	0.030107	0.030087
1%	0.739000	0.216000	0.739000	0.216000
5%	0.463000	0.146000	0.463000	0.146000
10%	0.347000	0.119000	0.347000	0.119000
Variables	**LTGE**		**ΔLTGE**	
	Constant LM-ist.	Constant + Trend LM-ist.	Constant LM-ist.	Constant + Trend LM-ist.
Critical Value	0.477273	0.129440	0.123529	0.047268
1%	0.739000	0.216000	0.739000	0.216000
5%	0.463000	0.146000	0.463000	0.146000
10%	0.347000	0.119000	0.347000	0.119000
Variables	**LHGE**		**ΔLHGE**	
	Constant LM-ist.	Constant + Trend LM-ist.	Constant LM-ist.	Constant + Trend LM-ist.
Critical Value	0.405103	0.108336	0.100711	0.100636
1%	0.739000	0.216000	0.739000	0.216000
5%	0.463000	0.146000	0.463000	0.146000
10%	0.347000	0.119000	0.347000	0.119000

When we examine the results of the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) test, we observe that the LHUE variable is not stationary in the level constant model, is stationary at the 10% significance level in the level constant+trend model, and is stationary at all significance levels in both the level constant and level constant+ trend models when the first difference of the variable is taken.

When we examine the results of the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) test, we observe that the LTGE variable is stationary at the 5% significance level in the level constant model and at the 10% significance level in the constant+trend model; however, when the first difference of the variable is taken, it is stationary at all significance levels in both the constant model and the constant+trend model.

Upon examining the results of the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) test, it is observed that the LHGE variable is stationary at the 10% significance level in the constant level model and at all significance levels in the constant+trend model; when the first difference of the variable is taken, it is stationary at all significance levels in both the constant model and the constant+trend model.

In summary, when the Phillips-Perron (1988) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) unit root tests are evaluated together, it is observed that the first differences of the variables are stationary and do not contain a unit root in both the PP and KPSS tests. Since the variables are not stationary at the I(2) level, the ARDL test can be applied to them. The established ARDL model is as shown in Model 10 below.

$$lnHUE = \beta_0 + \beta_1 lnTGE + \beta_2 lnHGE + \varepsilon_t \quad (10)$$

Table 5. Results of the ARDL boundary test

Test Statistic	Value	Prob.	I(0)	I(1)
F-statistic	5.059575	10%	2.63	3.35
		5%	3.1	3.87
		1%	4.13	5

According to the results of the ARDL boundary test, the F-statistic was found to be 5.059; consequently, since the I(1) statistic for the variables is greater than 5 at the 1% significance level, it is concluded that there is cointegration among the variables.

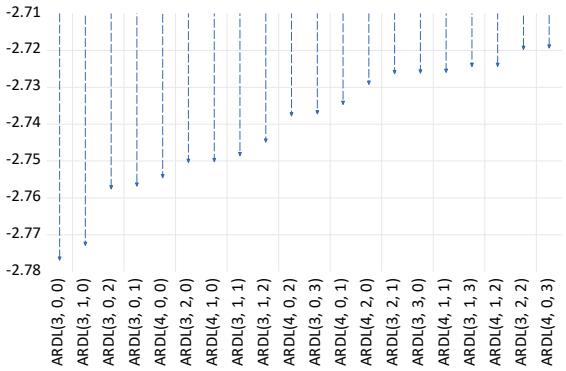


Fig 1. Model selection based on the Akaike ınformation criterion

In the design of the ARDL model, the smallest Akaike value is observed in the ARDL (3,0,0) model. It is noted that the 3rd lag of the LHUE variable, while the other variables are included without lags, yields the smallest Akaike value, which is significant in determining that there is no autocorrelation issue in the model.

Following the cointegration test, short-run parameter estimates must be determined. The short-run estimation results based on the ARDL (3,0,0) model are presented in Table 6.

Table 6. Results of the ARDL short-run estimation

Variables	Coefficient	Prob.
LHUE(-1)	0.245	0.00 (***)
LHUE(-2)	0.092	0.27
LHUE(-3)	0.311	0.00 (***)
LTGE	-0.377	0.05 (*)
LHGE	0.502	0.00 (***)
C	0.400	0.41

Note: *The values ***, **, and * indicate that the alternative hypothesis is accepted at the 1%, 5%, and 10% significance levels, respectively.*

According to the short-run ARDL results: the coefficient of the first lag of the LHUE variable (0.245) is significant at the 1% significance level, and the coefficient of the third lag (0.311) is significant at the 1% significance level; the LTGE variable has a coefficient of (-0.377) and is significant at the 10% significance level; and the LHGE variable has a causal relationship with the LHUE variable at the 1% significance level with a coefficient of (0.502). This suggests that the strong effect of the LHUE variable from the previous period is not carried over to the next period but reaches an effective level again in the subsequent period; in summary, it exhibits a fluctuating trend in the short term. The fact that the LTGE variable is at the 10% significance level indicates a statistically weak effect, while the LHGE variable being at the 1% significance level suggests that the variable is statistically more effective in the short term. According to the model, the probability value of the constant term is statistically insignificant. In summary, based on the short-term results, it can be stated that the first and third lags of service production and service confidence have a strong effect on service production, while consumer confidence has a weak effect. In the study covering the period from 2018:M01 to 2024:M11, the disruption of service production during the pandemic and the controlled reorganization of work life may explain the fluctuations in service production. Additionally, in the services sector, which predominantly features a labor-intensive employment structure, increases in service prices due to rising wage levels caused by inflation may lead to deferred consumption behavior and/or a decline in demand for services. Therefore, inflation is significant in terms of fluctuations in service production. Another key finding is that, in the short term, service confidence has a stronger impact on service production than consumer confidence.

Table 7. Results of the ARDL long-run estimation

Variables	Coefficient	Prob.
LTGE	-1.077	0.02 (**)
LHGE	1.435	0.00 (***)
C	1.144	0.36
ECT(-1)	-0.350	0.00 (***)
Breusch-Godfrey Serial Correlation LM Test	0,299	0,825
Heteroscedasticity Test: Breusch-Pagan-Godfrey	1,902	0,104
Ramsey Reset Test	1,947	0,167

An examination of the long-run ARDL test results reveals that they are similar to the short-run ARDL results. In the long run, the LTGE variable reduces the LHUE variable by 1.077 at the 5% significance level. Additionally, the LHGE variable increases the LHUE variable by 1.435 at the 1% significance level. Based on these results, it is supported that LHUE is negatively affected by an increase in the LTGE variable and positively affected by an increase in the LHGE variable. Furthermore, we can state that the probability value of the model's error correction coefficient (-0.350303) is significant at the 1% significance level. In this case, the finding is that any negative situation in the LHUE variable could be corrected within 2.85 months. Furthermore, as seen in the table, while there is no autocorrelation problem in the variables according to the Breusch-Godfrey test, the model also does not exhibit a heteroskedasticity problem according to the Breusch-Pagan-Godfrey test. Furthermore, the correct specification of the model is confirmed by the Ramsey Reset test result.

According to the findings from Table 7, the model's long-run error correction regression is as shown in Model 11.

$$EC = LHUE - (-1.0777*LTGE + 1.4356*LHGE + 1.1442) \quad (11)$$

CUSUM and CUSUM-Q tests were applied to measure the instability of the variance of the residuals after regression, and the results are shown in Figure 2.

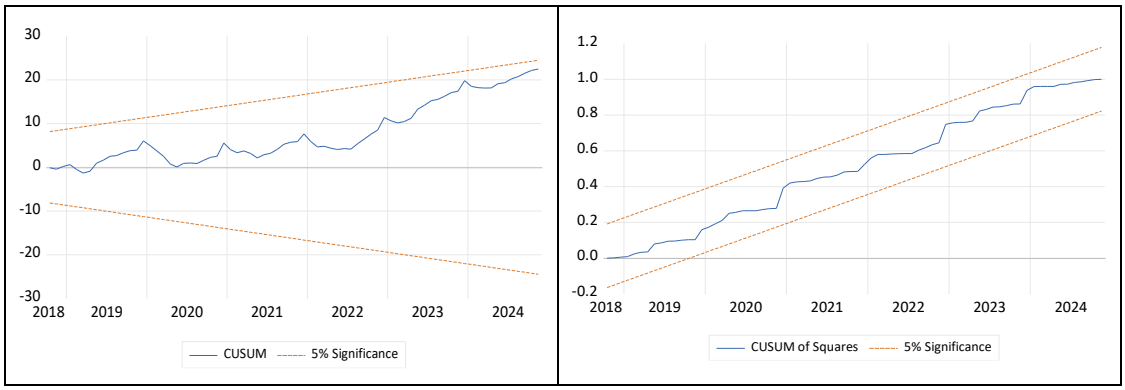


Fig 2. Results of the CUSUM and CUSUM-Q tests

While the CUSUM test indicates whether the error terms obtained in the test fall within the 5% confidence interval—that is, within the statistically desired limits—the CUSUM-Q test is used to determine whether the cumulative squares of the error

terms fall within the 5% confidence interval. In both tests, if the error terms fall within the 5% confidence interval, it is understood that the estimated model coefficients are statistically significant and stable.

According to the tables, the results of the CUSUM test indicate that the error terms fall within the confidence limits, and the results of the CUSUM-Q test show that the squares of the error terms also fall within the confidence limits.

DISCUSSION AND CONCLUSION

With the service sector's share of the economy growing day by day and the types of services becoming increasingly diverse, a shift toward a service-based economy has begun. Developments in production and knowledge levels within the global system demonstrate that the service sector has also been affected by these changes and is undergoing transformation. According to NACE (Rev. 2) codes, for the production of services in the H-N (excluding K) sector—including transportation and storage, accommodation and food services, information and communication, real estate, professional, scientific, and technical activities, veterinary services, and administrative and support services—it is essential to ensure consumer and service confidence regarding these services. In this context, based on the assumption that expectations regarding the future and confidence in the sector and the economy are key factors determining consumer behavior, this study examines the relationships between consumer confidence, confidence in the service sector, and service production in Türkiye over the 2018–2024 period from both short- and long-term perspectives. The findings clearly demonstrate that the effects of trust indices on service production are not one-dimensional; rather, they vary depending on factors such as the type of index, time, and organizational trust. This result is consistent with the macro-marketing literature discussing the role of trust indicators within market systems. Layton (2007) and Layton (2007) have emphasized that marketing systems are complex and adaptive structures; participants' expectations and perceptions of trust can directly influence the effectiveness of these systems and service outcomes.

According to the findings of the study, it was concluded that there is a negative correlation between service production and consumer confidence, a positive correlation between service production and service confidence, and a negative correlation between consumer confidence and service confidence. The fact that the service confidence index exerts a strong and positive effect on service production in the short term indicates that production decisions in the service sector are primarily driven by business confidence and market expectations in the short run. This finding aligns with the results of the panel causality analysis conducted by Demirel and Artan (2017) for European Union member countries: In that study, a bidirectional causal relationship was identified between economic confidence and industrial production, and it was determined that confidence indicators serve as leading indicators. From a macro-marketing perspective, this finding can be interpreted to mean that institutional trust directly influences the functionality of market systems. Layton (2009) noted that trade and production depend to a large extent on the quality of trust and coordination within the marketing system, and pointed out that a strong institutional trust environment would facilitate the faster implementation of production decisions.

The finding that the consumer confidence index has a limited impact on service production in the short term supports the findings of Ludvigson (2004). The study notes that consumer confidence has limited predictive power regarding consumer spending. Karasoy & Yüncüler, (2018) examined the explanatory and predictive power of consumer confidence indices on the growth of private consumption; they noted that while these indices may be insufficient on their own, their predictive capacity increases when used in conjunction with other variables.

The finding that an increase in consumer confidence has a negative impact on service production in the long term can be explained from a macro-marketing perspective. Katona (1968) predicted that consumers would increase their spending when they were optimistic; however, current research shows that this relationship is not universally valid. Especially during periods of high inflation, when uncertainty and anxiety about the future are high, rising confidence can lead not to increased spending but to a tendency to save; as consumers become more optimistic, they prefer to secure their income and build savings (Kwan & Cotsomitis, 2007). Given the high inflation, currency pressures, and loss of purchasing power experienced by Türkiye during the 2018–2024 period, this finding takes on significant importance. Consumer optimism can influence their preferences; they may choose to invest in store-of-value assets such as real estate, gold, or foreign currency rather than spending on services. The observed increase in confidence may indicate that consumers are opting for different investments rather than increasing their demand for services. This finding aligns with the study by Tunalı and Özkan (2016), which emphasizes that the relationship between confidence and spending is not always direct or immediate. This relationship aligns with the macro-marketing approach, which emphasizes that trust plays a multidimensional, multilayered role in market systems. As Wooliscroft (2020) points out, it is essential to consider both the contextual and temporal dimensions together to make sense of market phenomena at the macro level. The fact that confidence in the service sector remained relatively strong during periods of weakening consumer confidence in the 2018–2024 period covered by our study indicates that the supply side generates dynamics independent of the demand side. This finding is consistent with the perspective outlined by Barsky and Sims (2012): consumer and business confidence may contain non-overlapping sets of information regarding different sectors of the economy and, as a result, may occasionally move in opposite directions. In the case of Türkiye, the controlled restructuring of the service sector during the COVID-19 period and the subsequent recovery process explain the divergence between the consumer confidence and service confidence indices. In a study by Açıkgöz and Günay (2021), it was noted that Türkiye's Economic Confidence Index declined due to the decline in the service and retail trade confidence indices.

Additionally, the findings indicate that there were fluctuations in service production in the short term, with service confidence having a strong effect on service production, while consumer confidence had a weak effect. These results can be

explained by the fact that, during the period in question, service production in certain sectors of the service industry was initially disrupted due to the COVID-19 pandemic, followed by the controlled reorganization of work life. Furthermore, during the period in question, changes in consumer lifestyles resulting from restrictions imposed due to the pandemic, as well as economic factors such as cyclical fluctuations, increases in exchange rates, and changes in purchasing power, may have negatively affected consumer demand for the service sector and, consequently, service supply. In the long term, however, it was found that service production was negatively affected by an increase in consumer confidence but positively affected by an increase in service confidence. Furthermore, the fact that consumer confidence negatively affects service production in the long term can be interpreted to mean that improvements in consumer expectations do not always translate into spending. The current economic conditions can be interpreted as indicating cautious optimism in consumer confidence, yet this has not translated into service demand.

The fact that consumer confidence and service confidence have different effects on service production in the long and short term can be expressed as an indication that trust is not one-dimensional in market systems. The findings indicate that, in the short term, production processes are primarily shaped by institutional trust and market expectations. In the long term, the negative impact of increased consumer confidence on service production can be explained by changes in individuals' consumption preferences and the shift of resources to different sectors. Furthermore, the positive impact of increased service confidence on service production highlights the importance of institutional trust for market efficiency. The results also indicate that service production is shaped by institutional trust and consumer expectations in addition to income and demand determinants; highlighting the importance of trust for sustainable production growth in the service sector.

Another finding from the study is that, in the event of a shock to service production, production could recover within 2.85 months. This demonstrates the sector’s ability to rebound quickly due to its dynamic structure. Based on these findings, recommendations such as strengthening support measures for the service sector, increasing existing technology incentive regulations—such as digitalization—tailored to the sector’s needs and consumer expectations, and developing education and employment policies that support a qualified workforce can be presented to policymakers. It is believed that these policies will increase service production, thereby fostering economic growth and contributing to social welfare. Furthermore, firms operating in the highly competitive service sector can differentiate themselves by providing higher quality compared to their competitors; they can also implement strategies to enhance productivity through in-service training to counter cost increases resulting from demand postponements and fluctuations.

When the findings are considered as a whole, various conclusions can be drawn for policymakers. Service sector confidence's influence on production; developments in digital technology, investments in skilled labour and the stability of institutional policies significantly impact economic output. Meanwhile, the weakness of consumer confidence in demand, especially in periods of macroeconomic instability, highlights the critical importance of factors that support purchasing power. This is because consumers' optimism does not translate into service demand if the economy is unstable. Bu çalışma, hizmet üretimi, hizmet güveni ve tüketici güvenini birlikte incelemesi bakımından benzersizdir. However, this study has some limitations. The indices used may not reflect the different responses of the sub-sectors within the H-N sector range during the period under review. Future research using sector-specific confidence and production data could provide a more detailed understanding of the relationship between confidence and production.

Conclusion

The results obtained from the research should be briefly stated. According to the findings of the study, it was concluded that there is a negative correlation between service production and consumer confidence, a positive correlation between service production and service confidence, and a negative correlation between consumer confidence and service confidence. Additionally, the findings indicate that there were fluctuations in service production in the short term, with service confidence having a strong effect on service production, while consumer confidence had a weak effect. In the long term, however, it was found that service production was negatively affected by an increase in consumer confidence but positively affected by an increase in service confidence. Another finding from the study is that, in the event of a shock to service production, production could recover within 2.85 months. This demonstrates the sector’s ability to rebound quickly due to its dynamic structure.

Recommendations

This study utilized data from the service production index, service confidence index, and consumer confidence index. Future studies could expand this scope to include different indices or sub-indices specific to sector-specific services, providing a more detailed analysis.

Limitations and strengths

This study is unique in that it examines service production, service trust, and consumer trust together. Future studies using this or different indices to conduct similar, detailed, or different analyses specific to the service sector will contribute to the literature.

Ethical statement

Since this study uses data obtained from publicly available databases, an ethics committee approval is not required.

Generative AI Use Statement

Artificial intelligence–based tools, including ChatGPT (version 5.2), were not used in this study solely for language editing purposes, such as improving grammar, clarity, and readability of the manuscript. No AI tools were used for data analysis, interpretation of results, or generation of scientific content.

CRediT authorship contribution statement

Akbulut Dursun. Ö.: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - Original Draft, Writing - Review & Editing, Visualization, Supervision.

Data availability

The data from this study may be requested from the corresponding author upon reasonable request.

Declaration of competing interest

The author declares that she has no known competing financial interests or personal relationships that could have appeared to influence the study reported in this paper.

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