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ORIGINAL ARTICLE

ASSESSING HEALTH INSURANCE IN TURKEY DURING COVID-19: A GRANGER CAUSALITY TEST

Ufuk ALKAN
İskender DEMİRBİLEK
Sena ŞAHİN

Abstract
During pandemic periods, the need for individuals to access health services and have regular health checks increases, which reveals the importance of being covered by any health insurance. The state provides general health insurance, which provides access to basic health services and covers a large population. Private health insurance, on the other hand, offers a more personalised and comprehensive type of coverage and provides faster, higher quality and more comprehensive health services, although it requires additional premium payments. In this context, the aim of this study is to determine the effects of the COVID-19 outbreak on the private health insurance sector in Turkey before and after the pandemic period. Specifically, the study aims to explain how the COVID-19 pandemic affects the demand for health insurance. Through Granger causality analysis, the study will investigate the relationship between the number of insured individuals, market share, dummy variable for pre- and post-COVID-19 periods, and the growth rate of the insurance sector for private health insurance from January 2015 to October 2023. The analysis reveals that there is a bidirectional causal relationship between the variables indicating a reciprocal influence.

Keywords
COVID-19, Insurance, Health Insurance, Granger Causality, Turkey

JEL Classification
G22, I13, G23, D81.

Authors Notes:
Correspondence
Associate Professor, Faculty of Financial Sciences, Department of Banking, Marmara University, Istanbul, Turkey,
ORCID: 0000-0002-0586-8146,
ualkan@marmara.edu.tr

Assistant Professor, Faculty of Financial Sciences, Department of Insurance, Marmara University, Istanbul, Turkey,
ORCID: 0000-0001-5523-1736,
idemirbilek@marmara.edu.tr

Researcher, Institute of Banking and Insurance, Department of Insurance, Marmara University, Istanbul, Turkey,
ORCID: 0009-0002-7726-0815,
senasahin@marun.edu.tr

1. INTRODUCTION

Since the beginning of time, individuals instinctively protect themselves and their families against various risks. The social security system, which was formed in response to this need, is a system that creates confidence against the risks that individuals may face while continuing their lives. The concept of health is a significant issue in the social security system. This concept is an important subject that individuals should pay attention to in order to ensure and maintain better living standards.

The assurance offered by the state regarding health is the general health insurance. With the general health insurance, the aim is for all citizens to benefit from equal health services. In addition to this service provided by the state, private health insurance service is provided by insurance companies.

Insurance is a service provided by insurers that gives assurance to individuals against the risks they may face (Işık et al., 2024: 1-2). Private health insurance, which is a part of insurance services, is an insurance that provides coverage for large expenses that may occur due to various health risks that may happen to individuals in return for premium payment. It is especially important as a complement to general health insurance. Despite their importance in every period, health insurances have become more in demand, especially during the COVID-19 period, which has been experienced on a global scale.

The high expenditures individuals made on their health during this period revealed how important this insurance is. Especially in the case of epidemics that were not previously covered before the pandemic, insurance companies took action and included the epidemic within the scope of coverage, enabling companies to provide better service to their policyholders.

This study was conducted to determine the effects of the health insurance industry in Turkey before and after the pandemic period. In this context, firstly, the relationship between health, health system and insurance is explained conceptually. Then, information about the pandemic was reviewed and the COVID-19 pandemic period was explored.

In the application part of this study, firstly, domestic and foreign literature reviews are included. Then, the COVID-19 period in the private health insurance sector is tested with the Granger Causality Test. The data for the analysis in this section are obtained from the Central Bank of the Republic of Turkey (CBRT). The data covers the period January 2015-October 2023. In the study, the short and long-run relationships for the number of insured, market share and dummy variables, which are thought to be effective in the growth of private health insurance, are analyzed and causality analysis is conducted. This study aims to reveal the growth in the health insurance sector during the pandemic period with the variables used in the analysis and to contribute to the literature.

When domestic and foreign studies in the literature are investigated, it is observed that these studies generally focus on measuring the performance of the insurance sector in terms of profitability during the COVID-19 period. Unlike other studies, this study includes both the pre-pandemic and post-pandemic period, as well as a research to measure the growth momentum of the sector. For this reason, it is thought that the current research will contribute to the literature.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

In its simplest form, the word health simply means the absence of disease. It is one of the most basic needs for individuals and without health, other things are of no value (Witter, 2002: 4). According to the World Health Organization (WHO), the concept of health does not primarily refer to a state of illness or disability, but rather to the state of being physically, mentally and socially together in a state of complete integrity (World Health Organization, n.d.).

In general, it is possible to express the health system as a systemic structure consisting of organizations, institutions and resources that aim to improve human health and do so in integrity, complementing and supporting each other (Bitimli, 2019: 8). Health systems have three objectives. These are;

raising the level of social health in the population to whom health services are provided, responding to people's health-related demands, and while doing all these, providing financial assurance regarding the high costs of individuals' health expenditures (Uğurluoğlu & Çelik, 2005: 7).

The word insurance comes from the Latin word 'sicurta' meaning assurance (Kaya and Beşer, 2020: 442). It has a great importance in people's lives. It is a system that secures individuals against various risks in return for a certain premium. In this way, very large expenses are prevented from being paid with low insurance premium amounts. Thus, it is possible to say that individuals will save money. According to another definition, the insurance clause guarantees compensation for damages arising from the contract for the duration of the policy, regardless of all other causes (Magee, 1947: 688). In addition to the health insurance offered by the state, health insurance can be defined as a private insurance product purchased by the individual with his/her own preference and will, acting in anticipation of the financial risks that may occur in the future (Civan, 2010: 12).

There are two types of health insurance: public and private (Gökmen, 2015: 27). These are social and private insurance. Social insurance refers to institutions administered by the state with the support of employers in order to eliminate certain social risks that may occur with the premiums paid by working individuals (Oral, 2002: 13). Private insurance, on the other hand, provides various services and treatment opportunities that are not covered by social insurance. Private insurance is the compensation of the loss by the insurer according to the insurance contract in case the person who pays premiums on an individual voluntary basis encounters a situation determined as a risk (Öztürk, 2014: 13).

In Turkey, health insurance is offered under the sickness/health branch. This branch, which falls under both life and non-life insurance categories, covers treatment costs incurred in case of accidents or illnesses according to the amount specified in the policy, while it is also referred to as a product of sum assured insurance as a result of the fact that no health-related price can be determined and payment is made up to the amount of coverage accepted by the insured.

Covid19, which emerged in Wuhan, China in the last month of 2019, has entered our lives as an epidemic that influenced the whole world in every aspect. This highly contagious disease started to spread to many countries outside of China with a rapid growth in 2020 (Sevimoğlu, 2022: 33). As a result, an emergency was declared by the WHO and this epidemic was defined as a pandemic in 2020 (Wikipedia, 2023).

This epidemic is caused by a virus that spreads with respiratory infections in humans. The most important symptoms of the disease are fever, cough, weakness and headache. In addition, these symptoms vary from person to person. The presence of individuals in crowded places in the community and travelling between countries has accelerated the spread of the virus. The lack of any treatment has led to an increase in the number of individuals who died due to the epidemic. The pandemic period, which will continue for a long time, has started with the death of the first case in Turkey in 2020 (Yıldız, 2023: 241).

This pandemic has become a process that influences many areas from health to economy of countries. However, it is undoubtedly the health systems that are most affected by the pandemic. Failure to be ready for such an epidemic process has created a significant burden on countries and caused them to wear out (Meral, 2021: 444). In order to reduce the rate of spread of the virus and reduce the number of deaths, many measures have been taken in our country, as in other countries. However, despite all the measures taken, individuals could not be prevented from losing their lives. Many individuals all over the world have lost their lives due to this disease.

All in all, the COVID-19 pandemic has had significant impacts on health systems and insurance sectors. We can analyze the effects of the pandemic on private health insurance under several main headings:

a. Insurance Coverage and Access

During and after the COVID-19 pandemic, the demand for healthcare services has increased, brin-

ging the importance of private health insurance back to the agenda for many individuals. The pandemic has highlighted the difficulties faced by uninsured individuals in accessing healthcare services. This has led some countries to take steps to expand the coverage of both general health insurance and private health insurance policies (Galvani et al., 2020).

b. Insurance Premiums and Costs

The pandemic has led to increased costs for private health insurance companies. The treatment costs of COVID-19 patients caused unexpected expenses for insurance companies. These increased costs have led to premium increases in some insurance plans. However, at the same time, the postponement of many elective (non-emergency) health services led to some cost reductions (Cutler and Summers, 2020).

c. Telehealth Services

Restricted access to physical healthcare services during the pandemic has increased the importance of telehealth services. Insurance companies have made it easier for insured individuals to access these services by including telehealth services in their coverage. This accelerated the spread and acceptance of telehealth services (Bashshur et al., 2020).

d. Health Policies and Regulations

The pandemic has caused some regulations in the health insurance sector to be reconsidered. For example, many countries have debated whether COVID-19 tests and vaccines are covered by insurance. Most countries have ensured that these services are provided free of charge or covered by insurance (Frederick and Karl, 2021).

e. Risk Management and Emergency Preparedness

The pandemic has caused insurers to review their strategies for risk management and emergency preparedness. Insurance companies had to develop more robust and flexible plans to deal with similar situations in the future (Richter and Wilson, 2020).

f. Psychological and Mental Health Supports

COVID-19 has not only affected people's physical health, but also their mental health. Health insurance companies have placed more emphasis on including mental health services in their policies. The stress and anxiety caused by the pandemic increased the demand for mental health services (Pfefferbaum and North, 2020).

Overall, the COVID-19 pandemic has once again highlighted the criticality of private health insurance systems and the importance of providing accessible, inclusive health services. The pandemic has led to many changes and innovations in the health insurance sector and these changes are expected to continue in the long term.

3. LITERATURE

This section of the existing paper reviews studies that use different methodologies and data sources to understand the widespread impact of the COVID-19 pandemic on health insurance. These studies can be useful to provide a comprehensive understanding of the changes the pandemic has brought about in the health insurance landscape.

In the context of the health and social security, Boydak (2020) emphasized the obligation of states to create a protective and inclusive health and social insurance system against epidemics. It is stated that Turkey has successfully fulfilled this requirement with the general health insurance system. However, it is highlighted that the services provided should be organized more systematically and the lack of information in the society should be eliminated. The successful functioning of the general health insurance despite criticism and the importance of including pandemic diseases within the scope of emergencies are mentioned. Finally, it is emphasized that the services provided under general health insurance are important for accurate diagnosis and treatment.

Meral (2021) analyzed the impacts of the COVID-19 pandemic on the Turkish insurance industry. While analyzing the performance of the insurance sector in the 2016-2020 period, he compares the 2020 performance of the pandemic with other years. The results reveal that the non-life branch showed the highest performance in 2020, but the performance of the life branch was negatively affected, albeit to a limited extent. This result shows that the pandemic had different impacts on different branches in the Turkish insurance sector.

Atukalp (2021) investigated the effects of the COVID-19 pandemic on the health insurance sector in Turkey. The work covers the period between January 2019 and December 2020, and the number of coverages is analyzed on a sub-branch basis. As a result of the analysis, it is observed that after March 2020, when the first case of the COVID-19 outbreak was detected in Turkey, there was an increase in health insurances in April 2020, August 2020, October 2020 and December 2020.

Bulan and Özsarı (2023) examined the changes caused by the COVID-19 pandemic in health insurance in Turkey. In this study, in which general health insurance and private health insurance data are compared, no decrease in the number of insured was observed in terms of general health insurance, while the number of policies in private health insurance decreased. However, it was determined that there was no contraction in the sector. It is predicted that the intensive shift of health services to this area due to COVID-19 may increase the burden of disease in the coming periods, especially with the increase in postponed demands for chronic diseases.

Yörübulut (2023) explored the impact of changes in the field of health insurance, including health insurance, on the profitability ratios of insurance companies during the pandemic period. For this purpose, 15 insurance companies are analyzed using 2017-2021 data published by the Insurance Association of Turkey, including the pandemic period. Factors affecting the profitability ratio of companies as a measure of financial performance, such as the number of non-life policies, insurance leverage ratio, market share in health insurance, incurred loss ratio, net earned premiums and net incurred losses, were evaluated by panel data analysis. According to the research findings, although the number of non-life policies and liquidity are statistically insignificant, an increase in these factors increases the profitability ratio. Insurance leverage ratio, health insurance loss ratio, net earned premiums, net incurred claims and market share in health insurance are found to be statistically significant.

When the foreign literature was analysed, it was observed that important studies have made significant contributions to the academic literature over the years. However, it was observed that the foreign literature was especially concentrated in the first years of the pandemic.

Wang et al. (2020) used monthly province-based panel data and fixed effects models to examine how the COVID-19 pandemic affected the Chinese insurance market. The study points to a number of negative effects caused by COVID-19. Commercial insurance premium income, monthly-annual premium growth rate, insurance density and insurance depth have all declined due to COVID-19. The negative effects on both property and personal insurance are statistically significant. It is interpreted that increasing the level of social security and promoting digital insurance could help mitigate the negative impact of the pandemic on the insurance market.

Babuna et al. (2020) aimed to analyze the effects of the COVID-19 pandemic on the insurance sector in the period March-June 2020 compared to previous pandemics such as SARS-Cov, H1N1 and MERS in Ghana. Their analysis shows that premium production and profits decreased, but claims increased during the period under study. However, it was concluded that this situation will recover in

early 2021.

Preda et al. (2021) aimed to reveal the changes in global insurance markets during the current pandemic. These changes are generally felt through asset risks, low premium growth potential and long-term investments of insurance companies. In particular, developed markets may shrink in real terms due to the economic recession in the life insurance sector. Increasing mortality rates due to the COVID-19 pandemic are affecting the profits of many life insurers. The main trends in this sector are based on important factors such as premiums written in recent years, benefits paid, types of life insurance contracts and the density and degree of penetration of the life insurance sector.

Bundorf et al. (2021) examined how health insurance coverage in the US changed during the COVID-19 pandemic. During 2020, employer-sponsored coverage declined on a weekly basis, while other types of coverage from public sources increased. Overall, health insurance coverage of any type declined, while uninsured rates increased, especially at the start of the pandemic. This study finds that public programs have played an important role in protecting Americans who have experienced job loss, but many remain uninsured.

The results obtained from these works demonstrate that the COVID-19 pandemic has had far-reaching effects on the health insurance sector. There have been significant changes in health insurance coverage during the pandemic, and these changes have differed from country to country and across insurance types. In summary, the long-term effects of these changes need to be monitored. It is important to carefully monitor changes in health insurance coverage and transformations in the health insurance sector after the pandemic and take appropriate policy measures.

4. ECONOMETRIC MODEL

This study aims to investigate how the growth in the health branch of the insurance industry in Turkey has been affected by the COVID-19 pandemic. As the pandemic has negative effects on all sectors, it is known to have a profound impact on the insurance sector. This study aims to examine the effects of the pandemic on health insurance using various variables, thus making a novel contribution to the literature.

The existing work examines the long- and short-run relationships and causality analysis of the variables that are considered to be effective on the growth rate of the health insurance sector in Turkey for the number of insured, market share and a dummy variable for the COVID-19 period. Data are compiled from the Electronic Data Distribution System (EDDS) provided by the CBRT. The analyses are performed using Gaussian codes and the current version of Eviews program 13.0. Table 1 presents the variables employed in our model.

Table 1

The Variables Employed in the Analysis

Variable	Screening	Definition
Number of insured	SSAY	Independent variable
Market share	PPAY	Independent variable
Dummy variable (pre and post COVID-19)	DMY	Independent variable
Insurance sector growth rate	SBUY	Dependent variable

4.1. Statistical Information on Variables

In academic studies, seasonal filters are found to be more effective than logarithms in seasonal adjustment of variables. Modern software such as Eviews 13.0 is equipped with filters proposed by Hodrick and Prescott (1997) that allow the trend component to change slowly over time. However, there are some criticisms of these filters and therefore they are not included in this study. The stan-

dard methods employeed to remove seasonality in the data published by the US Census Bureau are the Census X-12 seasonal methods known as sum and multiplier shapes, which are emphasized by Alper and Aruoba (2001). In this study, the standard Census X-12 procedure developed by the "U.S. Department of Commerce and U.S. Census Bureau" is utilized with Eviews software. Time series include components such as trend, seasonal variations, cyclical volatilities and random flows. These components affect the stationarity of the series. After determining which component is under the influence of which component, adjustments should be made and then the series should be analyzed. In econometric studies with time series, determining the stationarity of the series is an important condition for stable forecasts.

Table 2

Descriptive Statistics Related to Variables

Statistics	SBUY	SSAY	PPAY
Average	15.15811	5934847.	15.95179
Median	8.665000	5652687.	15.10000
Maximum	91.13000	11005825	28.92000
Minimum	-4.800000	2892059.	11.67000
Standard Deviation	20.84933	1990404.	3.192166
Skewness	2.625672	0.619321	1.400595
Kurtosis	8.849170	2.603098	5.243766

According to Table 2, the mean value of the SBUY variable is approximately 15,15. this variable also has a standard deviation of 20,84. The mean value of the SSAY variable is approximately 5934847 and its standard deviation is 190404. Finally, the mean value of the PPAY variable is approximately 15,95 and its standard deviation is 3,19.

4.2. Stationarity Analysis

Granger and Newbold (1974) stated that the analysis of non-stationary time series may lead to the problem of spurious regression. Therefore, stationarity is a significant concept in the analysis of time series. It is necessary to examine the time series characteristics of the variables to be employed in the analysis and to examine the relationship between the variables.

The concept of stationarity refers to the situation where the means and variances of time series are constant and the covariance depends only on their time differences. A unit root test can be applied to analyze the statistical relationship between two-time series. If the series analyzed are stationary to the same degree, a real relationship between these series is assumed and they are said to be "cointegrated series" in regression. This means that the regression is valid.

When a time series is integrated of degree d and denoted as I(d), it is stated that the series will become stationary after being differenced d times. The Extended Dickey-Fuller (ADF) (1981) and Phillips-Perron (PP) (1988) tests are commonly utilized to assess the stationarity of time series.

In the tests conducted in the study, the "with constant" model, the "without constant" model and the "with trend and constant" model were employed to determine the stationarity of the series. As a result of this analysis, it was found that the analyzed series were not stationary at their level values. Accordingly, the first differences of all series were calculated, thereby establishing that all series were stationary.

Table 3

Stationarity Test Results

Variable	ADF Test		PP test	
	Level	First order difference	Level	First order difference
	Trend+Constant	Fixed	Trend+Constant	Constant
SBUY	-1.012 (0.390)	-8.913(0.000)*	-1.198(0.402)	-9.314(0.000)*
SSAY	-1.256 (0.152)	-7.566(0.002)*	-1.415(0.276)	-8.388(0.009)*
PPAY	-0.975 (0.475)	-5.345 (0.000)*	-1.108 (0.124)	-7.490 (0.000)*

*Stationary variable according to MacKinnon (1996) table

During the stationarity analysis of the variables, trend and constant components are included in the model as long as they are significant. In the choice of lag length, the minimum lag length at which autocorrelation decreases was preferred. The values in parentheses denote p-values.

According to the ADF and PP stationarity test results for SBUY, SSAY and PPAY variables in Table 3, the series are stationary at first difference, i.e. I(1). In line with these results, the cointegration test developed by Johansen (1988) was applied to determine the existence of a long-run relationship between the variables. For the estimation of the model, the optimal lag length was determined based on different criteria before the co-integration test.

4.3. Cointegration Analysis

Correctly determining the lag length is critical for cointegration analysis. The results of the criteria employed to determine the lag length in Eviews 13.0 are presented in Table 4.

Table 4

Lag Length Criteria Results

Lag Length	LogL	LR	FPE	AIC	SC	HQ
0	-2228.475	NA	1.20e+16	45.54031	45.61944	45.57232
1	-1931.183	570.3151	3.35e+13	**39.15680***	**39.97333***	**39.18483***
2	-1916.391	**27.47160***	**2.98e+13***	39.53859	40.09251	39.76264
3	-1913.540	5.119670	3.38e+13	39.66409	40.45540	39.98416
4	-1910.232	5.739559	3.81e+13	39.78024	40.80895	40.19633
5	-1905.192	8.434373	4.15e+13	39.86105	41.12716	40.37317

* Selected lag length
LR LR test statistic
FPE Final Prediction error statistic
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ Hannan-Quinn information criterion

As can be seen from Table 4, AIC, SC, and HQ indicate acceptability for lag "1". Therefore, the cointegration equation will be examined for lag "1". Since all series are I(1), the cointegration relationship can be examined employing the Johansen method. According to the λ trace statistic, the null hypothesis (r=0) is rejected since there is no cointegration relationship between the variables considered. Because the λ trace value is greater than the 5% critical value. At the 5% critical value, the existence of a minimum cointegration link should be confirmed. The results of the trace (λt race) and maximum eigenvalue (λ max) tests required to determine the existence of cointegration and the number of vectors are presented in Table 5.

Table 5

Johansen Cointegration Test Results

Cointegration Test According to Trace Statistic				
Hypotheses	**Eigenvalue**	**Trace Statistic**	**5% Critical Value**	**Prob.**
r = 0	0.326660	37.96724	29.79707	0.0046
r ≤1	0.190595	13.44595	15.49471	0.0994
Cointegration Test According to Maximum Eigenvalue Statistic				
Hypotheses	**Eigenvalue**	**Maximum Eigenvalue Statistic**	**5% Critical Value**	**Prob.**
r = 0	0.326660	24.52129	21.13162	0.0160
r ≤ 1	0.190595	13.11024	14.26460	0.0755

According to the Table 5, the results of the Johansen cointegration test are rejected by the Trace statistic and the Maximum Eigenvalue test statistics against the null hypothesis that there is no cointegration relationship (r=0) and the alternative hypothesis that there is a minimum cointegration relationship (r≥1). The null hypothesis that there is a maximum of one cointegration relationship between the variables (r≤1) is accepted against the alternative hypothesis that there are at least two cointegration relationships (r≥2). This indicates the presence of a cointegration vector in the model, which implies the existence of a long-run relationship. This means that there is a long-run relationship between these variables and they move together. The coefficient values of the aforementioned relationship are indicated by the normalized equation coefficients.

Table 6

Normalized Cointegration Equation Results

Log Likelihood Value : -2008.498			
Normalized Cointegration Coefficients			
FSBUY	FPPAY	FSSAY	FDMY
1.000	0.234*	0.315*	1.185*
	(0.012)	(0.026)	(0.207)

*Note: Statistically significant variable for *0.05, "F" denotes first order difference.*

According to Table 6, statistically significant results were obtained for all of the stimulus variables considered as basic in the model ($p<0.05$). According to the results of the normalized equations with changed signs, a 1% increase in the PPAY variable will lead to a 23.4% increase in the SBUY variable. A 1% increase in the SSAY variable will lead to a 31.5% increase in the SBUY variable. Looking at the coefficient magnitudes, the number of policyholders has a greater impact on the insurance sector growth rate than the market share. It is determined that the DMY variable has a significant positive effect on the insurance sector growth rate in the pre and post-COVID-19 periods. It is determined that the COVID-19 effect plays a contributory role in the growth of the sector.

Accordingly, the weak exogeneity test is utilized to identify whether the appropriate normalization has been performed. Table 7 demonstrates the results of the weak exogeneity test.

Table 7

Weak Exogeneity Test Results for Variables

Variables	LR Test (chi-square)	p
SBUY	26.742	0.001
PPAY	1.597	0.167
SSAY	1.091	0.259

As seen in Table 7, the likelihood ratio (LR) test rejects the H0 hypothesis "weakly exogenous" for the dependent variable SBUY at the 5% significance level, but is accepted for the independent variables PPAY and SSAY. In this case, it can be stated that the SBUY variable is endogenous but the main independent variables such as PPAY and SSAY are weakly exogenous. This proves the validity of the interpretations about the cointegration vector of the SBUY variable as a dependent variable.

4.4. Error Correction Model (VECM)

The Engle-Granger approach is a methodology employed to identify cointegration between two specific variables. According to this approach, there is a vector error correction mechanism (VECM) to correct short-run imbalances. In addition to the long-run equilibrium model, which is usually recommended in causality tests, a short-run error correction model is also recommended. These two models provide the possibility of combining long-run relationships between variables (equilibrium relationships) as well as short-run adjustment behavior (imbalances).

Error correction models are utilized to determine the existence of a short-run relationship between the variables. The results are presented in Table 8.

$$\Delta SBUY_t = \beta_0 + \beta_1 \Delta PPAY_t + \beta_2 \Delta SSAY_t + \beta_3 DMY + \beta_4 \Delta ECT_{t-1} + v_t \quad (1)$$

Table 8

Short Run Error Correction Model Estimation Results

Dependent Variable: $\Delta SBUY_t$	**Coefficient**	**Std. deviation**	**t-Statistic**	**Probability**
$\Delta PPAY_t$	0.197	0.025	7.881	0.000*
$\Delta SSAY_t$	0.296	0.042	7.047	0.000*
DMY_t	0.991	0.184	5.385	0.002*
ECT_{t-1}	-0.412	0.071	-5.802	0.000*
Intercept	1.375	0.170	8.088	0.005*
Diagnostic tests: R^2 =0.734, *Adj.* R^2 =0.729, *F-statistic=34.56, F =0.*000, ***Breusch-Godfrey LM Test*** = 0.153 ***White Test*** =*0.*120 ***Ramsey RESET Test*** = 0.**137** **JB test** =0.284				

*Notes: * denotes statistical significance at 5% significance level, JB; Jarque-Bera normality test p-value. Autocorrelation and heteroscedasticity problems in the estimations are addressed using the Newey-West method.*

According to the results in Table 8, the coefficient of the error correction term is negative and statistically significant. This indicates that the error correction mechanism of the models is active. In line with these results, it is observed that 41.2% of the short-run deviations between the long-run co-moving series are eliminated and the series approach the long-run equilibrium value again. In other words, the short-run deviations (41.2% of each month) are expected to be eliminated and the variables are expected to approach the long-run equilibrium value again. The effect of a shock is estimated to last 1/0.412=2.42 periods (months) after its entry into the system. This is evident from the fact that the long-run effect values (coefficients of cointegration equation) are large while the short-run effects are small.

The tests for the error correction model demonstrate that the model is significant, there are no autocorrelation and heteroscedasticity problems, and there are no model identification errors (specification test). In sum, the expected results are obtained.

4.5. Granger Causality Test

Another analysis performed within the scope of the analysis is the Granger Causality Test. The concept of causality statistically refers to the fact that the estimated future values of a time series variable are obtained by being influenced by the past values of itself or another related time series variable (Işık et al., 2023: 1406). Granger causality means that a variable X causes another variable Y in the Granger sense if Y is estimated by using only the past values of X when the information in both X and Y is given. In other words, variable X causes variable Y in the Granger sense if knowledge of past values of variable X allows for a more precise prediction of Y. Causality in the Granger sense can be both from X to Y and from Y to X. This is known as bidirectional causality. When the p-values in the Granger Causality Test are greater than 0.05, causality link between the series cannot be mentioned. The results of the Granger Causality Analysis for the series employed in the existing work are indicated in Table 9.

Table 9
Granger Causality Test Results

Null Hypotheses:	F-ist	p	Decision
FSBUY variable is not the Granger cause of FPPAY variable	7.534	0.002	Causality exists
FPPAY variable is not the Granger cause of FBUY variable	8.595	0.018	Causality exists
FSBUY variable is not the Granger cause of FSSAY variable	6.522	0.000	Causality exists
FSSAY variable is not the Granger cause of FBUY variable	9.103	0.022	Causality exists

As can be seen from Table 9, there is a bidirectional causality relationship between the SBUY variable and PPAY (SBUY↔PPAY). This indicates that both the past values of the SBUY variable affect the current value of the PPAY variable and the past values of the PPAY variable affect the current value of the SBUY variable. Likewise, there is a bidirectional causality relationship between the SBUY variable and SSAY (SBUY↔SSAY). In other words, both the past values of the SBUY variable affect the current value of the SSAY variable and the past values of the SSAY variable affect the current value of the SBUY variable.

6. CONCLUSION

Insurance is an assurance service provided to both firms and individuals in return for a certain premium in order to cover their losses that may occur as a result of risks. Especially in the field of health, it is important for individuals to feel secure. Health is one of the most fundamental elements of human life and is indispensable for living a quality life. Although individuals do everything they can to be healthy, some undesirable situations may occur. An example of this is the recent COVID-19 pandemic worldwide. Because dealing with health problems can be difficult for individuals. Health insurance is a type of insurance that individuals can secure against health risks by paying a certain premium. With this insurance, insured individuals can cover their health expenses up to the limits specified in the policy. The importance of health insurance has become even more evident, especially in emergencies such as pandemics. Insurance companies have expanded their insurance policies to cover losses that may occur during the pandemic period. As a result, trust in insurance companies has increased and encouraged sectoral growth.

This study analyzes the interaction between the number of insured and market share of the insurance sector in the health branch and the growth of the insurance sector during the COVID-19 period. In the study, Granger Causality Test is applied in the light of monthly data between January 2015 and October 2023. Factors such as trend and seasonal effects in the data were removed, the trend effect was examined by performing stationarity analysis and the variables were made stationary. The long-run relationship is examined by cointegration analysis and the lag length is taken into account. The

results show that market share and the number of policyholders affect growth in the insurance sector, but the number of policyholders is more influential on growth. COVID-19 was found to have a positive effect on growth in the insurance sector. The relationship between growth and other variables is analyzed with the weak externality test. In the short run, a negative but significant relationship was found between the variables. Finally, causality analysis was conducted and a bidirectional causality relationship was found and it was concluded that both independent variables (number of policyholders and market share) and the dependent variable (growth rate of the insurance sector) affect each other.

The demand for health insurance increased during the pandemic period. This is because individuals have become more worried about their future. The growth in the insurance sector was also confirmed by analyzing the data before and after the pandemic. The pandemic period has been a period of positive growth for the insurance sector, and it is important to increase the number of insured and market share to maintain this growth. In addition, taking into account the developments in the sector and the use of technology, insurance awareness should be increased and companies should improve themselves in this area. In this way, growth in the insurance sector will also contribute to the economy and increase national income.

As a result of the study, some recommendations for the health sector of the insurance industry after COVID-19 may be as follows:

• Flexible Policies and Comprehensive Protection The COVID-19 pandemic has changed the need and expectations for health insurance. Therefore, insurance companies can offer more flexible policy options to their customers. For example, they can develop policies that cover telemedicine services or provide additional protection in pandemic situations.

• Digital Transformation: Demand for digital healthcare services has increased during the pandemic. Insurance companies can adapt to this trend by supporting online health counseling, tele-medicine services and digital prescription applications.

• Health and Wellness Programs: Insurance companies may offer health and wellness programs to support the health of their customers. These programs can be designed to promote healthy lifestyles, increase access to preventive health services and help manage chronic diseases.

• Risk Assessment and Pricing: Given that COVID-19 may affect health insurance risk profiles, insurers may review their risk assessment and pricing strategies. For example, they may adjust premiums to account for increased post-pandemic healthcare costs.

• Crisis Management and Communication Strategies: In the event of future pandemics or emergencies, customers should be provided with crisis management and communication strategies related to health insurance. This can keep customers informed, address their concerns, and increase the credibility of insurance companies.

• Public-Private Partnerships: Insurance companies can collaborate with governments and health organizations to develop joint projects to protect public health and increase access to health services. These collaborations can enable a more effective response in crisis situations.

These recommendations can help insurers adapt to the post-COVID-19 era and meet the changing needs of their customers.

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