

THE EFFECT OF THE COVID-19 PANDEMIC ON MACROECONOMIC INDICATORS: QUADRUPLE HELIX MODEL FOR TURKEY CASE STUDY^{ab}

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Abstract: *There are different crisis periods in the world that significantly affect financial and economic markets and require some transformations. In these crisis periods, countries re-transform their financial and economic structures in line with the dimensions and effects of the crisis. In this context, countries implement different financial and economic policies such as supplying resources to the market, changing interest rates, trying to increase or decrease the inflation rate, and intervention in the markets. The COVID-19 pandemic, which emerged at the end of 2019 and made itself felt significantly in the first quarter of 2020, emerged as one of the different crises faced by countries in the world, and its effects were much larger and more inclusive. With the emergence of the pandemic, all countries started to implement financial and economic policies to reduce the effects of the pandemic, while trying to balance their existing financial and economic markets. Countries have had to create very inclusive financial and economic policies, especially due to the supply and demand-side shocks created by the pandemic, the slowdown in working life due to quarantine periods, and the fact that some sectors have come to a standstill. In this study, the effects of the Covid-19 pandemic on Turkey's macroeconomic indicators will be examined and evaluated comparatively according to the Quadruple Helix Model.*

Key words: COVID-19; macroeconomic indicators; quadruple helix model; Turkey.

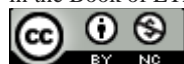
JEL Classification Codes: E20, E40, O10

1. INTRODUCTION

The COVID-19 pandemic, which came to the agenda as of the end of December 2019 and showed a great spread with the first quarter of 2020, deeply affected all countries. The emergence of the pandemic in a period when the economies of developed and developing countries followed a fluctuating course, led to the formation of a different scenario all over the world. With the announcement of the first case in Turkey as of March 2020, changes have begun

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to occur on Turkey's main macroeconomic indicators, with the impact of both national and international economic markets.

The fact that financial, economic and financial markets are in the key sector position and are in intense interaction with all other sectors result in the potential negative effects that may occur have a greater impact than expected. With the emergence of the pandemic, the health and tourism sectors of the countries have entered a period of intense negative pressure. The existence of the deadly risk posed by the pandemic has caused the tourism industry to come to a standstill for all countries. The negative impact of the tourism sector, which is a key source of income for the country's economies, especially employment, construction, food, transportation, etc. also hits the industry hard. Therefore, the fact that the tourism sector has come to a standstill during the pandemic process has caused a great decrease in the business volume in other sectors.

The biggest output of the negative impact of the pandemic process on the aforementioned sectors is the negative impact of the employment level of the country. While countries are expected to create new employment opportunities every year during their growth processes, with the emergence of the pandemic process, new employment levels could not be created and the existing employment level decreased. The fact that the sectors were directly and/or indirectly affected by the pandemic and there was an intense contraction in the demand level, which varies relatively according to the sector, caused the companies working in the relevant sectors not to create new employment opportunities, but also to reduce the number of existing employees. This situation, in turn, increases the demand contraction in the country's economy, because the loss of existing income of individuals leaving the labor market leads to a decrease in the level of extra demand.

Even people and companies that can maintain their income levels during the pandemic process have started to adopt a more cautious behavior in line with the uncertainty of the process and the expectation of a relatively long time. Individuals reduce or cut completely their expenditures other than basic / compulsory needs and expenditures. With the increase in the perceived risk level in environments of uncertainty, individuals tend to create and/or increase savings. This situation automatically narrows the demand level in the market and reduces the income of the sector companies. Firms with a decreasing income may choose to reduce the number of their employees because their price increase will have a leveraged effect on demand contraction. Therefore, a negative cycle begins to occur between the decrease in income caused by the decrease in demand and the corresponding decrease in the employment level.

With the negative pandemic effect in terms of companies and individuals, aid packages of countries have begun to be announced. Especially the new aid packages announced by developed countries and the effect of these packages have led to the formation of a new story in the world economy. With the aid packages offered by the United States and European Union countries being at very high levels, the level of liquidity and resources in circulation in the world has reached very high levels. On the one hand, this situation created a positive situation for the company and its individuals, on the other hand, it resulted in the formation of an inflationary effect or an increase to a great extent. With its very high circulating resource and the risk level created by the pandemic, some resources are directed to different investment alternatives, while some resources continue to wait at the expense of negative interest.

Along with the positive developments in the course of the pandemic, the perceived risk level in the markets began to decrease, and the risk appetite of individual and company-based investors began to increase. With the resources created by the aid packages, many different investment alternatives have started to emerge and the flow to the financial markets has started to increase. In addition, individuals start to increase their spending tendencies again, tourism, etc. With the reopening of the sectors, the contraction in demand that occurred in the past began to dissolve and an excessive demand began to emerge. This situation has started to create a direct

inflationary effect. In order to reduce the inflationary effect, which is a negative macroeconomic factor in terms of national economies, increases in interest rates have started to come to the fore in developed and developing countries. Due to the relationship between inflation and interest rate, which is of great importance in terms of the real interest level expected to be obtained from investments, countries have started to create and implement policies in the direction of regulating these macroeconomic factors.

Thanks to this study which is part of the PandeVITA Project funded by European Union, PandeVITA platform will produce comprehensive information about the interactions between society which is the dimension of Quadruple Helix model and economy / finance. The platform will also generate some policy implications.

2. THE ROLE OF QUADRUPLE HELIX MODEL FOR TURKEY CASE STUDY

In this study, the effects arising from the interaction of the main macroeconomic indicators presented above were examined in terms of Turkey and evaluations were made according to the Quadruple Helix Model. Below are the four main-dimensional interactions covered by the Quadruple Helix model (Schutz et al., 2019) which are government, industry, university and society. The government dimension plays an active role in the process of formulating and implementing activities, management processes and policies. The industry dimension is the main key factor in achieving economic growth. The university dimension expresses the behavior towards the formation of scientific and technological knowledge. The community dimension represents the needs/demands of the citizen.

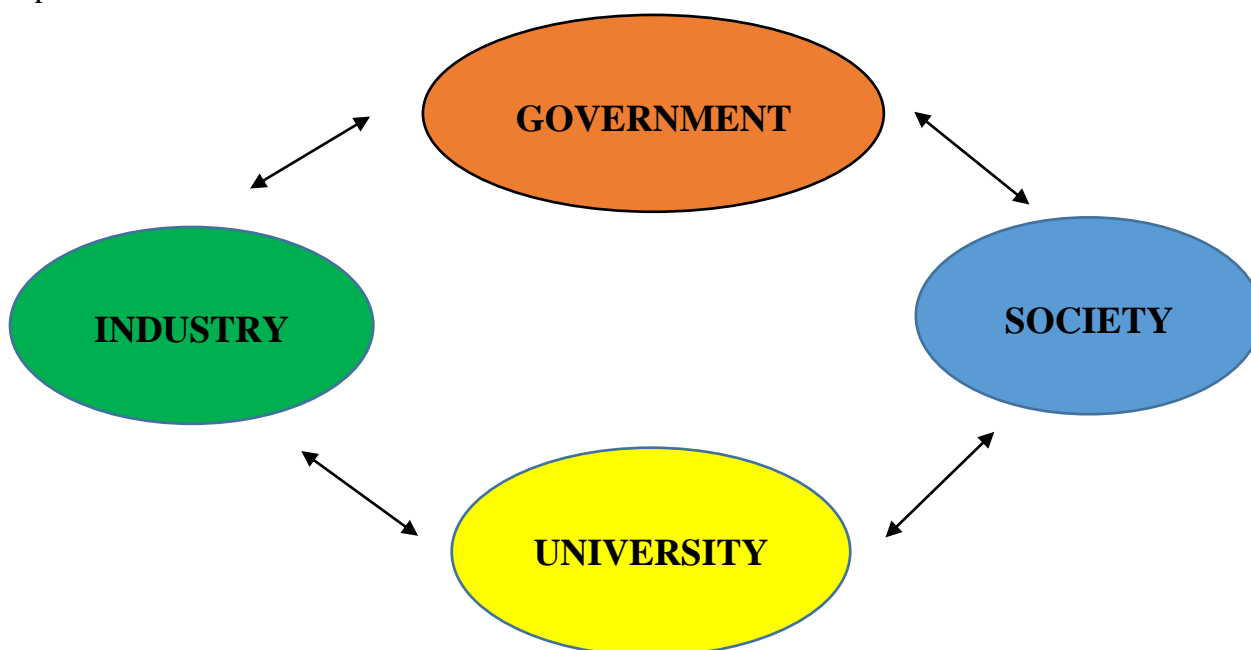


Figure no. 1 Quadruple Helix Model

Source: Authors' own processing based on the literature given above.

During the formation of the Quadruple Helix model, the Triple Helix Model was first introduced. The Triple Helix model put forward by Etzkowitz & Leydesdorff (1996) has the potential to provide innovation to traditional stakeholders in the industry sector and to create knowledge by sharing. The interaction between the three main dimensions based on this model is emphasized. These main dimensions are; academia, industry, and government. Based on this model, the Quadruple Helix Model was created by increasing the number of dimensions and creating a new stakeholder process. The new dimension added here has been society (Tarator et al., 2021). In this study, the interaction between the effects of economic/financial

macroeconomic policies that emerged in line with the COVID-19 pandemic and the "Government" dimension in the Quadruple Helix model has been revealed and the interactive model created is presented below.

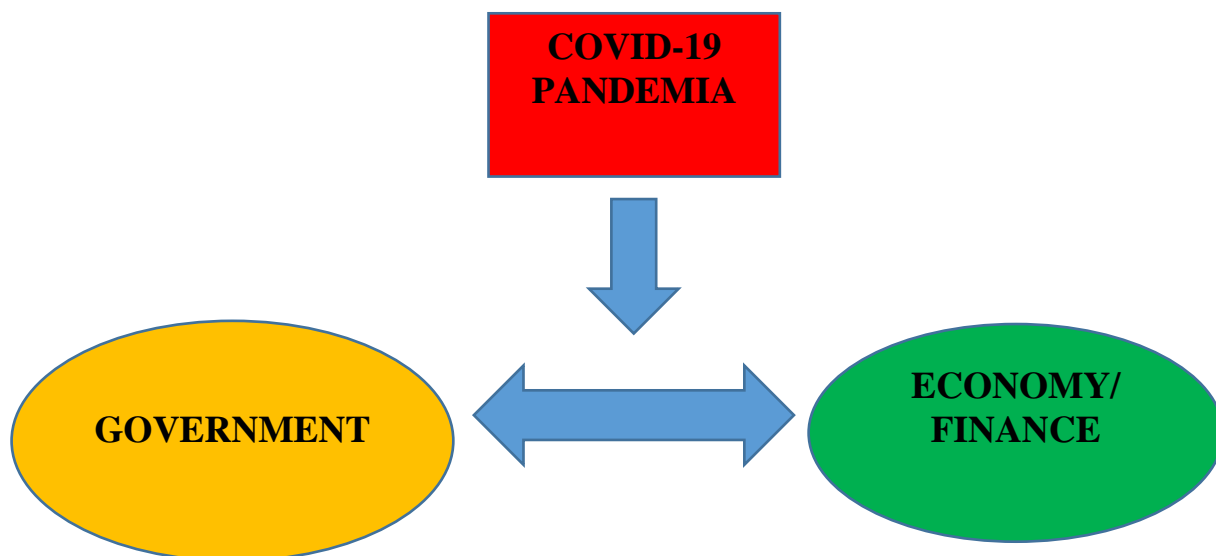


Figure no. 2 PandeVITA case study concept (Government and economy/finance)

Source: Authors' own processing based on the literature given above.

With the emergence of the COVID-19 Pandemic in Turkey and the emergence of its effects, the interaction of the government's policies and practices with the country's economic and financial markets and the results are discussed. Within the scope of this process, the study was shaped in line with the main macroeconomic factors that are based on the whole world and included in the comparative indicators. Comprehensive and up-to-date statistics on this subject, and other data were obtained from the websites of Turkish Statistical Institute (TURKSTAT), Central Bank of the Republic of Turkey (CBRT), Presidency of the Republic of Turkey Strategy and Budget Department (PRTSBD). In this direction, the case study based on the main macroeconomic variables: labor force, inflation rate, policy interest rate, economic confidence index, consumer confidence index, real sector confidence index and gross domestic product.

3. EFFECTS OF THE PANDEMIC PROCESS ON MACROECONOMIC INDICATORS

In terms of Turkey, which is among the developing countries, the effect of the pandemic process has been examined and evaluated separately in terms of basic macroeconomic factors. First of all, the effects of the pandemic process in terms of employment level were examined and the basic data on the employment factor are presented in Table 1 below.

Table No. 1. Seasonally Adjusted Status of Labor Force

Period	Rate of Participation to the Labor Force (%)	Employment Rate (%)	Unemployment Rate (%)
December 2019	52.3	45.4	13.1
January 2020	51.8	45.2	12.8
February 2020	50.9	44.4	12.8
March 2020	49.2	42.7	13.1
April 2020	47.7	41.1	13.7

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May 2020	47.8	41.1	13.9
June 2020	48.6	41.8	14
July 2020	49.2	42.6	13.5
August 2020	49.5	43	13.2
September 2020	49.6	43.2	12.8
October 2020	49.5	43.2	12.9
November 2020	49.4	43.1	12.9

Source: (TURKSTAT, 2021)

When Table 1 is examined; As of December 2019, when the pandemic emerged and its effects began to spread, and in the first quarter of 2020, it is seen that a negative course in the employment rate began. The employment rate, which was 45.4% in the period of December 2019, started to decrease with the negative effects of the pandemic process and decreased to the minimum level especially in the April-May 2020 period. Unemployment level and labor force participation rate levels also seem to support the trend in the employment rate, and it is seen that the unemployment rate decreased to the lowest level in the January-February 2020 period, when the pandemic process first showed its effects.

Table No. 2. Inflation Rate

(Annual Change–Change Compared to the Same Month of the Previous Year)

Period	Inflation Rate (%)	Period	Inflation Rate (%)
December 2019	11.84	January 2021	14.97
January 2020	12.15	February 2021	15.61
February 2020	12.37	March 2021	16.19
March 2020	11.86	April 2021	17.14
April 2020	10.94	May 2021	16.59
May 2020	11.39	June 2021	17.53
June 2020	12.62	July 2021	18.95
July 2020	11.76	August 2021	19.25
August 2020	11.77	September 2021	19.58
September 2020	11.75	October 2021	19.89
October 2020	11.89		
November 2020	14.03		
December 2020	14.60		

Source: (TURKSTAT, 2021)

When Table 2 is examined; As of December 2019, when the existence of the pandemic emerged, the inflation rate in Turkey is at the level of 11.84%. It is observed that the level of increase in price levels, which started to show its effects in the second quarter of the year as a result of the contraction in demand in the first quarter of 2020, when the pandemic began to make its presence felt in Turkey, started to decrease and went down to 10.94%. The inflation rate, which was around 12% on average until the end of the year, started to increase towards the end of the year. Finding the vaccine for the pandemic, the relaxation of the measures, etc. With the sudden opening of demand along with the processes, the rate of price increase increased and inflation started to show an increasing trend both in the world and in Turkey in 2021. As can be seen in the table, the inflation rate, which was 14.97 at the beginning of 2021, reached 19.89% as of October 2021.

Table No. 3. CBRT Policy Rate (1-Week Repo Rate)

Date	Interest Rate (%)
13.12.2019	12.00
17.01.2020	11.25
20.02.2020	10.75
18.03.2020	9.75

23.04.2020	8.75
22.05.2020	8.25
25.09.2020	10.25
20.11.2020	15.00
25.12.2020	17.00
19.03.2021	19.00
24.09.2021	18.00
22.10.2021	16.00
19.11.2021	15.00

Source: (CBRT, 2021)

When Table 3 is examined, the policy interest rate applied in Turkey at the beginning of the pandemic process and which has an effect on the formation of banks' loan interest rates is 12%. With the effect of the pandemic process, a slowdown in the economic system began to occur, a decrease in the policy interest rate in order for the markets to be revived with the emergence of related decreases in income and employment, for companies to continue their activities by providing cheaper resources / loans, and for individuals to continue their economic activities. the trend has started. Especially in the period of March 2020, when the pandemic made its presence felt in Turkey, interest rates decreased to single digits and continued at a rate of 8.25% until September 2020. As of September 2020, the phenomenon of inflation has started to make itself felt with the effect of the excessive printing process and aid packages in the world. Due to this process that emerged in Turkey, a process of increase in policy interest rates was again entered and the interest rate reached 19% by the end of the first quarter of 2021. Especially in 2021, the improvement that emerged as a result of the discovery of the vaccine and the intensification of the increase in the demand level made the existing inflation phenomenon even more effective and interest rates all over the world entered the process of increase. However, due to the interest phenomenon that emerged, a new economic policy was started to be followed for the process of increasing the costs of the economic system on an interest basis, closing the current account deficit and balancing the inflation, and the process of decreasing interest rates started again. The interest rate, which was 19% in March 2021, decreased to 15% in November 2021.

Table No. 4. Economic/Consumer/Real Sector Confidence Index

Period	ECI	CCI	RSCI	Period	ECI	CCI	RSCI
2019.09	92.8	77.7	99.7	2020.11	95.9	80.1	107.4
2019.10	96.1	78.5	104.2	2020.12	94.7	80.1	110.4
2019.11	96.9	81.3	105.9	2021.01	96.2	83.3	109
2019.12	99.2	80.7	108.7	2021.02	95.8	84.5	108.7
2020.01	99.3	81.4	106.4	2021.03	98.9	86.7	110.2
2020.02	98.4	79.6	106.7	2021.04	93.9	80.2	107.4
2020.03	94.8	81.1	98.6	2021.05	92.6	77.3	107.1
2020.04	58.4	78.1	62.3	2021.06	97.8	81.7	109.8
2020.05	69.0	82.7	73.5	2021.07	100.1	79.5	112.1
2020.06	81.2	82.7	89.8	2021.08	100.8	78.2	112.2
2020.07	90.1	82.3	99.4	2021.09	102.4	79.7	113.3
2020.08	92.3	79.4	105.2	2021.10	101.4	76.8	111.3
2020.09	94.3	82	105.7	ECI	Economic Confidence Index		
2020.10	97.2	81.9	109.7	CCI	Consumer Confidence Index		
Source: TURKSTAT (2021)				RSCI	Reel Sector Confidence Index		

Table 4 presents the basic indicators that reveal how well the functioning of the country's economies are functioning and the expectations regarding the future economic performance process. First of all, the economic confidence index reveals a general reflection of the performance level of the segments (consumers, real sector, sectors, etc.) involved in the entire

economic process. This economic confidence index, which is formed in the process, shows a tendency to develop together with both consumer and real sector confidence indices through the mutual interaction process. As of December 2019, when the pandemic process first emerged and announced in the world, the economic confidence index is 99.2, the consumer confidence index is 80.7 and the real sector confidence index is 108.7. With the effect of the pandemic in Turkey in the following time period, especially as of March 2020, when the first case was announced, the economic confidence index and the real sector confidence index started to decline, but this situation was not immediately reflected in the consumer confidence index. As of April 2020, a decreasing trend emerged in the consumer confidence index, and significant decreases began to occur in the other two index levels. In the process that develops towards the summer months, for individuals and companies; With the announcement of incentives to stop the economic slowdown and to increase production and demand again, a positive upward trend started to emerge from all three index levels. As of the end of 2020, the increasing trend in the recovery rate, which occurred with the discovery of the vaccine and its distribution and application in 2021, continued its process by showing fluctuations in increasing and decreasing directions with the increase in the variants that emerged during the year and especially in the inflation rates.

Table No. 5. Gross Domestic Product (2019-2021)

Year	Quarter	GDP (Million \$)	%
2019	I	172,470	-2.5
	II	175,523	-1.6
	III	204,059	1.0
	IV	208,303	6.0
	Total	760,355	0.9
2020	I	176,200	4.4
	II	152,585	-10.4
	III	196,582	6.3
	IV	191,535	6.2
	Total	716,902	1.8
2021	I	188,455	7.2
	II	188,566	21.7

Source: (PRTSBD, 2021)

When Table 5 is examined, the results of the interaction between the growth rate and the pandemic process in Turkey are clearly seen. After the first quarter of 2020, when the pandemic process started to take effect, and especially in the second quarter, there was a decrease of -10.4% compared to the second quarter of 2019. After this high level of decrease in the growth rate, with the effect of the announced incentive and aid packages and the activity in the tourism sector, recovery started again and positive growth rate data began to be obtained. Both the negative growth rate (-10.4%) in the second quarter of 2020 and the positive and high growth rate (21.7%) data in the second quarter of 2021 clearly reveal the impact of the pandemic process on Turkey's economic growth level.

4. CONCLUSIONS

There are systematic risks that need to be managed well in order for the economies of the countries to follow a stable course. Such risks that may arise can have knock-on effects on the main macroeconomic factors of countries. As a result of the economic policies that are tried to be planned and implemented at an optimal level, countries can manage the risks that may arise and even turn them into opportunities for themselves, or they can be caught off-guard and fall into a difficult situation in terms of their basic economic indicators. With the COVID-19 pandemic that emerged as of December 2019, countries all over the world have faced a very different risk

factor. Production, supply, demand, etc., which are the basic elements of the economy. After the pandemic, which directly and deeply affected its factors, a vicious circle began in the form of a decrease in the income of the companies, a decrease in the employment level, and a decrease in individual incomes in this direction, together with the great contraction in the demand level. With this negative interaction within the scope of the main sectors that make up the country's economies, aid and incentive packages have started to be announced intensively and at different levels for the implementation of very different and new economic policies and the continuation of the economy's functioning. The emergence of the pandemic and the onset of its effects, the discovery of the vaccine by the end of 2020, the evolution towards a positive course, and the subsequent emergence of different virus variants created the same fluctuating effect on the macroeconomic factors of all countries.

In this study, the effects of the fluctuating course of the pandemic process on the economies on the basic macroeconomic indicators of the Turkish economy were evaluated. The negative pandemic effect in the world showed itself as of March 2020, when cases started to emerge on Turkey's main macroeconomic factors. The development of the pandemic process, the great uncertainty about how it will evolve in the future, and the emergence of new variant formations may reveal the judgment that the fluctuating effect may continue in terms of basic macroeconomic factors both in the world and in Turkey.

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