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Chapter

Relationship between Economic Growth, Unemployment, Inflation and Current Account Balance: Theory and Case of Turkey

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Abstract

The relations between economic growth, unemployment, inflation and current account balance are analyzed theoretically and different comments on theoretical approaches are discussed in the study. Accordingly, while the unemployment-inflation relationship is considered with Phillips analysis and the scope of the growth-unemployment with Okun Law, the interaction between the current account balance and growth is shown with the equality of national income accounting. After the theoretical approaches described in detail with shared data and interpreted for Turkey. This study also examines the relation between the unemployment, inflation, economic growth, current account deficit with symmetric and asymmetric reserved causality tests were examined for the 2000Q1 – 2020Q4 period. The asymmetric hidden causality relationships between the series were researched with Hatemi-J (2012) method based on Toda-Yamamoto (1995) test in this study. When the relationship between the growth rate and the unemployment rate are examined between these years in Turkey it is observed that there is an inverse relationship between growth and unemployment, especially during crisis periods. After that to find this relationship we used symmetric and asymmetric causality. As a result of the estimates growth also has a one-way symmetrical causality relationship from negative shocks to negative inflation shocks. When the relationship between them is viewed only with one-way or two-way causality, there may be no relationship so the causality must be checked asymmetrically even to catch the assumption of the Okun's law correctly for Turkey.

Keywords: Phillips curve, Okoń law, growth, asymmetric and symmetric causality

1. Introduction

The economic growth, unemployment, inflation and current account balance are the most important variables that show the performance of an economy. The quality of the relationship between these variables is extremely important when the applying economic policies. Thus there may be harmony or contradiction between the policies to be implemented on the issues. In other words, unemployment policies for economic growth also lead to a decrease in unemployment, while trying to lower inflation could put negative pressure on unemployment. Therefore the

alignment or contradictions between the intended objectives and the instruments to be implemented should be taken into account when making policy proposals. In this study, the relations between growth, unemployment, inflation and current account are first discussed in theoretical terms and it is examined whether these theories are valid or not in the case of Turkey.

Accordingly, the Phillip curve analysis, which explains the nature of the relationship between unemployment and inflation, was analyzed in detail by comparing interpretations of different economic approaches. In the case of inflation, the demand-side policies will have an effect on these variables. In contrast, according to the Monetarist and New Classical approach, demand-side policies are ineffective and therefore unnecessary. In more accurate terms, the relationship between unemployment and inflation is temporary in the short-term because both variables may change in the same direction in the long term. After this topic was discussed in the first part of the study after then the case of Turkey was examined and discussed.

Another theoretical approach that attempts to explain the relationship between macroeconomic variables analysis are known as Okun's law. The Okun's law suggests an inverse relationship between the growth rate and the unemployment rate. In the one study is determined by Okun with regression analysis between 1947 and 1960. This law that explained every %1 growth rate in the United States reduced the decreased the unemployment rate 0.5% points. However, the growth rate must exceed a certain level and average or trend growth rate in order to affect unemployment. Although the Okun's law is tested for different countries which are generally verified the nature of this relationship varies considerably from country to country.

The Okun's law was explained in details in the second section and its validity was tested for Turkey in the last section with symmetric and asymmetric causality. The another important indicator of a country's economic performance in macroeconomics is the current account balance. There is a very close relationship between the current account deficit and the growth rate which has become an important problem especially for developing countries.

In the many literature of econometric studies based on the relationships between economic growth, current account deficit, inflation and unemployment have also been conducted. In their study, [1] conducted the necessary econometric analyzes to determine the relationship between the variables using the monthly data 2007–2014 economic growth, unemployment and inflation. In the study under discussion, there is a causality analysis between the current account deficit, inflation problem and growth [2]. The study [3] Brazil, Russia, India, using annual data for the period 1993–2011 belong to China and Turkey, the panel analyzed the causal relationship between the current account deficit and inflation method. The relations between Azerbaijan, Kazakhstan, Kyrgyzstan, Macedonia and Turkey for the period 1996–2012 using data on inflation and unemployment with panel cointegration analyze and causality tests [4]. They are studied causality and vector error correction model between inflation, economic, growth and unemployment in North African Countries [5]. In the study the inflation and economic growth are taken for Nigeria with regression analysis. They studied the inflation, economic growth, unemployment relationship with Var analysis for Iraq. In this study, the relationship between the current account deficits, economic growth and the current account with certain explanations are wanted to examined [6].

The last part of our chapter we determined the relationship between the current account and the growth rate and they were explained with the national income inequality and the nature of this relationship was discussed in Turkey.

When we look at these relations in terms of causality, it is stated that the direction of the relationship in question will yield different results when viewed as asymmetric and symmetrical and should be adapted accordingly to their economic policies.

2. Unemployment and inflation relationship: Phillips curve

The relationships between macroeconomic variables in an economy and the reciprocal interactions of these variables are crucial to policy proposals. The intervention was deemed unnecessary because it was assumed that the economy would always reach the full employment balance thanks to its spontaneous, intrinsic mechanisms at the time of the classic-neoclassical paradigm. However, the Great Depression system in 1929 has shown that it is insufficient to solve many problems such as especially unemployment and furthermore problems become deeper than before. Keynes' masterpiece General Theory has been a turning point in terms of the government's intervention in the economy and the nature of this intervention [7].

It can be said that the Classic-Neoclassical paradigm is also in crisis with the publication of the General Theory which Keynes expressed his views about the crisis. Microeconomic analyses which examine the optimum distribution of resources in neoclassical theory were replaced by the analysis of macroeconomic variables such as employment, national product, total lack of demand in the post-Keynes period, and analysis of interactions between these variables. In this context, the study was published with the title "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957" [8]. This study led to a long discussion of the relationship between inflation and unemployment and the effectiveness of its policies to be implemented. Reflecting the views of neoclassical Synthesis Keynesian economists, the original version of the Phillips Curve shows the relationship between the rate of increase of nominal wages in the UK between 1861 and 1957, i.e. wage inflation and the unemployment rate [9]. Phillips said the hypothesis that the change in monetary wage rates (the rate of change of money wage rates) is determined by the level of unemployment and the rate of change of unemployment can be generally accepted. These conclusions are of course tentative. There is need for much more detailed research into the relations between unemployment, wage rates, prices and productivity [8].

Paul Samuelson and Robert Solow examined the relationship between inflation and unemployment by substituting the Consumer Price Index in the United States instead of the wage rate, and thus developed a new interpretation in 1960. In this study, it was concluded that if unemployment was held at 5–6% (if unemployment were held at 5 to 6 percent) the price index could be stable, whereas if unemployment was held at 4%, there could be a 2% increase in inflation [10].

This interpretation, also called the Phillips Curve, which has been modified and improved has gained great importance in the literature and has become meaningful in terms of economic policy in this way. The Philips Curve shows the inverse relationship between the unemployment rate with the inflation rate, compatible with the Keynesian approach, high inflation rate, low unemployment rate and low inflation with high unemployment rate means that a choice can be made between combinations of. The governments which can be called' Mitte-Rechts 'prefer the first combination, while the governments that are' left-of-Centre '('Mitte-Links') have adopted the second policy proposal. The stagflation process, called the combination of rising inflation and unemployment, was seen after the 1970 oil crisis. This situation has led to questioning and discussion of the stable relationship between prices and unemployment [9].

The fact that the stagflation phenomenon that emerged in the late 1960s could not be explained by Phillips Curve Analysis intensified the debate on the Phillips curve durin this period. Under the fine-tuning policy, for example, if the government wants to reduce unemployment, it must increase total demand. However, it is necessary to endure some inflation increase with increasing total demand.

According to Friedman and Phelps, the economy does not stabilize after the inflation rate rises. Because if the adaptive expectations approach is valid, when inflation rises, inflation-related expectations also rise. In other words, the Phillips curve shifts to the right and unemployment returns to its natural rate again. In such a case, it is possible to reduce unemployment below its natural level with ever-increasing inflation. In this context, Friedman suggests that the stable relationship between unemployment and inflation is due to differing expected inflation and realized inflation rates. When the expected and current inflation rates are the same, there will be no change in real wages and hence the level of employment. Because in this case, the expected inflation rate will be reflected in long-term wage contracts [11]. To sum up, according to Friedman's analysis, the negative-sloping Phillips curve, that is, the existence of an inverse relationship between inflation and unemployment is temporary. Friedman specifically emphasizes here that the temporary trade off relationship is due to false expectations about inflation that lead to rising inflation. In the long term, as a result of the revision of inflation expectations, the exchange relationship disappears and the curve becomes perpendicular to the horizontal axis [12].

According to neoclassical synthesis Keynesian economists the Phillips curve is negatively sloped that means there is an exchange between unemployment and inflation whereas the Monetarist economists argue that is only true in the short term. In contrast, the new classical approach suggests that the Phillips Curve is a right perpendicular to the horizontal axis both in the short run and long run. According to the new classical analysis, according to rational expectations, unemployment always remains at the level of natural unemployment, except for unforeseen shocks and random errors under the assumption that there will be no systematic error in the forecast of inflation. In other words, there is no relationship between unemployment and inflation. This situation is explained by the Lucas 'surprise' supply function is determined,

$$Y - Y_n = \alpha\,(P - P^e) \tag{1}$$

According to the current price level equation if the deviation (PPe) between the (P) with the expected price level (Pe) be more greater the differences between the actual production (Y) and the natural balance in the level of output (Yn) will be more as (Y − Yn). Since inflation is the same as expected inflation in rational expectations approach, current income is always at the level of natural income and unemployment is also at the level of natural and natural unemployment. It is possible to deviate from the natural level of unemployment if the inflation estimate is incorrect. Such a situation can only be explained by a "surprise" development [13], meaning that the actual inflation rate deviates from the expected inflation rate. The fact that the economy is always in balance at the natural level of unemployment means at demand-side policies are unnecessary. According to The New Classical Macroeconomics theory, which has Monetarist views at the point of origin, the conjuncture policy is ineffective. With monetary policies, it is not possible to increase production and employment levels even in the short term.

The existence of a relationship between unemployment and inflation, that is, tradeoff between these two variables or not is important for policy proposals. The Keynesian economists argue that if there is an exchange between unemployment and inflation, it is possible to achieve the desired result with the demand-side policies to be implemented. In this context, expansionary monetary and fiscal policies will lead to demand expansion, resulting in unemployment reduction, while demand-biased inflation increases will occur. On the contrary if it is necessary to lower inflation, the shrinking policies that will be implemented require some

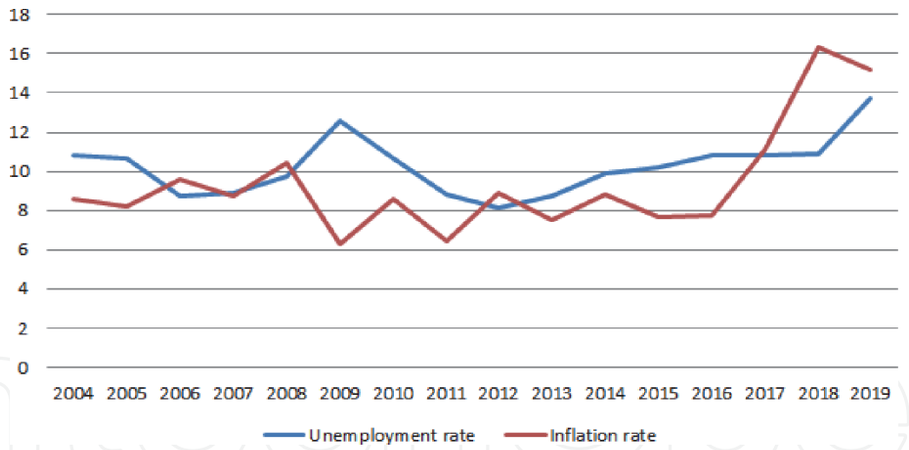


Figure 1.
Relationship between unemployment rate and inflation rate (2004–2019). Source: Turkish World Bank – TCMB.

amount of unemployment to be endured. In contrast, the Monetarist and new classical economists, who represent the orthodox approach, suggest that these two variables are independent of each other and that demand-side policies will have no effect on them. In this approach, which argues that inflation is always a monetary phenomenon the public intervention in the economy with cyclical policies will have unnecessary and negative consequences.

The below mentioned **Figure 1** shows the relationship between the unemployment rate and the inflation rate in Turkey. According to the chart, there is an inverse relationship between the unemployment rate and the inflation rate in general. In the period studied, the rate of increase in prices is low or vice versa during periods when unemployment rate is high in Turkey. In the post-2008 period when the global crisis occurred, unemployment decreased from 13 to 8% between 2009 and 2012, while the inflation rate remained unstable and rose from 6 to 9%. This can be seen as a result of expansionary monetary policies implemented in developed countries to counter the negative effects of the crisis on unemployment. As with other developing countries, capital inflows have accelerated with the increase in money supply in the global dimension. Intensive capital inflows can be said to have an effect that reduces unemployment by providing a high growth rate. The unemployment rate has started to rise after reaching its lowest level in 2012 and is nearing 14% in 2019. During this period, the inflation rate was bumpy but increased from 9 to 15%. This period occurs for the inflation and unemployment rising together and points to stagflationist developments.

Figure 1 shows that the rate of unemployment and inflation rose by 4 and 7 percentage points respectively in the period 2004–2019. Therefore, while it is possible to talk about the existence of a relationship between inflation and unemployment rate in the short term, it is observed that there is no exchange between the two variables in the long term. In other words, it is predictable that the expected impact of policies aimed at lowering the unemployment rate on inflation will be limited or short-term. Similarly, policies aimed at price stability should be expected to have a limited and short-term impact on unemployment.

3. Relationship between growth rate and unemployment: Okun's law

One of the highlights of the analysis on unemployment is the relationship between growth and unemployment. The main expectation of given the main

determinants of economic growth is the unemployment rate decreasing in an economy where the growth is occurring or at the least the current unemployment rate does not increase.

In this context, the effects of economic growth on employment or unemployment rate are examined and whether growth creates employment is the subject of research both in the world literature and in Turkey [1]. Historically, it is observed that the relationship between economic growth and employment has weakened or, in other words, become more complex in recent periods. It is observed that there is neither a one-to-one nor a stable relationship between growth and employment, especially with the developments in countries 'economies after [14]. Economists who supported the structural adjustment policy predicted that employment would increase with the liberalization of foreign trade, which is the basis of the export-based growth strategy. What many developing countries have experienced in recent years is far from confirming these claims of neoclassical theory. In order to ensure adequate employment in an environment where the working age population is increasing at a high pace, growth must be sustained as well as high growth rates. The fact that the growth figures in Turkey have been below minus six percent three times since the 1990s shows that the growth has been extremely unstable. This indicates that the growth due to short-term foreign capital inflows is not permanent and its fragility is high with the liberalization of capital movements [15].

The view that economic growth will lead to increased employment and reduce unemployment is known as Okun's law in the literature. Arthur Okun examined the relationship between the unemployment rate and economic growth in the United States by regression analysis using quarterly data for the period 1947–1960. According to the developed regression equation, the difference between current income and full employment income varies in the opposite direction with the unemployment rate [16]. The law developed by Okun states that if the growth rate exceeds the trend or average growth rate measured at 2.25%, it will lead to a decrease in the unemployment rate. Exactly, the question of how much e ach percentage point of GDP growth that exceeds the growth trend will lower the unemployment rate is being sought. The Okun law can similarly be used to predict the growth rate needed to reduce the unemployment rate by %1 [17]. The study covering the above-mentioned period for the United States concluded that each % 1growth rate over the pre-growth rate reduced the unemployment rate by %0.5 points [18]. The Okun law can be expressed by the following equation;

$$\Delta u = k(y - y*) \tag{2}$$

Where Δu is the change in the unemployment rate, y is the growth rate of the product. Y^* in the equation represents the growth trend of real GDP. This ratio varies from country to country. In the years in which the economy performs growth above the natural rate, there will be a change in the unemployment rate to k times the difference between the actual and natural growth rate. Accordingly, the relationship between growth and unemployment for the United States can be written as:

$$\Delta u = -0,5(y - 2,25) \tag{3}$$

Data covering the period 1975–1995 showed that unemployment decreased by 0.13 percentage points for every %1 point of growth exceeding % 4.3 in Turkey. In this context, the equation of Okun law for Turkey was found as follows:

$$\Delta u = -0,13(y - 4,3) \tag{4}$$

This study shows that the Okun law works very poorly for Turkey. The negative-directional regression line obtained in this study using regression analysis revealed the existence of an inverse relationship between the change in unemployment rate and the growth rate. However growth has an impact on unemployment it must be at least 4.3%. In other words, every %1 point increase after the growth rate reaches this level results in a reduction in the unemployment rate of only %0,13 [18]. It is seen that similar results have been reached in many different studies on Turkey. These calculations indicate that growth in the period of expansion of the conjuncture in particular had very low effects on employment, and hence the presence of non-employment growth. Another important finding obtained in these studies is that the relationship of Okun in the Turkish economy has an asymmetric structure, that is the effect of reducing unemployment during the expansion period of real output and the increasing unemployment during the contraction period are not same [3].

When the relationship between the growth rate and the unemployment rate are examined in 1999–2019 period in Turkey it is observed that there is an inverse relationship between growth and unemployment, especially during crisis periods. The unemployment rate reached high levels in 1999, 2001 and 2009, and in later years (in some periods) it began to decline, albeit lagging. Similarly, with the negative growth conditions caused by the foreign exchange crisis that took place in 2018, unemployment started to rise and reached its highest value in 2019 with 13.7%. On the other hand, the impact of the cyclical revival in the economy on unemployment remained relatively weak. Despite the growth rate approaching 10% in 2004 and 2005, the unemployment rate remained stable at high levels. It can be said that the decrease in the unemployment rate remained extremely limited in 2011, when the growth rate was the highest in the period studied. In the period of expansion that took place in 2013 and 2017, unemployment did not decrease, but rather started to increase (**Figure 2**).

Although growth statistics have increased over the years in the Turkish economy, unemployment rates have not decreased in the way predicted by Okun's law. In general accepted theory, when the growth rate of a country's economy increases, it is expected that employment will increase and the unemployment rate will decrease. Despite the high economic growth rates achieved in Turkey in recent years, this performance is not reflected in unemployment rates to the same extent, causing controversy. An economic growth model that depends on consumption-based foreign capital movements that do not provide employment is not sustainable. Considering the presence of rapid population growth and a demographic structure with a young population, it is of great importance to develop an economic

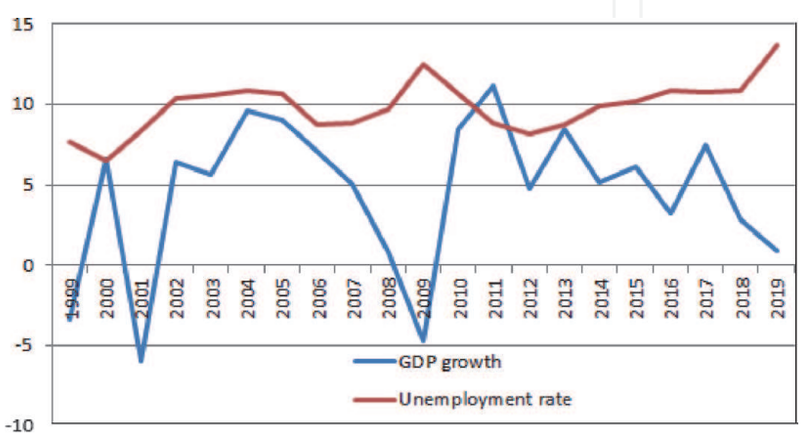


Figure 2.
Relationship between growth and unemployment rate (2004–2019). Source: Turkish World Bank – TCMB.

growth model with policies based on production, providing employment, focused on high value added products and reducing external dependence [17].

4. Growth and current account balance

The current account consists of two main items: the first is the foreign trade account showing the export and import of goods, and the second is the export and import of services, called "invisible trade" [19]. The current account deficit is less than the amount paid for goods produced and sold abroad to be consumed domestically, indicating that a country is making negative savings [20]. The relationship between the current account deficit and growth can be two-way relationship. Firstly the country with insufficient savings ratio or negative savings, the current account deficit can affect growth as investment spending is financed through the use of external savings. Second, as if income growth will increase demand for imported goods, the growth current account deficit may affect growth or may occur as a result of the growth rate itself.

The effect of the current account deficit on the growth rate is explained by providing investments with foreign savings if domestic savings are insufficient. It can be stated as follows if the savings are insufficient in an economy, investments are financed by borrowing of Foreign World Savings. In this context, as emphasized in both development economics and growth models, the source of growth is investment and the source of investment is savings ratio. If domestic savings are insufficient, it means that the difference can be met by using foreign sector savings and the current account deficit. The current account reflects the relationship between the financial markets and the goods and services markets in an economy. In the balance of payments, by definition, the current account deficit should be financed by capital account. In other words, the current account deficit may only be possible if necessary financing is provided in the capital account in the balance of payments.[1]

International flows of goods and capital are two sides of the coin and this can be explained by the national income accounting authority as follows [21]:

$$Y = C + I + X - M \tag{5}$$

This identification shows the components of National Income (Y), under the assumption of equivalence of public revenues and expenses. Total revenue equals household consumption expenditures (C), private sector investment expenditures and the difference between exports (X) and imports (M), i.e. net exports. When necessary adjustments are made here, it can be shown that net exports or the current account balance in a broad sense are equal to the domestic savings investment difference.:

$$S - I = X - M \tag{6}$$

This equality shows how the current account balance is achieved (If s = I and X = M) in an economy that finances domestic investments with domestic savings. Accordingly, if domestic savings are insufficient to meet the investments (S < I),

[1] The balance of payments, which is a current variable showing the sum of current account and capital account, is always in balance in ex post analysis. Current account deficit is possible by increasing the capital Account by the same amount. In other words, there can be no current account deficit that does not have a counterpart in the capital account, that is, it is not financed. Therefore, the view that the current account balance is a trivial problem as long as it is financed is an erroneous point of view, which has been put forward to emphasize that the current account deficit is not a major problem [10].

there will be current account deficit and the investments for finance to savings are provided from abroad [17]. Within the framework of this identification, for example, a study covering the 1980s for the United States concluded that the current account deficit could be explained by the lack of savings. In other words, the level of domestic investment is being supported by flows of foreign saving. The study also emphasizes that external savings flows are equal to the negative value of the current account balance [22]. The many studies similarly have found that the current account deficit affects the growth rate in Turkey as well. For example, changes in the current account deficit were shown to affect economic growth using the structured VAR method by evaluating the quarterly data in 2002–2014 [23]. The relationship between the current account deficit and growth in Turkey is closely related to the need for Energy (oil), investment goods and intermediate imports, as well as the insufficient savings rate. Turkey's dependence on exports in terms of oil and investment goods is an important factor affecting the reduction of the current account deficit. The realization of investments and therefore growth is linked to the current account deficit through the increase in imports. The consumption expenditures depend mainly on income in the Keynesian approach. Since income growth will affect demand for both domestic and imported goods, it will put a negative pressure on the current account. Thus, in this case, the rate of growth is the independent variable and the current account is the dependent variable, which varies accordingly. The relationship between these two variables is oriented from growth rate to current account balance. The import expenditure represented by M is an increasing function of income in the equality 6. The volume of imports consists of two components such as autonomous and revenue-dependent in the Keynesian model. Hence the total amount of imports varies in the right direction with income depending on the marginal import trend considered constant [24]. İt is observed that the mutual causality relationship is towards growth to current account deficit.

Figure 3 shows the ratio of the current account to GDP ratio and the growth rate in Turkey over the last 20 years. In the period examined, it is observed that the current account deficit increases during the expansion process and the current account deficit decreases during the contraction periods in Turkey. In addition, the current account balance has been continuously negative except the years 2001 and 2019. Especially when the economy experienced a contraction of close to 6% in 2002, the current account balance was realized at close to 2%. Similar to when the growth ratio reached its highest value (11.1%) the ratio growth to current account to GDP value reached % 8.9 in 2011, when the growth rate was a record it can be considered as an indication of how closely related the growth rate and the current account deficit are in Turkey.

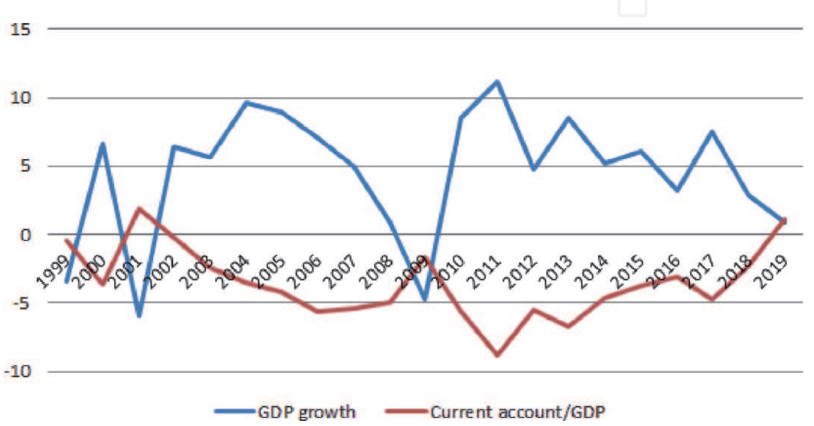


Figure 3.
Current account balance / GDP and growth rate (1999–2019). Source: OECD.

To summarize it is observed that while growth accelerated when the current account balance in Turkey gave a deficit. The growth slowed when the current account balance gave a surplus. In this context, the ratio of the current account deficit to GDP was 4.7% in 2017, while the same rate rose to 1.1% in 2019. In the same period, the growth rate started to decrease and reached 0.9% from 7.4%.

5. Data and variables

In this study we used Turkey's current account deficit (CAD), economic growth (G), inflation (INF) and unemployment rate (UR) data are used for the period 2000Q1-2020Q4. The data are taken from the Central Bank Electronic Data Distribution System (EVDS). Value of unemployment series from TUIK (Turkish Statistical Associatıon), others taken from EVDS.

6. Econometric methods

In this study, the degree of stationarity of series are found with Dickey Fuller and Ng -Perron methods. Between series interaction are measured with classic [25] causality test, [26] were analyzed by symmetric latent causality test and [27] asymmetric latent causality test methods. While [27] are developing symmetric and asymmetric implicit causality tests, [25] suggested the analysis which negative and positive shocks can be separated for the cointegration analysis with using the cumulative totals of these shocks. Firstly these series are divided into positive and negative shocks before these causality tests.

If causality relationships between two series such as y_{1t} and y_{2t} series,

$$y_{1t=Y_{1,0}} + \sum_{\dot{1}=0}^{t} \varepsilon_{1i} \tag{7}$$

$$y_{2t=Y_{2,0}} + \sum_{\dot{1}=0}^{t} \varepsilon_{2i} \tag{8}$$

And the positive shocks are showed,

$$\varepsilon_{1,i}^{+} = \max(\varepsilon_{1,i}, 0) \tag{9}$$

$$\varepsilon_{2,i^{+}} = max(\varepsilon_{2,i,}, 0) \tag{10}$$

The negative shocks are determined:

$$\varepsilon i1^{-} = \min(\varepsilon_{1,i}, 0) \tag{11}$$

$$\varepsilon_{2,i^{-}} = min(\varepsilon_{2,i,}, 0) \tag{12}$$

The estimated equation will be held in the table with Toda- Yamamato causality;

$$cad_t = \gamma_0 + \sum_{i=1}^{k} \alpha_1 \, cad_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_2 cad_{t-j} + \sum_{i=1}^{k} \alpha_3 G_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_4 G_{t-j} + + \sum_{i=1}^{k} \alpha_5 \, une_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_6 une_{t-j} + \sum_{i=1}^{k} \alpha_7 \, inf_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_2 inf_{t-j} + \varepsilon_{1t} \tag{13}$$

Other models will be helping one by one for each dependent variable with lagged independent other variables. When null hypothesis rejected that means there is causality for each taken dependent variable to independent variables. In the Todo yamamato causality test held the extra the lag value is expanded and taken dmax =1 and used the k levels with suitable lags levels.

They [26] refer to this causality analysis performed between the same types of shocks, [27] named this causality test asymmetric causality test performed between different types of shocks. In the study, Unit Root perron test [28] was performed and the findings were presented in **Table 1** below.

It was examined by the method of [28]. The MZa and MZt tests are developed from the type of ADF and PP type test whereas the null hypothesis says the variable is not stationary. MSB and MPT tests are KPSS group tests and the null hypothesis refers the series is stationary.

Table 1 was observed that all of the series were not stationary at level as I(0) but when the first differences were taken all variables became stationary as I (1).

After the determination of the degree of the level stationary of variables will be used for Granger causality test. In the analysis, causality relationships between the series were first examined by [29] method. The Akaike and Hannan-Quinn information criteria were determined based on VAR analysis. The first differences of the series were used for Granger causality and the results obtained are presented in **Table 2**.

Table 1 results show there is a strong one-way causality relationship between Inflation and Economic growth. The relationship is from inflation to growth ıt means that the inflation is cause of growth as the rejected null hypothesis shows it.

Inflation rates are also directly affects the higher economic growth rate in Turkey. The import of the raw materials and semi-finished materials are needed during the production effects the economy.

Variables	***I*(0)**				***I*(1)**			
	MZ_a	MZ_t	*MSB*	*MPT*	MZ_a	MZ_t	*MSB*	*MPT*
CAD +	−2,36 (18,15)	−1,34 (4,76)	0,46 (7,33)	5,54 (21,44)	−24,12 (−12,42)*	−4,54 (−3,11)*	0,45 (0,78)*	2,34 (3.34)*
CAD –	1,89 (18,1)	−1,67 (4,77)	1,42 (7,33)	34,55 (21,44)	−21,20 (−12,42)*	−4,33 (−3,11)*	0,34 (0,78)*	2,15 (3,34)*
UNE +	−4,33 (−18,7)	−2,44 (6,45)	1,56 (6,33)	22,13 (5,33)	−19,33 (−14,6)*	−3,43 (−2,44)*	0,64 (0,77)*	2,11 (3,21)*
UNE_	−4,21 (18,7)	−2,31 (6,46)	−1,57 (6,33)	25,45 (5,33)	−22,56 (−14,6)*	−3,66 (−2,44)*	0,67 (0,78)*	1,77 (3,21)*
INF+	−4,67 (20,3)	−2,44 (11,7)	0.55 (15,7)	27,56 (5,13)	−31,56 (−12,33)*	−3,89 (−2,67)*	0,22 (0,77)*	1,56 (1,88)*
INF-	−4,68 (20,4)	−1,66 (11,8)	0,34 (15,7)	31,42 (5,13)	27,45 (−12,33)*	−3,92 (−2,67)*	0,50 (0,78)*	1,42 (1,88)*
G+	−8,77 (4,22)	−3,77 (8,33)	0,21 (9,72)	8,55 (3,77)	−24,45 (−12,45)*	−2,44 (−1,16)*	0,33 (0,77)*	1,58 (2,33)*
G_	7,34 (4,24)	−3,59 (8,34)	0.22 (9,74)	9,88 (3,77)	−25,44 (−12,45)*	−2,56 (−1,16)*	0,34 (0.77)*	1,37 (2,33)*

The parenthesis shows the %1 significance level of asymptotic critical levels.
**The stationary serial that has at %1 significance critical values. The I(1) all models have trend and constant.*

Table 1.
Ng and Perron (2001) unit root test results [28].

Hypothesis	Opt.lag.	F statistics	Prob
G → INF	4	0,426	0.544
INF → G	4	0,210	0.021*
CAD → G	4	0,588	0.711
G → CAD	4	0,834	0.455
INF → UNE	4	0.615	0.233
UNE → INF	4	0,588	0.355
UNE → G	4	0,712	1.235
G → UNE	4	0,833	0.783

The null hypothesis the caused to determined variables.

Table 2.
Granger causality test.

Table 3 obtained the hidden causality test relationships results between the all variables which belong to [26]. We take the positive and negative shocks which refers different effect to causality between each other. The symmetric causality test shows the same shocks effect how affect the causality.

Table 3 shows the positive shocks on inflatıon causes the positive shocks on unemployment. The two way causality with unemployment and inflation under the positive shocks effect.

There is a mutual causal relationship between growth and unemployment under the positive shock situation. The inflation causes the growth when they are affected negative shock. There is a one way causality growth to inflation. In the symmetric causality we could not find any causality with other variables.

Hypothesis	Test statistic	Bootstrap Critical value
$G^{+} \rightarrow INF^{+}$	1231	4,87
$G^{-} \rightarrow INF^{-}$	4553*	2,31
$CAD^{+} \rightarrow G^{+}$	2237	4,55
$CAD^{-} \rightarrow G^{-}$	4674	5.22
$INF^{+} \rightarrow UNE^{+}$	8.232*	3,66
$INF^{-} \rightarrow UNE^{-}$	3478	4,21
$UNE^{+} \rightarrow G^{+}$	2361	5,67
$UNE^{-} \rightarrow G^{-}$	2456	7,34
$G^{+} \rightarrow CAD^{+}$	5346*	2,40
$G^{-} \rightarrow CAD^{-}$	5172	8,33
$UNE^{-} \rightarrow INF^{,-}$	4164	6,22
$UNE^{+} \rightarrow INF^{+}$	4671*	1,67
$G^{+} \rightarrow UNE^{+}$	3477*	2,39
$G^{-} \rightarrow INF^{-}$	3782	6,33

The causality with the %5 significance level.

Table 3.
Symmetric causality test.

Hypothesis	Var lag (p + d)	Asymmetric causality test probe	ARCH-LM	White	J.B.
$G^{+} \rightarrow INF^{-}$	4	0.867	0.645	0.788	0.001
$INF^{-} \rightarrow G^{+}$		0.563		0.231	
$CAD^{+} \rightarrow G^{-}$	7	0.059	0.328	0.345	0.001
$G^{-} \rightarrow CAD^{+}$		**0.001***			
$INF^{-} \rightarrow UNE^{+}$	4	**0.003***	0.239	0.358	0.013
$UNE^{+} \rightarrow INF^{-}$		0.548			
$UNE^{-} \rightarrow G^{+}$	6	0.458	0.234	0.127	0.022
$G^{+} \rightarrow UNE^{-}$		**0.001***			
$G^{+} \rightarrow CAD^{-}$	8	**0.002***	0.078	0.390	0.001
$CAD^{-} \rightarrow G^{+}$		**0.476**			
$UNE^{-} \rightarrow INF^{+}$	5	**0.007***	0.084	0.56	0.002
$INF^{+} \rightarrow UNE^{-}$		**0.013***			
$G^{+} \rightarrow UNE^{+}$	5	0.156	0.671	0.551	0.012
$UNE^{+} \rightarrow G^{+}$		0.088			
$INF^{+} \rightarrow G^{-}$	6	0.001	0.458	0.755	0.003
$G^{-} \rightarrow INF^{+}$		**0.002***			

*The **bold** numbers are statistically significant probabilities.*
**The asymmetric probability is statistically significant. The LM test for otocorrelation, White test for heteroscedasticity. The probability statistically significance levels for %5 confidence. Jarque bera test is for normality, the probability levels are statistically significant that eject the null hypothesis.*

Table 4.
Asymmetric causality test.

Table 4 shows the causality relationships between positive and negative shocks of series which they were investigated by [27] method which based on [23] test. The test of models are suitable for the analysis. There is no normal distribution because of asymmetric structure also there are no correlation and heteroscedasticity are found with Lm test and White test results under the null hypothesis accepted and not statistically significant probability levels [30–34].

According to these results the one way causality from negative growth shock to positive current deficit shocks. The negative growth shocks cause the positive unemployment shock. This means the positive effect on growth makes the negative effect on unemployment that makes the unemployment getting bigger.

The positive shock of growth causes the negative current account deficit shock. That means when the growth is becoming more well the current account deficit is continuing to increase. The negative shock on ınflation causes the positive shock on unemployment. Negative shock on growth causes the positive shock inflation. The negative shock on unemployment and positive shock on inflation have bidirectional causality.

7. Conclusion

In this study, economic growth for Turkey, the current account deficit, inflation and unemployment data in the period considered causality between these to show

the differences in the relationship be followed when the shocks that affected both symmetric and was examined by asymmetric causality test.

When we look at the symmetrical causality test, one-way causality was determined from positive unemployment to positive inflation shock, positive growth shock to positive unemployment shock, positive growth to positive current account deficit. There is also causality from negative growth shock to negative inflation. The obtained from the study results the multiple causality between unemployment and inflation when the positive shocks are effective on one of them which another is not.

As a result of the asymmetric test, there is causality from positive growth shocks to negative unemployment shocks and causality towards negative current shocks and positive current account deficit shocks. The mutual causality was observed between positive growth shocks and negative current account deficit shocks. In this way, while studying the causing between them, this causality may not emerge, but causality relationship may arise from considering different responses to shocks.

In addition, the emergence of different relationship structures in response to these positive and negative shocks from an economic point of view also makes the situation and impact of different economic causes a matter to be considered.

According to these statements imports must increase in order to accelerate the economy since Turkey has a production structure dependent on imports. In this case, there is inevitably an external account deficit. This deficit, which means the use of foreign savings, has caused the foreign debt stock in Turkey to exceed the tolerable level. Increasing foreign debt and the consequent need for foreign currency means that the economy becomes more fragile and macroeconomic balances deteriorate rapidly. In order to grow without a current account deficit the significant changes in the production structure of the economy must be implemented immediately in Turkey. First of all the intermediate goods producing sectors must be developed and the dependence on imports must be decreased. Moreover, a competitive exchange rate policy in foreign trade should be expected to have positive results.

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