The Effects of Interest Rates on Macro-Economic Variables: 2006-2018 Turkey Case

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Abstract

Interest rates play a decisive role in the structuring of economic policy. This role is active in the analysis of macroeconomic variables such as savings, investment and GNP. Fund movements required for global and local investments are realized according to the interest and inflation rates in the countries. In this way, individual and organizational behaviors are affected economically. .

Interest rates; It is a concept of primary importance in the theoretical studies of economists belonging to schools such as Classical, Neo-Classical, Keynesian, Post Keynesian, Monetarist and Rational Expectations Theory. The fact that it is a concept that policy makers should constantly consider also requires intensive work on the subject.

With this study; Considering the theoretical discussions on the determination of the interest rate, which is a monetary policy tool, it is aimed to reveal its key role in the Turkish economy between 2006-2018 in the light of some economic indicators. This study, which is presented methodologically with deductive and descriptive analysis method, will provide a theoretical contribution to researchers working on the Turkish Economy.

Keywords: Interest Rate, variable, quantity, cost.

1. Introduction

One of the various definitions of the concept of interest is "pricing of time". It is used together with the concept of credit. The value of the loan cannot be determined only by its amount, but also the duration must be known. Another concept in which interest and duration are used together is "Credit Volume". credit volume; It is a concept that has a functional relationship with the amount of money entering the production process and time. Accordingly, interest arises in the case of credit in the context of pricing time. In monetary economies, the position of the interest rate also forms the basis of socio-economic imbalance. For this reason, the interest rate has been subject to various criticisms. It is known that gold and silver brought from other continents and countries through geographical discoveries also lead to capital accumulation and these are also directed to industry with the interest rate mechanism. During the industrial revolution and the need for large capital accumulation, the necessary capital was provided through interest. However, due to the cyclical decrease in efficiency in economic actions, the narrowing of business areas and the negative results of the

applied interest rate, it has also caused different approaches in Macroeconomics. For example, Keynes's theory of liquidity trap reveals how interest drives cash out of production.

According to Keynesians; Fiscal policy itself is important in influencing national income. The objection of Monetarists in this regard is that fiscal policy alone cannot be effective. However, both are in common when the appropriate instrument in managing monetary policy is the interest rate. The focus of the Keynesian view was the claim that government activity, particularly tax cuts, would increase disposable income, which in turn would play a role in increasing aggregate demand. Proponents of Keynesian theory believe that the interest rate is primarily a monetary phenomenon. According to them; The interest rate is determined by the money supply and demand. Classics, on the other hand, believe that the interest rate is a real phenomenon. Therefore, he has a real theory of the interest rate. As a result, the thesis of the Keynesian theory that economic activity would immediately affect the real sector was rejected.

In classical theory, more than one market plays a role in determining the interest rate. Accordingly, the interest rate is determined by the supply of savings and the demand for savings for investment purposes. Money does not affect the interest rate and therefore does not affect the real economy, only the price level. Therefore, the best monetary policy will be a periodic policy that stabilizes the price level. If it is; requires predetermining the rate of growth in the money supply. In the classical model, interest rate fluctuations reduce the savings-investment equality,affects the balance of income and employment. But; That's not how things work in Keynes' model. Income fluctuations are determined by the balance in the savings/investment market, not interest rate fluctuations. In short; In the Keynesian model, the real economy is determined by money. The importance of the Keynesian interest theory within the scope of monetary policy emerges in maintaining an active monetary policy in order to keep the savings/investment balance at the targeted income level. Classics, on the other hand, believe in a monetary rule. Neo-Keynesians also argue that the demand for money is very sensitive to changes in interest rates, but investment spending is insensitive. However, Monetarism does not accept that changes in interest rates are the focal point of money demand, but it is very sensitive in investments.

Today, almost all of the world's economies are under the influence of the Rational Expectations Theory. Represented by Lucas, Sargent, Barro, Wallace as the successor of monetarism after 1970, this theory examines the conflicts of monetary and fiscal policies. Economics based on Keynesian theories is based on the rejection of policies. If it is necessary to balance supply and demand in the market, there should be no information gap when proposing deregulation in the market. It is assumed that individuals have all available information and are not exposed to systematic errors by using them effectively (**Lucas, 1972; Sargent δ Wallace 1975**).

2. Function of Interest

Interest yield is accepted as a reward that affects savings. Savings in an economy are a function of the interest rate. In a free enterprise economy, interest rates are determined by the supply and demand for money. An increase in money demand raises the interest rate, while an increase in money supply lowers interest rates. In open economies, in case of external deficit or external surplus, domestic prices are related to changes in interest rates.

2.1.Theory of Interest in the Classical School

In the classical school approach, long-term analyzes are taken into account. It is based on the view that monetary changes in the economy do not affect real variables such as production, employment and growth in the short run. The mechanism that enables the conversion of savings into investment is the interest rate. The classical theory of interest is a necessary part of the classical theory of employment because it is the tool that Say's Law makes valid in a monetary economy. Investing represents the demand for investable resources, while saving represents their supply. Interest is the "price" where the two are equal (**Peterson, 1967**). So; Monetary and real analyzes need to be done separately. Money, which is a nominal variable, is neutral in the long run and changes in money supply do not affect real variables. Money only mediates economic relations.

According to the classics, saving is an increasing function of the interest rate. So;

$$S = \mathfrak{f}(i) \qquad\qquad\qquad (1)$$

$$\mathfrak{f} > 0 \ \ linear\ relationship$$

$$i: intersert\ rate$$

Since consumption expenditures are also a decreasing function of the interest rate, when the interest rate increases, consumption expenditures decrease and savings increase; investment is a decreasing function of interest rates.

$$I = f(i) \qquad\qquad\qquad (2)$$

$$f < 0 \ \ inverse\ relationship$$

$$S=I$$
$$(3)$$

The rate of interest that equates savings to investments in classical theory is called the natural rate of interest. As long as the market rate of interest remains less than the natural rate of interest, aggregate demand will increase, which will increase the price level. This process will continue until the loanable funds in banks are exhausted. When the banks are unable to lend, the natural rate will increase, saving will increase and investment will decrease, so that the S = I balance will be re-established (**Savaş, 1986**).

The main theme of the explanations above is as follows: When interest rates increase, investment expenditures decrease, and when interest rates decrease, investment expenditures increase. Therefore (i) will decrease when S > I. This understanding and analysis method remained valid until the end of the 19th century without any objection. In the first half of the 20th century, new expansions in modern macroeconomic theory emerged with the approaches of K. Wicksell and his successor J. M. Keynes.

According to this;

1. Monetary and real analysis should be done separately.

2. Money, which is a nominal variable, is neutral in the long run and changes in money supply do not affect real variables. Money only mediates economic relations.

3. Since saving is an increasing function of interest rate and consumption expenditure is a decreasing function of interest rate, when the interest rate increases, consumption

expenditures decrease and savings increase; investment is a decreasing function of interest rates. Therefore, when interest rates increase, investment expenditures decrease, and when interest rates decrease, investment expenditures increase.

4. According to Ricardo's view from the classics; An abnormally low interest rate exists when an abundance of money has not yet caused a price increase.

Whether in the monetary or the real sphere, the classics accepted the "single interest rate". Wicksell divided the interest rate into two. 1. Monetary interest rate: The monetary interest rate is the interest rate that occurs in the cash loan market. In organized economies, this rate is determined by the banks. 2. If the natural interest rate is; is the rate of interest that equates savings to investments. In addition to these explanations, Real interest rate, which is very useful, is the rate of benefiting from real capital in production. The high or low real interest rate decreases or increases according to the economic situation of the country (**Eğilmez, 2017**). The real interest is formulated as follows.

Real Interest Rate: ([1 + Nominal Interest Rate] / [1 + Inflation Rate]) − 1
(4)

2.2.Bond Price and Interest Relationship

The important rule in the tradition of Pre-Keynesian Quantity Theory is this: In the long run, the only interaction favorable to changes in the money supply is the price level. In other words, changes in the money supply do not only affect real output and the interest rate set by savers. In some cases this interaction is treated as a general balance issue. According to this; While the economy is adjusted to long-run equilibrium, a change in money supply in the short run may affect the interest rate, but in long-run equilibrium it is independent of the money supply. In the short run, the variables that affect the interest rate are savings and investment, their effects are independent of changes in the money supply.

An oversupply occurs when the amount of bonds investors intend to sell exceeds the amount of bonds they intend to buy. The bond price will fall as people want to sell more than others are willing to buy. As long as the amount of bonds to be sold increases, the decrease in their prices will continue. If bond prices go into a very declining mode, demand will exceed supply, and in this case, excess demand will arise.

In a stable market environment, the price of the bond also expresses the interest rate. Due to the instabilities in the interest rate, the interest rate of the bond moves inversely with its prices. In this position, two factors are decisive in the bond market. The first factor: the supply of bonds is made only by companies that want to invest. Issued bonds finance investments. The planned supply of bonds is equal to the planned investment level. Demand for bonds grows only with buyers' desire to save. Planned demand for bonds equals planned savings. That is, a fall in the interest rate is assumed to increase the desired investment and hence the planned supply of bonds. Second factor; savings and investments are flow concepts, bonds are related to the flow from demand to supply.

Equilibrium condition in the bond market model:
$$B^D = B^S \quad \text{(B: bond,D:demand,S:supply)} \tag{5}$$
The demand and supply of bonds equals saving (S) and investment (I).

$$S=I$$

(6)

In this model, the interest rate is determined only by planned savings and planned investment. This partial equilibrium formula explicitly ignores two factors. The first factor: the effects of other markets on investment and savings are neglected in the partial equilibrium formula. In fact, a real increase in the money supply or a definite decrease in the price level also affects investment and savings. Second factor; It is based on the assumption that the only asset consumers can have is bonds, ignoring that savings can also put into other monetary assets. Similarly, firms keep their assets only in physical capital, not in money (**Harris, 1985**).

2.3. Loanable Funds Model

The Swedish School and its predecessors Wicksell and Ohlin were the first to study loanable funds. The economist who came to the fore in the English school was Robertson. In this model, bond prices are the independent variable and bond quantities are the dependent variable. Economists are more concerned with interest rates than with the price of bonds. In assessments applicable to any type of bond, the rule also applies to coupon or discount bonds. A firm issuing a bond means that it has borrowed from a natural or legal person who has bought the bond. Such bonds are called "offerable bonds". These are synonymous with demand for debt. The amount of funds in the hands of the applicants is called "lendable funds". Loanable funds are synonymous with the amount of bonds offered. Since the loanable funds are the dependent variable while the interest rate is taken as the independent variable, the interest rate in the bond market is determined by the loanable fund consent and the loanable fund demand. In this case, the bond supply and demand are determined by the monetary policy in the country's economy. As a result, the method of analysis in determining interest rates is the same as in monetary policy.

$B^D = S + \Delta M^S$ (Bond demand)   (7)

$$B^S = I + \Delta M^D \quad \text{(Bond supply)} \tag{8}$$

$S + \Delta M^S$ =I + ΔM^D (Equilibrium condition in the bond market) (9)

Equations 7 and 8 above include the components of buying and selling a new bond. It is expressed as the source of loanable funds, or in other words, the planned demand flow for bonds, combined with the investments in equation 9, and the collection of the existing money stock for a short period of one week.

$I(i) + \Delta M^D (i) = S(i) + \Delta M^S$ (10)

It is seen that the components of the interest rate in bonds are S and I. Also, ΔMD (change in the amount of money allocated to the bond demand) is the amount of money Keynes calls the liquidity preference. ΔM^S is an exogenous variable.

2.4. Factors Affecting Bond Demand

1. Health: When an economy grows rapidly, there is an increase in health expenditures. Each amount of bond demanded raises its price, or interest rate. In a recession, while income and health expenditures fall, the demand for bonds also falls.

2. Profit Expectations on Alternative Financial Assets: Bonds are discounted for expected returns in one year and expected in the next. The expected return and interest rate are decisive. The expected profit rate for one-year maturities is different from the interest rate. The demand for long-term bonds expresses the expectation of a lower interest rate in the future, and accordingly the amount will be low.

Returns on other financial assets also change expectations. If people suddenly become very optimistic about the stock market, or if they expect the stock market prices to be higher, if they expect their capital to bring profits, the expected profits in the stock market will increase. If the expected return on the bonds is constant, the expected return on the bond will be lower than the yield on the stock market. Demand for bonds will decrease. Similar to changes in inflation expectations, returns on real assets also change expectations. These real assets; assets such as houses and cars.

3. Risks in bonds: If prices in bond markets are excessively expensive, it is the bond that is less attractive when the risk is combined with bond increases.

4. Cash Conversion Rate of Bonds: If the rate of change in the bond market is high, bond sales will be easier as a result. The increase in the cash conversion rate will increase the amount of bonds demanded and interest rates. Similarly, the rate of conversion of alternative financial assets into cash will increase and the demand for bonds will decrease.

2.5. Factors Affecting Bond Supply

1. Profit Expectation: A firm; expects its profitability to be in a continuous increasing trend. New investment decisions also increase market borrowing. The rapid growth in the economy means the beginning of the period of expansion of business. Investment opportunities are expected to profit, and the supply of bonds increases, which increases the interest rate. In periods of economic recession, the expected profitability of investment opportunities will decrease, and the bond supply will also decrease.

2. Inflation Expectation: The real cost of borrowing is most accurately measured by the real interest rate. The data interest rate refers to the nominal interest. When the expected inflation rate increases in the nominal interest rate calculation, the real cost decreases and the amount of bonds supplied increases.

3. Government activities: The Treasury offers bonds to meet the government's financing deficit. The value of the bond offered corresponds to the difference between the government's revenue and expenditure. If the stated deficit is large, as has happened recently, the treasury sells more bonds and the amount of bonds issued increases the interest rate. The state, local governments and other government agencies may issue bonds to finance their expenditures.

2.6. Keynesian Liquidity Preference Theory and Interest Rate Understanding

The traditional quantity theory was never rejected in the pre-Keynesian interest rate debates. Keynes predicted that the expanding amount of money would have an effect on the decrease in interest rates, and this effect would decrease interest rates as a result of the

decrease in prices. The "liquidity preference" form used to explain the Keynesian theory of interest is also called the "Keynes effect" in the literature.

The Keynesian theory of interest is derived from the idea that money is a means of accumulation as well as a medium of exchange. The theory of interest in liquidity preference is based on the asset demand function, but as we will see later, it is not possible to construct a complete theory of interest without considering the transaction demand function.

Keynes; In his General Theory he used the concept of interest as a reward for protecting savings from hardship. He said that interest cannot be a reward for such savings, because when a person saves his money, he will not receive any interest at all, but still avoid consuming all his available income. By Keynes and other advocates of the liquidity preference approach, interest is the price to be paid for unused balances in response to speculative motives, rather than being a reward for savings (Keynes, 1936).

In order to better understand the subject, it would be helpful to ask the following question: "Why would anyone want to exchange their money holdings as wealth for something else from which they can generate income?" This can be answered with three items: 1-The fear of unexpected events, 2- The desire to add to the cash at hand, 3- The uncertainties of the future.

Holding wealth means having cash. Interest also represents a portion of the total money supply available. Such an analysis requires knowing the lower and upper limits of interest rates, which will be determined by market forces. This is to move towards stock variables rather than flow variables. Stock variables cover a certain moment, while flow variables cover a period. According to the previous explanations, with the interest rate as an independent variable, it is written as a function of demand for wealth and the amount of money supplied.

$$L_a = f(i) \quad (11)$$

La is the symbol for demand for money to acquire assets. As the interest rate (i) changes, the dependent variable also changes.

In liquidity preference analysis, the autonomous money supply for holding assets depends on the interest rate. As a result, if the interest rate is low and money demand is high, the interest rate will increase, and in the opposite case, the interest rate will decrease.

Keynesian money market theory is in some ways compatible with bond market theory. It is accepted that the imbalance in the money market will affect the interest rate on bonds. This acceptance is the most important difference between the Keynesian and Classical models. Demand for bonds; It is a function of the level of monetary income as well as the interest rate. In the Keynesian model, the variable that directly drives the money market is the interest rate rather than the absolute price level, as in the Classical model. Because money stock mostly affects interest rates, and interest rates affect investment and income.

In Keynes' theory of liquidity preference, there are two types of changes in the level of interest rates. (**Tobin, 1958**). First; It is the interest rates on the one hand and the amount of money allocated for the desired asset on the other hand, while in the position of demanding assets. The functioning of this type of change mechanism; It is related to the liquidity preference of interest and the demand for monetary assets in the bond market. When a single household or firm sees that it has less money than necessary at the moment it wants to trade, it can sell some of its bonds and add the income it has earned to its monetary assets. This

process redistributes the supply of bonds issued among individuals, does not change the total supply of money or bonds.

The second is; If all households and all firms consider adding to their monetary balance, they will want to sell all of their bonds. However, this is for a single individual. The total money and bond supply of the economy is constant at any moment (**Parasız, 1998**). For example; If there is a lot of money and bonds in a stable market, if someone tries to sell the bonds, they can't find anyone to buy them, and the prices of the bonds fall. A fall in bond prices means a rise in interest rates. When interest rates increase, people become more careful about money balances because; The opportunity cost of staying in balance increases.

2.7.Monetarist and Keynesian Comparison in Interest Rates

In the Keynesian world, when people turn to financial assets, they should assume an inverse relationship between bond prices and interest rates, and anticipate that interest rates are reflected in GNP with a lag. Neo Keynesians, however, that the demand for money is very sensitive to changes in the interest rate; They argue that investment spending is interest-insensitive. Because money can easily replace short-term assets. The view that interest rates will decrease slightly as bond purchases increase with the money that firms and individuals receive due to excess supply when an expansionary monetary policy is implemented supports the Keynesian view. Another point that supports the Keynesian view arises when a contractionary monetary policy is implemented. In this case, supply will shrink, so firms and individuals will sell bonds, and interest rates will rise slightly. Keynesians are of the opinion that investments are primarily affected by sales, profits and expectations and that changes in interest rates will not provide an important response in the short run.

Monetarists prioritize transaction motive in money demand, Keynesians prioritize speculation motive. According to the monetarist view, interest rates are not seen as the most important tool in spending. According to Friedman, the founder of monetarism; Expansionary monetary policy will lower interest rates. He criticizes that people keep money with them in an environment of increasing money supply when the interest rate is low. Monetarists are of the opinion that the demand for money will not respond much to changes in interest rates, whereas "investment expenditures are very sensitive to changes in interest rates". The Monetarist view is supported that when an expansionary monetary policy is applied, as bond purchases increase with the funds received by firms and individuals due to excess supply, interest rates will decrease substantially. When a contractionary monetary policy is applied, the supply of funds narrows. Firms and individuals sell bonds in their portfolios to raise cash, and interest rates rise substantially.

In this discussion, from a Monetarist perspective, three conclusions can be drawn about the interest rate: the current interest rate tends towards the expected rate of interest. Latter; It is equal to the expected variables in the nominal interest rate and price level. Third, the difference between the growth rate of real output based on the expected interest rate is constant or very small.

2.8. The Effects of Monetary Policy on the Interest Rate in Keynesian Terms

A contractionary monetary policy occurs by reducing the money supply. In this case, investments are affected due to the increase in interest rates because the total demand for investment decreases and the amount of investment decreases. Low investment amount causes low income as much as multiplier amount. This is illustrated in the reflection mechanism below.

$$M \downarrow \to i \uparrow \to I \downarrow \to Y \downarrow \qquad (12)$$

M: Money supply i: Interest rate I: Investment Y: National income.

When the expansionary monetary policy is implemented; lower interest rates make it easier to borrow more, and investment expands, the money supply increases, interest rates fall, job opportunities open up, and income and output increase.

$$M \uparrow \to i \downarrow \to I \uparrow Y \uparrow \qquad (13)$$

At the very beginning of all these, the MB engages in open market operations. MB does this in one of two ways; either injects money or uses funds in reserve. The amount of money to be loaned in banks increases and this money lends in return for interest. The factor that drives people to borrow is the low interest obligation to be paid. Thus, expansionary monetary policy takes the name of low-interest credit policy. Expansionary monetary policy increases the amount of money in banks to lend, increases customers' investment inclination, and therefore increases income. In the contractionary monetary policy, investments are realized at a low level due to the decrease in the amount of funds to be loaned in banks, causing a decrease in total income.

2.9. Emphasis on Rational Expectations Theory

According to the Rational Expectations Theory, "Keynesians have actually done nothing but tend to analyze the equilibrium analysis in microeconomics belonging to the classical theory with the help of social variables such as general price level, aggregate demand, employment level. The model is the same, but the variables are different." Sargent; He states that rational expectations and expectations of society are based on the foundations of economic theory (**Sargent, 1976**). Rational expectations are unbiased estimates of endogenous variables used for estimation, including all information about predetermined (known) variables and exogenous variables. In this respect, not only is knowledge important, but also the transmission mechanisms of knowledge are more important than knowledge in terms of the functioning of the economy. Expectations are rational if they are consistent with predictions from economic theory. In the presence of rational expectations, real variables such as prices, unemployment and real output are independent of the predicted changes in monetary and fiscal policies. For example, the increasing rate of growth in the money supply affects only the rate of inflation, but has no effect on employment and production (**Frisch, 1989**). Changes in interest rates have major effects on final output and investment demands. Calculations have resulted in findings that real interest rates have increased rather than decreased due to monetary development. According to this; If changes in the money stock are

gradually transferred to price or wage increases, they will have more of an impact on expected inflation than on interest rates.

According to the proponents of the Rational Expectations Theory; Keynes' models are wrong. He bases his claims on this on three main points:

1. Future expectations: According to Keynes, the future forecast is the average of past periods. It predicts the future by focusing on the recent past. However, there are a wide variety of sources of information for predicting the future. Even if Keynes's method is correct for the short term, individuals will be conscious about how the economic policies will develop in the long term (**Savaş, 1986**). According to the Rational Expectations Theory; The planning process of economic units is created by intelligent people who take into account all the data of the economy. In this context, it should be noted that all economic units have knowledge of the systematic part of the growth rate of the money supply and take this into account.

Table 1. Effects of Money Supply by Economic Schools

	Money Supply	Unemployment	Production	Inflation
According to Keynes	Increases	Decreases	Increases	Rises
According to the Rational Expectations Theory	Increases	Ineffective	Ineffective	Rise is fast
According to monetarists	Increases	Decreases	Ineffective	Rises slowly

Table 2.   **Economic Indicators**

Years	Money Supply (M3) %	Unemployment %	Industrial production %	Inflation %	Economic Growth %	Current Account Deficit %
2007	15.30	8.9	7.00	8.76	5.0	-18.55
2008	24.69	9.7	-0.56	10.44	0.8	-6.70
2009	13.04	12.6	-9.88	6.25	-4.7	71.19
2010	18.58	10.7	13.10	8.57	8.5	-262.82
2011	15.16	8.8	15.37	6.47	11.1	-66.76
2012	10.54	8.1	4.34	8.89	4.8	35.54

2013	21.07	8.7	6.56	7.49	8.5	-34.07
2014	11.76	9.9	5.89	8.85	5.2	30.10
2015	16.24	10.2	6.11	7.67	6.1	28
2016	17.86	10.8	3.41	7.78	3.2	2.58
2017	16.11	10.8	8.91	11.14	7.4	-47.78
2018	18.28	10.9	1.23	16.33	2.8	39.34
2019	28.19	11.3	-0.64	15.18	0,9	105.92

Source: Turkstat, CBRT

The data set in Table 2 is important in terms of seeing how much the effects of money supply have been affected over the years. There is an increase in the inflation rate and unemployment rate through money supply, but a decrease in GDP is also observed. This situation does not fit the Keynesian theories. Secondly; According to monetarists, when the money supply increases, unemployment and inflation also increase. There is a sharp decline in industrial production. Finally, according to the Rational Expectations Theory, while increasing the money supply, its ineffectiveness in unemployment and production increases, on the other hand, it confirms that it will only cause an increase in inflation.

2. Inconsistency of Keynesian macro theory: According to the claims of Rational Expectations Theory; Keynesian Macro Theory is based on contradictory assumptions. The equations that make up the models are indirectly based on individual behaviors while determining the social functions, but the future income level, taxes, price increases, and inter-variable dependencies are not taken into account (**Willes, 1980**).

3. Ambiguous and Misleading Criteria: It is the basic premise of Rational Expectations Theory that individuals maximize their own interests. Individuals should be provided with opportunities in the established economic models. While claiming that they adhere strictly to the principles of classical theory, they adopted the rule of "individuals optimize". There is no clear story of policy success in individual well-being as advocated by Keynesian models. For example, they argue that a low rate of unemployment and more production will increase individual welfare, and for this, an increase in the economic growth rate must be realized. According to the Keynesian view, the achievement of individual welfare can be increased within the limits set and dictated by policy makers. It is argued that a low rate of unemployment and more production will also increase individual welfare. In general, the purpose of Keynesian models is to ensure growth, but it does not give any information about how this will be reflected on individuals.

3. The Role of the Central Bank in Interest Policy

Central Banks not only determine the monetary policies of the countries, but also decide how much money will be issued and also determine the interest rates of the money loaned to the banks. In developing countries such as Turkey, the interest instrument is also used to cool the warming economy. When interest rates go up, growth policies are negatively affected.

Economic activity slows down, so inflation is expected to decline. The national money supply in the country is narrowed and the rise in the foreign exchange is prevented in this way. With the decision to reduce the interest rate, the national money supply expands, and in this way; exchange rate decline is prevented. Theoretically, this approach is also compatible with the classical assumption. (**Seyidoğlu, 1996**)

The efficiency of the CBT to set the policy rate; It is defined as the interest rate in a one-week repo auction. Banks' repo requests are met at this interest rate. Banks make repo by giving their bonds and bills as collateral and taking money from their CB. Thus, they create a fund for themselves. This efficiency provides the slowdown-acceleration mechanism in the economy. Thus, it keeps inflation, which is one of its basic economic duties, under control. CB; While it aims to provide revival by reducing the interest rate in the periods when the economy is weak, when the economy heats up, it increases the interest rate and ensures that money shifts to interest rather than consumption. There was also a period when these activities of the MB were insufficient. For example; During the 1997 Japanese crisis, interest rates were reduced to almost zero, but there was still an experience in which the recession was not resolved. The policy to be followed in the resulting liquidity crisis was also resolved through the CB. (**Krugman, 2003**)

CB; It also observes price increases with the effect of exchange rate movements. When these increases are generalized, there will be a weakening in domestic demand conditions. The deterioration in pricing behavior increases inflation. If the interest rate is increased; On the one hand, it will be ensured that the money goes to high interest rates instead of foreign currency, and on the other hand, it will be ensured that foreign investors exchange foreign currency and invest in Turkish Lira. The aim in this is; It is to ensure the stability of TL. By lowering the foreign exchange rate, cost-induced inflation will also be prevented. The demand for money from the banks causes the interest rate to increase.

Banks increase their customer portfolios with high interest rates. In this way, for those who want to make a profit in risk-free areas in the market, the tendency to spend is abandoned. Inflation is prevented by the method of restricting the expenditure items of individuals. MB with inflation. It is not possible to lower interest rates. It will even encourage raising interest rates to curb inflation (**Parasız, 1988**). Although there is no direct connection between inflationary expectations and the nominal interest rate, as long as inflation continues, it pushes investors to act sensibly and rationally. According to the General Keynesian assumptions, the imbalance in the money market in an inflationary environment triggers a reactive rise in the nominal interest rate.

4. Effects of The Interest Rate

According to the theoretical explanation discussed in the previous paragraphs, the interest rate is key in various economic actions. This situation is important in terms of parallelism, stability, healthy economic structure and functioning in the interests reflected from the macro level to the micro level and from the micro level to the macro level. These effects can be explained as follows:
a. Positive Effects

By increasing the interest rate to the countries with balance of payments deficit, it is aimed to provide hot money inflow from abroad and to relieve the domestic market in this way. The increase in foreign currency has an effect on the appreciation of the local currency, for example TL. Thus, cost inflation caused by the exchange rate rise is prevented. As a result, not only cost inflation but also demand inflation is prevented. When the interest rate is increased, consumption decreases and an increase in savings is expected. As a result of the decrease in consumption, a decrease is observed in inflation. Low inflation leads to an increase in real earnings. When interest rates fall, the prices of bonds and stocks rise, and investors' wealth rises.

b. Adverse Effects

Companies cut their investments in order to pay the debt interest, inflation will increase with a high probability. Those who take loans from banks are in a difficult situation. While people tend to save, those who want to start a business turn to less risky or risk-free income tools instead of taking risks. The simplest way to do this; is to choose the way of living with the return of the time deposit account. Ultimately, this will cause the industry and economy to slow down. As interest rates increase, investment costs increase. Increasing costs have an effect on abstaining from investment decisions. As increasing interest rates will decrease the profitability rates in real sector investments, it will also have undesirable results in employment. As a result of all these, the economic growth rate is expected to be at low levels. With the decision to increase interest rates when market interest rates are high, it will be possible for inflation to rise again in the next period.

c. Effect of Interest Rate on Public Investments

Interest rates are effective in direct and indirect investor decisions as well as in public investment decisions. The investment expenditures of the government are important data in terms of achieving the targeted economic growth rates. National income is a source of finance for the investments in question, as well as the source of interest expenditures. Table 3; The rate of increase of periodic investments in GNP in the same period, and also the ratio of interest expenditures to GNP during the period are stated.

Years 2006-2018 in Turkey

Table 3. Public Investment Expenditures and Interest Expenditures

Years	Investment Expenditures (Thousand TL)	Ratio of Investment Expenditures to GNP	Interest Expenditure. (Thousand TL)	Interest Expenditure. Ratio to GNP
2006	22.445.588	2.84	46.567.673	5.90
2007	26.737.363	3.04	49.440.530	5.62
2008	32.300.167	3.25	51.517.818	5.18
2009	31.404.519	3.14	54.588.423	5.46

2010	37.544.859	3.24	49.724.617	4.29
2011	43.322.235	3.11	43.610.638	3.13
2012	49.811.475	3.17	49.951.134	3.18
2013	65.775.217	3.63	51.668.316	2.86
2014	66.916.353	3.27	51.693.198	2.53
2015	81.101.004	3.47	54.850.975	2.35
2016	91.415.838	3.50	52.737.351	2.02
2017	115.055.656	3.70	60.284.880	1.94
2018	136.415.982	3.65	81.442.190	2.18

Source: Presidency of the Republic of Turkey Strategy and Budget Department; C.B.T.R.

Table 4.   Interest Expenditures and Public Expenditures Correlation

	Investment Expenditures	Interest Expenditures
Investment Expenditures	1	0.8029842660889208
Interest Expenditures	0.8029842660889208	1

Table 5.   Pearson Correlation Criteria

Powerful	Middle	Low	0	Low	Middle	Powerful
-1≤r≤-0.9	-0,9≤r≤-0,5	-0,5≤r≤0		0<r≤0,5	0,5<r≤0,9	0,9<r≤1

0<r coefficient <0   the correlation is low

0,5<rcoefficient<0,74 the correlation middle

0,75<rcoefficient<1   the correlation powerful

The Pearson correlation value is also called the "r" value, the r value will be in the range of -1 to 1. The closer it is to -1 or 1, the stronger the correlation (correlation). If the r value is negative, there is an inverse relationship between the two headings. The correlation coefficient (r) in Table 3 shows that the consistency between investment expenditures and

interest expenditures in the Turkish economy between 2006 and 2018 is 0.80. This value shows the existence of a strong relationship according to the criteria mentioned above, and its positive sign indicates that the relationship between public investment expenditures and interest expenditures is positive.

    d. Rate Increase, Inflation and Fisher Effect

    The theoretical framework considers the behavior of interest rates under inflationary conditions derived from the work of Irving Fisher. His interest is in investigating the effects of inflation on nominal interest rates. In this framework, he defined the nominal interest rate as a function of the real interest rate and the expected inflation rate. In Cagan and Friedman's long-run analysis, any increase in the money supply will result in an increase in the inflation rate. According to this; It can be said that expected inflation will cause a nominal increase. The real interest rate assumed in all discussions is the assumption that changes in the growth rate of the money supply do not change the real interest rate. That is, money is neutral (**Cagan, 1956**).

    Specifically for Fisher; He formulated two components, namely changes in price level and expected real interest rate and expected inflation. The expected real rate expresses efficiency and savings and is fixed in the short run. The expected inflation premium is compensation to the lender for accepting the risk of losing some of his wealth during the term of the contract. Consequently, the rate of interest observed in the market (known as the nominal rate) can be formulated as follows.

$$i_n = i_r + p_e \tag{14}$$

$i_n = Nominal\ interest\ rate; i_r$=Expected real interest rate;P_e=Expected price changes

    The price variable in the equation indicates the expected change in prices. The realized price level only represents the inflation expectations predicted by financial market participants. After assuming that the real rate is constant, a direct link is established between the expectation of inflation or deflation and the nominal interest rate. This connection is called the "Fisher effect". Under these assumptions, the nominal rate may vary directly and precisely with inflation expectations. There may also be an inflation premium within the nominal rate. Therefore, if the real rate is 3% and the inflation expectation is zero, the nominal rate over the contract period should be 3% per annum. If the annual expected price rises by 7%, the nominal rate should be 10%. Interest calculations according to the Fisher model of the Turkish economy over the years are indicated.

Table 6.   **2006-2018 Real Interest Rates**

Years	Nominal Interest Rates %	Net Nominal Interest Rates %	Inflation (CPI) Rate %	Real Interest Rate %
2006	16.09	13.7	9.65	3.7

2007	17.98	15.3	8.39	6.4
2008	17.30	14.7	10.06	4.2
2009	17.50	14.9	6.53	7.8
2010	9.63	8.2	6.40	1.7
2011	8.34	7.1	10.45	-3.0
2012	9.60	8.2	6.16	1.9
2013	8.49	7.5	7.40	0.1
2014	7.69	6.8	8.17	-1.3
2015	9.36	8.2	8.81	-0.5
2016	10.44	9.2	8.53	0.6
2017	10.35	9.1	11.92	-2.5
2018	12.19	10.7	20.30	-8.0

Source: CBRT, Treasury, TURKSTAT

Table 7.   **Correlation Analysis for Table 6**

	Real Interest	Nominal Interest	Inflation
Real Interest	1	0.6690258000755605	-0.7145386512512569
Nominal Interest	0.6690258000755605	1	0.04075041632080012
Inflation	-0.71453865125 12569	0.0407504163208 0012	1

According to the Pearson correlation criteria, the relationship between the "r" value, nominal and real interest rates is moderate and positive, and the relationship between the real interest rate and the CPI is moderate and negative. A negative sign indicates that as one variable increases, the other decreases.

Looking at the empirical evidence, there is a strong relationship between the interest rate and the inflation rate. For example, countries with high inflation are often countries with high interest rates. There are fierce debates as to whether the Fisher effect exists in this case. In summary, the opinions put forward are as follows: Expectations of price increases lead to a higher nominal rate increase, but it is not known whether a change in the nominal rate will lead to the possibility of a rapid and full increase in inflation. The Fisher effect shows that only nominal rates are based on inflation expectations, but this expectation is not met. Insisting on the realization of the expectation and the constant real rate is a more serious

assumption than the Fisher effect. Accordingly, some observers questioned the rate at which the nominal rate adjusts to changes in inflationary expectations (**Rose, 1988**).

Creditors are concerned about the loss of purchasing power within the specified maturity due to the upward trend of inflation. For this reason, creditors, who play a key role in the loanable funds model theory, do not offer a large part of their funds to the market. So; since the expected increase in inflation will mean that it will cause real loss of creditors, it is the reason for the contraction effect on the credit supply. Borrowers, on the other hand, expect to borrow at the previous interest rate and repay the borrowed money with depreciated money. Therefore, a borrowing cost arises with inflation.

5. Keynesian Approach to The Effect Of Interest Rate On Economic Growth

Various definitions are encountered in economic growth. In its most general definition, the annual increase in real GNP is called economic growth (**Begg et al., 2010**). Based on this definition, the theoretical foundations of Keynesian theory will be mentioned.

Aggregate demand is one of the most basic concepts in Keynesian macro theory. This is also called "effective demand". Effective demand is determined by investment expenditures. Investment expenditures are also explained with the help of the concept of "marginal efficiency of capital". If the rate of decrease in the value of the capital good over time is higher than the prevailing interest rate, it is profitable to invest, but in case of equality it will be unstable. If the entrepreneur wants to increase the accumulation of capital, the interest rate should decrease. According to this explanation, there is an inverse relationship between investment and interest rate.

Another Keynesian method for determining the status of the interest rate is the "present value" calculation. In this method, investment is inversely proportional to the interest rate. According to Keynes, in this previously known method; The interest rate should be determined according to everyone's subjective opinions before making an investment decision. Therefore, the interest rate is determined not by investment and savings in the commodity market, but by analysis of the demand for money in the money market. In Keynesian analysis, as the interest rate decreases, investments and national income increase. If the nominal national income level is certain in the economy, the interest rate is determined as a result of the interaction of money supply and demand. The most important basic motive in this interaction is the motive of speculation (**Savaş, 1986**).

An increase in the real money supply leads to a decrease in the market interest rate and an increase in real income. The Keynesian transmission mechanism works as follows; an increase in real cash lowers the interest rate, resulting in an increase in real income through investments. Autonomous investments or increase in public expenditures provide opportunities for higher income levels. This is the reason for a high interest rate. According to Tobin's analysis, if the interest rate remains constant while public spending is increased, this increase in spending increases real income as much as it increases. If real income is kept constant and the money supply is increased, prices will increase equally. As a result, an increase in the money supply only creates inflation. Real income does not change. It is concluded from the explanations that monetary policy is completely ineffective (**Tobin, 1974**). Assuming that an increase in interest rates will decrease investments, it is seen as

negative for growth. Increasing the interest rate, which means the implementation of tight monetary policy, allows the investor, who will find low-cost money and invest, to give up on investment due to high costs. This effect may cause it to be seen as negative in terms of growth as it hinders investments.

6. External Deficiencies and Interest Expenditures

Government deficits mean government borrowing. Many economists argue that government deficits increase interest rates. As interest rates increase, investments decrease. Low investments mean that future capital goods will decrease further. In addition, external deficits reduce the income level both today and in the future. If government deficits increase the real interest rate, it can also affect international trade.

While countries borrow from world markets, they borrow at different interest rates. According to the economic evaluation of the countries, if the risk of non-payment of the debts is high, they are borrowed with high interest. If one pillar of reducing the debt burden of the country's economy is to pay the interest and a part of the principal from current income, the other pillar is to increase the GNP (**Kazgan, 2005**).

When the capital account of the balance of payments is analyzed, the relationship between interest rates and exchange rates emerges. The relationship between spot and forward rates and interest rates is very important for speculators. Economic agents also choose the way of earning by making interest arbitrage. Investors who want to take advantage of the differences in interest rates in countries want to make a profit. An increase in the national interest rate increases the amount of wealth desired to be held in terms of national assets and, accordingly, the demand for national currency. As a result, as the national currency appreciates, the exchange rate decreases. For example, when TL is appreciated, foreign currency becomes cheaper. In this case, domestic production is not made and employment decreases. Because it is in the form of providing the same good in foreign markets with cheaper foreign exchange and importing it. In case of an increase in the foreign interest rate, the process reverses, causing an increase in the exchange rate, that is, the depreciation of the national currency. As the national money supply increases, domestic interest rates fall. Foreign financial instruments are attractive to investors, and foreign exchange outflows occur by selling some of their assets. The depreciation of the national currency causes the current account balance to give a surplus. According to the portfolio balance model; as the current account surplus increases, it means that the exchange rate will decrease and the national currency will appreciate (**Bulut, 2005**).

When the Turkish economy transitioned to financial liberalization in 1989, financial markets were opened to speculators. According to this understanding, the exchange rates and interest rates were linked in national markets and the markets were out of the control of the CBT. In order to maintain financial balances, domestic real interest rates were kept high and a low exchange rate policy was followed. The low exchange rate and high interest policy, while being a means of providing resources for public finance deficits, had an effect on increasing imports and expanding consumption. However, this policy implemented caused the crisis in 1994. Another example in an open economy environment and in explaining its relevance to interest rates is that in 2001, the Undersecretariat of Treasury issued FX-indexed

bonds to public and fund banks amounting to approximately USD 8.1 billion. In short, the instrument that plays a role in both these examples is the interest rate.

7. Results, Discussion and Recommendations

Fluctuations in interest rates are among the main issues in macroeconomics. Classical, Neo-Classical and Monetarist economists give importance only to monetary policy instruments as economic policy. They establish the relationship between the money supply and prices through the interest rate. In classical analysis, interest is primarily thought of as the price paid for deprivation. your interest; The idea that there is a reward for waiting to return is the essence of the Classical view. Planned financial investments indirectly lead to employment and, increasingly, to economic growth. The interest rate plays a role in the transition of mutual funds from nominal to real and from real to nominal.

Policies related to increasing or decreasing interest rates are policies that affect the whole of society. Central Banks have the largest share in the decision to increase or decrease the interest rate. For this reason, the distinguished role of the MB in the country's economy should always be considered. As it is understood from the correlation tests, there is a positive relationship between interest rates and inflation. However, no study on the cause-effect relationship has been conducted here. In the study, it is pointed out that policy makers regarding interest rates in terms of the Turkish economy should also pay attention to the issue of inflation, and that it is necessary to take decisions regarding production in the real area rather than the nominal area.

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