-ARAŞTIRMA MAKALESİ-

THE CONCEPT OF BORROWING: AN APPLICATION FOR TÜRKIYE, COVERING THE TERM OF 1976-2022

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Abstract

Worldwide, debt and interest on debt continue to increase in terms of both the amount and the ratio of national income. While borrowing should be used for investment purposes or preferred in bad times, it is seen that it is used intensely for consumption purposes, including the good periods of the economy, as seen before the pandemic. In this context, it is important to identify the variables that cause the debt growth and to develop policies to keep the debt growth at a moderate level. In this article, the growth of Turkey's external debt stock is modeled with the triple deficit concept and the cointegration method using the relevant data for the 1976-2022 period. It has been observed that the biggest significant positive effect on the total debt is from the difference of the reserve.

Keywords: Borrowing, budget, debt, triple deficit.

BORÇLANMA KAVRAMI: 1976-2022 DÖNEMİNİ KAPSAYAN TÜRKİYE İÇİN BİR UYGULAMA

Öz

Dünya genelinde borç ile borç faizlerinin hem miktarı hem de milli gelire oranı artmaya devam etmektedir. Borçlanmanın yatırım amaçlı kullanılması veya kötü zamanlarda tercih edilmesi gerekirken, pandemi öncesinde de görüldüğü üzere ekonominin iyi dönemleri de dâhil olmak üzere tüketim amaçlı yoğun olarak kullanılmaktadır. Bu bağlamda borç artışına neden olan değişkenlerin tespit edilmesi ve borç büyümesinin ılımlı düzeyde tutulmasına yönelik politikaların geliştirilmesi önem taşımaktadır. Bu makalede, Türkiye'nin dış borç stokunun büyümesi, 1976-2022 dönemine ilişkin veriler kullanılarak üçlü açık kavramı ve eş bütünleşme yöntemiyle modellenmiştir. Yapılan ampirik çalışmada, toplam borç üzerindeki en büyük pozitif etkinin rezerv farkından kaynaklandığı görülmüştür.

Anahtar Kelimeler: Anahtar Kelimeler: Borçlanma, bütçe, borç, üçüz açık

1. Introduction

In the life cycle of households, companies, and countries, their incomes are not the same in all periods and may be less in some periods and more in some periods. Since consumption is relatively stable, in some periods more expenditure than income can be made. In addition, households, companies, or governments with insufficient capital use borrowing instruments to make new investments or to complete the missing working capital. In addition, the need for foreign currency is

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financed by external borrowing. We can call the income that the lenders earn in return for delaying consumption and the cost incurred by the borrowers in return for bringing consumption forward as interest. The sum of the debt and its interest can cause serious payment problems to borrowers in the long term. In borrowing, it is extremely important that the maturity and exchange rates of assets and liabilities are compatible with each other. Due to the bad effects of interest, which is a resource transfer from the borrower to the lender, a negative stance has been taken against interest since ancient Greek philosophers. Interest is also prohibited in the holy books due to its negative effects. However, with the start of trade, borrowing and therefore interest became a part of daily life despite all its costs.

With the "Life Cycle Hypothesis" developed by Modigliani and awarded the Nobel Prize in 1985, it has been revealed that households try to keep consumption constant throughout their lives, in this context, they borrow in low-income times and save in high-income periods (Deaton 2005).

Eaton and Gersowitz (1981) emphasized the importance of borrowing in bad times and paying off debt in good times, because countries exist and borrow in more than one period, the incomes obtained during these periods differ for various reasons, and the timely payment of debts is a prerequisite for borrowing in bad times. However, due to the developments in the marketing, communication, and finance sectors, both the quantitative and the proportional size of the debts have increased each year. The pandemic, which has been experienced since 2020, has accelerated this process even more. According to the study conducted by Ranasinghe (2021), based on the data of the Institute of International Finance (IIF), the total debt stock in the world was 220 trillion US dollars and the ratio of debt stock to GNP was 310% in 2014, while by the end of 2021 the debt stock will be 300 trillion US dollars and the ratio of debt stock to GNP 353% is expected. It is seen that the economy is in a period of rising until the pandemic in 2014-2020. Even in these periods, the tendency to borrow continued to increase. Households, companies, or governments may be faced with the inability to pay their debts if they take the debt in good times and try to pay it off in bad times, or if they borrow for consumption rather than production. In this case, crises and even bankruptcies may occur. When the recent crises are examined, it is seen that the most important reason for most of them is the failure of households, companies, or countries to pay their debts on time. Considering that one of the main reasons for the crisis in 2008 was the inability to pay the debts, it is obvious that we may face similar dangers in the coming years.

The concept of debt, which refers to money received to be given back or to be paid in return for a certain job or action, is quite broad. However, its use and follow-up are generally limited to the money received to be returned. This situation can cause problems in the follow-up and payment of the debt. Especially in developing countries, the follow-up and monitoring of implicit commitments are not carried out transparently, and the unrealistic follow-up of liabilities may cause problems in the payment of debts.

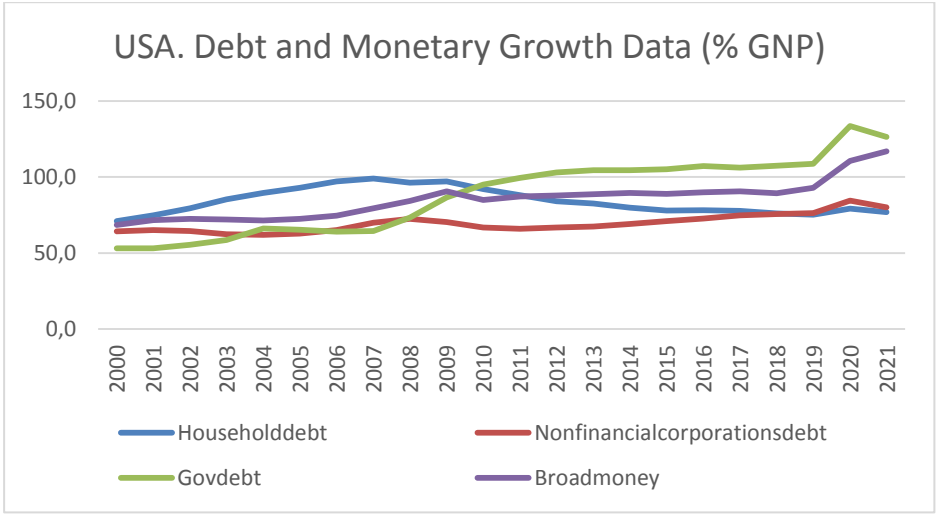
In this context, it is important to examine the main reasons for the increase in debts and to produce policies regarding these reasons. It is aimed to determine the issues that will be given importance and priority in creating long-term action plans for institutions that manage monetary and fiscal policies, such as the Ministry of Treasury and Finance, Turkey Strategy and Budget Presidency, the Central Bank, and the Banking Regulation and Supervision Agency, in order to keep the external debt at a sustainable level. In this study, first, the concept of borrowing and the basic problems related to borrowing will be revealed. Then, empirical studies on this subject will be presented. Following the explanation of the econometric methods to be used, the reasons for the debts will be analyzed with the help of the data of Türkiye. Interest payments and changes in debt stock have not been addressed in theoretical studies on triple deficit. With the help of the change in the debt stock and the inclusion of interest payments, the debt stock will be modeled with the concept of triple deficit. In addition, it is seen that empirical studies on borrowing generally focus on the consequences of borrowing rather than its causes. Studies focusing on the causes of borrowing have been conducted with limited macro variables. In this study, the change in reserves and the debt stock of the previous period are added to the main macro variables.

2. Theoretical Background

Developed and developing countries have experienced many crises in the last century. Eichengreen and Hausmann (1999) explained the relationship between exchange rate and financial fragility with; the moral hazard hypothesis (distorted results of implicit guarantees), the original sin hypothesis (the inability of the domestic currency to borrow abroad or even for long-term borrowing at home), and the commitment problem hypothesis (problems with the weakness of institutions that deal with commitment). Eichengreen et al. (2007) added currency mismatches (currency differences in assets and liabilities) in addition to the issues mentioned above. In other words, the most important reasons for financial fragility are the problems in borrowing and paying the debt due to structural problems. It must be considered that the increase in the debt stock of developing countries and the shortening of its maturity will be an important problem in the coming years.

The data on the debt and monetary base of the USA, the world's largest economy, is shown in Figure-1. Debt; is divided into three categories: households, non-financial companies, and government. Values are obtained by dividing by GDP. As can be seen in Chart-1, both the amount and composition of the debt have undergone significant changes over the years. While the government debt at the beginning of the period was 53.1% of the GDP and its share in the total debt was 42%, in 2020, the ratio of the debt to the GDP was 126% and its share in the total debt increased to 62%. Household debt, on the other hand, peaked both in quantity and its share in debt in 2007, and with the 2008 crisis, it fell back to the old ratios. While the ratio of firms' total debt to GDP was 64% at the beginning of the period, it increased to 80% at the end of the period. It is observed that both the increase in debt and the standard deviation of non-financial companies are much more limited than the other two variables. In addition, when the ratio of Broad money to GNP is examined, it is seen that the ratio, which was 68.5% in 2000, increased to 116% in 2021. Despite the decrease in borrowing after the pandemic in 2020, the Broad money continues to grow. In addition, there is a significant similarity between the increase in public debt and monetary expansion. The correlation between both variables is 92%. In other words, despite the negative costs of both instruments, they are used at an increasing rate, even in periods when the economy is good.

Figure -1: Debt and Monetary Growth Data in the USA



Source: Consolidated data from IMF (2023) and, Worldbank (2023)

It has been stated above that some of the most important causes of the crisis are the increases in the debt stock and the changes in the content of the debt. For this reason, it is extremely important to keep the debt stock under control within a payable margin. Monitoring the debt stock with its nominal value is not sufficient in this context. The change in the purchasing power of money and income over time changes the relative value of the debt stock over time. In this context, the debt stock is generally monitored by proportioning it to the national income. Thus, the situation of the debt over time and between countries can be followed more easily. Blanchard and Johnson (2013) included concepts such as interest and growth in Equation (1) in the follow-up of the debt stock. In the equation, B_t is debt stock, Y_t is national income, r is real interest, g is growth, $G_t$is government expenditures, and T_t is tax

revenues. In other words, it was emphasized that in the periodical change the ratio of debt to GNP were important, debt stock, interest, growth, and budget deficits.

$$\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} = (r-g)\frac{B_{t-1}}{Y_{t-1}} - \frac{G_t - T_t}{Y_t} \quad (1)$$

Mankiw (2009) stated that if countries run a deficit in their budgets and finance it with borrowing, savings and investment will fall and a foreign trade deficit will be created. It was emphasized that this situation would cause a lower equilibrium value of the capital stock in the long run, higher external debt stock, and a greater debt burden on future generations.

One of the basic concepts in borrowing is the budget constraint. The budget shows the income and expenses of households, companies, and countries in a certain period. The budget constraint, on the other hand, shows the possible combinations of goods or services that households, companies, or countries can purchase in each period. Since it is not possible to borrow forever, the expenditures of households, companies, and countries should be within the budget constraint. In growth models, a constraint called the "no Ponzi game" prevents the debt from exploding in the long run (Blanchard and Fisher 1993). Romer (2012) put forth the amounts that individuals can consume during their lifetime in equation (2) and the budgets of countries in equation (3). In the equation, C is consumption, $K(0)$ is initial wealth, W is wage, T is tax, G is government spending, and $B(0)$ is initial debt. According to Equation (2), the total consumption that individuals can make during their lifetime must be equal to or less than their initial wealth and net income. In Equation (3), it is modeled that the total expenditures of the states can never exceed the amount to be obtained by deducting the initial debt from the tax revenues.

$$C \leq K(0) + W - T \quad (2)$$

$$G \leq B(0) + T \quad (3)$$

The need for borrowing and the increase in the debt stock is due to the imbalances observed and followed in the national income accounts. In other words, if it is consumed more than the income, the missing amount must be financed by borrowing, expanding the monetary base, or selling assets. In equation (1), the increase in the debt stock has been tried to be modeled only with the government budget deficit. Due to the inadequacy of this approach, the study called "Two Deficit" was put forward by Chenery and Strout (1965) to investigate the effect of foreign aid on economic development. The model named "C-S" by Fei and Ranis (1967) is shown in equations (3-6), excluding the public in national income calculations. In Equations (5) and (6), it is stated that if the resources are insufficient in investment or import, they should be financed with foreign resources (F).

$$Y = C + S \quad (4)$$

$$I = S + F \quad (5)$$

$$\mathrm{M} = \mathrm{X} + \mathrm{F} \quad (6)$$

When Equations (5) and (6) are combined, it is emphasized that investment/savings and foreign trade deficit should be equal, and in case not, the need for resources is financed by foreign aid.

$F=I-S=M-X$

Bacha (1989) developed the concept of two deficits, including the public in Equation (3), with equation (7) as the triple deficit. In equation (7), investment (I) is divided into government (I_g) and private (I_p).

$$I_g = (S_p - I_p) + (G - T) + (X - M) \quad (7)$$

By including interest payments on previously acquired loans and the change in reserves in Equation (7), we obtain Equation (8). Since the previous period's debt stock is used in interest payments, it is included in (t) as a time variable.

$$I_{g_t} = \left(S_{p_t} - I_{p_t}\right) + (G_t - T_t) + (X_t - M_t) + rD_{t-1}\text{-}\Delta R \quad (8)$$

In the case of investment/Savings, Government, and Foreign Trade deficits, borrowing is required to finance these deficits. The situation in which the change in debt stock is included in the model is in Equation (9).

$$I_{g_t} + (D_t - D_{t-1}) = \left(S_{p_t} - I_{p_t}\right) + (G_t - T_t) + (X_t - M_t) + rD_{t-1} - \Delta R \quad (9)$$

With the help of Equation (9), we can find the debt stock in Equation (10). As can be seen from the equation, the factors that increase borrowing, which we call three deficits; are the savings/investment, and public and foreign trade deficits of the private sector. In addition, the changes in the debt and interest and reserves of the past periods are added to the three deficits.

$$D_t = \left(S_{p_t} - I_{p_t}\right) + \left(G_t - T_t - I_{g_t}\right) + (X_t - M_t) + (1 + r)D_{t-1} - \Delta R \quad (10)$$

Agénor and Montiel (2008) modeled the household and government budgets in Equations (1) and (2) with the help of real money balance and government debt in Equation (11). The second part of the equation shows the household's budget limit. The third part represents the government's budget limit. In the equation, ι is tax rate, τ is transfers and π is inflation. $\dot{m}$ represents the real increase in the money stock after adjusting for inflation. It has been emphasized that consumption and real interest rate are independent of the growth rate of the nominal money stock. In other words, it is emphasized that there is no real effect of increasing the money stock in the long run.

$$\dot{m} + \dot{d} = (1 - \iota)(y + \tau + rb) - c - \pi m = g - \iota y + (1 - \iota)(\tau + rb) - \pi m \quad (11)$$

The criticisms of Free (2010) that the nominal debt amounts do not reflect the truth are as follows:

- A significant part of the debt stock is kept in Central Banks,
- There are significant government debt securities in Social Security Institutions,
- Government expenditures accelerate economic growth,
- Inflation reduces the nominal value of the debt stock,
- The actual amount of borrowing is much higher due to future liabilities (such as future social security deficits, and commitments given) that are not reflected in the borrowing value.

Reinhart and Rogoff (2010) stated that there are five alternatives for countries to reduce their debt level. These; economic growth, fiscal adjustment/austerity, default/restructuring, inflation surprise, and a constant dose of financial pressure accompanied by a constant dose of inflation. The first of these is relatively rare, the rest are difficult and unpopular. It is emphasized that although developed countries used alternative number (3) before the 2nd World War and alternative number (5) after the 2nd World War, it is not used today.

Eichengreen et al (2021), on the other hand, emphasized that governments and societies may form heavy debts due to wars, financial crises, and other emergencies. It has been stated that primary surplus, moderate inflation, and economic growth are required to reduce this debt stock. However, it has been shown that the situation worsens when it is completely dependent on inflation or when very large primary surpluses are tried to be sustained for long periods, and the resulting high inflation erodes the support given to the government and the confidence in the economy. It has been stated that political and economic conditions preclude efforts to maintain the primary surplus.

As a result, households, companies, or governments will either reduce their assets by selling their wealth or increase their liabilities by borrowing if the expenses are higher periodically. An additional opportunity for governments is to print money. All these alternatives have a cost. Decision-makers need to evaluate the budget deficit very carefully and with which resources it should be financed.

3. Literature on Borrowing

Pioneering empirical studies on borrowing have been on the effect of borrowing on growth. In the studies, it was tried to find the optimal borrowing rate. In later studies, the factors affecting borrowing were tried to be modeled. General information about the studies carried out is given below.

Table 1: Econometric Studies on Borrowing

Studies	Country/Term	Variables	Method	Results
Cecchetti et al. (2011)	18 OECD countries/ 1980-2010	8 variables (gross saving (public and private) as a share of GDP, population growth, openness to trade, CPI, etc.)	Panel data	If the government and household debt exceed 85% of GDP and corporate debt exceeds 90% of GDP, it has a negative impact on growth.
Checherita and Rother (2010)	12 European countries/ 1970-2011	Growth of GNP per capita, Debt/GNP, savings/investment, population growth	Dynamic panel data	There is a non-linear relationship between growth and public debt/GDP and if this ratio exceeds 90%, growth decreases.
Checherita -Westphal and Semeano (2020)	10 European countries/ 1999-2017	Interest-growth differential, government debt, primary balance, output gap, current account balance, factor productivity, population, and short-term interest rate	Panel VAR	The difference between interest rate and growth is higher in countries with a higher public debt burden, primary deficit, or an increase in public debt.
Dawood et al. (2021)	32 Asian countries/ 1995-2019	External debt, growth, government spending, inflation, and population growth	Panel GMM	The long-term effect of explanatory variables on external debt is much greater than the short-term effect.
Eaton and Gersowitz (1981)	38 countries / 1970-1974	Public debt, exports, imports, and national income.	Regression	Export revenues increase both demand and supply for borrowing.
Eren and Malamud (2019)	110 countries, 23.992 companies, and 102.159 Bond/ 2000-2019	Currency, Inflation Risk Premium (IRP), and maturity	Regression	The IRP differences explain the fall and rise of the dollar's dominance.
Freytag and Paldam (2012)	73 countries / 1970-2004	Growth and the ratio of government debt to GDP	Kernel regression	The effect of debt acquisition on growth is negative but rather small.
Hagen and Wolf (2006)	22 EU countries / 1980-2003	Debt and budget deficit	Dynamic GMM panel	That budget deficits in Europe provide only limited information on the evolution of past debt levels.
Hilscher et al. (2014)	ABD/2012	Debt/GNP and inflation	Multivariate Gaussian copula	High inflation only slightly reduces the real value of debt.
Magoti et al. (2020)	Tanzania, Kenya, Uganda, Burundi and Rwanda/ 2004/2018	Savings-investment gap (SG), fiscal balance(FB) and current account balance (CAB)	Granger Causality Test, Pooled Mean Group panel ARDL	Triple deficit hypothesis in East African countries does not hold.

Reinhart et al. (2003)	55 countries/ 1979-2002	IIR values, 3 dummy variables, and Debt/GNI	Panel Data	In countries with more limited access to credit, a significant and negative relationship was found between debt and credibility.
Reinhart and Rogoff (2010)	44 countries/ 1790-2009	Debt/GDP ratio, inflation, and growth	Mean and median	The increase in the debt/GNP ratio has different effects on growth and inflation in developed and developing countries.
Rinaldi and Sanchis-Arellano (2006)	12 AB countries / 1989-2004	Loans, debt, income, assets, inflation, unemployment, interest rate, house price, and homestay rate	Panel cointegration	That the increase in the debt ratio puts the household sector in a riskier financial position and income grows less than the debt ratio.
Soh et al. (2021)	40 countries/ 2002/2018	Debt, government effectiveness, corruption, and inflation	Panel Data regression	Government efficiency in developing countries and corruption and inflation have an impact on government debt in developed countries.
Şen et al. (2014)	Turkey/1980/ 2010	Savings-investment gap (SG), fiscal balance(FB) and current account balance (CAB)	Granger Causality and VAR	The relationship between the variables of the triple deficit was examined.

In summary, the following points are emphasized in the empirical studies on debt.

- The increase in debt affects developed and developing countries differently,
- Exceeding a certain rate of debt has a negative impact on growth due to an increase in interest rates,
- Variables for explaining debt are more explanatory in the long run,
- The effect of high inflation on the decrease in the real value of debt is limited,
- As the access to credit becomes more difficult, the increase in the debt stock negatively affects the credibility.

When the literature studies are examined, it is understood that the studies generally focus on the result of the debt stock. It is seen that the studies on the causes of the debt stock are carried out with limited macro variables. Since revealing the reasons for the increase in the debt stock is of vital importance for keeping the debt stock under control, it is considered that work should be done in this context. In econometric studies conducted with triple deficits, the cause-effect relationship between the three deficits or between the triple deficits and macroeconomic variables such as growth has been examined, but how the resulting deficits are financed has not been examined. The resulting deficits are financed by borrowing (although the state has the opportunity to expand the monetary base, this alternative triggers inflation). However, paying off debt with debt cannot be sustained in the long term. In this respect, it is especially important to investigate the effect of triple deficits on external debt.

4. Econometric Methodology and Data

Econometric Methodology

One of the basic assumptions in time series-based empirical studies is that the series is stationary. In case the series is not stationary; It can cause the presence of autocorrelation and an insignificant increase in R^2. In addition, time series must be stationary to predict financial assets and perform causality tests (Gujarati and Porter, 2009).

If the mean and autocovariance of the time series change over time, it is assumed that they are

not stationary. For the AR(1) processes specified in Equation (12) to be stationary, which varies depending on the constant term and the time trend, it must be $|\rho| \leq 1$. In this context, the Dickey-Fuller test and table values are summarized by Hamilton (1994).

$$y_t = \rho y_{t-1} + u_t$$
$$y_t = \propto + \rho y_{t-1} + u_t \quad (12)$$
$$y_t = \propto + \rho y_{t-1} + \delta t + u_t$$

As a result of the studies on the stationarity of the time series, it has been determined that the models developed for the stationary series are used in the non-stationary series, resulting in erroneous results. The pioneering work on the methods to be used for non-stationary series was done by Granger, Engle, and Granger, and these studies brought Granger the Nobel Prize in 2003. Engle and Granger applied a two-step procedure, first estimating β by the Least Squares Method, then substituting it for the Error Correction Method and estimating the Error Correction Method by the Least Squares Method (Syczewska 2011). The second method used for cointegration was developed by Johansen using the Vector Autoregression method (Hjalmarsson and Österholm 2007).

In modeling the panel cointegration, Hansen (1992) divided independent variable (x_t) in classical regression into two parts (x'_{1t}, x'_{2t}) and obtained the y_t series in equation (13).

$$y_t = Ax_t + u_{1t}$$
$$x_{1t} = k_{1t} \quad (13)$$

$$x_{2t} = \prod_1 k_{1t} + \prod_2 k_{2t} + x^0_{2t-1} u_{2t}$$

According to the values of k_{1t} and k_{2t} in equation 14, existence of cointegration, and the existence of time trend and constant coefficient of cointegration can be tested. To remove the long-run dependence between the cointegrating equation and stochastic regressors innovations is used Canonical Cointegrating Regression.

Data

In general, the debt that households use to meet their consumption needs, companies, and governments to meet their needs for growth, renewal, or survival continue to grow in quantity and proportion today. This study will be tested how compatible the theoretically presented information is with the actual situation today. In the study, the data of Türkiye for the years 1975-2022 were used. Data are from World Bank and Turkey Strategy and Budget Presidency.

As stated in the second part, where the theoretical framework is explained, some of the important sources of financing the triple deficits are external borrowing and international reserves. The fact that savings rates, capital accumulation and financial markets in Turkey are not at the level of developed countries further increases the importance of foreign borrowing and international reserves. Since international reserves are considered as reserve funds for countries and are not used to finance triple deficits except in compulsory situations, the main source of financing triple deficits is external borrowing. For these reasons, triple deficits and reserves were included in the econometric study as independent variables, and external debt as dependent variables. In the study, the econometric validity of equation (10), which is derived from the concept of triple deficit, will be investigated. Variables to be used for this purpose; external debt (EXTERNALDEBT) was used as the dependent variable, savings (SAVING), investment (INVESTMENT), exports (EXPORTS), imports (IMPORTS), tax revenues (TAX), government expenditures (GOVERNMENT) and reserves (RESERV) were used as independent variables. By equation (10), the previous period value of the "external debt" variable was also included in the study. All the variables are included in proportion to national income.[2] Descriptive statistics for the variables to be used in the model are presented in Table-1.

Table 2: Descriptive Statistics of Variables

	Mean (*)	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis

[2] Logarithmic transformation has not been used because it may cause coefficients to be difficult to interpret, may compress outliers when there are outliers in the data set, may be undefined against zero and negative values, and may cause the variance of error terms to change after logarithmic transformation.

EXTERNALDEBT	40,37 *(N.V.)*	40,74	60,34	11,38	11,15	0,72	3,48
INVESTMENT	24,03 *(23,22)*	24,55	35,04	14,50	50,02	0,09	2,20
SAVING	25,71 *(21,40)*	24,76	38,40	18,19	49,19	0,52	2,52
IMPORTS	22,10 (*21,86)*	22,78	42,59	58,82	75,26	0,06	2,99
EXPORTS	19,30 *(21,54)*	21,28	38,58	32,18	83,41	0,17	2,81
GOVERNMENT	12,07 *(17,35)*	12,29	5,66	7,52	21,05	0,59	2,77
TAX	15,80 (*14,74)*	16,52	19,05	10,80	24,71	0,63	2,12
RESERV	0,08 *(N.V.)*	0,09	0,14	0,02	0,04	0,09	1,47

(*) OECD Countries

When the descriptive statistics of the variables to be used in the study are examined, it is seen that Turkey does not have a deficit except for foreign trade. A similar result is seen when the values are compared with OECD countries.

5. Empirical Evidence

Since the series to be used are cumulative, first, the unit root test was performed by equation (12), and the test results are in Table-2. The Augmented Dickey-Fuller (ADF) test was preferred because it is the pioneering study on this subject and the most preferred and parametric test. As a prerequisite for cointegration, the first difference of non-stationary series must be stationary. For this reason, after the unit root test was applied to the series, the first differences were also tested.

Table 3: Unit Root Tests of Variables

	LEVEL		FIRST DIFFERENCE	
	ADF Sta.	Prob.(*)	ADF Sta.	Prob.(**)
EXTERNALDEBT	-2,9731	0,0450*	-5,6556	0,0000**
INVESTMENT	-1,5540	0,4976*	-8,6240	0,0000**
SAVING	-2,5946	0,1014*	-9,0685	0,0000**
IMPORTS	-0,3576	0,9077*	-5,9298	0,0000**
EXPORTS	-0,6649	0,8453*	-6,3696	0,0000**
GOVERNMENT	-1,5189	0,5153*	-5,8999	0,0000**
TAX	-0,9410	0,7656*	-6,9838	0,0000**
RESERV	-1,1368	0,6933*	-8,6747	0,0000**

Null Hypothesis: Series have a unit root

(*) : The null hypothesis is accepted at the level of α=0.01.

(**) : The null hypothesis is rejected at all the level α=0.01.

It is seen that the existence of unit root in level form cannot be denied in all series. For this reason, Cointegrating Regression (Fully Modified Least Squares) was used to find a cointegrating equation with cointegrating vector of weights characterizing the long-run relationship between the variables. The results of the study are below.

Table 4: Cointegration Results

Variable	Coefficient	t-Statistic	Prob.
EXTERNALDEBT(-1)	0,71	18,84	0,00*
INVESTMENT-SAVING	0,08	1,77	0,09**
IMPORTS-EXPORTS	-0,51	-4,71	0,00*
GOVERNMENT-TAX	0,30	1,76	0,09**
RESERVES	29,90	2,97	0,01*

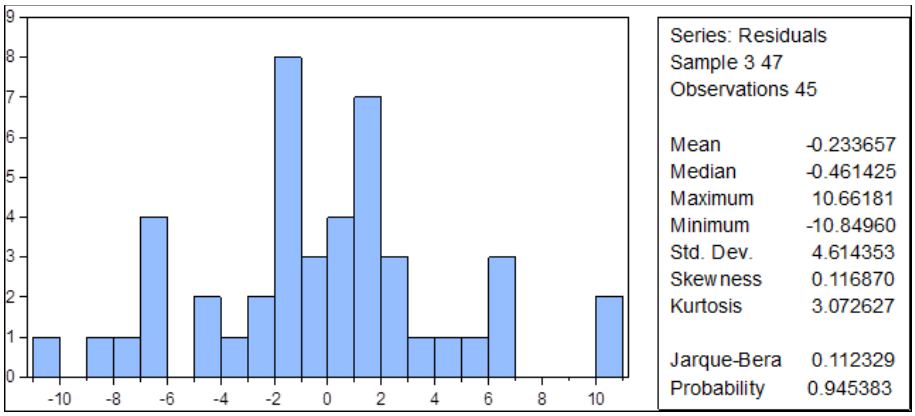
C	12,97	7,97	0,00*

Dependent Variable: EXTERNALDEBT
(*)The coefficients are significant at the level of α=0,01
(**) The coefficients are significant at the level of α=0,1

When the 4th Table is examined, it is seen that the coefficients of the other variables, except the foreign trade deficit, are positive. The reason for this is that the values of other variables except foreign trade are positive. In this respect, the signs of the coefficients are consistent within themselves. When the coefficients are examined in terms of their size, it is seen that the ratio of international reserves to GNP is the most effective variable in the model (29.90). The 70% correlation between the reserve and the foreign debt indicates the necessity of keeping a significant reserve in order to rollover the foreign debt. In the study, the (c) value (12.97) is the second important factor and shows that it is very difficult to reduce the value of foreign debt. Among the triple deficits, it is seen that the most important variable affecting external debt is foreign trade (0.51) and the least is the savings/investment deficit (0.08). The public deficit has a noticeable effect (0.30) on external borrowing.

The ratio of the variance in the dependent variable that could be explained from the independent variables, R^2, was found 74%. The adjusted R^2 for which the number of independent variables is improved is 71%. The adjusted R^2 value of 71% indicates that the explanatory nature of the model is at an acceptable level. As a result, the results of the Jarque-Bera test regarding the normal distribution of error terms are shown in Figure 2. It was found that the error term was normally distributed as its skewness was 0.11 and kurtosis was 3.07, therefore the Jarque-Bera value was 0.11 and the p value was 0.95.

Figure -2: Jarque-Bera Test Results for Error Terms



For the study to be valid, the resulting residual should be normally distributed and there should be no autocorrelation. In Chart-2 are the results of the normal distribution of the residual. It is seen that the kurtosis is close to 0 and the skewness is close to 3. Since the P value is 0,67, the hypothesis that the residual is normally distributed cannot be rejected.

In cointegration analysis, the presence of autocorrelation between error terms may affect the statistical reliability of the model. Failure to properly handle autocorrelation can cause the model to produce inaccurate results and reduce the effectiveness of the analysis. Therefore, it is important to investigate the autocorrelation between error terms. Q statistic values for 12 periods regarding the error terms in the model are in Table-5 and autocorrelation is rejected.

Table 5: Q Statistic Values for 12 Periods

Period	AC	PAC	Q-Stat	Prob*
1	0,080	0,080	0,309	0,579
2	0,000	-0,007	0,309	0,857
3	-0,125	-0,125	1,098	0,778
4	-0,339	-0,327	7,040	0,134
5	-0,017	0,027	7,054	0,217
6	0,000	-0,013	7,054	0,316

7	0,148	0,085	8,277	0,309
8	0,072	-0,056	8,571	0,380
9	-0,049	-0,055	8,711	0,464
10	-0,074	-0,062	9,046	0,528
11	-0,154	-0,081	10,522	0,484
12	-0,090	-0,097	11,047	0,525

The residuals obtained from estimation of Equation (10) must be not cointegrated. Therefore, to test whether the variables are cointegrated Engle-Granger Cointegration Test is used. Engle and Granger (1987) recommended the use of the ADF test procedure in the cointegration test. The test statistics are in Table 4. The Phillips-Ouliaris tests reject the null hypothesis of no cointegration (unit root in the residuals) at roughly the % 1 significance level.

Table 4: Engle-Granger Cointegration Test Results

Statistics	Value	Prob.
Engle-Granger tau-statistic	-5,7726	0,0118
Engle-Granger z-statistic	-38,7547	0,0101

6. Conclusion

There are basic principles for borrowing such as the fact that borrowing is for production rather than consumption, it should be preferred in bad times of the economy, and the maturity and exchange rate match between income and expenditure, when the borrowing tendency in the world is examined. However, it is seen that these principles are not followed very much. In this study, after drawing attention to the quantitative and proportional size of the borrowing, studies on borrowing have been put forward.

Due to the cumulative nature of the data to be examined, the mean and autocovariance generally change. If there is a unit root in the series, it is inevitable that autocorrelation will occur and R^2 will be higher than it should be. As stated in Chapter 4, it is stated that in this case, if the series to be studied has a unit root and if there is a unit root in the series, cointegration should be used.

In the econometric study, the variables in the concept of triple deficit specified in Equation (10) made with national income calculations were used. Unlike previous studies on triple deficit, changes in reserves were included in the econometric study. The explanatory power of the study was 71%. In the tests related to the resulting residual, it was observed that the residual was normally distributed and there was no autocorrelation. When the coefficients related to the variables are examined, it is seen that the biggest effect on the formation of debt is caused by public deficits and savings/investment inequality.

Econometric studies with the concept of triple deficit focused on the cause and effect relationship between three variables. Therefore, it is not possible to determine the reasons for the increase in the debt stock with these studies. Although it was determined that the variables were not stationary, cointegration was not used. In this study, first of all, the relationship between the triple deficit and debt stock, which was put forward by Bacha (1989), was put forward theoretically and then supported empirically by the example of Turkey. Again, non-stationary series are modeled with the help of cointegration, and the above mentioned drawback is eliminated. The lack of studies on macroeconomic calculations for the causes of the debt stock may cause deficiencies in which areas should be given priority to policy makers. In this study, it was tried to determine the degree of importance of the macroeconomic variables related to the prevention of the increase in the external debt stock.

When Table 4 is examined, it is seen that the most important variable affecting external borrowing is the change in reserves. In this context, it is important for decision makers to keep reserves at an optimum level. For reserves to be healthy and sustainable, foreign trade must be high.

Countries' reserves need to be provided from long-term sources and at low cost. Since it is not possible to convert debt into debt in the long run, foreign trade surplus is of vital importance for both reserves and foreign borrowing. As the borrowing level increases, the interest rate on the debt increases and the maturity becomes shorter. In particular, credit rating agencies downgrade the country's rating based on this risk, making borrowing difficult. The second important variable is the constant coefficient. This situation shows the difficulty of sudden movements in debts. The high fixed coefficient shows that it is very difficult to reduce the level of debt. Therefore, it is necessary to act correctly at the initial borrowing stage. The effects of foreign trade deficit and public deficits on foreign borrowing are similar. Increasing imports and/or public expenditures increases the external debt stock, in line with the literature. In order to keep the foreign debt at a moderate level for the economy, imports and public expenditures need to be kept under control. It seems that the savings/investment gap has a limited effect on the external debt stock.

Limitations

Data from the World Bank and the Presidential Strategy and Budget Directorate were used in the study to investigate the effects of triple deficits on borrowing for Turkey, covering the years 1976-2022. Due to lack of sufficient data; Instead of total debt stock, foreign debt, only values for goods and services in imports and exports, and missing values for public income and expenses (public income is limited only to taxes and expenditures are limited to consumption) are used.

Future Research Fields

Developments in communication, marketing and finance increase consumption every day. The reasons such as pandemic and conflict/war, developments in technology and financial fields, and the rise in the prices of natural resources such as oil and natural gas have caused a significant deterioration in income distribution in recent years. As noted above, a reduction in consumption may be slower than a reduction in income. This situation creates the need for additional borrowing both to sustain current consumption and to pay current debts. In this context, countries and individuals will be more likely to experience problems in paying their debts. The more widespread the non-payment of debts, the more likely this issue will spread to countries and the world. It will be important for borrowers and lenders to carry out studies on the developments in income distribution in the world and in countries and on the payment of debts.

Since the 2008 crisis in the world, significant decreases have been experienced in interest rates. This situation facilitated access to credit and thus, there was a tendency to increase in borrowing. In the pandemic, countries continued the same policy to reduce the impact of the crisis. Today, the increase in prices, especially in energy, the increase in conflicts and tensions, and the important developments in technology have led to an increase in interest rates. Both the increase in prices and the recession of countries reduce the probability of repayment of loans. It is necessary to investigate the effects of interest rate hikes on the repayment of debts and to increase interest rates. This study of decision makers will reduce the likelihood of a major financial crisis within or between countries.

A high ratio of external debt to Gross National Product (GNP) can pose a number of potential problems for a country's economic health and sustainability. The main problems we may encounter if this rate increases are; the increase in the cost of borrowing, the difficulty in fulfilling external debt service obligations, the increase in the country's sensitivity to exchange rate fluctuations, the decrease in economic growth, the decrease in social aid and the decrease in investments. To prevent these problems; ensuring political stability, increasing the country's competitiveness through investments in education and technology, improving the investment environment, attracting foreign direct investments, increasing exports, keeping imports under control, keeping the public and private sectors in a healthy structure with monetary and fiscal policies, and effectively managing debts. should be managed accordingly.

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