Beykoz Akademi Dergisi, 2022; 10(2), 1-19 ARAŞTIRMA MAKALESİ
Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
DOI: 10.14514/beykozad.1063904

# MONETARY VS FISCAL DOMINANCE IN TURKISH PUBLIC FINANCES[1]

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## Abstract

The interactive roles of monetary and fiscal policies are represented by two competing theories in the literature. The advocates of the first theory, the monetarist view, argue that the fiscal authorities tune the primary balance in an attempt to preserve the fiscal solvency for each price level. On the contrary, the proponents of the new approach assert that the fiscal authorities are able to set primary surplus without making a binding commitment to restore solvency. In this study, the purpose is to figure out which approach is valid for Turkish public finances. To accomplish this objective, we run a model based on Bohn (1998) using the Auto Regressive Distributed Lag (ARDL) method so as to determine the type of regime prevalent in the Turkish economy. Besides, we run a Toda-Yamamoto type causality analysis to detect the direction of causality among public debt and primary balances. The results from both analyses reveal that the Turkish public finances are characterised by monetary dominant regimes which indicate that the fiscal solvency is restored by primary balance alterations by a set of active fiscal policy actions.

**Keywords:** Monetary dominance, fiscal dominance, ARDL, Toda-Yamamoto

**Jel Codes:** H5, H72, H30

# TÜRK KAMU MALİYESİNDE PARASAL VE MALİ BASKINLIK

## Öz

Para ve maliye politikalarının etkileşimli rolleri literatürde iki teori tarafından temsil edilmektedir. İlk teori olan monetarist görüşün savunucularına göre mali otorite her bir fiyat seviyesi için bütçe dengesini korumak amacıyla faiz dışı dengeyi optimize etmeyi amaçlarlar. Aksine, yeni yaklaşımın savunucuları, mali otoritelerin ödeme gücünü yeniden sağlamak için bağlayıcı bir taahhütte bulunmadan faiz dışı fazla verebildiğini ve böylelikle para politikası araçlarını mali amaçlar için kullanılabileceğini savunmaktadır. Bu çalışmada amaç, Türk kamu maliyesi için hangi yaklaşımın geçerli olduğunu ortaya çıkarmaktır. Bu amaca ulaşmak için, Türkiye ekonomisinde geçerli olan rejim türünü belirlemek için Otoregresif Dağıtılmış Gecikme (ARDL) yöntemini kullanarak Bohn (1998) temelli bir model üzerinden analiz gerçekleştirilmiştir. Ayrıca kamu borçları ve faiz dışı dengeler arasındaki nedenselliğin yönünü tespit etmek için Toda-Yamamoto nedensellik analizi yapılmıştır. Her iki analizden elde edilen bulgular, Türk kamu maliyesinin, mali ödeme gücünün bir dizi aktif maliye politikası eylemi yardımıyla gerçekleştirilen faiz dışı denge değişiklikleriyle restore edildiğini ve bu nedenle parasal baskın rejimle karakterize olduğunu ortaya koymaktadır.

**Anahtar Kelimeler:** Parasal baskınlık, mali baskınlık, ARDL, Toda-Yamamoto

**Jel Codes:** H5, H72, H30

[1] This study was developed based on findings used in the presentation titled "Ricardian vs non-Ricardian Regimes in the Long-Run Posture of Turkish Public Finances" which was prepared for Econtr 2021 conference (2-4 September 2021)

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## 1. Introduction

The fiscal policy is traditionally associated with the stabilization of the fiscal balances therefore the most important problem confronted by the fiscal authorities is the budget deficit sustainability which to a large extent has been related to government solvency in the long run. Nevertheless, one of the prerequisites of a solvent public budget is the availability of favourable conditions under which the fiscal authorities execute public borrowing. While an economic atmosphere characterized by a high growth rate and the low-interest rate is ideal for the sustainability of public finances, in the case of low growth and high-interest rate, high primary surplus levels are required to preserve fiscal stability in a credible manner. In traditional taxonomy, the fiscal authority determines the primary surplus to reassure fiscal solvency for the prevailing price level in the economy. In this setting, the central bank is supposed to act in the former stage and set the price level without confronting any constraint from the fiscal policy authorities. Thus, the fiscal policy turns out to be the follower and tunes the primary balance to restore fiscal stability given the price level determined by the central bank. In the literature, this setting is also called monetary dominant (MD) regime since the fiscal policy acts secondarily and aims to adjust its fiscal stability restoration policies based on any price level occurring in the economy under the control of the central bank (Tanner et al. 2013). However, in the last two decades, an alternative paradigm called the fiscal theory of price level sparked interest in the fiscal policy literature. According to this new view, the fiscal authorities are capable of setting primary balance levels in an erratic manner and their fiscal policy choice is allowed to be independent of the existing price level. In this setup, the primary balance determination is considered an exogenous process, unlike the monetarist view. Also, contrary to the monetarist view, the price level is determined endogenously and fiscal solvency is achieved through price adjustments which impel the central bank to actively take a role in the fiscal stability restoration. The central bank can only determine the timing of inflation but the level thereof. In the literature, this theory is also called fiscal dominant regime since the fiscal policy is gaining control over the monetary policy in establishing fiscal solvency (Jevdonic and Milenkovic, 2018).

In monetary dominant regimes, price stability is prioritized against fiscal stability, in contrast, in fiscal dominant regimes, fiscal stability has a higher degree of importance in public choice. In this study, our purpose is to find out which theory is compatible with the dynamics of fiscal and monetary interactions in Turkey so as to determine as to whether fiscal stability or price stability is prioritized in the Turkish economy.

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To accomplish this objective, we use two methodologies namely, Bohn (1998) model estimation via Autoregressive Distributed Lag (ARDL) method and a Toda-Yamamoto type causality analysis to figure out the direction of causality among economic indicators. In view of this objective, the rest of the paper is developed under three sections. In the section that follows, the theoretical background will be discussed in order to have a firm grasp of the distinction between the two competing theories. In the second section, the data and its salient features along with the main features of the methodologies used for the analysis will be discussed in detail. The following part is devoted to the estimation results and their interpretations. Based on the empirical findings, the dominant regime in Turkey will be figured out in this section and inferences regarding the implications of those findings will also be discussed. The final part concludes and presents final remarks about the research findings.

## 2. Theoretical Issues: The Monetary Dominant Regime vs The Fiscal Dominant Regime

The economic authorities oftentimes use a combination of fiscal and monetary policies to restore economic stability and to revert the divergent economic indicators back to their steady pattern. The design of this combination may bring about either fiscal or monetary dominance depending on the policy choices by the government. Fiscal policy can briefly be described as the set of implemented alterations in the tax, government spending, public goods and services etc. in an attempt to recoup the deviations of economic variables from their long-run trend while monetary policy refers to the set of actions taken by the central bank for preserving the price stability through money supply manipulations (Leeper,2010). The dominance of fiscal policy occurs when the monetary policy is tailored by the fiscal authorities in line with their fiscal objectives. In this case, the government gives priority to fiscal targets but utilizes the monetary tool for achieving its goals. In this manner, the government can manipulate the inflation rate and money supply through its fiscal expenditure channels without being concerned about the level of taxes and its political economics. Monetary dominance, however, refers to the case where fiscal policy is dominated by monetary targets. According to that, the monetary authority shelters any fiscal policy to guarantee the liquidity of the government for the existing monetary policy (Komulainen and Pirttila, 2000).

Critiques of the traditional view argue that fiscal dominance is the extravagance by the fiscal authority sheltered by the central bank. Put differently, in this setting, the monetary authority adjusts the money supply in compliance with the fiscal policy designed by the fiscal authority’s expenditure and revenue plans.

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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Also, according to them, another case wherein fiscal dominance appears is the high debt environment which impels the government to focus on intertemporal budget constraint fulfilment concerns rather than controlling inflation (Zoli,2005). No matter why it occurs, fiscal dominance restrains the level of effectiveness of the conducted monetary policies. In general, the central bank's motivation is to preserve price stability along with low inflation rates while the fiscal authorities seek fiscal sources to satiate public expenditures. Thus, the fiscal policymakers demand high levels of seignorage in the case of fiscal dominance. The higher degree of fiscal dominance in the economy, the less costly it is for the fiscal policy to finance its budget deficit using central bank resources. Nevertheless, this type of fiscal sovereignty hinders central bank independence to a remarkable extent. The central banks pursue their monetary policies based on predefined objectives and fiscal dominance obscures these objectives and impels the central bank to use its tools for the accomplishment of the fiscal targets rather than monetary policy objectives. (Komulainen and Pirttila, 2000). According to Alesina and Tabellini (1988) fiscal and monetary authorities are in a strategic conflict and the dominant policy limits the power of the recessive policy. In fiscal dominant regimes, for instance, the fiscal authorities attempt to use the seignorage to finance their fiscal objectives which is a clear violation of the central bank's independence and is deemed hazardous for economic performance.

As in the case of all economic players, the governments also confront a budget constraint which needs to be fulfilled for the stability of the public finances. For this condition to hold, the discounted value of the liabilities must be matched by the discounted value of the future primary balances. In a monetary-dominant (Ricardian) regime, the fiscal policy fine-tunes the primary balances to shun explosive accumulation of public debt in the economy. This condition holds when monetary dominance prevails in the economy along with central bank independence. Whereas in a fiscal dominant (non-Ricardian) atmosphere, the fiscal authorities design their primary balance strategies without a binding commitment to fulfil the intertemporal budget constraint and this scenario is described as fiscal dominance (Sargent and Wallace (1981)). In this case, the monetary policy is hegemonized by the fiscal objectives and its policy choices are manipulated by the fiscal authority. In economies characterized by monetary dominance, monetary policy is designed in accordance with targets with a sheer concentration on monetary indicators and the fiscal authorities calibrate their policies in a manner to absorb the unpleasant outcomes of the fiscal shocks. In such a scenario, the fiscal authorities are expected to overhaul their policy choices rather than relying on the monetary policy facilities.

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Fiscal dominance is more prevalent in developing countries compared to Western Economies since tax collection is less efficient in those countries and they are mostly characterized by political instabilities. It begets inconvenient outcomes in those countries which originate from the violation of the central bank independence through interventions by the fiscal authorities. The purpose of those interventions is oftentimes to fulfil the budgetary targets which could not be achieved via sole fiscal policies. In other words, when the fiscal authorities fail to meet their fiscal objectives, they impel the monetary policy utensils to be used to back their fiscal policies at the expense of reduced quality of monetary policies. Those countries are mostly characterized by a lack of institutional maturity which culminates in insufficient commitment to the central bank's independence. The absence of developed institutional and jurisdictional mechanisms is generally prevalent in those countries are among the profound reasons for the existence of such unfledged conditions in the economic systems.

Moreover, the market access for funding is relatively limited rendering the seignorage more costly and thereby broadening their reliance on inflation tax in comparison to the developed world (Catao and Terrones (2005)). Therefore, inflation targeting has been harder to achieve in developing countries due to higher inflation and more volatile output in those countries (Blanchard (2004)). Those nations are predominantly characterised by fragile economic structures, and unstable credibility and are prone to confronting repeating economic shocks. According to Turner (2011), the fiscal vulnerabilities, high-risk atmosphere and ambiguities regarding the future course of interest rates in developing countries culminate in fiscal dominance. Thus, it is an interesting research question for Turkey which is classified as an emerging economy.

## 3. Methodological Issues

As mentioned earlier, Turkey, being a developing country, potentially allows room for fiscal dominance. In developing countries, due to their precarious nature, there can be long episodes of fiscal dominance, however, they are mostly not permanent. Hence, the study strives to find out if fiscal dominance is prevalent in the long-run posture of Turkey or if episodes of fiscal dominance as in the case of the financial crisis in 2001 are only temporary.

To accomplish this objective, the methodology described in Rubio et al. (2014) is used in this study. They start building up their model using the conventional budget constraint i.e.:

$$b_t = \sum_{i=0}^{\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t s_{t+j+1} + \lim_{j\to\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t b_{t+j+1} \quad (1)$$

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Then, they incorporate the transversality condition which refers to the imposition of a restriction on the intertemporal budget constraint to avoid unsustainable Ponzi schemes in public borrowing. In this scenario, the transversality condition repeals the infinite postponement of debt payments and thereby impels the government to repay its debt through primary balance generation at a certain point in time. Formally, this condition can be represented as follows;

$$\lim_{j\to\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t b_{t+j+1}=0 \qquad (2)$$

Hence, removing this bit from the first equation we end up with the following formula which will be used for testing the existence of fiscal dominance in Turkey;

$$b_t = \sum_{i=0}^{\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t s_{t+j+1} \qquad (3)$$

In this articulation, the current debt is compelled to be paid by the accumulation of future primary surplus generations which is the sensible way of debt financing since it prevents explosive debt patterns from showing up. In other words, the primary surplus needs to react to the public debt realizations to preserve fiscal stability (Beqiraj et al (2018)). From a monetary vs fiscal dominance standpoint, there is no difference since ex-ante the intertemporal budget constraint needs to be fulfilled in both regimes. Nevertheless, the distinction occurs in the manner through which solvency is achieved under both regimes. In monetary dominant taxonomy, the prices are determined in the money market and the primary balance is fine-tuned to meet the intertemporal budget constraint through fiscal policy adjustments. Thus, in equation three, $E_t s_{t+j+1}$ is determined and generated endogenously to match the given $b_t$. However, in fiscal dominant regimes, the primary balance is determined regardless of the public debt accumulation generally tailored through politico-economic reasons, and the government relies on monetary policies to control the price level so as to fulfil the intertemporal budget constraint. In this setting, solvency culminates in price stability.

According to Rubio et al. (2014), the empirical analysis of the above setting can be implemented via two approaches;

- Backwards-looking approach
- Forward-looking approach

In the first approach, the Ricardian regime implies that a larger public debt in the previous period gives rise to a larger primary surplus in the current period. Formally, $\Delta b_{t-1} \rightarrow \Delta s_t$ whereas in the forward-looking approach, the existence of Ricardian regimes implies that a rise

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in the current level of primary surplus leads to a decline in the public debt in the next period or $\Delta s_t \rightarrow \nabla b_{t+1}$.

In this study, the first approach is utilized and uses the following function to test the validity of fiscal dominance in Turkish public finances. $s_t = \alpha + \beta b_{t-1} + v_t$. In this setup, a positive $\beta$ coefficient indicates monetary dominance while $\beta \leq 0$ implies fiscal dominance. Also, as an auxiliary analysis, a Toda -Yamamoto type causality test has been conducted among those variables to detect the direction of causality since in fiscal dominant regimes the primary surplus is expected to respond to public debt level and vice versa for monetary dominance.

## 4. Literature Review

A vast literature has grown up around the topic of fiscal dominance: Gadea et al. (2012), examine the nexus between seignorage and the prevalence of fiscal dominance in Argentina for the 1875-1990 estimation period. Their findings indicate that there exists a dynamic relationship between deficits and monetary base in the long run which clearly hints that the economy is characterized by fiscal dominance in the long run. Tanner and Ramos (2003) implement both approaches to the detection of fiscal dominance (backward looking-forward looking) to Brazilian data. The estimation results in this study point to the existence of monetary dominance with occasional deviations towards fiscal dominance in the economy. Fratianni and Spinelli (2001) explore the fiscal dominance phenomenon for Italian data. Their results show that in Italy fiscal dominance is the active policy. Their intertemporal analysis results suggest that fiscal dominance was among the characteristics of the economic policy in the country for several decades since the thirties. Sabate et al. (2019) attempt to investigate the existence of fiscal dominance by analysing the connection between money creation and deficits. They employ the panel co-integration technique for seventeen countries for the estimation period 1870-1938. Their findings are in favour of monetary dominance. Rubio et al. (2014) also implement the aforementioned backwards-looking and forward-looking approaches for detecting fiscal dominance. Their findings are suggestive that fiscal targets dominate the economic policies of the government in Spain. Li et al. (2020) pursue a fiscal dominance analysis for China. According to this study, after a series of reforms, the central bank of China has gained a certain level of independence which liberated the bank from the dominance of fiscal authorities. Nevertheless, the study notes that dominance of fiscal purposes on monetary tools is still prevalent in the economy which corresponds to a de facto fiscal dominance despite de jure jurisdictions in favour of monetary dominance. Gruben and Welch (2010) investigate

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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the existence of fiscal dominance for nine Latin American countries for the 1995Q1-2004Q1 period via Granger causality and Vector Error Correction methods. Their findings are inconclusive for Brazil and Uruguay but imply fiscal dominance for other countries which are verified by both techniques. Trenovski and Tashevska (2015) seek evidence of fiscal dominance for Macedonia for the 2000-2011 period. The results reveal that when designing discretionary fiscal policies, the government did not devote sufficient room for public debt corrections. Thus, for the estimation period, the empirical findings imply fiscal dominance rather than monetary dominance. Gelsefidi et al. (2017) deal with fiscal dominance in the case of Iran. They prefer the forward-looking approach for detecting fiscal dominance in the country. Using an autoregressive model for the 1978-2017 period, they basically test the existence of a decline in the public debt arising due to an initial rise in the primary balance. Also, since Iran is a resource based economy, they include oil prices in the model as well. For Iran, the null hypothesis of fiscal dominance cannot be rejected for the estimation sample. Oktayer and Oktayer (2016) investigate the existence of monetary dominance in Turkish public finances using the data set covering the 1989-2012 period. The results in this study show that for only the subperiod of 2001-2012, the monetary dominant regime is prevalent in Turkey. Oktayer (2013) also strives to find out the dominant regime in the Turkish economy. The data set in this study covers the 1988-2013 period. The study reveals that the monetary dominant regime is prevalent in the economy for the 2001-2013 period and in the rest of the sample fiscal dominant regime is valid. Songur and Saraç (2018) conduct an empirical analysis to figure out the sovereign regime in Turkey from 1975 to 2014. The results indicate that the monetary dominant regime is prevalent for the estimation period. Elmas and Songur (2016) investigate the same topic for the European countries for the 1995-2012 period. The empirical results of this study reveal that monetary dominant policy is the active regime in the selected European countries. Bölükbaş and Peker (2017) use cointegration methods to detect the prevalence of the monetary dominant regime in Turkey between 2006 and 2015. The results suggest that the fiscal dominant regime was the active policy during the estimation period in Turkey.

## 5. Data and Its Salient Features

In order to carry out the dual analysis involving ARDL estimation and causality analysis for detecting the type of dominant regime in Turkey, the dataset retrieved from the IMF database which covers the 1970-2020 period was used. Based on equation 3 the dataset is comprised of primary balance to GDP and public debt to GDP ratios. The graphs below plot the data for the estimation period.

Beykoz Akademi Dergisi, 2022; 10(2), 1-19 ARAŞTIRMA MAKALESİ
Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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The figures clearly show that the parameters exhibit different patterns during different subsectors of the sample period. For instance, the primary balance is predominantly in the negative territory with the exception of the early 2000s and late 90s. and the public debt is constantly rising which are negative signals for fiscal stability in the country, as it is also shown by equation 3, the unpleasant upward movements in the public debt need to be neutralized through positive primary balance realizations for long-term sustainability which did not exist in the country for this period (Bohn, 1995).

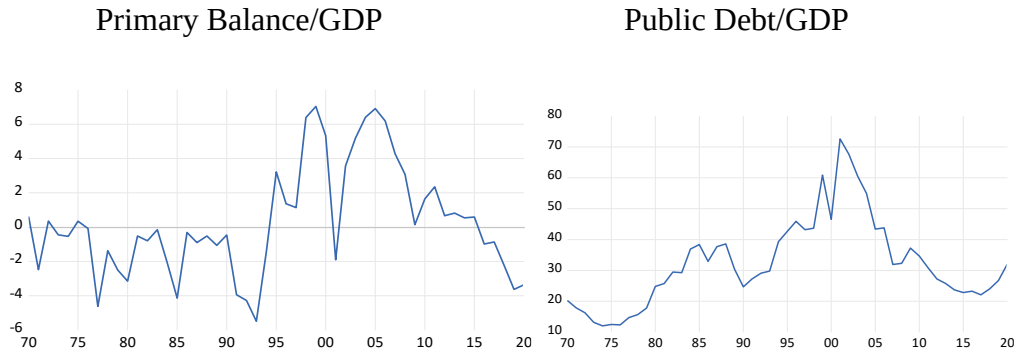


**Figure 1** Data

Source: IMF Database

In recent years, the primary balance is once again in deficit which violates this condition and emits signals of deteriorating public finances. The public debt, on the other hand, displays a more stable pattern and oscillates around the 20-40 per cent band for the entire sample with the exception of the 2001 summit where it reaches levels as high as 72 per cent. In recent years, however, a mounting trend is observable in recent years which indicates rising riskiness in terms of public debt management.

## 6. Empirics

### 6.1. ARDL Method

The ARDL approach is designed by Pesaran (1997) and Peseran and Shin (1999) and Peseran et al. (2001). This approach is comprised of three stages: First, the existence of cointegration among variables is tested through the bounds test which is based on the following equation:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{m} \alpha_{2i} \Delta X_{1t-i} + \ldots + \sum_{i=0}^{m} \alpha_{ki} \Delta X_{kt-i} + \alpha_1 Y_{t-1} + \alpha_2 X_{1t-1} + \cdots + \alpha_k X_{kt-1} + u_t \qquad (1)$$

F-Bounds test simply examines the joint significance of $\alpha_1 \ldots \alpha_k$ to verify the existence of cointegration among variables. Once the cointegration is detected, the long-term relationship

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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among the variables can be represented by the following formula provided that coefficient stability is established and the model does not suffer from serious flaws such as autocorrelation, heteroskedasticity, violation of normality for residuals, etc.

$$Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta X_{1t-i} + \cdots + \sum_{i=0}^{r} \alpha_{ki} \Delta X_{kt-i} + u_t \quad (2)$$

Also, the following error correction model below represents the short-run dynamics of the model and the last term indicates the magnitude of error correction in each round. Thus, for a stable long-run equilibrium the coefficient needs to have a value between -1 and 0.

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta X_{1t-i} + \ldots + \sum_{i=0}^{r} \alpha_{ki} \Delta X_{kt-i} + \mu ecm_{t-1} + u_t \quad (3)$$

### 6.2. Toda-Yamamoto Test

The process of this test is described in Toda and Yamamoto (1995) which is a revamped form of the standard Granger causality test which relaxes the stationarity requirement and resolves the shortcomings thereof. The TY procedure initially requires the estimation of the following VAR:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \cdots + \alpha_p Y_{t-p} + \theta_1 X_{t-1} + \cdots + \theta_p X_{t-p} + \epsilon_t$$
$$X_t = \beta_0 + \beta_1 X_{t-1} + \cdots + \beta_p X_{t-p} + \delta_1 Y_{t-1} + \cdots + \delta_p Y_{t-p} + v_t \quad (4)$$

In this setup the null hypotheses $H_0$: $\theta_1 = \cdots = \theta_p = 0$ and $H_0$: $\delta_1 = \cdots = \delta_p = 0$ are tested for inspecting the existence and direction of causality between variables.

According to Toda-Yamamoto (1995), if the variables are integrated, so long as the degree of integration of the variables does not exceed the actual lag length of the VAR, the causality analysis can be carried out over $\left(k + d_{(\text{Max})}\right)th$ order VAR where $d_{(\text{Max})}$ refers to the maximum order of integration and k stands for the optimal lag length.

Beykoz Akademi Dergisi, 2022; 10(2), 1-19 ARAŞTIRMA MAKALESİ
Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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### 6.3. Estimation Results

The stationarity analysis has been carried out via five different formal tests since, as reported by Bohn (1998), relying on one formal test potentially leads to misleading results regarding the stationarity of the series. The formal tests included in this section are Augmented Dickey-Fuller (ADF), Dickey-Fuller Generalized Least Squares (DF-GLS), Philips-Perron, Kwiatkowski – Philips – Schmidt – Shin (KPSS), Elliot – Rothenberg Stock Point Optimal (ERS). The table 1 depicts the test statistics and critical levels for these tests.[3]

**Table 1** Formal Stationarity Test Results

**(Level)**

| | | ADF | DF-GLS | PP | KPSS | ERS |
|---|---|---|---|---|---|---|
| Primary Balance | | -2,68 | -2,72 | -2,68 | 0,23 | 2,28 |
| | 1% | -3,57 | -2,61 | -3,57 | 0,73 | 1,87 |
| | 5% | -2,92 | -1,94 | -2,92 | 0,46 | 2,97 |
| | 10% | -2,59 | -1,61 | -2,59 | 0,34 | 3,91 |
| Public Debt | | -1.88 | -1,65 | -1.65 | 0,44 | 5.93 |
| | 1% | -3,6 | -2,62 | -2,61 | 0,73 | 1,87 |
| | 5% | -2,93 | -1,94 | -1.94 | 0,46 | 2,97 |
| | 10% | -2,6 | -1,61 | -1,61 | 0,34 | 3,91 |

**(First Difference)**

| | | ADF | DF-GLS | PP | KPSS | ERS |
|---|---|---|---|---|---|---|
| Primary Balance | | -8,07 | -0,8 | -9,04 | 0,17 | 1,79 |
| | 1% | -3,57 | -2,61 | -3,57 | 0,73 | 1,87 |
| | 5% | -2,92 | -1,94 | -2,92 | 0,46 | 2,97 |
| | 10% | -2,59 | -1,61 | -2,59 | 0,34 | 3,91 |
| Public Debt | | -7.12 | -6.99 | -6.99 | 0,09 | 1,07 |
| | 1% | -3,62 | -2,62 | -2,61 | 0,73 | 1,87 |
| | 5% | -2,94 | -1,95 | -1.94 | 0,46 | 2,97 |
| | 10% | -2,61 | -1,61 | -1,61 | 0,34 | 3,91 |

[3] Interested readers might refer to the following source for a detailed comparison of these tests. https://faculty.washington.edu/ezivot/econ584/notes/unitroot.pdf

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**Table 2.** Diagnostics

| **Diagnostic Test** | **Test Statistic** | **P-value** |
|---|---|---|
| Normality Test | JB: 1,492758 | 0,47 |
| Serial Correlation LM Test | F-stat: 0,6253 | 0,5397 |
| | $N*R^2$: 1.3543 | 0,5080 |
| BPG Heteroskedasticity Test | F-stat: 0,4511 | 0,6397 |
| | $N*R^2$: 0,9427 | 0,6241 |
| | Scaled Exp. 1,1836 | 0,5533 |
| Ramsey Reset Test | t-stat: 1,3667 | 0,1785 |
| | F-stat: 1,8679 | 0,1785 |
| | L.R: 1,9928 | 0,1580 |

Source: Author's calculations

**Table 3.** F-Bounds Test

F-Bounds Test

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| | | | Asymptotic: n=1000 | |
| F-statistic | 7.4445 | 10% | 3.02 | 3.51 |
| k | 1 | 5% | 3.62 | 4.16 |
| | | 1% | 4.94 | 5.58 |
| Actual Sample Size | 48 | | Finite Sample: n=50 | |
| | | 10% | 3.17 | 3,65 |
| | | 5% | 3,86 | 4,44 |
| | | 1% | 5.50 | 6.24 |
| | | | Finite Sample: n=45 | |
| | | 10% | 3.19 | 3,73 |
| | | 5% | 3,87 | 4,46 |
| | | 1% | 5,60 | 6,19 |

Source: Author's calculations

Beykoz Akademi Dergisi, 2022; 10(2), 1-19 ARAŞTIRMA MAKALESİ
Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
DOI: 10.14514/beykozad.1063904

Before analysing the estimation results, it is essential to verify that the model passes certain diagnostic tests. The table 2 shows the summary of the diagnostic test results for the model. The sensible interpretations of the model entail the model to be void of autocorrelation, heteroskedasticity, nonnormally distributed error terms, and unstable coefficients. The test statistics tabulated in this table verify that the model is suitable for the analysis.

In addition, Table 3 displays the test statistic for the F-bound test along with critical values for several levels of significance. The F-Bounds test results clearly indicate that cointegration exists among variables since the test statistic is higher than the upper bound value for all levels of significance.

As mentioned above, the model does not suffer from flaws regarding residuals and structure. However, for a visual inspection of the model stability, it is worthwhile to check the recursive behaviour of the residuals.

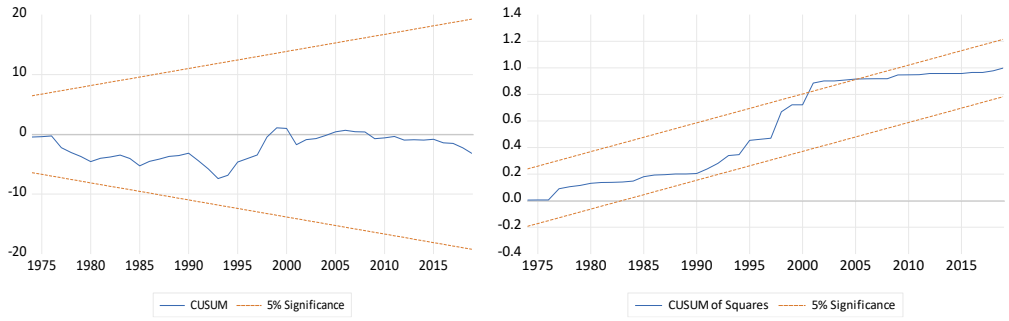


**Figure 2.** Recursive Residuals (CUSUM)

Source: Author's calculations

Figure 2 plots the recursive behaviour of the residuals via CUSUM and CUSUMSQR values. Residuals are well-behaved in general with slight deviation evidenced by CUSUMSQR in the early 2000s. The short deviation in those years is not persistent and the variance of the residuals can be assumed to be mean-reverting and stable overall.

The findings from the ARDL estimation reveal long-run coefficients of 0.55 and 0.08 for lagged primary balance and public debt respectively. Also, the error correction term in Table 5 is equal to -0.44 which lies within the [-1,0] range which guarantees the stability of the cointegrating system. These findings are suggestive that overall monetary dominance is the characteristic feature of the economic policies in Turkey which implies that in general central bank independently determines its policy objectives without being committed to backing fiscal policies to fulfil the intertemporal budget constraint. There might be episodes of fiscal

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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dominance in the economic history of Turkey but the findings do not contradict these periods since the study investigates the dominant policy in the long run through a cointegrating equation. As mentioned earlier, according to the monetarist view, price level determination is prioritized over fiscal targets which is the case in developing countries with high inflation. In the modern economic history of Turkey, inflation has indeed had more deleterious effects on the economy compared to public debt accumulation. Thus, it is evident that the fiscal policies were designed to trim excessive upward movements in public debt through primary balance realizations without impelling the monetary policy to facilitate debt management via seignorage generation or otherwise. In essence, with exception of the late 90s and early 2000s public debt to GDP ratio appears to be stable which signals that the economy did not need fiscal dominant strategies and allowed room for monetary dominant strategies which backs our empirical findings via cointegration.

**Table 4.** ARDL Regression

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| PB(-1) | 0.555045 | 0.103563 | 5.359507 | 0.0000 |
| DEBT(-1) | 0.089400 | 0.024623 | 3.630763 | 0.0007 |
| C | -2.792037 | 0.832247 | 3.354818 | 0.0016 |
| R-squared | 0.613082 | Mean dependent var | | 0.343698 |
| Adjusted R-squared | 0.596260 | S.D. dependent var | | 3.196045 |
| S.E. of regression | 2.030784 | Akaike info criterion | | 4.313991 |
| Sum squared resid | 1.897079 | Schwarz criterion | | 4.429817 |
| Log likelihood | -1.026928 | Hannan-Quinn criter. | | 4.357935 |
| F-statistic | 3.644417 | Durbin-Watson stat | | 1.771537 |
| Prob(F-statistic) | 0.000000 | | | |

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Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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**Table 5.** Error Correction Model

ECM Regression

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CointEq(-1) | -0.444955 | 0.092171 | -4.827492 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.326019 | Mean dependent var | -0.083310 |
| Adjusted R-squared | 0.326019 | S.D. dependent var | 2.421577 |
| S.E. of regression | 1.988026 | Akaike info criterion | 4.232359 |
| Sum squared resid | 189.7079 | Schwarz criterion | 4.270967 |
| Log likelihood | -102.6928 | Hannan-Quinn criter. | 4.247007 |
| Durbin-Watson stat | 1.771537 | | |

In order to enhance the analysis and thereby verify our findings, we also carry out a Toda-Yamamoto-style causality test to see the direction of causality among variables as described in the previous section. For this purpose, firstly we determine the level of integration and optimal lag length.

**Table 6.** Lag Length Criteria

| Lag | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|
| 0 | NA | 1529,035 | 13,040 | 13,119 | 13,069 |
| 1 | 103,719* | 177,303* | 10,853* | 11,089* | 10,942* |
| 2 | 3,393 | 194,131 | 10,942 | 11,336 | 11,090 |
| 3 | 3,689 | 210,475 | 11,020 | 11,571 | 11,228 |
| 4 | 4,439 | 223,156 | 11,074 | 11,782 | 11,340 |

The maximum order of integration is one, and Table 6 suggests that the optimal lag length is one. Thus, regardless of the individual test results, it is safe to conclude that the maximum order

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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of integration is one and as a result, $(k + d_{(\mathrm{Max})})$ is equal to 2 which are essential for the TY procedure.

**Table 7.** Toda-Yamamoto Causality Test Results

| Dependent variable: PB | | | |
|---|---|---|---|
| Excluded | Chi-sq | df | Prob. |
| DEBT | 14,098 | 2 | 0,0009 |
| All | 14,098 | 2 | 0,0009 |

| Dependent variable: DEBT | | | |
|---|---|---|---|
| Excluded | Chi-sq | df | Prob. |
| PB | 0,9292 | 2 | 0,6284 |
| All | 0,9292 | 2 | 0,6284 |

Table 7 summarizes the findings of the TY causality analysis. There exists a unidirectional causality relation among variables and thereby it is verified that the debt Granger causes primary balance which implies that the monetary dominant regime is active in the long run since the fine-tunings against the oscillations in the debt level are implemented by fiscal policy adjustments without thwarting the monetary targets through interventions.

## Conclusion

In this study, the main purpose is to determine which fiscal policy type is prevalent in Turkey through empirical analysis. In the literature, there are two mainstream fiscal regimes i.e. monetary dominant (Ricardian) regime and fiscal dominant (Non-Ricardian) regime. The prevalence of either regime is chiefly important for appraising the level of fiscal sturdiness in the country. Succinctly speaking, in a monetary dominant regime the government revenues are spent to pay the existing government liabilities. Put differently, in the case of monetary

Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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dominance, primary surpluses serve the function of fiscal reciprocation to the upswings in public indebtedness so as to preserve fiscal solvency. In fiscal dominant regimes, on the other hand, the fiscal authority is not committed to spending future taxes to finance new public debt since the new public debt is to be partially covered through central bank money. In other words, the active (or dominant) player varies among alternative regimes which directly alters the course of fiscal sustainability since the policy mix under these two scenarios differs completely. Thus, it is essential to assess the dominant regime through empirical evidence in order to evaluate the status of fiscal posture in the country.

For this purpose, an ARDL model to test the existence of the long-run positive response of the public debt parameter to primary balance, which is a sign of the prevalence of monetary dominance in the economy, is estimated in this study. Besides, a Toda-Yamamoto type causality analysis to detect a unidirectional causality among public debt among primary balance is carried out as an auxiliary analysis. The results from both analyses reveal that the primary balance positively responds to public debt movements which indicates that monetary dominance is the active policy type in the long run in the Turkish economy for the 1970-2020 estimation period. In the recent economic history of the country, there might be short episodes of fiscal dominance during which the monetary policy tools were subdued by the fiscal authorities due to politico-economic reasons, the monetary dominance appears to be the active policy type in the country. These findings lead to the conclusion that from an institutional maturity standpoint, the established economic structure and rules preserve the functioning of the proper interaction among monetary and fiscal policies in the long run. The main contribution of this study to the literature was the adaptation of Rubio et al (2014) model to the Turkish case with backward looking approach using the longest data set used in the literature thus far. Further studies might use the forward-looking approach described in the study to determine the active policy regime in the country.

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Gönderim tarihi: 27.01.2022 Kabul tarihi: 05.10.2022
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