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# The Impact of Fiscal Policies on Unemployment: An Empirical Evidence for Türkiye

*Maliye Politikalarının İşsizlik Üzerine Etkisi: Türkiye için Ampirik Bir Kanıt*

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**Abstract**

The economic policies implemented in a country can directly or indirectly affect many macroeconomic indicators. One of these macroeconomic indicators is the unemployment rate. The government's aim to reduce unemployment with the economic policies they implement. Especially in times of crisis, fiscal policies come to the fore, find a wider application area and support employment. The effects of fiscal policies may differ between expansionary and contractionary policies. The aim of this study is to investigate the effect of fiscal policies implemented in Türkiye on unemployment. For this purpose, monthly data for the period 2014:1-2022:12 were used in the study. In the study, public expenditures, direct and indirect tax revenues are used to represent fiscal policy. The ARDL bounds test was used in the analysis. In addition, the frequency domain causality test developed by Breitung and Candelon (2006) was used to the robustness check of the findings. The findings show that increases in government expenditures increase unemployment in the long run. On the other hand, while increases in indirect taxes reduce unemployment, increases in direct taxes have no effect on unemployment. The findings obtained from the causality test also support this situation.

**Keywords:** Fiscal policy, unemployment, ARDL bounds test, frequency domain causality test

**Öz**

Bir ülkede uygulanan iktisat politikaları birçok makro iktisadi göstergeyi doğrudan ya da dolaylı olarak etkileyebilmektedir. Bu makro iktisadi göstergelerden birisi de işsizlik oranıdır. Hükümetler uyguladıkları iktisadi politikalarla işsizliği azaltmayı hedeflemektedirler. Özellikle kriz dönemlerinde maliye politikaları gündeme gelmekte, daha geniş uygulama alanı bulmakta ve istihdamı desteklemektedir. Maliye politikalarının etkileri genişletici ve daraltıcı politikalarda farklılık gösterebilir. Bu çalışmanın amacı, Türkiye'de uygulanan maliye politikalarının işsizlik üzerine etkisinin araştırılmasıdır. Amaç doğrultusunda çalışmada, 2014:1-2022:12 dönemine ait aylık verilerden yararlanılmıştır. Çalışmada maliye politikasını temsilen kamu harcamaları, dolaylı ve dolaysız vergi gelirleri kullanılmıştır. Analizde ARDL sınır testi kullanılmıştır. Ayrıca elde edilen bulguların sağlamlığı için Breitung ve Candelon (2006) tarafından geliştirilen frekans alanı nedensellik testi kullanılmıştır. Bulgular, uzun dönemde kamu harcamalarındaki artışların işsizliği arttırdığını göstermektedir. Diğer taraftan dolaylı vergilerdeki artışlar işsizliği azaltırken, dolaysız vergilerdeki artışların işsizlik üzerinde bir etkisi bulunmamaktadır. Nedensellik testinden elde edilen bulgular da bu durumu desteklemektedir.

**Anahtar Kelimeler:** Maliye politikası, işsizlik, ARDL sınır testi, frekans alanı nedensellik testi

## Introduction

One of the main goals of every country is to increase the welfare of the country. In order to increase economic welfare, unemployment should be reduced by producing policies to ensure full employment. The unique structure and demographic characteristics of each country have a direct impact on unemployment. Therefore, economic administrations of countries decide which methods to use while trying to reduce unemployment and increase social welfare. The public sector, which has a decisive influence among economic units, has an important function at this point. However, depending on the role attributed to the state in economic life, the size of the public sector and solutions to combat unemployment have been debated for years. This situation varies according to the political economy systems of countries.

Historically, there are several influential schools of thought on what the role of the state should be in the economy. Accordingly, the classical economic school, which is one of the most prominent of these schools, attributes the main cause of temporary instabilities in the economy to the interventions made in the economy through public expenditures, taxes and similar instruments. According to them, unemployment is voluntary and interventions in the economy are not effective at full employment. According to the Keynesian school, which adopts the opposite view to the classical economic view, unemployment is involuntary and the economy is not always at full employment. In the Keynesian school, what needs to be done is to eliminate this inadequacy through state intervention. In Keynesian thought, a decrease in aggregate demand will be achieved through an increase in public expenditures. In this way, national income and employment level will increase. Therefore, government intervention in the economy through fiscal policy instruments will bring the economy out of the underemployment level. Especially in times of crisis, fiscal policies come to the agenda more frequently and find a wider application area.

Theoretically, an increase in public investment will have different effects on private investment. First of all, the need to finance the increase in public investment implies higher taxes, or it may lead to a demand for more funds from the government in capital markets. Ultimately, this would lead to higher interest rates. A possible reduction in savings available for private investors could lead to an crowding out effect on private investment. On the other hand, public investment can create more favorable conditions for private investment. For example, additional infrastructure spending will increase the productivity of private investment (Afonso & Aubyn, 2009, p. 21-22). That is, higher public investment may crowding out private spending on capital goods, regardless of the financing mechanism. Or, higher public spending on infrastructure facilities, health and education may have a crowding-in effect on private investment by increasing marginal productivity (Bahal et al., 2018, p. 323). If the crowding-out effect is more dominant in an economy, the level of total investment in the economy will fall as the

increase in public investment cannot be offset by a net decrease in private investment. A decline in total investment implies a decline in output and employment. On the other hand, if the pull effect of public investments is more dominant in an economy, additional public investments will increase national income and employment (Topal, 2017a, p. 189). In addition to all these, it can also be said that an increase in government spending will reduce national savings and increase the real interest rate. This will reduce investments and lower the capital stock in the medium term. As a result, labor demand will also fall (Tagkalakis, 2013, p. 3).

With Keynes, fiscal policy has become the sole economic policy instrument that regulates and directs the economy through taxes and public expenditures. Monetary policy, which is another economic policy instrument, has become a stepping stone of this policy rather than being an equivalent policy instrument to fiscal policy (Şen & Kaya, 2015, p. 61). With globalization, economic crises have also evolved and spread more rapidly from country to country. In these periods when fiscal policies are more memorable, states have taken harsh axioms. In fact, with the major crises in the 21st century, the size of the public sector of states has been on an upward trend in both developed and developing countries. Indeed, neoliberal policies in the global economy slowed down after the 2008-2009 global financial crisis. The global financial crisis of 2008-2009, the European debt crisis and the more recent Covid-19 pandemic crisis caused states to resort more frequently to the economy with fiscal policy instruments (Sertkaya & Songur, 2021). The view that states should play an active role in revitalizing economic activities and emerging from crises has led to the recall of Keynesian policies. In these years, Türkiye also used public expenditures and taxes as the main economic policy instruments in response to large and small crises.

This study investigates how unemployment, one of the most important macroeconomic problems in Türkiye, is affected by the components of taxes, namely indirect and non-direct taxes and public expenditures. Unlike other studies in the literature, this study focuses on the effects of total public expenditures and tax structure on the unemployment rate. In particular, taking into account the effect of direct and indirect taxes on unemployment increases the originality of the study and thus allows the literature to be expanded. Accordingly, the long-run effects of this relationship are analyzed with the ARDL bounds test approach within the framework of monthly data for the period 2014:1 - 2022:12. On the other hand, the robustness of the ARDL results is checked with the Frequency Domain Causality Test developed by Breitung & Candelon (2006). The framework of the study consists of four sections. Accordingly, the introduction of the study is followed by the empirical literature. Then, the data set and methodology of the study are introduced and empirical findings are reported. Finally, the study is concluded with the conclusion.

## 1. Literature Review

The role, size and limits of the public sector in the economy are among the most debated issues in the literature. Through expenditure and tax policy instruments, the public sector has an impact on production, output level, employment, investment and savings, which are the main components of the economy. One of the main objectives of fiscal policy is to ensure full employment in the economy. In this respect, analysing the effects of expenditure and tax policies on unemployment is essential for economic authorities to make sound decisions. The studies analysing the effect of public expenditures and taxes on unemployment in the literature are presented in Table 1.

**Table 1.** Empirical Literature

| *Author(s)* | *Country(s)* | *Period* | *Method* | *Findings* |
|---|---|---|---|---|
| *Dalenberg & Partridge (1995)* | *28 Metropolitan Areas* | *1966-1981* | *Regression Analysis* | *They found that taxes are negatively related to total employment, while education expenditures are positively related to total employment.* |
| *Abrams (1999)* | *G-7 Countries* | *1984-1993* | *Regression Analysis* | *It found a positive relationship between the size of government and the unemployment rate.* |
| *Widmalm (2001)* | *23 OECD Countries* | *1965 - 1990* | *Panel Regression Analysis* | *Finding evidence that tax structure affects economic growth, the author also finds that the share of total tax on personal income has a strong and negative correlation with economic growth.* |
| *Christopoulos et. al. (2005)* | *10 European Countries* | *1961–1999* | *Panel Cointegration Test; Fully Modified Ordinary Least Square (FMOLS) test* | *A positive relationship was found between the government size and the unemployment rate.* |
| *Feldmann (2006)* | *19 Industrial Countries* | *1985 - 2002* | *Regression Analysis* | *A positive relationship was found between the government size and the unemployment rate.* |
| *Durkaya & Ceylan (2006)* | *Türkiye* | *1980 - 2004* | *Engle-Granger Cointegration VECM* | *It was found bidirectional causality was found between direct taxes and economic growth, no causality was found between indirect taxes and growth.* |
| *Şahin & Özenç (2007)* | *Türkiye* | *1988-2006* | *Granger Causality Test* | *Government expenditures have not been found to have an effect on unemployment.* |
| *Feldmann (2009)* | *58 Countries* | *1980-2003* | *Regression Analysis* | *It concluded that the proportion of government consumption in total* |

| | | | | |
|---|---|---|---|---|
| | | | | *consumption and the high proportion of transfers and subsidies in GDP have a negative impact on unemployment.* |
| *Aslan & Kula (2010)* | *Türkiye* | *2000:1-2007:3 (quarterly data)* | *Johansen Cointegration, Granger Causality Test* | *A unidirectional causality is found from the government size to the unemployment rate (high school or technical high school graduate), and a bidirectional causality is found between the size of government and the unemployment rate (secondary or technical school and tertiary graduate).* |
| *Wang & Abrams (2011)* | *20 OECD Countries* | *1970 - 1999* | *Panel Error-Correction* | *They found that the government size has an important role in affecting the steady-state unemployment rate.* |
| *Aysu & Dökmen (2011)* | *17 OECD Countries* | *1990-2007* | *Panel Cointegration Test* | *There was found to be a statistical relationship between the size of government and unemployment rate.* |
| *Tagkalakis (2013)* | *Greece* | *(2000-2012) (quarterly data)* | *Structural Vector Autoregression (SVAR)* | *An increase in government expenditures (government purchases, government consumption expenditure, government wage bill payments and public investment) reduces unemployment (rate), and while an increase in the tax burden and direct and indirect taxes increase unemployment (rate).* |
| *Kanca & Bayrak (2015)* | *Türkiye* | *1980-2013* | *Johansen Cointegration, Granger Causality Test* | *A bidirectional causality was found between transfer expenditures and unemployment level, while an inverse causality was found between current and investment expenditures and unemployment level.* |
| *Durkaya & Ceylan (2016)* | *Türkiye* | *2002-2014 (quarterly data)* | *Toda-Yamamoto Causality Test* | *No relationship was found between the government size and unemployment rate. However, a unidirectional causal relationship was found from the unemployment rate to government size in the short run.* |
| *Stoilova (2017)* | *EU-28 member states* | *1996–2013* | *Pool Panel Data Regression Estimation* | *It was concluded that a tax structure based on consumption taxes, personal* |

| | | | | |
|---|---|---|---|---|
| | | | | *income and property taxes affects economic growth.* |
| *Topal (2017b)* | *22 OECD Countries* | *1971 -2014* | *Pooled Mean Group (PMG) Estimation* | *He found that indirect taxes have a positive effect on economic growth, while direct taxes have a negative effect.* |
| *Holden & Sparrman (2018)* | *20 OECD Countries* | *1980–2007* | *Panel Data Estimation* | *They have been found that an increase in government purchases reduces unemployment.* |
| *Erdoğan et. al., (2018)* | *Türkiye* | *2006.1 – 2016.2 (quarterly data)* | *Vector Autoregression (VAR) Method; VAR Causality Analysis* | *A unidirectional causality relationship was found from unemployment to government size.* |
| *Abouelfarag & Qutb (2020)* | *Egypt* | *1980–2017* | *Johansen Cointegration Test; Vector Error Correction Model (VECM)* | *They found that public expenditures increase the unemployment rate in the long run.* |
| *Sağdıç & Yıldız (2020)* | *26 Development Regions of Türkiye* | *2004-2018* | *Panel ARDL-PMG Estimation* | *They found that the increase in public expenditures decreases the unemployment rate.* |
| *Ertekin (2020)* | *Türkiye* | *1980-2017* | *Engle and Granger Method* | *A positive relationship was found between public expenditures and tax burden and unemployment.* |
| *Özer (2020)* | *Türkiye* | *1980-2018* | *Fourier Shin Cointegration Test; Toda-Yamamoto Causality Test* | *A positive relationship was found between public expenditures and unemployment rate. A unidirectional causality relationship was found from public expenditures to the unemployment rate.* |
| *Neog & Gaur (2020)* | *14 Indian States* | *1991–2016* | *PMG Estimation* | *They concluded that income tax and commodity-services tax have a negative impact, while property and capital transactions tax have a significant positive impact on state economic growth.* |
| *Kocaman & Biçerli (2021)* | *Türkiye* | *2005:12-2019:08* | *Nonlinear Autoregressive Distributed Lag (NARDL)* | *They concluded that an increase in public expenditures increases unemployment and a decrease in taxes decreases unemployment.* |

The empirical debates on the impact of public expenditures on unemployment focus on the size of the public sector and the components of public expenditures. Studies focusing on the effects of taxes on unemployment are more limited in the literature. And in these studies, the effect of tax on unemployment is mainly associated with the level of output of the economy. A review of the literature reveals that there is no definite conclusion on how and in what direction taxes and expenditures affect

unemployment. This result was influenced by the fact that the analyses were conducted for different economies, different periods were taken into account, and different variables and econometric methods were applied. Unlike other studies, this study focuses on the effects of total public expenditures and tax structure on the unemployment rate. In particular, the consideration of the effect of direct and indirect taxes on unemployment increases the originality of the study.

## 2. Model and Data Set

In this study, the effect of the fiscal policies implemented in Türkiye on unemployment was investigated. The analysis was conducted within the framework of the model presented in Equation 1.

$$lnUNEMP_t = \beta_0 + \beta_1 lnDTAX_t + \beta_2 lnIDTAX_t + \beta_3 lnGEXP_t + \varepsilon_t \quad (1)$$

where $lnUNEMP_t$ is the logarithm of unemployment rate, $lnDTAX_t$ is the logarithm of direct tax revenue, $lnIDTAX_t$ is the logarithm of indirect tax revenue, and $lnGEXP_t$ is the logarithm of government expenditure and $\varepsilon_t$ is an independently and normally distributed error term. The data set of the study is obtained from the CBRT (EDDS). The monthly data set for the period 2014:1-2022:12 was used in the analysis.

### 2.1. Econometric Method

In the analyzes made with time series, unit root levels of the series should be investigated first. For this reason, in this study, firstly, unit root properties of series were investigated with Augmented Dickey-Fuller (ADF) (1981) and Phillips-Perron (PP) (1988) unit root tests. In both tests, the alternative hypothesis that the series is stationary is tested against the null hypothesis that the series is not stationary.

In this study, the error correction model was used to separate the short-term and long-term effects of fiscal policies on unemployment. Within the framework of the ARDL bounds test developed by Pesaran et al. (2001), Model (1) was reformulated as Model (2) below.

$$\begin{aligned}\Delta lnUNEMP_t = \beta_0 &+ \sum_{k=1}^{m} \beta_{1,k}\Delta lnUNEMP_{t-k} + \sum_{k=0}^{n} \beta_{2,k}\Delta lnDTAX_{t-k} \\ &+ \sum_{k=0}^{p} \beta_{3,k}\Delta lnIDTAX_{t-k} + \sum_{k=0}^{r} \beta_{4,k}\Delta lnGEXP_{t-k} \\ &+ \alpha_1 lnUNEMP_{t-1} + \alpha_2 lnDTAX_{t-1} + \alpha_3 lnIDTAX_{t-1} \\ &+ \beta_4 lnGEXP_{t-1} + \varepsilon_t\end{aligned} \quad (2)$$

In order to estimate the long-run coefficients, there must be a long-term relationship between the variables. For this, cointegration tests are used. Pesaran et al. (2001) developed two tests to investigate the existence of a long-run relationship among the series. The first test is the standard F test (bounds test), which is decided according to the lower and upper critical values. In this test, the critical values presented by Pesaran et al. (2001) are compared with the test statistics obtained from

the analysis. If test statistic is above the upper critical value, the null hypothesis suggesting that there is no cointegration relationship between the variables is rejected. Therefore, it can be stated that there is a long-term relationship among the variables. In the second test, in an error correction specification, the variables are expected to converge to their long-run equilibrium values. In this framework, Model (3) is estimated and the error correction coefficient (η) is expected to be negative and statistically significant.

$$\Delta lnUNEMP_t = \beta_0 + \sum_{k=1}^{m} \beta_{1,k}\Delta lnUNEMP_{t-k} + \sum_{k=0}^{n} \beta_{2,k}\Delta lnDTAX_{t-k} + \sum_{k=0}^{p} \beta_{3,k}\Delta lnIDTAX_{t-k} + \sum_{k=0}^{r} \beta_{4,k}\Delta lnGEXP_{t-k} + \eta ECM_{t-1} + \varepsilon_t \quad (3)$$

In the next step, the ARDL long-run model should be estimated for the independent variables. In this context, ARDL long-term estimation for Model (1) is obtained with the help of Model (4).

$$\Delta lnUNEMP_t = \beta_0 + \sum_{k=1}^{m} \beta_{1,k}\Delta lnUNEMP_{t-k} + \sum_{k=0}^{n} \beta_{2,k}\Delta lnDTAX_{t-k} + \sum_{k=0}^{p} \beta_{3,k}\Delta lnIDTAX_{t-k} + \sum_{k=0}^{r} \beta_{4,k}\Delta lnGEXP_{t-k} + \varepsilon_t \quad (4)$$

In the study, causality analysis was used to check the robustness of the findings obtained from the ARDL test. Granger and Toda-Yamamoto causality tests deal with the causality relationship between the series in the model for a single test statistic. However, the variation of causality over time has also been examined in the literature. One of these studies is the Frequency Domain Causality Test proposed by Breitung & Candelon (2006) following Geweke (1982) and Hosoya (1991). This test is a test that predicts short-, medium- and long-term causality.

Geweke (1982) and Hosoya (1991) developed a frequency-based causality measurement that includes a feature based on the decomposition of spectral density functions. In this framework, they created a two-dimensional time series vector to measure causality $z_t = [x_t, y_t]'$. $z_t$ is a finitely ordered VAR model.

$$\Theta(L)z_t = \varepsilon_t \quad (5)$$

$\Theta = (L) = I - \Theta_1 L - \cdots - \Theta_p L^p$ is the polynomial equation with $L^k z_t = z_{t-k}$ with a 2x2 lag size. The error vector $\varepsilon_t$ is assumed to be white noise. $E(\varepsilon_t) = 0$ and $E(\varepsilon\varepsilon') = \Sigma$, where $\Sigma$ is positive definite. G is defined as the low triangular matrix of the Cholesky decomposition. $G'G = \Sigma^{-1}$ and its expected value is $E(\eta_t\eta_t') = I$ where $\eta_t = G\varepsilon_t$. Under the assumption that the system is stationary, $\phi(L) = \Theta(L)^{-1}$ and $(L) = \phi(L)G^{-1}$. In this case, the MA process can be expressed as in Equation (6).

$$z_t = \phi(L)\varepsilon_t = [x_t\ y_t\ ] = \left[\phi_{11}(L)\ \phi_{12}(L)\ \phi_{21}(L)\ \phi_{22}(L)\right][\varepsilon_{1t}\ \varepsilon_{2t}\ ] = \psi(L)\eta_t\ = \left[\psi_{11}(L)\ \psi_{12}(L)\ \psi_{21}(L)\ \psi_{22}(L)\right][\eta_{1t}\ \eta_{2t}\ ] \quad (6)$$

The spectral density function obtained with the help of these equations is as in Equation (7).

$$f_x(\omega) = \frac{1}{2\pi}\{|\psi_{11}(e^{-i\omega})|^2 + |\psi_{12}(e^{-i\omega})|^2\} \quad (7)$$

Geweke (1982), on the other hand, expressed the measurement of Granger causality at different frequencies as follows.

$$M_{y\to x}(\omega) = log\left[\frac{2\pi f_x(\omega)}{|\psi_{11}(e^{-i\omega})|^2}\right] = log\left[1 + \frac{|\psi_{12}(e^{-i\omega})|^2}{|\psi_{11}(e^{-i\omega})|^2}\right] \quad (8)$$

Accordingly, if $|\psi_{12}(e^{-i\omega})| = 0$ at any $\omega$ frequency, there will be no causal relationship from variable *y* to variable *x* since $log\ log\ (1) = 0$. If the components of $z_t$ are first-order integrated, that is, I(1) and there is cointegration, the autoregressive polynomial $\Theta(L)$ will have a unit root and the roots of the polynomial will lie outside the unit circle. In this case, if $z_{t-1}$ is subtracted from both sides of the Equation (5), the Equation (9) is obtained.

$$\Delta z_t = (\Theta_1 - I)z_{t-1} + \Theta_2 z_{t-2} + \cdots + \Theta_p z_{t-p} + \varepsilon_t = \widetilde{\Theta}(L)z_{t-1} + \varepsilon_t \quad (9)$$

Geweke (1982) and Hosoya (1991) developed the measure of causality by specific frequency based on the decomposition of spectral density. Breitung & Candelon (2006) developed a test process by placing linear constraints on autoregressive parameters. In this way, the testing process has been developed to examine both cointegration relationships and multidimensional systems.

If there is no causality from y to x at frequency $\omega$, $|\psi_{12}(e^{-i\omega})|$ value will be equal to zero. Equation $\psi_{12}(L) = -\frac{g^{22}\Theta_{12}(L)}{|\Theta(L)|}$ is obtained by using equation $\psi(L) = \Theta(L)^{-1}G^{-1}$. In this equation, $g^{22}$ gives the low diagonal elements of the $G^{-1}$ matrix, and $|\Theta(L)|$ gives the determinant value of $\Theta(L)$. In order to show the elements of matrix $\theta_{12,k}$, B, the hypothesis whether y is the cause of x is tested as in Equation (10). The hypothesis that y is the cause of x is tested as in Equation (10) to show the elements of matrix $\Theta_k$ for $\theta_{12,k}$ value.

$$|\theta_{12}(e^{-i\omega})| = \left|\sum_{k=1}^{p} \theta_{12,k}cos(k\omega) - \sum_{k=1}^{p} \theta_{12,k}sin(k\omega)i\right| = 0 \quad (10)$$

Equation (10) is a sufficient condition for $|\Theta_{12}(e^{-i\omega})| = 0$.

$$\sum_{k=1}^{p} \theta_{12,k}cos(k\omega) = 0 \quad (11)$$

$$\sum_{k=1}^{p} \theta_{12,k}sin(k\omega)i = 0 \quad (12)$$

Breitung & Candelon (2006) applied linear constraints to the above equations. Then the VAR model for $x_t$ can be expressed as in Equation (13).

$$x_t = \alpha_1 x_{t-1} + \cdots + \alpha_p x_{t-p} + \beta_1 y_{t-1} + \cdots + \beta_p y_{t-p} + e_{1t} \quad (13)$$

The null hypothesis is equal to the linear constraint with $M_{y\to x}(\omega) = 0$ and $\beta = \left[\beta_1, \ldots, \beta_p\right]'$.

$$H_0: R(\omega)\beta = 0 \quad (14)$$

and

$$R(\omega) = [cos(\omega)\, cos(2\omega)\ \ldots\ cos(p\omega)\, sin(\omega)\, sin(2\omega)\ \ldots\ sin(p\omega)\,] \quad (15)$$

Causality for $\omega \in (0, \pi)$ is tested with the F-statistic. The test process $(2, T-2p)$ shows the F-distribution with degrees of freedom.

### 2.2. Findings

When working with time series, first of all, the stationarity degrees of the series should be investigated. The results of unit root tests are presented in Table 2 According to the ADF test results, all variables become stationary when first-degree difference is taken. In the PP test, while $lnDTAX_t$ and $lnGEXP_t$ are stationary at the level, $lnUNEMP_t$ and $lnIDTAX_t$ become stationary when first-degree difference is taken. In this case, it would be appropriate to use the ARDL bounds test in the study.

**Table 2.** Unit Root Tests

| ADF | | | |
|---|---|---|---|
| Variables | ADF-Test Stat. | MacKinnon Critical Value (%5) | Lag Length (k) |
| $\boldsymbol{lnUNEMP_t^a}$ | -2.055 | -2.892 | 12 |
| $\boldsymbol{lnDTAX_t^a}$ | 3.908 | -2.892 | 11 |
| $\boldsymbol{lnIDTAX_t^c}$ | 2.109 | -1.944 | 1 |
| $\boldsymbol{lnGEXP_t^c}$ | 2.944 | -1.944 | 2 |
| $\boldsymbol{\Delta lnUNEMP_t^c}$ | -2.186** | -1.944 | 11 |
| $\boldsymbol{\Delta lnDTAX_t^b}$ | -3.984** | -3.458 | 11 |
| $\boldsymbol{\Delta lnIDTAX_t^c}$ | -13.113** | -1.944 | 0 |
| $\boldsymbol{\Delta lnGEXP_t^a}$ | -13.932** | -2.889 | 1 |
| PP | | | |
| Variables | PP Test Stat. | MacKinnon Critical Value (%5) | Bandwidth |
| $\boldsymbol{lnUNEMP_t^a}$ | -2.391 | -2.889 | 14 |
| $\boldsymbol{lnDTAX_t^b}$ | - 12.735** | -3.452 | 7 |

| | | | |
|---|---|---|---|
| $lnIDTAX_t^c$ | 2.525 | -1.944 | 16 |
| $lnGEXP_t^b$ | -6.821** | -3.452 | 6 |
| $\Delta lnUNEMP_t^c$ | -11.402** | -1.944 | 74 |
| $\Delta lnDTAX_t^b$ | -131.293** | -3.453 | 105 |
| $\Delta lnIDTAX_t^c$ | -13.462** | -1.944 | 5 |
| $\Delta lnGEXP_t^c$ | -22.245** | -1.944 | 11 |

**Notes:** $\Delta$ is a first-order difference operator. The Shwartz Information Criterion was used to determine the lag lengths. In the ADF test, the maximum lag length was taken as 12. a is the model with a constant in the test equation. b is the model with constant and trend in the test equation. a is the model without a constant and trend in the test equation. The Barlett Kernel method was used in the PP Unit Root Test, and the Bandwith Width was determined by the Newey-West method.

The ARDL results are presented in Table 3. First of all, the diagnostic test results given in Panel C regarding the model results obtained were examined. The estimated model ($\underline{R^2}$) has an acceptable explanatory power considering the value. According to the Jarque-Bera test, since the null hypothesis that the error terms are normally distributed cannot be rejected, the error terms fit the normality distribution. The null hypothesis, which states that there is no problem of varying variance according to the Breusch-Pagan-Godfrey heteroscedasticity Test, cannot be rejected. In other words, it was concluded that the remains were homoscedastic. Therefore, there is no problem of varying variance in the model. According to the Breusch-Godfrey autocorrelation test, the null hypothesis, which states that the residues do not have autocorrelation, could not be rejected. According to the Ramsey Test, it can be stated that there is no specification error in the model.

**Table 3.** ARDL Findings

| **Panel A: Short-Run Coefficient** | | | |
|---|---|---|---|
| | Coefficient | Std. Error | Prob. |
| $lnUNEMP_{t-1}$ | 0.863*** | 0.042 | 0.000 |
| $lnDTAX_t$ | 0.098*** | 0.023 | 0.001 |
| $lnDTAX_{t-1}$ | 0.009 | 0.022 | 0.673 |
| $lnDTAX_{t-2}$ | -0.041** | 0.020 | 0.045 |
| $lnDTAX_{t-3}$ | -0.128*** | 0.020 | 0.000 |
| $lnDTAX_{t-4}$ | -0.046** | 0.020 | 0.026 |
| $lnDTAX_{t-5}$ | 0.064*** | 0.022 | 0.005 |
| $lnIDTAX_t$ | -0.095*** | 0.036 | 0.009 |

| | | | |
|---|---|---|---|
| $lnGEXP_t$ | 0.120*** | 0.037 | 0.002 |
| $Constant$ | 0.525*** | 0.179 | 0.004 |

**Panel B: Long-Run Coefficient**

| | Coefficient | Std. Error | Prob. |
|---|---|---|---|
| $lnDTAX_t$ | -0.315 | 0.369 | 0.396 |
| $lnIDTAX_t$ | -0.690*** | 0.250 | 0.007 |
| $lnGEXP_t$ | 0.876** | 0.345 | 0.013 |
| $Constant$ | 3.826*** | 1.278 | 0.004 |

**Panel C: Diagnostic Tests**

| | | | |
|---|---|---|---|
| F-Stat. (Bounds Test) | 4.113** | | |
| $ECM_{t-1}$ | -0.137 [0.030]*** | $\chi^2_{BG}$ | 0.698 (0.500) |
| $\underline{R^2}$ | 0.88 | $\chi^2_{BPG}$ | 4.607 (0.867) |
| Jarque-Bera | 0.686 (0.709) | Ramsey Testi | 0.859 (0.393) |

**Notes:** *, **, *** are statistically significant levels at 10%, 5% and 1% levels, respectively. In the ARDL model, the maximum lag length was taken as 12 and lag lengths were determined according to the Schwartz Information Criteria. The lower and upper critical values for the Bounds Test (F-statistic) are 2.79-3.67 for 5%, respectively. $ECM_{t-1}$, is the error correction coefficient in the error correction model. Values in parentheses are probabilities, and values in square brackets are standard error. $\chi^2_{BG}$, is the Breusch-Godfrey LM rank correlation test. $\chi^2_{BPG}$ is the Breusch-Pagan-Godfrey variance test.

By looking at the F-statistic in Panel C, it is decided whether there is a cointegration relationship between the variables. The F-statistic obtained from the analyzes is statistically above the upper critical value at the 5% significance level. Therefore, there is a long-run relationship among the variables.

In the next step, the ARDL long-run model is estimated. The findings are presented in Panel B. According to the findings, direct taxes have no effect on unemployment. Because the estimated coefficient of direct taxes is statistically insignificant. On the other hand, indirect taxes have a negative effect on unemployment. On the other hand, the increase in government expenditures increases unemployment.

According to the short-term estimate results in Panel A, increases in direct taxes increase unemployment. An increase in indirect taxes reduces unemployment. The increase in public expenditures increases unemployment.

**Table 4.** Breitung and Candelon Causality Test Results

| | Long-Run | | Middle-Run | | Short-Run | |
|---|---|---|---|---|---|---|
| $\omega$ | 0.01 | 0.05 | 1.00 | 1.50 | 2.00 | 2.50 |
| $lnDTAX_t \nRightarrow lnUNEMP_t$ | 0.762 | 0.767 | 3.102** | 0.855 | 3.879** | 3.191** |
| $lnIDTAX_t \nRightarrow lnUNEMP_t$ | 7.303*** | 7.255*** | 0.309 | 2.162 | 4.921*** | 1.965 |
| $lnGEXP_t \nRightarrow lnUNEMP_t$ | 1.226 | 1.236 | 1.992 | 0.935 | 2.482* | 2.827* |

**Notes:** The maximum lag length is taken as 12. Critical values under degrees of freedom (2.T-2.p): %1, 4.79; %5, 3.07; %10, 2.35. *, **, *** are statistically significant levels at 10%, 5% and 1% levels, respectively. ω notation is the frequency domain.

In the study, the robustness of ARDL results was checked with the Breitung & Candelon (2006) causality test. The obtained results are presented in Table 4. According to the findings, direct taxes, indirect taxes and government expenditures are the causes of unemployment in the short run. In the long run, indirect taxes are the cause of unemployment, while direct taxes and government expenditures are not the cause of unemployment. The findings from the causality test are substantially consistent with the findings from the ARDL test.

**Conclusion**

One of the most basic functions of governments in every country is to collect taxes and spend money. Governments transform this function into a direct economic policy to revitalize a shrinking economy and reduce unemployment, especially in times of crisis. At a stage when nominal interest rates approach zero and interest rates are no longer able to stimulate economic activity, the effectiveness of monetary policy decreases. At this point, governments resort to fiscal policy instruments more frequently, although the consequences of the resulting effect are debatable. In the 21st century, global crises have been proof of this.

In this study, it is investigated how unemployment, one of the most important macroeconomic problems of Türkiye, is affected by indirect and non-direct taxes and public expenditures, which are components of taxes. In this context, within the framework of monthly data for the period 2014:1 - 2022:12, the long-run effects of this relationship are analyzed using the ARDL bounds test approach. According to the findings, while an increase in public expenditures increases unemployment in the long run, an increase in indirect data decreases unemployment. There is no statistical relationship between direct data and unemployment. On the other hand, the robustness of the ARDL results is checked with the Frequency Domain Causality Test. Accordingly, direct taxes, indirect taxes and government expenditures cause

unemployment in the short run. In the long run, while indirect taxes are the cause of unemployment, direct taxes and government expenditures are not. The findings from the causality test are largely consistent with the findings from the ARDL test.

Theoretically, it is possible to allocate public spending to growth-enhancing infrastructure and education. In practice, however, most of the spending goes to redistribution or government-mandated consumption expenditures that do not increase productivity. On the other hand, the level of government spending can encourage other government interventions in the functioning of the private sector, especially regulations that constrain economic growth and productivity (Abrams, 1999). Moreover, developing countries differ from developed countries in many ways. First of all, many developing countries do not have well-developed financial markets. This imposes more functions on governments. Second, high taxes, an inevitable consequence of a large public sector, are likely to reduce both private domestic investment and FDI inflows. Third, since access to foreign financial markets is often limited in developing countries, a lack of capital can severely hamper the growth of private enterprise. Fourth, workers find it more attractive to work in the public sector because it generally provides greater job security and benefits. State institutions, which are still dominant in most developing countries, can crowding out private enterprises. As this weakens the ability of private enterprises to benefit from economies of scale, they are likely to suffer from international competition. Fifth, in most developing countries, a significant share of government spending goes on transfers and subsidies. This is likely to weaken incentives to work among the population and distort competition among businesses. Finally, since the private sector is relatively small where the public sector is large, the private sector's ability to absorb new entrants to the labor market or laid-off workers following structural changes will be limited (Feldmann, 2009, p. 315-316).

This study contributes to the arguments that public expenditures, which are used as a fiscal policy tool in Türkiye, increase unemployment. The roots of unemployment in Türkiye are mostly structural problems. The exclusion of the private sector, the high youth population and the inability of the labor force to adapt to current and renewed production models make the unemployment problem more severe. Likewise, unemployment insurance more or less reduces the cost of being unemployed in Türkiye. For these and similar reasons, unemployment increases. On the other hand, tax types (direct and indirect) have different effects on unemployment in Türkiye. While there is no statistically significant relationship between direct taxes and unemployment, increases in indirect taxes reduce unemployment. While indirect tax revenues constitute approximately 66% of total tax revenues in Türkiye, direct tax revenues remain at 34% (Songur & Yüksel, 2018, p. 52). This may be an indication that the effect of direct tax revenues is less, and therefore, firms do not take direct taxes into account when making employment decisions. Moreover, the government's

implementation of tax incentives in employment and minimum wage in order to prevent an increase in unemployment due to the Covid-19 crisis and the inflation process in recent years supports our findings. On the other hand, the fact that indirect taxes reduce unemployment and that the state imposes the tax burden on the working class by spreading the tax need to the bottom rather than on firms shows that it supports firms' employment decisions positively.

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The authors declare that all ethical principles and rules were followed in the data collection, analysis, and reporting processes.

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**Conflict of Interest**

The authors declare no conflict of interest.