...::KENT AKADEMİSİ | URBAN ACADEMY

Volume: 18 Issue: 2 - 2025 | Cilt: 18 Sayı 2 - 2025

ARTICLE INFO | MAKALE KÜNYESİ
Research Article | Araştırma Makalesi
Submission Date | Gönderilme Tarihi: 05.09.2024
Admission Date | Kabul Tarihi: 06.02.2025

CITATION INFO | ATIF KÜNYESİ
Ay, Ş., Çelik, S. ,(2025), A Study on the Relationship Between Welfare Levels and Tax Revenues: Empirical Evidence from the Cities of the TRC2 and TRC3 Regions, *Kent Akademisi Dergisi,* 18(2):987-998. https://doi.org/110.35674/kent.1544213

A Study on the Relationship Between Welfare Levels and Tax Revenues: Empirical Evidence from the Cities of the TRC2 and TRC3 Regions

Refah Düzeyi ve Vergi Gelirleri İlişkisinin İncelenmesi: TRC2 ve TRC3 Bölgesi Şehirlerine Yönelik Ampirik Kanıtlar

Şahin AY[1], Süleyman ÇELİK[2]

Öz

Vergi gelirleri ile refah düzeyi arasındaki ilişki, ekonomik kalkınma ve sosyal eşitlik açısından önemli bir araştırma konusudur. Vergi gelirlerinin artırılması, devletlerin vatandaşlarına daha iyi hizmet sunabilmesi ve uzun vadede refah seviyesini yükseltebilmesi için kritik bir rol oynamaktadır. Ancak, uygulanan politikaların ve atılan adımların her zaman istenilen başarıya ulaşmadığı ve bazı durumlarda toplumsal huzursuzluğa yol açtığı bilinmektedir. Bölgeler arası gelişmişlik farklarını azaltma amacıyla uygulanan ekonomik ve mali politikalar, farklı bölgelerde çeşitli makroekonomik göstergeler üzerinde değişken etkiler yaratmaktadır. Bu çalışmanın amacı, Türkiye'nin Güneydoğu Anadolu Bölgesi'nde yer alan TRC2 (Diyarbakır ve Şanlıurfa) ve TRC3 (Mardin, Batman, Siirt ve Şırnak) bölgelerindeki vergi gelirlerinin refah düzeyi üzerindeki etkilerini ampirik olarak incelemektir. Araştırma, 2004-2022 dönemini kapsamakta olup panel veri analizi yöntemi kullanılmıştır. Elde edilen bulgulara göre, vergi gelirleri ile refah düzeyi arasında eşbütünleşme olduğu görülmüş ve vergi gelirlerinden refah düzeyine doğru nedensellik olduğu belirlenmiştir. Ayrıca katsayı tahmincilerinden elde edilen sonuçlar, panelin geneli için vergi gelirlerindeki artışın refah düzeyini azalttığı yönündedir. Ancak şehir bazında sonuçlar incelendiğinde Mardin ve Şırnak illerinde tersi sonuçlara ulaşılmıştır. Vergi gelirlerinde meydana gelen artışların bu şehirlerde refah düzeyini pozitif yönde etkilediğini göstermektedir.

Anahtar Kelimeler: Vergi Gelirleri, Refah Düzeyi, TRC2, TRC3, Panel Veri Analizi

ABSTRACT

The relationship between tax revenues and welfare levels is a significant research trend in terms of economic development and social equity. Increasing tax revenues is critical in enabling governments to provide better services to their citizens and, in the long run, enhance the overall welfare level. However, it is known that the 2policies implemented and the steps taken do not consistently achieve the desired success and may sometimes lead to social unrest. Economic and fiscal policies aimed at reducing regional disparities in development create variable effects on different macroeconomic indicators across regions. The purpose of this study is to empirically examine the impact of tax revenues on welfare levels in the TRC2 (Diyarbakır and Şanlıurfa) and TRC3 (Mardin, Batman, Siirt, and Şırnak) regions located in Türkiye's Southeastern Anatolia Region. The research covers the period from 2004 to 2022 and employs panel data analysis methods. The findings indicate a cointegration relationship between tax revenues and welfare levels, with causality from tax revenues to welfare levels. Furthermore, coefficient estimations suggest that increases in tax revenues reduce welfare levels for the panel as a whole. However, when examining city-specific results, the opposite outcomes were observed in the Turkish cities of Mardin and Şırnak, where increases in tax revenues positively impacted welfare levels.

[1] **Corresponding Author:** Assist. Prof. Dr. Siirt University, Kurtalan Vocational School, Public Finance Program, sahinay@siirt.edu.tr 0000-0002-3036-2155
[2] **Author:** Assoc. Prof. Dr. Siirt University, Kurtalan Vocational School, Public Finance Program, celik.slymn@gmail.com 0000-0001-8999-0095

Keywords: Tax Revenues, Welfare Levels, TRC2, TRC3, Panel Data Analysis

INTRODUCTION:

Governments need to increase public revenues to provide better services to their citizens. The most important public revenue, tax revenues, when increased correctly and fairly, bring many positive outcomes for a large portion of society. The increase in tax revenues also affects many variables. It is known that the steps taken and policies implemented by governments aiming to improve the welfare levels of all their citizens in the long term do not consistently achieve the desired goals and sometimes result in unsuccessful policy attempts. The inability to reflect welfare uniformly across all segments of society leads to social unrest, and the demand to resolve this negative situation tends to increase continuously. When a specific region or city remains at a lower level both economically and socially compared to other regions and cities, governments are prompted to take measures. Special economic and fiscal measures are implemented in certain areas to reduce regional disparities in development, and the outcomes of these measures are subsequently evaluated. Within this framework, the fiscal measures implemented in certain cities lead to positive transformations in economic indicators, while in some cases, they result in negative impacts on various macroeconomic indicators. The TRC2 region, consisting of the cities of Diyarbakır and Şanlıurfa, and the TRC3 region, comprising the cities of Mardin, Batman, Siirt, and Şırnak, represent parts of Türkiye's Southeastern Anatolia Region. These regions include cities that are socio-culturally and economically similar. Although many economic variables determine welfare levels, the impact of per capita income, one of the most critical indicators, on tax revenues in the TRC2 and TRC3 cities is significant in addressing many specific economic issues. Therefore, this study aims to examine the effects of increases empirically or decreases in tax revenues on welfare levels in the selected cities.

1. Conceptual Framework

Taxes have a significant impact on the economy. These effects include the need for public resources, eliminating income inequality, and promoting economic growth. Through taxes, investments are made in education, healthcare, and transportation, while progressive taxes help eliminate income inequality. In the context of economic growth, the impact of taxes on consumption and expenditures is examined (Karagöz, 2023, p. 441). Efficiently planned taxation aims to achieve fiscal policy objectives most accurately, which includes promoting economic growth while minimizing tax collection costs (Stoilova & Patonov, 2012, p. 1031). Although there are various methodologies for analyzing the relationship between tax revenues and growth and development, it is evident that the savings and investment preferences of individuals have a substantial impact on taxes. Moreover, tax effort, structure, capacity, and selection of tax types are crucial in ensuring growth and development. Tax policies must be designed to ensure that taxes are levied based on the ability to pay and that the rules of tax policies are inclusive for everyone (Akdoğan, 2014, p. 122). In this context, taxes must be designed within the principles of efficiency and equity to impact social welfare levels. This is because the characteristics of taxes influence the efficiency and equity of resource distribution. Consequently, welfare and taxation have a significant relationship (Selen & Karaş, 2018, p. 980).

The relationship between tax revenues and welfare levels is typically examined from the perspective of the entire country or selected countries, making the results obtained from specific regions particularly intriguing. In Türkiye, the TRC2 and TRC3 regions, which frequently appear at the lower end of many development indices, hold significant socio-cultural and economic importance.

The TRC2 region, comprising Diyarbakır and Şanlıurfa, has a population of approximately 4 million, 63% under 30, and exports to 123 countries. It is also an important agricultural region, hosting large farming areas and generating around 40 billion TL in annual agricultural activity (Karacadağ Development

Agency, 2024). On the other hand, the TRC3 region consists of Siirt, Batman, Şırnak, and Mardin. This region includes 30 districts and 802 villages, covering 3.4% of Türkiye's land area (DİKA, 2017). The TRC3 region is a cultural mosaic with diverse characteristics and holds significant economic potential (Ay & Hacıköylü, 2023, p. 173).

2. Literature Review

Previous studies on the relationship between tax revenues and welfare levels typically focus on how tax revenues impact growth rates. These studies generally analyze OECD countries, European Union countries, or the situation of a particular country over a selected period. Research conducted on one or more regions within a single country is relatively rare.

Folster and Henrekson (2001) examined the impact of taxes and public expenditures on growth in selected wealthy countries with high welfare levels between 1970 and 1995. They concluded that public expenditures and taxes negatively affect growth.

Zeng and Du (2003) investigated the long-term effects of taxes on consumption, capital, and labor on growth. They argued that if all tax revenues are used for transfer expenditures, taxes on consumption, capital, and labor will have a negative impact on growth.

Durkaya and Ceylan (2006), The Engle-Granger cointegration test was used for the long term, and for the short term, the error correction model and the Granger causality test were employed. In their study on the relationship between tax revenues and economic growth in the Turkish economy, found a bidirectional causality relationship between direct taxes and economic growth.

In their study focused on selected East Asian countries and Iran, Sameti and Rafie (2010) found that indirect taxes had a negligible effect on income distribution and economic growth.

Martinez-Vazquez, Vulovic, and Liu (2011) conducted a study covering the period from 1972 to 2005 for 116 countries. They concluded that an increase in the share of direct taxes negatively affects growth in developed countries.

Ormaechea and Yoo (2012) determined that corporate tax was the tax type that had the most negative impact on economic growth in their study of 69 countries between 1970 and 2009. However, it was stated that personal income taxes also had a negative impact on growth.

Stoilova (2017) conducted a study covering the period from 1996 to 2013 for 28 European Union countries. The study concluded that income taxes and import-related taxes positively impact economic growth, while value-added tax has a negative effect on growth, and property taxes have no significant impact on growth.

Dam and Ertekin (2018) analyzed the impact of tax revenues on growth in Türkiye using the ARDL Bounds Testing approach, with quarterly tax revenue and economic growth data from Q1 2005 to Q2 2016. The study found a cointegration relationship between the series and indicated a positive long-term relationship between economic growth and tax revenues.

Akıncı (2019) examined the relationship between total tax revenues and economic growth in Türkiye for the period from Q1 2006 to Q3 2018 within the context of structural breaks. The study identified a long-term cointegration relationship during this period. Unit root tests and the Maki structural break cointegration test were employed in the analysis.

Karagöz (2023) investigated the impact of tax levels and structures on the sustainability of growth, focusing on productivity, competitiveness, and welfare. The study analyzed data from 35 OECD countries for the period 2008-2017 using panel data analysis.

Taşdemir (2023) examined the effects of tax types on financial development and economic growth in Turkey. The Toda-Yamamoto Granger causality test was used in the study. As a result, a one-way causality from economic growth to taxes on goods and services was determined. In addition, a one-way causality from tax revenues on goods and services to the financial development index was found.

Durucan (2023) analyzed the relationship between economic growth and direct and indirect taxes in Turkey between 1924-1962 and 1963-2021. The Toda-Yamamoto Granger causality test was used in the study. It was concluded that there was a one-way causality relationship from tax revenues to economic growth in the first period covering the years 1924-1962; and there was a two-way causality relationship between indirect tax revenues and economic growth. In the second period covering the years 1963-2021, there was a two-way causality relationship between direct tax revenues and economic growth, there was no causality relationship between indirect tax revenues and economic growth, and there was a one-way causality relationship from direct tax revenues to indirect tax revenues.

Hoylu and Kara (2023) examined the effect of taxes on economic growth in Turkey between 1990 and 2019. Unit root, vector autoregression (VAR) and cointegration methods were used in the study. According to the results of the study, it was determined that indirect taxes positively affected economic growth and direct taxes negatively affected economic growth.

3. Empirical Analysis of the Relationship Between Welfare Levels and Tax Revenues

The primary objective of this research is to analyze the impact of tax revenues on welfare using empirical methods specific to selected cities. Thus, this section of the study focuses on the empirical analysis of the relationship between welfare levels and tax revenues. In this context, the data set used, the model established, and the variables included in the model are detailed.

3.1. Data and Variables

This study uses data from the TRC2 (Diyarbakır and Şanlıurfa) and TRC3 (Mardin, Batman, Şırnak, and Siirt) regions of Türkiye for the years 2004–2022 as the sample. The data are sourced from the online databases of TÜİK (TURKSTAT) and the Ministry of Treasury and Finance (MoTF).

In this section of the study, various tests were applied for the empirical analysis. These include preliminary tests such as the Homogeneity and Cross-Sectional Dependence tests, the Hadri & Kurozumi (2012) panel unit root test from the second-generation unit root tests, the Westerlund (2007) panel cointegration test, and the Canning-Pedroni (2008) causality test from the second-generation tests. Finally, the Common Correlated Effects (CCE) estimator was used for long-term parameter estimation. These diverse tests provide a comprehensive perspective on the model's reliability and effectiveness by covering various aspects of the analysis. The results of the applied methods were thoroughly analyzed and summarized.

In the study, the data and variable information used in the established model are presented in Table 1 below.

Table 1. Data and Variables

Variables	Description	Years	Data Source
GDP	Per Capita Income in Relevant City	2004–2022	(TURKSTAT)

TR	Tax Revenues in the Relevant City	2004–2022	(MoTF)

The variables TR and GDP were used in their logarithmic values. The variables have been seasonally adjusted. Accordingly, the empirical model is functionally specified as follows:

$$GDP = f(TR) \quad \textbf{(1)}$$

Model: $GDP_t = \beta_0 + \beta_1 TR_t$ **(2)**

3.2. Findings

Under this heading, the methodology for the applied empirical tests is outlined, and the results obtained from the analysis are evaluated and interpreted through tables.

- **Homogeneity and Cross-Sectional Dependence Test Results**

Panel analysis is an econometric method to examine datasets that combine time series and cross-sectional data. Cross-sectional dependence (CSD) refers to the situation where observations in a panel dataset are not independent. The purpose of testing for cross-sectional dependence in this study is to determine whether there is a relationship between cross-sectional units and whether these units are affected similarly by shocks in the series. Cross-sectional dependence indicates the correlation between different units at the same point in time. This situation is called cross-sectional dependence when there is a similarity or relationship between different units simultaneously. This type of dependence is a significant consideration in panel data analyses because it can mislead the results of standard regression analyses. For example, if cross-sectional dependence is present, standard error estimates may be incorrect, leading to misleading results. Therefore, it is crucial to test for cross-sectional dependence to determine whether first-generation or second-generation tests should be used. The results of these tests are important for improving the accuracy of the analysis and ensuring the reliability of the results (Pesaran, 2004). The commonly accepted hypothesis definitions for assessing the presence or absence of cross-sectional dependence in the literature are as follows:

- H_0**:** There is no cross-sectional dependence
- H_1**:** There is cross-sectional dependence.

According to cross-sectional dependence hypotheses, if the p-value of the statistical results is less than 10%, the alternative hypothesis is accepted, indicating the presence of cross-sectional dependence. Conversely, if the p-value exceeds 10%, the null hypothesis is accepted, suggesting no cross-sectional dependence. Acceptance of the alternative hypothesis signifies a strong relationship between the series, indicating the existence of cross-sectional dependence (Pesaran et al., 2008).

In panel analyses, the homogeneity test is used to determine whether homogeneity among the units in the panel dataset exists. Homogeneity refers to the condition where different units (e.g., different companies, regions, or countries) exhibit similar behaviors concerning the variables in the dataset. If homogeneity exists in panel datasets, it implies that the distribution of variables among the units is similar. Conversely, the absence of homogeneity indicates differences among the units that must be considered. In this context, the hypothesis definitions of the tests developed by Pesaran and Yamagata (2008), referred to as delta tests ($\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$), are as follows:

- H_0**:** *Parameters are homogeneous*. There is homogeneity among the units in the panel dataset. Hence, there are no differences among the units, and they exhibit similar behaviors concerning the variables.
- H_1**:** *Parameters are heterogeneous*. There is no homogeneity among the units in the panel dataset. Hence, there are differences among the units, and they exhibit different behaviors concerning the variables.

The results of the preliminary tests for cross-sectional dependence and homogeneity are presented in Table 2. The cross-sectional dependence test results revealed significant p-values, indicating the presence of cross-sectional dependence. In contrast, the homogeneity test results showed that the null hypothesis was not rejected, suggesting that the model is homogeneous. Therefore, while the model exhibits cross-sectional dependence, it has been identified as homogeneous. These findings imply that the subsequent tests used in the analysis should be second-generation tests that account for homogeneity. Consequently, the empirical analysis will be completed using second-generation tests.

Table 2. Pre-Test Results

Cross-Sectional Dependence Test:	**Statistics**	**Probability**
LM (BP,1980)	226.754	0.000***
CD_{lm} (Pesaran, 2004)	38.661	0.000***
CD (Pesaran, 2004)	15.046	0.000***
LM_{adj} (PUY, 2008)	42.459	0.000***
Homogeneity Test:		
$\tilde{\Delta}$	6.120	0.262
$\tilde{\Delta}_{adj}$	6.591	0.238

Note: p>0.01 indicates statistical significance.

- **Unit Root Test Results**

The panel unit root test developed by Hadri and Kurozumi (2012) is employed in the study. This test determines whether time series in panel datasets exhibit unit root characteristics. It is commonly applied to identify the presence of unit roots in panel data. Panel unit root tests indicate that series are non-stationary if unit roots are present. The Hadri and Kurozumi (2012) test is offered as an alternative to other panel unit root tests and is known for its higher power. The primary aim of the test is to assess the stationarity of time series within the panel dataset. By testing specific hypotheses, the Hadri and Kurozumi (2012) panel unit root test identifies the presence of unit roots in the panel data. This test is a crucial tool for evaluating the stationarity characteristics of time series in panel data analyses (Hadri & Kurozumi, 2012).

The unit root test developed by Hadri and Kurozumi (2012) in the literature is based on two distinct test statistics, which are as follows:

- H_0: The series is stationary for all cross − sectional units (countries)
- H_1: The series is not stationary for at least some cross − sectional units (countries)

Table 3: Hadri-Kurozumi (2012) Panel Unit Root Test

	Fixed		**Fixed and Trend**	
Level	**Statistics**	**Probability**	**Statistics**	**Probability**
GDP				
Z_A^{SPC}	3.6231	0.0001	-1.5808	0.9430***
Z_A^{LA}	-0.1852	0.5735***	-1.3717	0.9149***
TR				
Z_A^{SPC}	-1.8780	0.9698***	-0.9216	0.8216***
Z_A^{LA}	-1.9294	0.9732***	-1.6773	0.9533***
First Difference				
GDP				
Z_A^{SPC}	-0.3552	0.6388***	-0.2667	0.6052***

	Z_A^{LA}	-0.2906	0.6143***	-0.3803	0.6481***
TR					
	Z_A^{SPC}	-0.7420	0.7709***	1.0587	0.1562***
	Z_A^{LA}	-0.8621	0.8057***	1.0998	0.1357***

Note: P>0.01** indicates statistical significance and stationarity.

Upon examining the unit root test results in Table 3, it is observed that the GDP variable contains a unit root at the level value and in the fixed model. However, the TR variable is stationary at the level value. Both variables become stationary after taking the first difference.

- **ECM Cointegration Test Results**

The ECM (Error Correction Model) panel cointegration test was chosen for this study because it accounts for cross-sectional dependence. The ECM, developed by Westerlund (2007), is used in econometric analyses to examine the dynamic relationships between time series data. This model addresses both long-term equilibrium relationships and short-term dynamic adjustments between series. ECM is employed to explain the relationship between two or more time series, often characterized as cointegration relationships. Cointegration indicates that time series are connected and move together over the long term, although short-term imbalances may exist. ECM is used to correct these imbalances and explore long-term equilibrium relationships. The model identifies cointegration relationships using tools such as unit root tests and then constructs an error correction model to represent these relationships. ECM is widely used for examining stationarity and cointegration properties of time series data and modeling long-term relationships, particularly in macroeconomic analysis and financial econometrics. The accepted hypotheses in the literature are based on two distinct test statistics, which are as follows:

- H_0: There is no cointegration.
- H_1: There is cointegration.

Table 4. Westerlund (2007) ECM Test Results

Tests (ECM)	Fixed			Fixed and Trend		
	Statistics	Asymptotic Probability	Bootstrap Probability	Statistics	Asymptotic Probability	Bootstrap Probability
Group Tau	3.442	0.000***	0.000***	4.021	0.000***	0.000***
Group Alpha	2.223	0.000***	0.000***	3.504	0.000***	0.000***
Panel Tau	0.709	0.634	0.874	2.832	0.000***	0.000***
Panel Alpha	1.365	0.389	0.152	2.483	0.000***	0.000***

Note: P>0.01*** indicates statistical significance.

Table 4 presents the cointegration results for the panel. Since the slope coefficients were found to be homogeneous and due to the presence of cross-sectional dependence in the panel, the ECM (Error Correction Model) test is interpreted based on group and asymptotic values. The p-values in these models are statistically significant. These results indicate the presence of a cointegration relationship in the panel, suggesting that the variables move together over the long term and exhibit cointegration.

- **Canning & Pedroni Causality Test Results**

The causality test developed by Canning and Pedroni (2008) is used in econometric analyses to examine causal relationships between variables. Similar to the Granger causality test, it evaluates whether one variable can predict another variable. Causality tests are employed to determine whether

one variable causally affects another. The Canning and Pedroni (2008) test is designed explicitly for panel datasets to assess causality. Unlike other causality tests, it is effective in situations with multiple observations across time and space in panel datasets (Canning & Pedroni, 2008). The hypotheses for this test are as follows:

- H_0: There is no causality among the variables in the panel dataset. Hence, one variable does not predict another.
- H_1: At least one variable in the panel dataset can predict another variable. Hence, at least one causality relationship exists.

These hypotheses test the causality relationships between variables in the panel dataset. If the null hypothesis is rejected, meaning that the p-value is significant, it indicates that at least one variable in the panel dataset can predict another, thus demonstrating a causality relationship. In this case, the alternative hypothesis is accepted, and it is concluded that a causality relationship exists between the variables.

Table 5 presents the results for both panel and city-specific causality. Initially, Fisher (Lambda Person) statistics are examined as they provide information about the overall panel. A significant Fisher statistic indicating causality from the TR variable to the GDP variable is observed, while the Fisher statistic for causality from the GDP variable to the TR variable is insignificant. This case suggests that the expected causality from TR to GDP is detected. Therefore, this result proves that tax revenues have a causal impact on welfare. In city-specific results, causality from tax revenues to welfare levels is observed in all cities except Şanlıurfa and Siirt (Diyarbakır, Mardin, Batman, and Şırnak).

Table 5: Canning and Pedroni (2008) Test Results

CITIES	**TR≠>GDP**		**GDP≠>TR**	
	Wald	**Probability**	**Wald**	**Probability**
Şanlıurfa	-1.439427	0.180588	-1.316298	0.217446
Diyarbakır	-2.077784	0.058106*	-1.954058	0.072552
Mardin	-2.640546	0.020375**	-1.193366	0.254050
Batman	-1.845696	0.087828*	-0.756668	0.462742
Şırnak	-2.276783	0.040359**	-0.177171	0.862104
Siirt	-1.694089	0.114056	-0.716370	0.486434
Fisher (Lamda Person)	32.52775	0.001147***	14.31821	0.280851

Note: P>0.01***, P>0.05**, and P>0.10* indicate statistical significance.

- **Coefficient Estimation Results**

Common Correlated Effects (CCE) is a model used in panel data analysis. This model addresses correlated effects among units in panel datasets and seeks to model these effects accurately. The CCE model considers correlated effects among units in panel datasets and determines the structure of the error terms accordingly. It aims to obtain accurate results by accounting for the correlated structure present in panel datasets that include both time series and cross-sectional data. The key features of the CCE model are as follows:

Consideration of Correlated Effects: The CCE model aims to model correlated effects among units in panel datasets accurately. This approach allows for a more precise handling of the correlated structure present in the data.

Identification of Complex Error Structures: The CCE model identifies the complex structure of error terms, enabling a better understanding of correlations and relationships among units. This improves the accuracy of results in panel data analyses.

Applicability in Cointegration and Causality Analysis: The CCE model can be used in cointegration and causality analyses within panel datasets. Accurate modeling of correlated effects facilitates a better understanding of relationships between variables.

The method used in this study, developed by Pesaran (2006), accounts for cross-sectional dependence and provides country-specific results. The coefficient estimates for the CCE estimator are presented in Table 6.

According to the results in Table 6, the tax revenues (TR) variable parameters are statistically significant both for the overall panel and at the city level. While the coefficient is negative for the overall panel, it is positive for Şırnak and Mardin. In the remaining cities, the coefficients are negative. Therefore, the impact of tax revenues on welfare levels is negative for the overall panel. The findings suggest that Şırnak and Mardin are distinct from other cities, indicating that tax revenues increase welfare levels in these cities. Conversely, in Şanlıurfa, Diyarbakır, Batman, and Siirt, the opposite effect is observed: increases in tax revenues negatively affect welfare levels.

Table 6: Long Run Coefficient Estimation Results

DEPENDENT VARIABLE: GDP	**CCE (Common Correlated Effects Coefficient Estimator)**	
CITIES	**C**	**TR**
Panel	8.127 (0.00)***	-0.019 (0.00)***
Şanlıurfa	9.028 (0.00)***	-0.098 (0.00)***
Diyarbakır	9.119 (0.00)***	-0.091 (0.00)***
Mardin	6.452 (0.00)***	0.115 (0.00)***
Batman	8.588 (0.00)***	-0.059 (0.00)***
Şırnak	7.406 (0.00)***	0.049 (0.00)***
Siirt	8.167 (0.00)***	-0.030 (0.09)*

Not: P>0.01***, P>0.05**, and P>0.10* indicate statistical significance.

CONCLUSION and EVALUATION

Fundamentally, it is a crucial responsibility of governments to enhance the welfare levels of citizens, cities, regions, and, ultimately, the entire country. To achieve this goal, reducing regional development disparities and implementing targeted interventions to address economic problems in disadvantaged areas in the short term are significant issues that warrant discussion. Analyzing indicators that affect welfare levels is an essential aspect of financial practices that requires thorough investigation.

The relationship between tax revenues and welfare levels is a significant research topic concerning economic development and social equity. Tax revenues enable governments to finance public services, undertake infrastructure investments, and sustain social welfare programs. A sufficient and effective tax system facilitates better health, education, social security, and public safety services. Improvements in the quality of these services enhance individual living standards and increase overall societal welfare. Moreover, a fair and balanced tax policy helps reduce income distribution inequalities, promotes social justice, and supports economic stability. However, the effective use of tax revenues, including preventing corruption and waste, plays a crucial role in determining welfare levels. Therefore, the design and implementation of tax policies are paramount for sustainable economic growth and societal welfare.

In this context, the study aims to provide valuable insights into the effectiveness of policies that can be applied to specific cities by analyzing the impact of changes in tax revenues on welfare levels. The research examines the effects of fiscal policies implemented to reduce regional development disparities, focusing on the short- and long-term effects of changes in tax revenues on welfare levels.

The study covers cities in the TRC2 and TRC3 regions, which are below the national average in terms of welfare levels, from 2004 to 2022. Initially, econometric preliminary tests were conducted, followed by applying the Error Correction Model (ECM) developed by Westerlund (2007) to detect cointegration relationships among variables. The test revealed a long-term cointegration relationship between the series. Subsequently, the Canning and Pedroni (2008) causality test was applied to examine causality among the series. The study found causality from tax revenues to welfare levels across the panel but no causality from welfare levels to tax revenues. In the final stage, the CCE estimator was used to estimate the direction and degree of the relationship among the series. The findings indicate that, for the overall panel, tax revenue increases negatively impact welfare levels. When examining city-specific results, a negative effect was observed for Diyarbakır, Batman, Siirt, and Şanlıurfa, while a positive effect was found for Mardin and Şırnak. These empirical findings are expected to contribute to policymakers by providing insights into the effectiveness of policies addressing regional development disparities.

The results obtained for Diyarbakır, Batman, Siirt and Şanlıurfa were in line with theoretical expectations. The high level of indirect taxes in these cities, the unfair distribution of the tax burden, the fact that economic activities are based on agriculture and low value-added sectors, the size of the informal economy, tax revenues not being spent in sufficiently welfare-enhancing areas, the high rate of population growth, and the lack of sufficient investments due to political instability, and the fact that tax and economic policies are not in line with the needs of the region lead to the conclusion that tax revenues have negative effects on welfare. It is thought that there are some reasons for the difference in Şırnak and Mardin provinces. It is seen that Mardin province ranked 79th among 81 provinces in Turkey in terms of tax accrual/collection rates in 2017 and 80th in 2018, 2019 and 2020 (Ay, 2021). This situation is one of the indicators that there are serious problems in tax collection in Mardin province. However, it has been observed that tax collection is low in Şırnak province. Therefore, since the increase in tax revenues in these two cities is limited, its effect that reduces welfare has been relatively weakened. In addition, the development of Şırnak, especially in the agricultural sector, and the historical and touristic infrastructure of Mardin have an effect that increases welfare. Another situation that should be considered is that these two provinces have problems originating from the informal economy due to being border provinces. These reasons lead to results in a higher level of increase in welfare compared to the increase in tax revenues in the two cities. Although it is quite difficult to analyze the dimensions of the informal economy, investigating the size of the informal economy in these provinces and analyzing its effect on tax revenues will better explain the situation in these provinces.

Compliance with Ethical Standard

Conflict of Interest: *The author(s) declare that they do not have a conflict of interest with themselves and/or other third parties and institutions, or if so, how this conflict of interest arose and will be resolved, and author contribution declaration forms are added to the article process files with wet signatures.*

Ethics Committee Permission: Ethics committee approval is not required for this study.

Funding Disclosure: No financial support was required in this study.

REFERENCES:

Acosta-Ormaechea, S., & Yoo, J. (2012). Tax Composition and Growth: A Broad CrossCountry Perspective. IMF Working Paper, 12(257), 1-35. https://www.imf.org/external/pubs/ft /wp/2012/wp 12257.pdf

Akdoğan, A. (2014). Kamu Maliyesi. Ankara: Seçkin Yayıncılık.

Akıncı, A. (2019). The Impact of Tax Revenue on Economic Growth in Turkey. *Research of Financial Economic and Social Studies*, 4(1), 100-106. https://dergipark.org.tr/tr/download/article-file/724504

Ay, Ş. (2021). An Evaluation on Tax Accrual/Collection Rates. *Al Farabi International Journal on Social Sciences*, 6(2), 40-53. https://dergipark.org.tr/tr/download/article-file/1644239

Ay, Ş. & Hacıköylü, C. (2023). Determinants of Tax Morale in TRC3 Regİon (Mardin, Batman, Siirt, Şırnak): A Qualİtative Analysis. *Anadolu University Journal of the Faculty of Economics and Administrative Sciences*, 24(1), 170-202. https://dergipark.org.tr/tr/download/article-file/2756029

Canning, D. & Pedroni, P. (2008). Infrastructure, long-run economic growth and causality tests for cointegrated panels. *The Manchester school*, 76(5), 504-527.

Dam, M. M. & Ertekin, Ş. (2018). The Confusion of Authority in The Implementation of Self-Employment Income Exception. *Vergi Raporu* (228), 19-32. https://www.vergiraporu.com.tr/upImage/org/2eb0cd2.pdf

DİKA (2017). İstatistiklerle TRC3 bölgesi. Ankara: Ütopya Grafik Tasarım. https://www.dika.org.tr/assets/upload/dosyalar/istatisliklerle-trc3-bolgesi.pdf

Durkaya, M. & Ceylan, S. (2006). Vergi gelirleri ve ekonomik büyüme. *Maliye Dergisi* (150), 79-89. https://pdf.trdizin.gov.tr/pdf/V0JhMGl2ckY2R2FRRjBDZUlDUjFmcEc0K2k0czd1dGZBZjVraXRGZHVQM2R6T1RBOE1ZQWZJVnZJakZscjNSZFV0L1hCOEpWcnJJekxFYkx3VHY0L2J5TFVvRHF6Q1BWOUZnbDVwVElwMmdEZTE1cTNhYWFVc0ZocUNRelRaWmRYMldiaU5mNXFkckZSakNvNGxFZUYyN0llNHl0VXZPTmV4VnhDQVU5YmZBL25QdGZPL29TclNPWGdIL2I5L2swL0Z4SlkyeWIveXphMVk5VjZtV1ArdllYODZNQlZZVWNPL0JCcGlnQzVQTT0

Durucan, A. (2023). The Relationship between Economic Growth and Direct-Indirect Taxes in Türkiye: From the Republic to Present. *Afyon Kocatepe University Journal of Social Sciences*, 25(100. Yılında Cumhuriyet Özel Sayısı), 185-198. https://dergipark.org.tr/tr/download/article-file / 3261396

Folster, S. & Henrekson, M. (2001). Growth effects of government expenditure and taxation in rich countries. *European Economic Review*, 45(8), 1501-1520.

Hadri, K. & Kurozumi, E. (2012). A simple panel stationarity test in the presence of serial correlation and a common factor. Economics Letters, 115(1), 31-34.

Hoylu, M., & Kara, M. A. (2023). The Effects ff Indirect and Direct Taxes on Economic Growth in the Turkish Economy. *Gaziantep Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 5(1), 1-13. https://dergipark.org.tr/tr/download/article-file/2680215

Karacadağ Kalkınma Ajansı (2024). https://www.karacadag.gov.tr/yatirim/

Karagöz, H. (2023). The Effect of Tax Revenues and Tax Structure on the Sustainability of Economic Growth: An Analysis in a Perspective of Welfare, Efficiency and Competitiveness. *İstanbul Ticaret University Journal of Social Sciences*, 22(46), 438-457. https://dergipark.org.tr/en/download/article-file/3194415

Martinez-Vazquez, J., Vulovic, V. & Liu, Y. (2011). Direct versus indirect taxation: trends, theory, and economic significance. *Edward Elgar Publishing*.

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels, *Cesifo Working Paper Series*, 1229, Cambridge.

Pesaran, M. H. (2006). Estimation and inference in large heterogenous panels with a multi factor error structure. *Econometrica*, 74(4), 967-1012.

Pesaran, M. H.,Ullah, A. & Yamagata, T. (2008). ABias-Adjusted LM Test of Error Cross-Section Independence. *Econometrics Journal*, 11, 105-127.

Pesaran, M. H. & Yamagata, T. (2008). Testing Slope homogeneity in large panels. *Journal of Econometrics*, 142(1), 50-93.

Sameti, M. & Rafie, L. (2010). Interaction of income distribution, taxes and economic growth (The Case of Iran and Some Selected East Asian Countries). *Iranian Economic Review*, 14(25), 67-81.

Selen, U. & Karaş, E. (2018). The Relationship Between Social Welfare and Taxation in The Context ofWelfare Economics: Evaluation of Turkish Revenue Tax. *4th SCF International Conference on "Economics and Social Impacts of Globalization" and "Future Turkey-European Union Relations*, (979-993). https://www.researchgate.net/publication/328582_Refah_Iktisadi_Kapsaminda_Sosyal_Refah_ve_Vergileme_Iliskisi_Turk_Gelir_Vergisinin _Degerlendirilmesi

Stoilova, D. (2017). Tax structure and economic growth: Evidence from the European Union. *Contaduría administración*, 62(3), 1041-1057.

Stoilova, D. & Patonov, N. (2012). An Empirical Evidence for The Impact of Taxation on Economy Growth in The European Union. *Book of Proceedings- Tourism and Management Studies International Conference* (s. 1031-1039). Algarve/Portugal: ESGHT-University of the Algarve.

Taşdemir, F. D. (2023). A Research on the Relationship between Some Tax Types, Financial Development and Economic Growth in the Türkiye's Economy. *Balkan and Near Eastern Journal of Social Sciences*, 09(Special İssue), 185-195. https://ibaness.org/bnejss/2023_09_special_issue/22_ Tasdemir.pdf

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics*, 69(6), 709-748.

Zeng, J. & Du, H. (2003). Allocation of tax revenue and growth effects of taxation. Impulse response functions. National University of Singapore, Singapore.