DOI: 10.26650/PB/SS10.2019.001.016

# THE ANALYSIS OF TAX PERFORMANCE IN TURKEY

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## Abstract

Tax policies of Turkey have been one of the most concerning *economic issues during the course of* the *European Union accession process*. The tax revenues have been an important economic factor affecting tax policies and economic growth in Turkey. Tax performance has been an economic indicator which shows the effects of tax collection on economic development and income redistribution. Tax performance as an important economic indicator for the effects of tax policy shows how to make tax implementation in regard to the effiency and equity principles of taxation in any country. In this study, it will be scrutinized Turkish tax performance compared to EU-15 countries. The aim of this study is to analyze Turkey's tax policy . The tax convergence of Turkey with EU -15 countries will be examined by exploring the stationary tax differentials series using the data sets from Eurostat and Turkish Revenue Administration. In this study , tax revenues-to-GDP ratios are used for tax convergence showing the tax performance in Turkey. and a unit root in the nonlinear framework will be tested to examine the Turkish tax performance compared to EU-15 countries.

**Keywords:** Tax performance, Tax convergence, Turkey, EU, EU-15 countries.

**JEL Classifications:** H20, H21, C01

## 1. Introduction

In this study, Turkey's tax performance will be analyzed in comparison with EU countries. Although there are many different reasons to choose Turkey, two important reasons make Turkey an attractive example for this study. First of all, Turkey as a candidate country for European Union membership has been one of the most discussed countries due to her tax policies in the EU Reports especially during accession process. Secondly, Turkish tax policy has been discussed as general government policy not only in terms of the place of tax revenues in budget revenues but also in regard to the state traditions of tax collection and taxation authority in Turkey. Tax policies should be analyzed as an important economic indicator which shows the state power from the period of Ottoman Empire to the Republic of Turkey. According to the public finance theory, tax policies aim the optimal resource allocation, equitable distribution of income and, economic stability. For Turkey like other developing countries, tax policy for sustainability of the country is important as well as for having sufficient fiscal power to avoid being among debtor countries. The starting point of this study is to provide what we need for the econometric analysis on tax policy developments in Turkey.

In this study, it is aimed to investigate the tax convergence of Turkey with EU-15 countries. Therefore, in order to make more suitable tax performance analysis, the data series of total tax burdens,that is the total tax revenues/GDP ratios in Turkey and the EU-15 countries are used.

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## 2. Approaches in the Tax Performance Analysis

State power, non tax revenues and behaviours of taxpayers have effect on the tax performance in any country. Tax performance has been one of the most important economic indicators which shows the economic power of a country. The countries with low per capita income can not, as a rule, meet the administrative and institutional requirements for a modern tax system. The rising revenue requirements for public expenditures with economic development have a positive impact on tax collection. In the public finance literature, it is argued that there is a positive relationship between tax ratios and per capita GDPs. An empirical study using the data sets of 177 countries (Haldenwang & Ivanyna, 2011),shows that the ratio of tax to GDP per capita is statistically signicifant for tax performance. In statistical terms, an increase of 10% in GDP per capita increases tax revenues by % 0.34.

In the traditional regression approach and behavioral economics approach, tax performance is measured by comparing actual tax revenues with potential tax revenues. The potential tax revenue is generated from the predicted values based on regression analysis. This method takes into consideration structural economic features in any country (Gaalya, 2017: 232). The tax effort as a ratio of actual tax revenues to the potential tax revenues shows the level of achievement in regard to the tax capacity in a country. A tax effort ratio of more than 1.0 shows that it has a preference for level of taxation above the average. IMF calculations of tax effort show that Brazil had the highest tax effort with the ratio of 1.806 followed by Tunisia, Egypt, Ivory Coast, and Sudan in the period of 1969-1971( Bird,1976:254). A realistic public finance approach for underdeveloped and developing countries must take into account the economic surplus generated in the economy (Bird, 1976: 259). Bird argued that the mining sector such as other natural resources in underdeveloped countries had a large surplus which is very difficult to tax.

Tax capacity has economic and the fiscal upper limits . The economic upper limit of tax capacity is the GDP of the country. A tax system in a country having the pareto optimality should have economic efficiency, administrative simplicity, political responsibility and equity (Carvalho, 2017: 11). Social factors as well as economic factors affect the tax capacity. Behaviours of taxpayers and administrative simplicity have been important social factors which have affected tax capacities (Susam, 2015: 291). These factors are also factors increasing the cost of tax collection either implicitly or explicitly.

## 3. Empirical Analysis Method and Implementation

### 3.1. Econometric Methodology

It is well known that traditional unit root tests such as Augmented Dickey-Fuller (ADF) have weakness in terms of persistent failure to reject the null of a unit root.

KSS (2003) develop a strategy for testing the null hypothesis of unit root considering the nonlinear exponential smooth transition autoregressive (ESTAR) model framework. In KSS test, the null hypothesis of the unit root is tested against the nonlinear exponential smooth transition autoregressive (ESTAR) but globally stationary process. KSS (2003) consider the univariate ESTAR of order one model,

$$\Delta y_t = \gamma y_{t-1}\left[1-\exp\left(-\theta y_{t-1}^2\right)\right]+\varepsilon_t \quad (1)$$

KSS (2003) define the null hypothesis of unit root as $\theta = 0$ and the alternative hypothesis of globally ESTAR stationarity as $\theta > 0$. However, testing directly the null of unit root is not feasible because the parameter $\gamma$ is not identified under the null hypothesis. To overcome this problem, KSS (2003) propose a first order Taylor approximation to the ESTAR model given in equation (3) under the null and present the auxiliary regression.

$$\Delta y_t = \delta y_{t-1}^3 + \varepsilon_t \quad (2)$$

By ordinary least squares (OLS) estimation of this auxiliary regression, the null of unit root can be tested against the globally ESTAR stationarity which corresponds to $H_0 : \delta = 0$ vs. $H_1 : \delta < 0$ using a t-type test statistic which is labeled as $t_{NL}$ and is obtained as $\hat{\delta} \Big/ SE\left(\hat{\delta}\right)$. Here, $\hat{\delta}$ is OLS estimate of $\delta$ and $SE\left(\hat{\delta}\right)$ is the standard error of $\hat{\delta}$.

KSS (2003) point out that in the nonlinear models; the modeling of deterministic components such as intercepts and trends is not obvious thus, we use the demeaned and/or detrended data instead of including the deterministic components in the auxiliary regression.

Apart from KSS (2003), Sollis (2009) proposes an alternative to KSS nonlinear unit root test, referred to as an asymmetric ESTAR (AESTAR) model, which allows for symmetric or asymmetric stationary ESTAR nonlinearity under the alternative hypothesis. The main advantage of the Sollis (2009) test is that the nonlinear behavior of the series displays symmetric or asymmetric adjustments for positive and negative deviations towards the equilibrium level.

The AESTAR model of Sollis (2009) employs both an exponential function and a logistic function as follows:

$$\Delta y_t = \left[1-\exp\left(-\theta_1 y_{t-1}^2\right)\right]\left\{\left[1+\exp\left(-\theta_2 y_{t-1}\right)\right]^{-1}\gamma_1 + \left(1-\left[1+\exp\left(-\theta_2 y_{t-1}\right)\right]^{-1}\right)\gamma_2\right\} y_{t-1} + \varepsilon_t \quad (3)$$
$$\theta_1 \geq 0, \quad \theta_2 \geq 0$$

Sollis (2009) follows the same strategy to get the auxiliary regression computing a first-order Taylor series approximation to the AESTAR model under the null. The auxiliary regression is obtained as following computing the first-order Taylor expansion around $\theta_1 = 0$:

$$\Delta y_t = \delta_1 y_{t-1}^3 + \delta_2 y_{t-1}^4 + \varepsilon_t \quad (4)$$

Henceforth, the null hypothesis becomes $H_0 : \delta_1 = \delta_2 = 0$ in the preceding representation. The auxiliary regression model can be estimated using OLS method.

As mentioned Kapetanios et. al. (2003), the modeling deterministic components such as intercept and intercept/trend in auxiliary regression model (in nonlinear models) is obvious, so we use de-meaned and de-trended data. From this point of view, there also exist three cases of F-test statistic for Sollis (2009) test: i) raw data case $\left(F_{AE}\right)$, ii) de-meaned data case $\left(F_{AE,\mu}\right)$ and iii) de-trended data case $\left(F_{AE,t}\right)$.

### 3.2. Data and Empirical Results

The data set involves annual tax revenues (of GDP) (as a proxy of tax burden variable) of Turkey and European Union for the period from 1972 to 2016, a total of 45 observations. The data are obtained from the World Development Indicators database. In order to test tax burden convergence, we calculate the tax burden differential variable $y_{i,t}$ as following:

$$y_{i,t} = TB_{TURKEY,t} - TB_{EU,t} \quad (5)$$

where $TB_{TURKEY,t}$ denotes the tax burden of Turkey at time $t$ and $TB_{EU,t}$ is the tax burden of European Union during the same period.

We employ nonlinear unit root tests of the KSS (2003) the Sollis (2009) using demeaned data for tax burden differential variable and the optimal lag lengths are determined through Akaike Information Criterion (AIC). We summarize the empirical results in Table 1.

**Table 1: The results of KSS and Sollis unit root tests**

| Unit Root Tests | | Lag Lengths | Test Statistics |
|---|---|---|---|
| KSS | $t_{NL,\mu}$ | 10 | -0.96964* |
| Sollis | $F_{AE,\mu}$ | 10 | 0.93466* |

**Notes:** * denotes the rejection of the null hypothesis of unit root at the 5% significance level. The optimal lag lengths are determined through Akaike Information Criterion (AIC).

The results presented in Table 1 indicate that the null hypothesis of unit root cannot be rejected at the 5% significance level according to the nonlinear unit root tests of KSS and Sollis. Thus, there does not exist a convergence in terms of tax burden between Turkey an European Union.

## 4. Conclusion

The ratio of tax revenues to the GDP used for the tax performance in this study show also the total tax burden of a country.To use the total tax revenue instead of a special tax revenue for tax convergence between Turkey and EU-15 countries, has facilitated to analyze the impact of tax revenues on economic growth and employment. The purpose of present paper is to investigate whether or not tax burden convergence exists between Turkey and the European Union. The data set involves annual tax revenues of GDP (as a proxy of tax burden variable) of Turkey and European Union for the period from 1972 to 2016, a total of 45 observations. We calculate the tax burden differential variable in order to test inflation convergence. The empirical results indicate that the null hypothesis of unit root cannot be rejected at the 5% significance level according to the nonlinear unit root tests of KSS and Sollis. Thus, there does not exist a convergence in terms of tax burden between Turkey and the European Union. As known, efficiency and equity principles of taxation are very important in regard to the tax policy in the EU countries. Our study reminds it should be taken more steps towards more efficient and fair taxation in Turkey. After these steps, it can be achieved to build a more efficient tax system and there can be a tax convergence between Turkey and the European Union.

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