



# The effects of financial development and tax on income inequality in Türkiye: The financial Kuznets curve hypothesis

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## Abstract

One of the factors that ensure the peace of society in a country is the fair distribution of income in that country. With the access of individuals to financial resources, the level of income increases, and this increase makes income distribution an even more important issue. Financial development is an important factor that can prevent income inequality. Kuznets approach put forward by Kuznets (1955) has been named the financial Kuznets curve (FKC) with the finding of Greenwood and Jovanovic (1990). According to their theoretical stipulations, an inverted-U relation between financial sector development and income inequality exists. The main purpose of this study is to investigate whether financial development and tax have an effect on income distribution in the Turkish economy between the period of 1995-2021. Longterm estimation via ARDL boundary test indicates that the variables are cointegrated. It is revealed that the FKC hypothesis is not valid in the selected period.

**Keywords:** Financial Kuznets Curve, Income Inequality, Financial Development, ARDL Bounds test

**JEL codes:** C58, R11

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## 1. INTRODUCTION

The relationship between financial sector development and income distribution is one of the main issues that researchers have been working on for many years. The problem of income inequality is a situation encountered in every age and society. However, problems in income distribution have become a situation that has gained importance with industrialization and capitalist market economy. Especially after 1980, with the increasing globalization phenomenon, the income distribution inequality has become a big problem to be solved (Sarı, 2003). With globalization, financial development continues to increase. While financial growth has a positive affect on economic growth by increasing investment and employment with more funds and credits, it can also have a negative affect on economic growth as it increases debtness. In addition to economic growth, inequality in income distribution is an important factor in the development of societies. The social relations that determine the way in which the national income is shared among individuals in a certain period in a society is called distribution. The share of individuals as a result of this distribution is called income distribution (Ersezer, 2006). The inequality encountered during income distribution is measured by the Lorenz curve (developed by Max Lorenz) and the GINI coefficient (developed by Corrado Gini). The GINI coefficient values are between zero and one. The inequality in income distribution decreases as it approaches zero, and increases as it approaches one. If the coefficient is zero, there is complete equality, if it is one, there is complete inequality.

Income distribution inequality is an issue that prevents the increase in the economic development and welfare level of emerging countries (Tanand Law, 2012). Fair distribution of GDP in a country is important. The fact that the income increase of the people is higher in a certain part of the population and less in the other part causes social unrest. The difference of

income between the rich community and the poor community leads to class conflicts. Income growth that is not spread to the base not only causes social problems, but also causes harm to countries that aim to grow. Achieving and maintaining social peace in a country depends on that country having a fair income distribution. To provide this justice is realized by the intervention of the government in the economy by using fiscal policy tools. Financial development, GDP, inflation, public expenditures, taxation, education, increase in population etc. are among the most important factors affecting income inequality.

Tax is an important financial tool in the hands of the government in the elimination of injustice in income distribution and its redistribution. Because, when the social purpose in the tax process is not realized at a sufficient level, it ensures that the income is distributed at the desired level in favor of the economically weak, by taking measures for public expenditures. For this reason, factors such as taking into account the ability to pay in the taxation process, tax rate, tax audition, tax reflection are effective on the redistribution of income.

Three different views have been put forward regarding the relationship between income distribution injustice and financial growth. The first argument is a negative and linear relationship, the second is an inverse-U relationship, and the third is a positive and linear relationship. In this study, it is investigated whether there is an inverted-U-shaped relationship between the variables, called the Kuznets curve. Kuznets (1955) has revealed that as income level increases, income inequality will increase first and then decrease. This Kuznets curve has taken its place in the literature with different adaptations by examining the relationships between different variables. One of them is financial Kuznets curve approach put forward by Greenwood and Jovanovic(1990), which examines the financial development and income injustice

relation. Kuznets (1995) argues that income in rural areas is lower than in cities, but on the contrary, income distribution is more equitable. Income inequality is increasing even more in urbanization that occurs with industrialization. This situation continues until a certain value is reached, then reverses after this value, and one of the reasons for this is the development of the financial system. So much so that the development of this system affects income distribution by revealing job and educational opportunities.

This study covers the period of 1995-2021, and its aim is to examine the effect of financial development and taxation on income distribution in the Turkish economy within the scope of FKC. The problem in the study is whether financial development and taxation process eliminate the inequality in income distribution. In this regard, first of all, the studies in the literature on the subject are presented. Then, the econometric method, data set and quadratic form model to be used in the application are specified. After examining the stationarity of the variables, it is investigated whether there is long-term cointegration in the series with the ARDL bounds test approach. Finally, the findings have been interpreted and policy recommendations have been presented.

## 2. LITERATURE REVIEW

In the literature, there are studies examining the effect of financial development on income distribution. The findings in the studies differ from each other due to the selected country/country group, analysis period or method differences. In this section, studies in the literature are reviewed.

Wang et. al. (2023) have discussed income inequality in China from the perspective of technological innovation in the framework of the FKC between 1985 and 2019. The relationship between the variables is analyzed by models those are Johansen cointegration, VECM Granger causality, and ARDL model. Then, CCR, Dynamic OLS, and Fully Modified OLS estimations are used

for long-term parameter estimation. While technological innovation positively affects the difference of income between urban and countryside regions, financial development causes an inverted-U formation.

FKC hypothesis validation has been investigated for India, Pakistan, Iran and Argentina by Ang (2010), Shahbaz and Islam (2011), Shahbaz (2015), Doğan (2018), respectively. In the aforementioned studies, the existence of the hypothesis is not found.

Studies analyzing the relationship between income inequality and financial development for the Turkish economy have taken their place in the literature. The findings indicate differences according to the selected period and methods, and some of them are as follows.

The validity of the FKC in the Turkish economy has been tested by Can et al. (2022) using the ARDL bounds test approach between 1987 and 2019. The findings indicate that there is an inverted relationship between growth and income inequality, namely, the relationship is U-formed.

According to the results obtained by Özbek and Oğul (2022) by testing the FKC validation in the Turkish economy for the short and long term, it has been seen that the hypothesis is valid, in other words, the inverted-U shape is revealed. GINI coefficient, government expenditures, GDP and financial development variables have been examined between 1990 and 2019.

In this study, a long-term cointegration relationship could not be obtained as a result of econometric analyzes conducted for the 1980-2017 periods in Turkey, and it also is revealed that the FKC hypothesis is not valid (Dumrul et al., 2021).

Pata (2020) examined the affects of financial development, urbanization and inflation variables on Turkey's income distribution for the period 1987-2016. It is found that while inflation increases income inequality, urbanization decreases it. Furthermore, the

validation of FKC is obtained.

The tax-income inequality relationship in Turkey is revealed by Demirgil (2018) for the years 1980-2014 using the ARDL boundary test. The results reveal that indirect tax increases GINI coefficient while direct tax decreases it.

Destek et al. (2017) have tested the FKC hypothesis for Turkey between 1977 and 2013 and revealed the existence of the hypothesis. Çetin and Şeker (2015) have discussed the Turkish economy in their study. According to the findings, it is concluded that financial growth reduces income distribution.

The affect of financial growth on income distribution for Turkiye has been investigated using the ARDL method for the period 1980-2012 and it has been determined that a fair income distribution is provided by an efficient financial system (Kanberoğlu and Arvas, 2014).

In addition, there are panel data analysis studies in the literature, and these studies are mentioned below.

The income distribution differences of 20 developed and developing countries are examined by Khatatbeh et al. (2023) between 1980 and 2015 within the scope of the FKC hypothesis. They have found that most of the countries are inverted-U-shaped, while the rest are U-shaped. It has been seen that the differences in results arise from the financial structures and economic development levels of the countries.

A panel data analysis have been studied by Doytch et. al. (2023) for 85 countries. According to authors, the relationship between financial development and energy consumption is researched under FKC hypothesis to determine the inverted-U form. While stock market development indicators reveal the existence of the FKC hypothesis, credit markets do not. Thus, the presence of the relationship between stock exchange development and energy consumption highlights the importance of

promoting innovative technologies.

Altiner et al. (2022) have investigated the relationship between income injustice and financial growth of 30 countries grouped as the best, middle and bad performing countries between 2000 and 2015. In the study, it is determined that FKC is valid in the best performing countries. The panel cointegration test obtained by Durbin-Hausman and the CCE coefficient estimator is applied in the research.

Argun (2016) has conducted a study covering the years 1989-2013 for developing countries and determined that the increase in financial sector loans also increased the income distribution. Moreover, Kuznet's hypothesis has been valid.

Considering the empirical studies in the literature, no consensus has been reached on the financial Kuznets curve hypothesis validation. There are differences in the studies according to the method used, period, and country/country groups.

### 3. DATA, MODEL AND METHODOLOGY

In this study, financial development affect on income injustice for Turkiye between the years 1995-2021 is examined within the scope of the financial Kuznet curve hypothesis. The dependent variable in the model is income inequality and is represented by the GINI values. Financial development is the independent variable in the model which is also the main explanatory variable. The financial development index has been chosen to measure the effect of financial structure. Tax is one of the most important financial instruments in eliminating inequality in income distribution and redistribution of income. For this reason, it is considered as another independent variable in order to examine the affect of tax burden on income injustice. Hereof, the model to be used in the study is created as follows;

$$\ln gini_t = \beta_0 + \beta_1 f d_t + \beta_2 f dsq_t + \beta_3 lntax + \varepsilon_t \quad (1)$$

Here *lngini*, *fd*, *fdsq*, and *lntax* indicate income distribution indicator, financial development, square of financial development and tax burden, respectively.  $\varepsilon_t$  denotes the error term. The natural logarithm of all variables has been taken besides *fd* and *fdsq*. To analyze the validation of the financial Kuznets curve, the coefficient of the financial development variable has to be positive and statistically significant while the square of financial development coefficient has to be statistically significant and also negative. Namely,  $\beta_1 > 0$  and  $\beta_2 < 0$ . In the study, the GINI coefficient is obtained from the SWIID 5.0 dataset that is created by Solt (2016). Financial development and tax burden data are obtained from the IMF database and Heritage Foundation, respectively.

Co-integration analysis is a method that reveals the long-term relationship between series. In this research, the boundary test approach called ARDL developed by Pesaran et al. (2001) has been used, which eliminates this constraint, unlike classical cointegration tests, which are restricted to contain different levels of stationarity. While examining the long-term relationship between the series, the test called as ARDL is more advantageous and reliable than the others because it allows the dependent variable to be stationary at difference level (I(1)) and the independent variables are stationary regardless of their level (I(0) or I(1)) and includes the error term in the model.

Hence, in order to determine the constructability of the ARDL model, first of all, the unit root test should be tested. The stationarity of the variables in the study is determined by using the KPSS stationarity test (Kwiatkowski et al., 1992). KPSS is a linear test that defends the stationarity of the variables in its null hypothesis.

Based on a linear regression model in KPSS is as follows: (Çil, 2004)

$$y_t = r_t + \beta_t + \varepsilon_t, \quad t = 1, \dots, T.$$

$$r_t = r_{t-1} + u_t$$

Here,  $y_t$  is the observed series whose stationarity is to be investigated. The autonomous parameter denoted by  $r_t$  in the model represents the random walk process.  $\beta_t$  and  $\varepsilon_t$  denote the deterministic trend and the stationary error term, respectively.  $u_t$  is IID  $(0, \sigma^2)$ . The stationary hypothesis is  $\sigma_u^2 = 0$ . Since  $\varepsilon_t$  is assumed stationary, the trend is stationary under the null hypothesis  $y_t$ . If  $\sigma_u^2 = 0$ ,  $u_t$  to be constant is required and thus the  $r_t$  process stationarity, that is taken into account as a random walk.

In the KPSS stationarity test, the null hypothesis defends the stationarity of the variable, while the alternative hypothesis argues that there is no stationarity. Namely,

$$H_0 = \text{The variable is stationary.}$$

$$H_1 = \text{The variable is not stationary.}$$

Following the KPSS stationarity test, ARDL bounds test is used in the study which allows to analyze the long-term relation between the integrated series at different levels. The ARDL model of Model 1 is created as follows:

$$\sum_{i=1}^n \delta_{3,i} \Delta lntax_{t-i} + \beta_0 lngini_{t-1} + \beta_1 fd_{t-1} + \beta_2 fdsq_{t-1} + \beta_3 lntax_{t-1} + \varepsilon_t \quad (2)$$

Here,  $\Delta$  and  $n$  denote the difference operation and lag number, respectively. To test the co-significance of the coefficients  $\beta_0, \beta_1, \beta_2$  and  $\beta_3$ , the  $F$ -statistic, which determines the lower and upper bounds, is calculated. The  $F$  statistic is interpreted by checking at the lower and upper limit values of I(0) and I(1). If the  $F$  statistical value is greater than the upper limit, the  $H_1$  hypothesis cannot be rejected. Otherwise, the  $H_0$  hypothesis cannot be rejected. Thus, the null hypothesis of the ARDL model argues the lack of cointegration and the alternative hypothesis does the opposite, are

formed as follows:

$$H_0 = \beta_0 = \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1 = \beta_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$$

## 5. EMPIRICAL RESULTS

First of all, the descriptive statistics of the variables in the model are calculated and included in Table 1.

**Table 1.** Descriptive Statistics

	Ingini	fd	fdsq	Intax
Mean	3.711	0.425	0.185	4.218
Median	3.698	0.454	0.206	4.290
Max	3.754	0.510	0.260	4.360
Min	3.676	0.292	0.085	3.790
Std. Dv.	0.026	0.071	0.058	0.157
Skewn.	0.322	- 0.472	- 0.343	- 1.449
Kurtosis	1.509	1.732	1.593	4.511

The average of Ingini at the level of 3.711 is an indication that the income distribution is not fair. The lowest Ingini value is in 2013, which is 3,676. It is seen that there is an increasing trend between 2013 and 2017. The financial development series indicates an increasing trend as of 2001. In the period covering the study, the average of the financial development series is 0.425, and the maximum value is 0.510 while the minimum is 0.292. The maximum value is 4.360 while the minimum is 3.790 for Intax series, with an average of 4.218.

KPSS stationary test has been used to determine the unit root of the variables in the model. The findings regarding the series stationary are displayed in the following table (Table 2).

**Table 2.** KPSS Stationary Test Results

Variables	I(0)	I(1)
Ingini	0.6703*	0,2791
fd	0.7241*	0.1774
fdsq	0.7350*	0.1722
Intax	0.6551*	0,3844**
KPSS Critical Values		
%1	0.7390	
%5	0.4630	
%10	0.3470	

**Note:** \* and \*\* denote the rejection of null hypothesis at %5 and %10 significance level, respectively.

According to the results in Table 2, it is seen that all variables obtained by taking the first difference (I(1)) are stationary and the significance level is 5%.

Among the cointegration tests is the ARDL bounds test approach belonging to Pesaran et al. (2001), which allows to test the relationship between the variables regardless of whether they are I(0), I(1) or mutually cointegrating. In this context, considering the unit root results of the variables, it is decided that the ARDL approach should be applied.

On account of investigating the cointegration relationship between the series in the context of Model 2, a boundary test is performed and the findings are displayed in Table 3. The F statistical value has been calculated as 5.556 and represented in Table 3. Since this calculated F statistical value has exceeded Pesaran et al.'s (2001) upper bound value of 4.66, the existence of a cointegration relationship between the variables has revealed. Before calculating the long-term coefficients, diagnostic tests have been applied to determine the reliability of the model and displayed in

Table 3. We can interpret the obtained results as follows: As a result of the Breusch-GodfreySerialCorrelation LM test, it has been revealed that there is lack of autocorrelation problem in the models. The error terms for all models are free of varying variance problems via The Breusch-Pagan-Godfrey Heteroskedasticity test. Moreover, the error terms have normal distribution according to normality test.

**Table 3.** ARDL Boundary Test Result

Critical Value	I(0) Bounds	I(1) Bounds
%1	3.65	4.66
%5	2.79	4.08
%10	2.37	3.2
F-stat value	5.556	
Diagnostic Tests		
Breusch-GodfreySerialCorrelation LMTest	2.116(0.320)	
Normality	0.698(0.705)	
Breusch-Pagan-GodfreyHeteroskedasticity Test	1.750(0.313)	

**Note:** Values in parentheses indicate the probability value.

A long-term equilibrium relationship existence between the variables has been determined by the F test. Then, the coefficients reflecting this long-run relationship need to be estimated.

**Table 4.** ARDL (3,4,4,4) Model Long-run Coefficients

Variables	Coeff.	t-stat.	prob
fd	-2.298	-2.059	0.108
fdsq	3.020	2.131	0.100***
lntax	-0.280	-3.668	0.021**
C	5.310	13.319	0.000*

**Note:** \*, \*\* and \*\*\* denote the signification at %1, %5 and %10, respectively.

According to the results of the analysis, the ARDL (3,4,4,4) model has been determined and the long-term coefficients of this model are given in Table4. The findings demonstrate that the square of financial development has statistically significany at the 10% significance level. According to the result, 1 unit increase in the square of financial development increases the GINI variable by 3.020%. Moreover, it is stated in the table that the tax variable is statistically significant at the 5% level. A 1% increase in the tax burden reduces the GINI by 0.280%. In other words, these results mean that the square of financial development and tax have an effect on income distribution in the long run.

In addition, it has been determined that FKC is not valid in the Turkish economy, since is negative and is positive. This means that the inverted-U hypothesis is not satisfied.

## 6. CONCLUSION AND POLICY IMPLICATIONS

Financial development takes a significant place among the sustainable development goals of economies. The goal of any production process in the country is to ensure economic and financial growth. The distribution of the income obtained through this growth and development process among individuals is very important in terms of social peace. The possible

inequality in income distribution will bring along many socioeconomic problems. In order to eliminate these problems and create a balance, the factors that may cause income inequality should be addressed and solutions need to be proposed. For this reason, the problem of the relationship between financial development and income distribution is quite old. In this study, the effects of financial development on income inequality have been examined for the period 1995-2021. In addition to these variables, tax is one of the most important fiscal policy tools of the government in order to satisfy the equality in income distribution and to ensure its redistribution. Because tax is a social-purpose tool that develops in favor of those who are weak in terms of economic income. For this reason, it is important to consider the ability of individuals to pay during taxation. In this context, the effect of tax burden on income distribution has tried to be examined in this study.

In the study, the financial development data available in the IMF Databank is used as a measure of financial development. Income inequality data has been obtained from the SWIID5.0 database developed by Solt (2016) and is represented by the GINI coefficient. Before starting the econometric analysis, the descriptive statistics of the series are calculated and have displayed in Table 1. Then, KPSS stationarity test has been applied to investigate whether the variables have a unit root. As a result of the test, it is determined that the first differences of all variables are stationary. After the unit root test, ARDL bounds test approach is used to examine the long-term cointegration between the series. As a result of the analyzes, it has been revealed that the inverted-U form in the FKC curve is not valid because of the negativeness of coefficient and positiveness of coefficient. This situation reveals that the financial development in Turkey is not sufficient to provide equality in income distribution. It has been concluded that the increase in tax will reduce inequality on income distribution. This means that when

factors such as individuals' ability to pay, tax rate, and tax audit are taken into account in the taxation process, it is clear that the tax burden will positively affect the equality on income distribution (Yüce, 2002). It has been revealed that the FKC approach is not valid for Türkiye with the method applied in the selected period. In this context, it is expected that the reforms that policy makers will implement in the financial sector will have a positive effect on income distribution, financial and social development.

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