Impact of Indirect Taxes on Income Distribution

Dolaylı Vergilerin Gelir Dağılımı Üzerindeki Etkisi

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ÖZ

Ülkelerin makroekonomik amaçları incelendiğinde bu amaçlar ekonomik büyüme ve kalkınma, ekonomik istikrar, ödemeler bilançosu dengesi, gelir dağılımında adalet ve kaynak tahsisinde etkinliğin sağlanmasından oluşmaktadır. Bu amaçlardan ekonomik büyüme ve kalkınmanın sağlanmasında gelişmiş ülkeler genellikle belirli bir oranda ekonomik büyümenin sağlanmasına öncelik verirken gelişmekte olan ülkelerin önceliği ise belirli bir kalkınmışlık düzeyine ulaşabilmektedir. Ekonomik büyüme ve kalkınmanın sağlanması en önemli öncelik gibi görülse de tek başına bu amaca ulaşılması ekonomik anlamda başarılı olunduğu anlamına gelmemektedir. Büyümenin yanı sıra büyüyen ekonomiden tüm topluma adil bir payın verilmesi ekonomik refahı artıracak, toplumsal kalkınmaya katkıda bulunacak, sosyal barışa olumlu etki yapacak ve ekonomik büyümenin hızlanmasına neden olacaktır. Ancak, piyasanın kendi haline bırakılması durumunda ekonomik büyüme sonucunda elde edilen gelir toplum arasında adaletsiz bir şekilde paylaşılması olası bir durumdur. Bu nedenle devletin piyasaya müdahalede bulunarak geliri olması gerektiği gibi paylaştırması görüşü literatürde oldukça savunulan bir konudur.

Devlet geliri piyasadaki ekonomik aktörler arasında paylaştırırken hiç şüphesiz ki belirli araçlara ihtiyaç duymaktadır. Bu araçlar kamu harcamaları, vergiler ve borçlanmadan oluşmaktadır. Vergiler açısında durum incelendiğinde, gelirin yeniden dağılımında gelir vergisi ve kurumlar vergisi gibi dolaysız vergilerin daha etkin olduğu söylenebilir. Diğer taraftan, katma değer vergisi ve özel tüketim vergisi gibi dolaylı vergilerin ise sahip oldukları tersine artan oranlılık özelliği nedeniyle gelir dağılımını olumsuz etkileyeceği tahmin edilmektedir. Bu çalışmada dolaylı vergilerin gelir dağılımı üzerindeki etkisi Türkiye ekonomisi özelinde incelenmiştir. Çalışma sonucunda, incelenen 1990-2017 döneminde dolaylı vergilerin gelir dağılımını negatif etkilediği ampirik olarak tespit edilmiştir. Bu durum uygulama sonuçlarının teorik beklentilerle uyumlu olduğunu göstermektedir.

ANAHTAR KELİMELER
Vergilendirme, Gelir Dağılımı, Gecikmesi Dağıtılmış Otoregresif Sınır Testi (ARDL).

ABSTRACT

When the macroeconomic objectives of the countries are analysed, these aims include economic growth and development, economic stability, balance of payments, fair income distribution and resource allocative efficiency. Among these objectives, while developing countries generally give priority to economic growth at a certain rate, the priority of developing countries is to reach a certain level of development. Although economic growth and development are the most important priority, achieving this aim alone does not mean that it is economically successful. In addition to growth, giving a common share from the growing economy to the whole society increases economic prosperity, contributes to social development, positively affects social peace and causes acceleration of economic growth. However, if the market is left to itself, it is possible that the income generated as a result of economic growth will be un equally shared among the society. For this reason, the idea that the government intervenes in the market and allocates the income as it should be being a highly defended subject in the literature.

There is no doubt that the state needs certain instruments when allocating income among economic actors in the market. These instruments consist of public expenditures, taxes and debt. When the situation is examined in terms of taxes, it can be said that direct taxes such as income tax and corporate tax are more effective in the redistribution of income-wealth. On the other hand, indirect taxes such as value added tax and special consumption tax are estimated to negatively affect income distribution due to the contrary progressivity. In this study, the effect of indirect taxes on income distribution has been examined in Turkish economy. As a result of the study, it was determined empirically that indirect taxes negatively affect the income distribution in the analysed period of 1990-2017. This shows that implementation results are in line with theoretical expectations. This shows that, application results and theoretical expectations are adaptive.

KEYWORDS
Taxation, Income Distribution, Autoregressive Distributed Lag (ARDL).

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INTRODUCTION

When public revenues, one of the fiscal policy instruments, are taken into consideration, the biggest share in these revenues is undoubtedly composed of taxes. In this context, while economic instruments are classified, taxes represent a public revenue in the strict sense. The impact of taxes on the economy, which represents the most important item of public revenues, is different according to the type of taxes. Therefore, the classification of taxes is very important.

Tax refers to the funds transferred from the private sector to the public sector based on the public power of the government. Taxes can be classified as income-expenditure-wealth taxes in terms of the source of tax, direct-indirect according to the relationship with income, specific-ad valorem in terms of tax object, subjective-objective in terms of tax assessment, progressive-proportional-regressive rate in terms of tax rates (Pınar, 2006: 37), central administration-local administration in terms of collection, fixed-rated in terms of tariff.

Theoretically, direct taxes are collected on income and have a reducing effect on disposable income. When these personal income taxes are examined, these taxes are subjective. In this way, it is possible to lower taxation of low income people by means of institutions such as minimum living allowance and disability allowance. In addition, due to the increasing rate tariff, it is possible to have proportionately higher taxation of those with high income. This implies that personal income taxes have a regulating effect on income distribution. On the other hand, among the direct taxes, the most important tax income after personal income tax is obtained from corporate tax. Corporate tax is a flat-rate tax with objective character, unlike income tax. The impact of these taxes on income distribution depends heavily on tax shifting. If the possibility of tax shifting is low, the tax is placed on the high-income taxpayers and has a positive effect on the income distribution. Otherwise, it is possible that there will be a deterioration in income distribution if the tax is shifted in the price mechanism at a high rate. In this case, because high income earners have a low marginal propensity to consumption, the deterioration of income distribution results from the settlement of the tax on the low-income individuals.

In this study, when the indirect taxes are examined in terms of their effects on income distribution, it is expected that these taxes will theoretically negatively affect the income distribution. The reason for the expected negative impact on income distribution as a result of indirect taxes results from the reverse progression of these taxes. In this case, the average tax rate gradually decreases as a result of the increase in tax assessment. The tax rate applied is fixed, but there is an inverse proportion between the income and tax burden for individuals. In this context, it is clear that low-income individuals will have to bear the higher tax burden. Considering that the marginal propensity of consume of low-income individuals are high, indirect taxes are mostly collected from low-income people. In this case, indirect taxes are likely to affect low-income people more than high-income ones. Therefore, indirect taxes are expected to have a detrimental effect on income distribution.

1. INCOME DISTRIBUTION AND TYPES

The distribution of the total output or income, which is generated in a specific time zone in a specific country, among people in that country is defined as income distribution. Income distribution, which is very important in economic, social and political terms, can be calculated differently among individuals, production factors, various groups or regions. In this respect, the distribution of the output as a result of production activity as wage, interest, rent and profit is the *functional distribution of income*. *Regional distribution of income* refers to the share of regions in national income. This method is used to investigate the reasons for the lagging of some regions by revealing development differences between regions in the country. On the other hand, the share of agriculture, industry and service sectors from the national income is divided as *sectoral distribution of income*. The method used to compare the level of development of countries in the international arena is the *personal distribution of income*.

Another issue to be considered when examining the types of income distribution is how this income is distributed as a result of market activities. Income generated as a result of production activity in the market spontaneously distributes among economic actors without any public intervention at the beginning. This represents the *primary income distribution*. This spontaneous income distribution in the market is usually not fair due to institutional factors or market failures. This situation affects the market negatively in social, political and economic terms. Macroeconomic objectives such as economic growth and development are affected negatively, and the government intervenes in the market through various means. The redistribution of income among actors as a result of government intervention in the market is defined as *secondary income distribution*.

2. METHODS FOR MEASURING INCOME DISTRIBUTION

While achieving a fair income distribution is an important economic policy objective, the method of measuring the income distribution is very important. Therefore, various methods for measuring income distribution have been developed in the literature. In this context, the most common method for measuring income distribution is the Lorenz Curve that was developed by Max Lorenz in 1905. The Lorenz curve is used to measure the distribution of income between populations. For this purpose, it shows the share of a certain percentage of the population from income as a percentage. The Lorenz curve shows the cumulative percentages of income on the vertical axis and the cumulative percentages of the population on the horizontal axis. The 45-degree line between these two axes implies that the income is equally divided between the population and is called line of perfect equality. At all points on this line, the percentage of the population and the percentage of income are equal, and everyone receives the same share of the income. However, it is not possible to share all income equally among the society. In this case, the Lorenz curve comes into play and is drawn towards the horizontal axis from the point where the population is zero percent to the point where it is hundred percent. This shows the existing income distribution and represents the share of a certain percentage of the population in income. If income inequality decreases, the Lorenz curve will move away from the horizontal axis, and if income inequality increases, it will converge to the horizontal axis.

The most commonly used method for grading and mathematically expressing justice in income distribution is the Gini coefficient. The coefficient was found by Italian statistician Corrado Gini. Gini coefficient is ratio of area between Lorenz curve and line of perfect equality to the entire area below the line of perfect equality and it takes a value between 1 and 0. Approaching one of these areas means that income inequality increases, approaching to zero means that income inequality decreases, being one means income is completely unequally distributed, and being zero means income is shared equally between the population. However, although it is possible in theory that the Gini coefficient is exactly one or zero, it expresses a utopian situation.

On the other hand, the need to introduce value judgements explicitly in the measurement of inequality was stressed by Atkinson (1970) in the important paper introducing his eponymous measure (Creedy, 2019: 2). This is the most popular welfare-based measure of inequality. It presents the percentage of total income that a given society would have to forego in order to have more equal shares of income between its citizens. This measure depends on the degree of society aversion to inequality (a theoretical parameter decided by the researcher), where a higher value entails greater social utility or willingness by individuals to accept smaller incomes in exchange for a more equal distribution. An important feature of the Atkinson index is that it can be decomposed into withinand between-group inequality. Moreover, unlike other indices, it can provide welfare implications of alternative policies and allows the researcher to include some normative content to the analysis (Bellu and Liberati, 2006).

Kuznets (1955) investigated income inequality in the economic growth process by using the income distribution change data in the USA, England and Germany. Firstly, he found that after the First World War there was a sharp decrease in income inequality in the United States and Britain, and at the same time significant income growth in both countries. Then, he combined his observations about America and England with the historical transition from agriculture to industry in the process of economic development and examined the direction of the change in income distribution. According to the results; income inequality follows an inverted U-trend against the GDP per capita taken as an indicator of economic growth. Kuznets argues that inequality increases in the initial terms of development and decreases after a threshold value. According to Kuznets, the income of the individuals in the agricultural sector is lower than the industrial income but more equal. This shows that the transition to the industrial sector increases the income of individuals and increases the income inequality (Topuz and Dağdemir, 2016: 118). These are the methods to measure income distribution in generally.

3. LITERATURE

Fair income distribution is one of the most important macroeconomic objectives of governments. Income distribution is affected by many economic and social factors. In theory, the effect of taxes on income distribution is expected to be different according to tax types. In this context, direct taxes are expected to have a positive effect on income distribution, while indirect taxes are expected to affect income distribution negatively. Therefore, the effect of taxes on income distribution has increased its importance in recent years. The literature on this subject has been examined mainly with recent studies.

Baldemir, Çakmak and Avcı (2003) analyzed empirically the distribution of VAT rates according to income groups. As a result, they proposed that VAT rates should be determined according to the income levels of the people instead of single rate VAT in order to improve the income distribution.

Prasad (2008) compared the effect of taxes and public expenditures on income inequality between 6 Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Peru) and OECD countries with panel data method. According to the results of the study, direct taxes decreased Gini coefficient by 0.6% and indirect taxes increased by 0.5%.

Albayrak (2011) examined the effects of indirect tax policies on income distribution in Turkey in comparison with the growth year of 2004. The results of the study showed that both the Value Added Tax (VAT) and Special Consumption Tax (SCT) disrupted the income distribution in 2009 compared to 2004. In addition, it was found that the VAT and SCT reductions made to stimulate demand in 2009 created a distribution in favor of higher income groups.

Martinez, Vuloviç and Dodson (2012) examined the effects of tax and public expenditure policies on income distribution by using panel data method. In their studies, they used the data of 150 countries for the period of 1970-2009. According to the results of the study, progressive personal income taxes have a positive effect on income distribution. Corporate tax has a positive effect on income distribution as well as personal income tax. On the other hand, general consumption taxes and customs duties have negative effects on income distribution.

Bilgiç (2015), analysed the effects of taxation policies on income distribution by using the least squares method with 1990-2013 data for Turkey. Gini coefficient was used as independent variable and the share of indirect and indirect taxes in GDP was used as dependent variables. According to the results of the analysis, the coefficient of indirect taxes is statistically insignificant.

Drucker, Krill and Geva (2017), examined the effect of taxes on income inequality and economic growth between 1975-2011 in 25 OECD countries by using panel data analysis. At the end of the study, they determined that consumption taxes increased both income inequality and economic growth. (1530-4205-1-PB (1))

Oboh and Eromonsele (2018), examined the effect of taxation on income distribution in Nigeria during 1980-2014 by using the error correction model. As a result of the study, they found that indirect taxes increase income inequality

Demirgil (2018), analysed the relationship between tax and income distribution with Autoregressive Distributed Lag Bound Test (ARDL) using Turkey's 1980-2014 annual data. As a result of the analysis, cointegration relationship was found between the series. A 1% increase in indirect tax rate increases Gini coefficient by 0.10% and a 1% increase in direct tax rate decreases Gini coefficient by 0.05%.

4. DATA AND METHODOLOGY

In this study, data for the period between 1990-2017 were used to measure the effects of indirect taxes on income distribution in Turkey. ID represents Gini coefficient, IT represents indirect taxes, and basically two variables are used. Income distribution are considered as dependent and indirect taxes as independent variables. The data of Gini Coefficient for 1980-2005 period are taken from Dumlu and Aydın's article titled "*Estimation of Gini Coefficient by Econometric Models for Turkey for the Year 2006*", for 2006-2017 are taken from Income and "*Living Conditions Survey of Turkey Statistical Institution*". Data on indirect taxes were obtained from "*Central Bank of the Republic of Turkey Electronic Data Dissemination System*" and included in the study by taking the ratio to GDP.

In order to test the stationarity of the series, firstly, unit root tests were performed with Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test. Then, the causality relationship between the series was examined by using Autoregressive Distributed Lag (ARDL) Bounds Test.

4.1. Unit Root Tests

For a series to be stationary, the expected value, variance and covariance of the series must be independent from time. This means that the series fluctuates around the expected value and frequently interrupts the expected value line.

If a series is stationary, the shocks occurring in previous periods are not permanent and are not transferred to the next period. However, if the series has a unit root, it is possible to find a false regression problem in the analysis with these series. Therefore, unit root test of the series must be performed firstly.

Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests were performed to determine the stationarity of ID and IT series. In addition to the ADF unit root test, which is frequently used in empirical studies, the PP test is also performed because the PP test is considered stronger than the ADF in the analysis of the stability of trendy series. The results are given in the Table 1.

Table 1. Unit Root Test Results

Series	ADF Unit Root Test	PP Unit Root Test
IT	-0.875 (0) [0.944]	-0.788 (3) [0.954]
ID	-4.483 (0) [0.007]	-4.481 (1) [0.007]
D(IT)	-5.633 (0) [0.000]	-5.664 (3) [0.000]
Critical Values	%1: -4.33 %5: -3.58 %10:-3.22	%1: -4.35 %5: -3.59 %10: -3.23

Note: The values in parentheses in the ADF test indicate the appropriate lag lengths determined according to SIC. In the PP test, the values in brackets represent the Bandwith values, reflecting the appropriate lag lengths determined according to Newey-West.

According to the results of ADF and PP unit root test, "τ" statistic for ID in the constant and trend model is lower than the critical values. The hypothesis H_0, which states that the series has unit root, was rejected for this series. This means that the ID series is stationary at the level value. When the ADF and PP tests for IT are evaluated, the calculated "τ" statistic is greater than the critical values. In this case, H_0 hypothesis could not be rejected for IT series and it was found that this series is not stationary at the level value. On the other hand, IT series is stationary when the first difference is taken. In other words, it is determined that the ID series is *I(0)* and the IT series is *I(1)*.

4.2. Empirical Findings

Various cointegration tests are applied to examine the long-term relationship between variables. In classical cointegration tests, variables have to be stationary to the same degree (Esen, Yıldırım and Kostakoğlu, 2012: 256). The ARDL test is an effective method to predict short- and long-term relationships. Because this method can be used in studies with limited number of observations and variables need not be equally stable as in the cointegration tests of Johansen-Juselius (1990) and Engle-Granger (1987). The ARDL method was first proposed by Pesaran, Shin and Smith (1996) and allows testing the relationship between variables that are different degrees of stationary. This approach developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001) has become frequently used in cointegration analyzes. By the means of ARDL method, it has become possible to include variables that are stationary at different degrees into the analysis. The ARDL method can be performed without any unit root testing. However, there are no appropriate critical value of table if the variables are stationary in the second difference. Therefore, unit root tests are performed to prove that the variables in the analysis are not *I(2)* (Pata, Yurtkuran and Kalça, 2016: 266).

The series used in this study are stationary in different degrees. For this reason, cointegration between variables was tried to be determined by using ARDL method. If there is cointegration between the variables, long and short term information can be easily estimated by this method. As a result of the unit root tests, it was found that the variables were not stationary to the same degree.

After examining the unit root test results of the series, the boundary test was used to test the long-term cointegration relationship between the series. The equation used in the model for the boundary test is as follows;

$$\Delta ID_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta ID_{t-i} + \sum_{i=0}^{m} \alpha_{2i} \Delta IT_{t-i} + \alpha_3 IT_{t-1} + e_t \qquad (1)$$

Boundary test was performed to investigate the cointegration relationship between the series and the results are shown in Table 2.

Table 2. Boundary Test Results

K	F statistics	Limit Values (%5)	
1	4.97	3.62	4.16

Note: "k" is the quantity of independent value. Critical values were obtained from Table CI (iii) in Pesaran, Shin and Smith (2001: 300).

F statistics are used to determine cointegration of series. In order for a cointegration to exist, the calculated "F" statistic must be greater than the upper limit value. Otherwise, if the calculated F statistic is less than the lower limit value, there is no cointegration between the series. In case the obtained value is between the limit values, it is not possible to comment on cointegration. When the results of the boundary test in Table 2 are examined, the calculated F statistics is 4.97 and exceeds the upper limit of 4.16. In this case, there is a cointegration relationship between the series.

After determining that the variables move together in the long run, the parameters of this long run relationship should be estimated. Long term ARDL model was established as follows:

$$ID_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} ID_{t-i} + \sum_{i=0}^{m} \alpha_{2i} IT_{t-i} + e_t \qquad (2)$$

Long-term ARDL (3, 2) model was estimated according to equation (2) and the results were given in Table 3.

Table 3. ARDL (3, 2) Long Term Results

	Coefficient	Std. Error	t-Statistic	Prob.
IT	0.347597	0.148089	2.347223	0.0306
C	44.02054	1.606028	27.40958	0.0000
Diagnostic Tests				
$R^2 = 0.84$		$X^2_{BG} = 0,237$ (0.91)		
Adj.$R^2 = 0.79$		$X^2_{ARCH} = 1,71$ (0.20)		
F = 16,98 (0,00)		$X^2_{JB} = 1,54$ (0.46)		
DW = 1,84		$X^2_{R} = 0,02$ (0.87)		

Note: X^2_{BG} refers to Breusch-Godfrey autocorrelation, X^2_{ARCH} → ARCH heteroskedasticity, X^2_{JB} → Jarque-Bera normality and X^2_{R} → Ramsey Reset. Values in parentheses indicate probability values.

According to the long-term coefficients in Table 1, the results are significant. Accordingly, the increases in indirect taxes affect the Gini Coefficient negatively. CUSUM and CUSUMQ graphics were used to check the model.

Figure 1. CUSUM and CUSUMQ Graphics
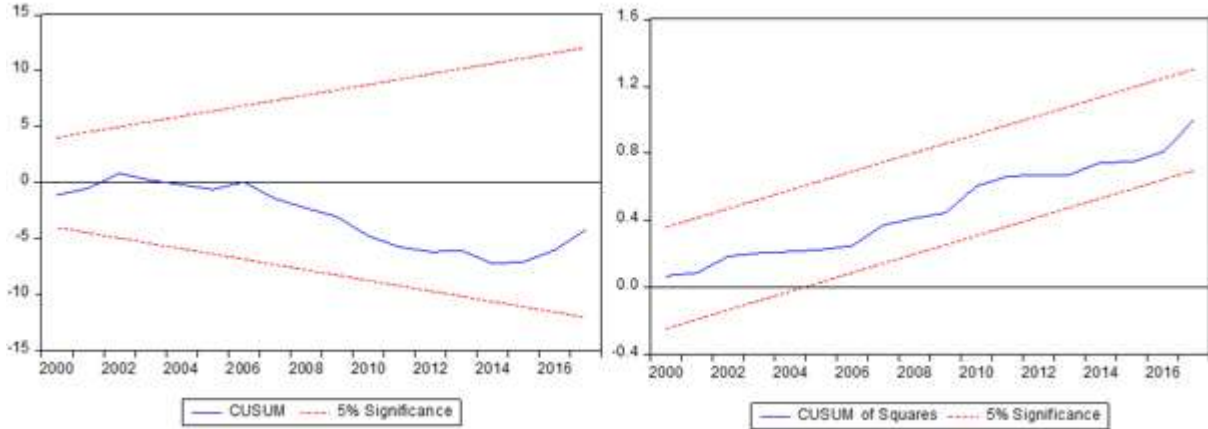
The CUSUM and CUSUMSQ statistics for the long-term model are within critical limits at 5% significance level. It shows that the coefficients in the ARDL model are stable. Accordingly, it is seen that the graph of the model is within the confidence intervals and it is a problem free model.

After evaluating the long-term results, the persistence of short-term shocks must be tested. For this purpose, the following model was established in order to test the long-term conditions of short-term deviations:

$$\Delta ID_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} ID_{t-i} + \sum_{i=0}^{m} \alpha_{2i} IT_{t-i} + \beta ECM_{t-i} e_t \qquad (3)$$

Table 4. Short Term Results

	Coefficient	Std. Error	t-Statistic	Prob.
D(ID(-1))	-0.556676	0.158911	-3.503063	0.0025
D(ID(-2))	-0.445349	0.164900	-2.700722	0.0146
D(IT)	0.358846	0.179567	1.998392	0.0610
D(IT(-1))	0.472023	0.201710	2.340112	0.0310
ECT(-1)	-0.425858	0.104606	-4.071064	0.0007

ARDL error correction model was used to examine the short term relationship between variables. The error correction term is expressed by the ECT. The ECT is used to determine the long-term equilibrium of deviations in the short term. Accordingly, the negative value of the term error correction means that the short term deviations disappear in the long term. Otherwise, if the error correction term has a positive value, short-term deviations are increasingly distancing from the equilibrium in the long-term. According to the short-term results given in Table 1, it is seen that the error correction term is negative and statistically significant. This means that short term deviations are balanced in the long term. These results are consistent with economic theory and expectations. In summary of the study, cointegration relationship was found between the series and it was found that indirect taxes had a negative effect on income distribution.

CONCLUSION

Fair income distribution is one of the most important objectives of fiscal policy. For the developing Turkey's economy, a balanced and stable economic growth and development as well as fair sharing of this growth are the social aims of the state. In this respect, taxes are used as an important tool in ensuring fair distribution of income. In the context of tax policies, it is predicted that the income distribution will be affected negatively if the share of indirect taxes in tax revenues is high. In this respect, it is possible to say that indirect taxes disrupt income justice. When the tax policies of the Turkey economy are evaluated, as a result of liberalization the share of indirect taxes in the taxes has increased gradually in Turkey since 1980s. Since the propensity to consume is high, indirect taxes are often a burden on low-income people. Therefore, it is estimated that these taxes on expenditure disrupt the income distribution in Turkey. According to the results of the study, indirect taxes increase the Gini coefficient. In other words, it is concluded that the income distribution has deteriorated because of increasing in indirect taxes. This situation is consistent with the theoretical expectations.

The results of the study showed concordance with the studies of Prasad (2008), Albayrak (2011), Martinez, Vuloviç and Dodson (2012), Drucker, Krill and Geva (2017), Demirgil, (2018) and Oboh and Eromonsele (2018),

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