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INTERACTION OF INDIRECT TAXES AND INFLATION: THE CASE OF TURKEY

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Abstract. Inflation is an undesirable situation for a country's economy due to the negative effects it causes. Therefore, it has been the subject of numerous empirical studies. Many of these studies focus on the interaction between inflation and indirect tax revenues, and it presents arguments that there is a strong interaction between the variables discussed. The main feature that distinguishes our study from others is that it talks about how the economic policies implemented in the Presidential Government System, which was passed as of 09 July 2018, affect the aforesaid interaction. In this study, which aims to reveal the interaction between indirect tax revenues and inflation, indirect tax revenues and inflation data in Turkey for the period 2004:1-2021:8 are analyzed with Vector Auto Regressive (VAR) on a monthly basis. As a result of the analysis, a statistically significant and important interaction was detected between the two parameters. In addition, findings regarding the existence of a one-way causality relationship from inflation to tax revenues were obtained.

Keywords: Tax Policy, Indirect Taxes, Inflation, VAR Analysis, Turkey.

JEL Classification: E31, E62, H71.

Introduction

As known, inflation is a continuous increase occurring in general level of prices. Due to negativities it leads to, inflation is an economic instability. In the short run, inflation can disturb the effectiveness of resources a country has and cause injustice in distribution. In the long run, due to resource distribution disturbed, impeding formation of stable economic growth, it interrupts economic activity.

Inflation is a critical phenomenon having a critical importance in the sense of installing stability. To express differently, although there is no excessive fluctuation in general level of prices and full employment [rates], and they range in a reasonable level. It can be defined as the fact that countries can realize a growth in compatible with their potential growth rates and that they have not high current deficit (Tepekule, 2016).

In fact, inflation is not anything other than supply–demand unbalance. This instability negatively influences economies with the implications it will lead to. Especially economic agents can move away from optimality with the decisions they make due to inflationist process. From this aspect, the most important negativity of inflation is that economic decision – units (decision makers) make the decisions they make awry. That is, in an environment where general level of prices is continuously increasing, economic decision makers move through the slogan "store and gain". In an economy in which prices are continuously changing, it is possible to expect that both producers and consumers buy today and gain further. Thus, in the sense of all economy, the amounts of demand and supply will move away from the equilibrium.

As known, there are many elements determining the prices of goods taking place in inflation basket. The inputs used for production of goods, transportation costs and taxes can be exemplified in this scope. From this point of view, for eliminating the existing inflation in a country economy, it is extremely important to know from which elements increase in prices arise.

The phenomenon inflation, which has begun to gain importance after Second World War, is a leading issue

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that is necessary to be considered in terms of especially developing countries. Another issue that is considered in terms of developing countries is that the incomes obtained from expenditures occupy an important place in volume in total tax incomes. When taken into consideration that inflation means that total level of demand overtakes total level of supply, the following question can come into mind: In the developing countries, where consumption tendency is high, how do the taxes levied from expenditures interact with inflation?

In our country, which is among the developing countries, the expenditure tax occupies important place in volume in total tax incomes. As known, our country struggle with inflationist instability that becomes chronic for very long times. Unavoidably, as mentioned above, the question whether or not there is a relationship between inflationist instability experienced in our country and expenditure tax comes into mind. Due to the importance it has, the interaction of inflation and expenditure tax was selected as study subject.

In historical process, although inflation course in Turkey follows a bumpy trend, inflation made itself felt deeply in 1970s (Aydoğan, 2004). Especially, that energy crises erupt became the most scrutinized subject of inflation either academic or administrative point of view. When reached 1980s, the issue inflation has any longer become a bitter social problem of all country.

For preventing the course at full speed in inflation, January 24, 1980 stability program was signed with IMF. According to this, inflation rate that was 107.3% in 1980 was targeted to lower to 36.7% in 1981 and 26.8% in 1982, step by step. With neoliberal policies applied in the same period, inflation accelerated toward the late 80s. In spite of tight monetary policy tried to be applied with stability policy at January 24, 1980 the increase in monetary supply continued, and that public deficits were financed by means Central Bank of Republic of Turkey [CBRT] led inflation to reaccelerate in 1990s (Aydoğan, 2004).

In 1990s, political stability in Turkey began to break down and, in view of this, inflation rates began to very rapidly increase. This case led foreign capital to go out from the country (Şahin, 1995). Disturbance of the expectations of economic decision makers injured reliability to Turkish Lira and demand of foreign currency increased due to a possible devaluation. The increasing demand of foreign currency became irremovable by CBRT and, as a result, Turkey lost the status of investable country.

The year 1994 was the year when inflation peaked. High interest rates and domestic debt crisis experienced in 1994 are among the main factors of inflation rise. For preventing this bad course, a new stability program was put into operation on the date of April 5, 1994 (Özatay, 2009).

Inflation rate that peaked in 1994, together with booming in economy, which occurred in the second half of 1994, began to fall; however, in the late 1990s, optimistic air blowing in economy disappeared (Torun & Karanfil, 2016). For Turkey economy, years of crisis have any longer begun. As of the year 2000, inflation rates began to rise again due to the increasing interests and domestic debt stock. In 2002, via Transition to Strong Economy Program, central bank used short term interest rates, which aims to provide price stability and is an instrument, for achieving inflation target. In the years of 2003 and 2004, depending on inflation targeting, inflation rates any longer followed a fixed and fluctuated course (Eğilmez, 2020). Implicit inflation targeting, adopted in the period 2002–2005, played an effective role in this period.

On the other hand, in 2005, six zero was removed from Turkish Lira, and New Turkish Lira was passed. Due to this, inflation did not both rise and prestige of money rose. In 2006, instead of implicit inflation targeting program, applied as of 2002, open inflation targeting was passed (Ministry of Treasury and Finance, 2007, 2008).

Beginning from 2006, together with open inflation targeting, although inflation was controlled with contractionary monetary policy that have been applied, the increases in the energy and food prices, which occurred in international area, limited the effectivity of monetary policies. On the other hand, in 2007, as a result of increase of both public expenditures and consumption taxes, inflation rate actualized as 8.8% (CBRT, 2006).

In the first half of the year 2008, the increase in both domestic and foreign energy and food prices led inflation to rise (Türk Sanayicileri ve İşadamları, 2009). Depending on global financial crisis that emerged as of the middle 2008, a recession was experienced in the world economy. Therefore, the rate of increase in energy and food prices fell. This fall in the prices caused rate of increase in inflation to decrease (Ministry of Treasury and Finance, 2010).

In this direction, global financial crisis that continued to influence Turkey economy in 2009 as well, leading prices to fall, reduced Consumer Price Index (CPI) in 2009 in the rate of 6.3% compared to the previous year (CBRT, 2009).

In 2010, due to rise in oil prices, CPI increased by varying in the rate of 8.6% compared to the previous year (CBRT, 2010). In return to this, in 2011, CPI, showing fall tendency, varied in the rate of 6.5% compared to the previous year (Müstakil Sanayici ve İşadamları Derneği, 2012). On the other hand, as a result of increase in the general level of prices in 2012, CPI increased in the rate of 8.9%, varying compared to the previous year (CBRT, 2012).

In 2013, in the course of consumption prices, the group of unprocessed food and energy prices was effective over the year. In the first half of the year, inflation remained over the value targeted. In the second half of the year, due to uncertainty experienced at global level associated with monetary policies, capital flows remained weak. Therefore, Turkish Lira was devaluated. Especially,

via main group of goods, core inflation rose and CPI became 7.49% at the end of the year (CBRT, 2013).

Beginning from May 2013, CPI that was in the tendency of rise in the first half of 2014 began to decrease in the second half of the year and, as of yearend, actualized in the rate of 8.85% (CBRT, 2014). In 2015, especially oil, the fall observed in the import prices over the year limited the rise in inflation (CBRT, 2015). Thus, at the yearend, CPI and WPI actualized as 7.67% and 8.63%, respectively. On the other hand, in 2016, CPI and WPI varied in the rates of 7.78% and 5.67% respectively, compared to the previous year.

As of 2017 yearend, inflation rate actualized at the end of 11.92%. In the formation of inflation over uncertainty range of around the target determined, value loss in TL, increase in unprocessed food prices, and tax regulations made in 2017 were effective (CBRT, 2017).

The year 2018 was a period, when important shocks were experienced. In the first period of 9 months of the year, GDP increased in the rate of 4.5% compared to the previous year. Depending on revaluation of TL and fall in demand, inflation regressed and actualized at the level of 20.30% (CBRT, 2018).

Economic activity that slowed down beginning from the second half of 2018 left its place to the tendency of recovery with the actions taken and policies applied beginning from the first quarter of 2019. Consumer inflation, largely regressing compared to the previous year, actualized at the level of 11.8% as of yearend. In the first half of the year, while policy interest was kept constant, considering improvement in inflation, beginning from July, policy interest was reduced a total of 12 points (CBRT, 2019).

Consumer inflation completed the year 2020 with 14.6%. There is a large contribution of the elements of demand and cost. In this period, arising from in domestic demand conditions, especially exchange rate, cumulative cost effects, increase in prices of international food the other products and rise in inflation, consumer inflation followed a higher course than estimated. In addition to producer prices, devalued TL and upward course in product prices, as a result of resistant demand conditions and supply limitations that became evident in some industry, [inflation] rose fast and, thus, cost pressure on consumer inflation became strong (CBRT, 2020).

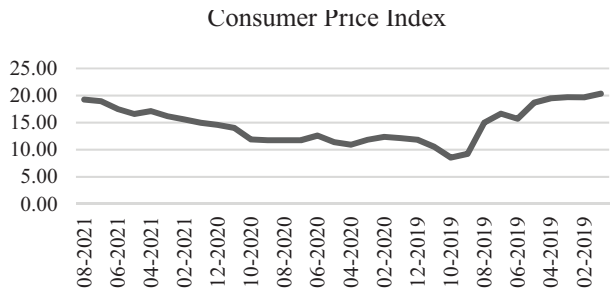

Figure 1. The course of CPI in Turkey (01.2019-08.2021) (source: Turkish Statistical Institute, 2021)

In the direction of explanations given above, the course of CPI that actualized in the period of January 2019 – August 2021 in our country is shown in Figure 1. As known, open inflation targeting was applied in our country until 2010 and, in post-2010 period, application of interest corridor, which consists of combination of open and implicit inflation targeting, was used.

Interest corridor is a difference between overnight lending and borrowing rate of Central Bank of Republic of Turkey and, CBRT, changing lending and borrowing interests, aims to control monetary supply (Bernhardsen & Kloster, 2010).

Consumer inflation that achieved single digit numbers in September and October 2019 (9.26 and 8.55), toward the late 2019, increased with the effect of lower basis and completed the year 2019 with 11.84% (CBRT, 2019).

The year 2020 followed a fluctuated course due to global pandemic experienced all over the world. Especially, precautions taken in quarantine scope led to an unstable appearance in consumer inflation.

In the year 2021, increases in international commodity prices as well as the elements of demand and cost, high levels in inflation expectations, and supply decrease seen in some sectors also led inflation indicators to range higher (CBRT, 2021). Therefore, CBRT, using the instrument of policy interest rate, went toward monetary tightening.

To explain historical development in tax income, the period 1995–1999 became the years in which political stability could not be provided in terms of political powers. Between these years, that four governments took charge in prevented making decision mechanism from functioning effectively and, consequently, caused many problems to emerge (Sugözü, 2008). Double digit inflation, economic shrinkage, dollarization, 1997 Asian Crisis and 1999 Earthquake became developments stamping this period.

With No.4369 law, which came into by being published in Official Journal dated July 29, 1998, important arrangements were made in public finance, in order to reduce informality and provide tax compliance.

The main reason for the increase in the general level of prices in 2000s is the deficits in public finance. As a result, borrowing form Central Bank increased inflation rates. In order to be able to take support from IMF and World Bank and reduce inflation, decision was made to apply disinflation program. In this direction, it was tried to provide reducing public expenditures and increasing tax incomes (Kurtoğlu, 2014).

In 2002, Special Consumption Tax (SCT) came into force, in 2004, Special Communication Tax and Tax on Games of Chance. With the new taxes of interest, the share of indirect taxes in total taxes rose (Cural & Çevik, 2015). As seen in Table 1, in the period of 2008–2013, the share of indirect taxes in total taxes gradually rises. Even if some fluctuations occurred, in the period from 2013 to 2020, percentage share of taxes was always bigger than that of indirect taxes.

Table 1. Percentage Share of Direct and Indirect Taxes in Total Tax Incomes source: compiled from the Statistics in the 2006, 2007, 2009 and 2021 reports of the Ministry of Treasury and Finance)

Year	Total Tax Incomes	Indirect Tax Incomes (%)	Direct Tax Incomes (%)
2003	100	67.0	33.0
2004	100	68.9	31.1
2005	100	69.4	30.6
2006	100	68.5	31.5
2007	100	66.1	33.9
2008	100	64.9	35.1
2009	100	64.5	35.5
2010	100	68.4	31.6
2011	100	67.7	32.3
2012	100	66.8	33.2
2013	100	67.9	32.1
2014	100	66.5	33.5
2015	100	67.1	32.9
2016	100	67.6	32.4
2017	100	67.0	33.0
2018	100	62.8	37.2
2019	100	61.8	38.2
2020	100	65.3	34.7

1. Literature review

Some part of empirical studies, for example Koutsouvelis and Papastathopoulos (2013), introduced about interaction of taxation and inflation focuses on the effects on tax applications, which is an unit of fiscal policy, continuous increases in general level of prices. Some studies, for example Güvenek, et al. (2010), analyses the effect tax policies reveal in inflation. Some studies in the literature scrutinize interaction continuous increase in general level of prices with direct/indirect taxes.

Karadağ and Westaway (1999) analyzed inflation- indirect tax interaction in Turkey by means of Structural Equality Model. In the study, it is introduced that an increase to be made in the rate of Value Added Tax (VAT) in Turkey will reflect on consumer prices in the same direction, and that it will lead to decrease in total demand.

Güvenek et al. (2010) scrutinized the interaction between inflation and indirect taxes by means of VAR model for the period 1980-2008 in Turkey and obtained strong findings regarding that there is a mutual relationship between inflation and indirect taxes.

Arısoy and Ünlükaplan (2011) analyzed the relationship between VAT, public expenditures and inflation by means of VAR model in Turkey for the period 1994:1-2000:6. As a result of the study, there was a mutual relationship between VAT incomes and public expenditures, and, additionally, that VAT had a strong effect on both public expenditures and inflation.

Koutsouvelis and Papastathopoulos (2013), in Greek economy for the period 2000–2011, analyzed the interaction of indirect taxes and inflation by means of a simple regression model and concluded that the increase in the rates of indirect taxes increased inflation.

Moździerz (2017), for the period 2007–2016, in the study they carried out on some European Union (EU) countries, obtained findings regarding that there was mutual interaction between inflation and indirect taxes. The findings of interest express that increase in indirect taxes affected general level of prices and that it also increased inflation. In addition, the study of interest reveals that the increase occurring in the prices also increased tax assessment.

Akıncı and Özçelik (2018) analyzed the effect of indirect taxes on inflation by means of ARDL analysis for the period 2006:Ml-2018:M5. The findings obtained show that there was a long term co-integration between indirect taxes and inflation.

Çakmaklı et all. (2018), in the study they analyzed the relationship between indirect taxes, levied through tobacco products, and inflation in Turkey for the period 2005–2017, concluded that an increase in indirect taxes applied to tobacco products increased inflation.

Akduğan (2020), in his study, using monthly data in Turkey for the period 2004–2019, examined the interaction between inflation and indirect taxes by being based Granger and Yamamoto causality relationship and VAR model. According to the findings obtained, while there was no causality between indirect taxes and producer price index (PPE), there was unidirectional causality from CPI to indirect tax incomes. On the other hand, according to the result of ARDL bound test, there is a long term relationship between CPI and indirect taxes.

2. Econometric analysis

Taxes can be nominally collected without discriminating between the real and fully inflationist components of the items forming taxable income. This case changes the effect of inflation on direct taxes and leading to some erroneous calculations in the collection and analysis process of tax incomes, causes unreal analyses. However, in economic conjuncture, the effect of direct and indirect taxes on inflation also brings the discussions about how long policies will be effective with it (Jenkins & Lahouel, 1981).

When considering the structure of indirect taxes from expenditures and reflection of the tax, an increase general level of prices will nominally increase the incomes of indirect tax as well (Akduğan, 2020). In other words, the effect of interest of the continuous increase of general level of prices can lead to erroneous determination the direction and resource of interaction between inflation and indirect taxes.

2.1. Dataset and methodology

In this study, in which interaction of inflation and direct tax is studied, the monthly data of the period 2003:01–2021:8 were utilized. As inflation data, while

using Consumer Prices Index (CPI) published by Turkey Statistics Institute, percentage equivalence of indirect tax incomes, utilizing budgetary statistics published by Ministry of Treasury and Finance, was formed by the definition of indirect tax, which is accepted in the methodology used by European Commission.

According to the relevant definition, indirect taxes are the consumption taxes collected from VAT expenditures, manufacturing and import taxes, and other product taxes (European Commission, 2016).

Table 2. Data Information used in the analysis

Data	Data Indication	Data Resource
Consumer Price Index	CPI	Turkey Statistics Institute
Indirect Tax Income	ITI	Ministry of Treasure and Finance

The data belonging to the variables of interest, first of all, are subjected to test in terms of whether or not to have unit root; lagging lengths were identified, it was scrutinized whether or not there are autocorrelation and varying variance and, finally, cause-effect functions of VAR model were formed.

2.2. Empirical results

2.2.1. Stationarity (unit root) test

In analysis of time series, whether or not series is stationary. Stationarity is that average and variance of a time series is fixed, and that co-variance between two values belonging to series only depends on the difference between two values. In order to be able to obtain significant relationship between parameters used in analysis, it is necessary for series to be stationary or have a homogenous structure from the same degree (Korkmaz & Uygurtürk, 2008).

In the study, [for] unit root test of time series Augmented Dickey-Fuller (ADF) (1981) and Phillips-Perron (PP) (1988) tests were used.

2.2.1.1. ADF Test

For ADF, the models, in which there are constant and trend; there is only constant and there are both constant and trend, are shown by the Eqs (1), (2) and (3), respectively (Sevüktekin & Nargeleçekenler, 2010).

$$\Delta yt = \delta yt-1 + \sum_{j=1}^{n} ai\Delta yt-j + \mu t; \quad (1)$$

$$\Delta yt = b0 + \delta yt-1 + \sum_{j=1}^{n} ai\Delta yt-j + \mu t; \quad (2)$$

$$\Delta yt = b0 + b1t + \delta yt-1 + \sum_{j=1}^{n} ai\Delta yt-j + \mu t. \quad (3)$$

In the Equations given place above: p represents lagging length; Δ, first degree difference processor; b, δ, α; coefficients of variables; $b0$, constant term and μt, error term.

t value obtained as a result of ADF test is compared with MacKinnon table values, calculated by Dickey-Fuller, and $\delta = 0$ or $\beta = 0$ is tested. Null hypothesis shows that series is not stationary, namely, that it has unit root; if (H0: $\delta = 0$ or H0: $\beta = \delta = 0$) is alternative hypothesis and (H1: $\delta \neq 0$ or H1: $\beta \neq \delta \neq 0$), that series is stationary (Göktaş, 2005).

2.2.1.2. PP Test

PP unit root test is one of the other tests used for researching whether or not series contains unit root. This test is also used for identifying the presence of higher degree series correlation in a time series (Sevüktekin & Çınar, 2017). PP test is calculated by the following Eq. (4):

$$\Delta yt = a + byt-1 + c1\Delta yt-1 + c2\,yt-1 + \ldots + cp-1\Delta yt-p-1 + \mu t, \quad (4)$$

where Δy_t denotes first degree difference of series y; a, b, c_1, c_2 , ... , c_{p-1} coefficients; t, time, p, lagging number and Ut, error term.

PP test applies a non-parametric revise to t-statistics of c coefficient for identifying a series correlation. Asymptotic distribution of PP test statistics shows similarity to ADF test. That is, if r-statistics is absolutely bigger than MacKinnon critical values, it is expressed that the relevant time series does not contain unit root (Tarı, 2010).

2.2.2. Results of unit root test

According to the results of stationarity test, it was identified that the series of Consumer Price Index and indirect tax income, examined in the frame work of "the model with constant and trend", was not stationary at the level. In order for both data to be stationary, the first differences of series were taken, and their stationarities were provided.

While stationarity analyses were made for the variables, seasonal effects in economic time series were sort out; economic crises and political instabilities were taken into consideration according to statistical significance and, on condition that the components of trend and constant in model selection are significant, they are included in the model. About lagging length, minımum lagging length, in which autocorrelation does not remain, was preferred.

According to ADF and PP stationarity test results, all parameters given in theoretical framework include I(1) unit root in the first difference. In other words, all series become stationary, when their first differences are taken. That series is stationary at the same level reports that causality can be between variables. Therefore, before causality analysis, VAR model was formed.

VAR analysis is based on causality test. The most important advantage of VAR model is that it does not bring

Table 3. Results of unit test

Tests / Variables	LEVEL		FIRST DIFFERENCE	
	ADF Test Stat.	PP Test Stat.	ADF Test Stat.	PP Test Stat.
ITI	–14.413 Prob=0.001	–1.611 Prob =0.163	–9.619 Prob =0.001*	–10.871 Prob =0.001*
CPI	–8.363 Prob =0.000	–10.633 Prob =0.000	–9.424 Prob =0.001*	–51.620 Prob =0.001*

Notes: * MacKinnon (1996) One-sided p-values, stationary variable.

Table 4. Results of Lagging Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	–483.3254	NA	0.372835	4.689135	4.721335*	4.702156
1	–474.7803	16.84254	0.356818	4.645220	4.741821	4.684285
2	–467.3954	14.41310	0.345342	4.612516	4.773517	4.677623*
3	–461.5042	11.38397	0.339100	4.594243	4.819645	4.685394
4	–454.4414	13.51150	0.329232	4.564651	4.854452	4.681844
5	–449.1588	10.00375*	0.325206*	4.552259*	4.906461	4.695495

Notes: * indicates lag order selected by the criterion. *Note*: LR – sequential modified LR test statistics (each test is at 5% level); FPE –Final prediction error; AIC – Akaike information criterion; SC: Schwarz information criterion; HQ – Hannan-Quinn information criterion.

Table 5. Autocorrelation findings

Variable	Coefficient	Std Error	t–stat	Prob.
CPI	–0.035661	0.055442	–0.643209	0.5208
C	5.699773	0.065545	86.95951	0.0000
R–squared	0.001966	Mean dependent var		5.671132
Adjust R–squared	–0.002786	S.D dependant var		0.699335
S.E of Regression	0.700309	Akaike info criterion		2.134799
Sum squared residual	102.9908	Schwarz criterion		2.166465
Log likehood	–224.2887	Hannan–Quinn criterion		2.147597
F–statistic	0.413718	Durbin–Watson Stat.		1.985705
Prob(F–statistic)	0.520790			

any limitation to the model. This model, which enables analysis to be made without discriminating between variables as internal and external, is often used in time series analyses. On the other hand, since dependent variable is given place in lagged value, [the model] enables to strongly predict. Therefore, in this analysis, whose coefficients are difficult to interpret, statistical findings were obtained by means of cause-effect functions and variance discrimination (Gültekin & Hayat, 2016).

For introducing an interaction between variables, it is important to identify suitable lagging length. The results of criteria used in identifying lagging length formed by Eviews software are given in Table 3.

As will be seen from Table 4, five of three criteria give suitability for 5 lagging.

After identifying optimal lagging length, turn comes into formation of VAR model. VAR model formed was subjected to varying variance and autocorrelation tests. Test results regarding this take place in Table 5.

According to the results in Table 5, there is no autocorrelation problem since the Durbin Watson test statistical value is higher than the table value of at the five percent significance level. According to the results in Table 6, since the probability value is higher than five percent, there is no problem of heteroscedasticity.

Table 6. Heteroscedasticity findings

Chi–square	Degree of Freedom	Prob.
30.27340	24	0.1759

It is possible to define cause–effect function in the form of that they are functions measuring effect of internal (dependent) variable to shock of 1 standard error. Cause–effect functions belonging to the variables of Indirect tax and Consumer Price Index are as follows in Figs 2–5.

According to the figures above, while a shock occurring in indirect taxes has effect of about 3 periods on inflation, a shock occurring on inflation has effect of about 2 periods on indirect taxes.

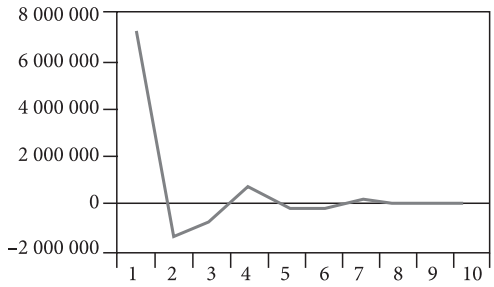

Figure 2. The Effect of a Shock in Indirect Taxes on Indirect Taxes

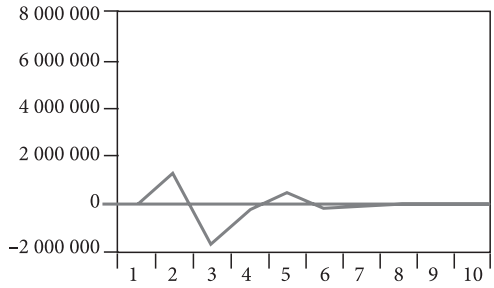

Figure 3. The Effect of a Shock in Indirect Taxes on the Consumer Price Index

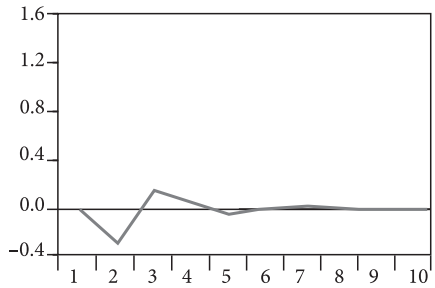

Figure 4. Effect of a shock in the Consumer Price Index on Indirect Taxes

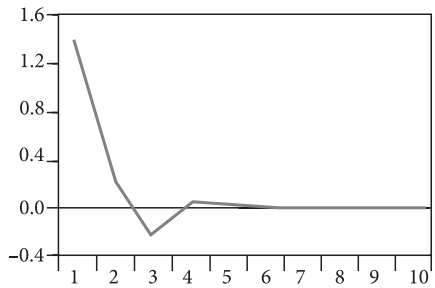

Figure 5. Effect of a shock in the Consumer Price Index on the Consumer Price Index

Conclusions

As known, in the developing countries, saving tendency is less, and expenditure tendency is high. In this type of countries, whose structural transformation cannot complete, capital is a scarce factor, and this case cause fluctuations at the level of production – total supply. In this context, in the developing countries, the level of increasing demand remains over supply from time to time and, thus, leads to economic instability referred to inflation. Provided that any action is not taken, after a certain time, it becomes chronic, harms to economic growth and development, and causes a sort of resource transfer from private sector to public sector. Due to the importance it has, policy makers specifically give importance to struggle with inflation.

Taxes are of effective instruments of fiscal policy, which effectively function in struggle of governments with inflation. Government can intervene by means of taxes according to the sort of fluctuations experienced in economy. If there is an inflationist process arising from demand, government, increasing tax rates, can remove instability experienced. At this point, it is expected that indirect taxes levied from expenditures are more effective in struggling with inflation.

Besides that inflation has the effects like disturbing public finance, the most remarkable feature of it is "similarity to indirect taxes" in terms of public finance. Inflation takes purchasing power from individuals and transfers to government in the same way as taxes. In addition, inflation also makes anesthetic effect for those bearing tax.

Due to the fact that the compensatory effect of expenditure taxes on total demand is high, in the study, the interaction of expenditure taxes and inflation is scrutinized for the period 2004:1–2021:8. The share of indirect expenditure taxes in total tax income and Consumer Price Index (CPI) data were analyzed by means of VAR model. According to the findings obtained as a result of statistical tests made, a fluctuation occurring in indirect taxes leads to effect of about three periods on consumer price index. It is observed that a fluctuation in CPI leads to an effect of about 2 periods on indirect taxes.

Effect lagging between variables gives messages regarding that inflation in our country cannot be eliminating by only meeting demand. Indirect expenditure taxes is an element of the price of goods bought by consumer or producer. From this point of view, while an increase that will occur in indirect taxes, on the one hand, raises the price of goods and reduces total demand, on the other hand, it increases the costs of producers using the relevant product, and this can cause cost inflation in macro scale. Producer will unavoidably reflect cost increase of interest to the price of the product produced after a certain time.

For removing these negativities experienced, increasing indirect expenditure taxes uncontrollability for only controlling demand, as a result, can again cause inflation with a different mechanism. Based on the findings obtained as a result of the impulse–response analysis, the indirect tax weapon used in the fight against inflation should be effectively separated according to the goods purchased over it, in order to break the inflationary cycle experienced. The goods and services, through which [tax] is levied must be classified according to income and demand flexibilities and, in case of instability to be experienced, it must be applied to the group of goods and service, which will

give result the most effectively and in the short time.

As a conclusion, while struggling with inflation that is a supply – demand unbalance, fiscal policies, which will remove unbalance under consideration, must be holistically applied. Furthermore, when bringing into mind that inflation is a monetary phenomenon, simultaneously applying taxation policy that is an instrument of monetary and fiscal policy will have a great importance in eliminating inflation called "monster".

References

Akduğan, U. (2020). Enflasyon ve Dolaylı Vergiler Arasındaki Bağlantı: Türkiye Örneği. *MANAS Sosyal Araştırmalar Dergisi*, *9*(4), 2248–2262. https://doi.org/10.33206/mjss.719936

Akıncı, A., & Özçelik, Ö. (2018). Türkiye'de Dolaylı Vergilerin Enflasyon Üzerindeki Etkisi, *Maliye ve Finans Yazıları*, *110*, 9–20. https://doi.org/10.33203/mfy.455483

Arısoy, İ., & Ünlükaplan, İ. (2011). Katma Değer Vergisi, Enflasyon Oranı ve Kamu Harcamaları Arasındaki İlişkilerin Dinamik Analizi. *Sosyoekonomi, 16*(16), 93–112. https://dergipark.org.tr/tr/pub/sosyoekonomi/issue/21076/226912

Aydoğan, E. (2004). 1980'den Günümüze Türkiye'de Enflasyon Serüveni. *Celal Bayar* Üniversitesi İktisadi *ve* İdari *Bilimler Fakültesi Yönetim ve Ekonomi Dergisi, 11*(1), 91–110. https://dergipark.org.tr/en/pub/yonveek/issue/13680/165538

Bernhardsen, T., & Kloster, A. (2010). Liquidity management system: floor or corridor. *Norges Bank Staff Memo*, *4*. https://www.norges-bank.no/globalassets/upload/publikasjoner/staff-memo/2010/staff_memo_042010.pdf?v=03/09/2017122442&ft=.pdf

Central Bank of Republic of Turkey. (2006, 2007, 2009–2020). *Annual Report 2006, 2007, 2009–2020*. https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Publications/Reports/Annual+Reports/

Central Bank of Republic of Turkey. (2019), *IV. Enflasyon Raporu Bilgilendirme Toplantısı,* https://www.tcmb.gov.tr/wps/wcm/connect/23620938

Central Bank of Republic of Turkey. (2021). *Financial Stability Report – May 2021, 32*, *II. Macroeconomic Outlook*. https://www.tcmb.gov.tr/wps/wcm/connect/1f786ea7–7704–4895–a8f9–8e0bc562a39e/3.Macro.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE–1f786ea7–7704–4895–a8f9–8e0bc562a39e–nG6G8tX

Cural, M., & Çevik, N. (2015). Ekonomik kalkınmanın vergi yapısı üzerindeki etkisi: 1924–2013 dönemi türkiye örneği. *Amme* İdaresi *Dergisi, 48*(3), 127–158. https://www.researchgate.net/publication/284819219

Çakmaklı, C., Demiralp, S., Yeşiltaş, S., & Yıldırım, M. A. (2018). Tütün ürünlerine uygulanan dolaylı vergilerin enflasyona etkileri. *Koç University – Tüsiad Economic Research Forum Working Paper Series*, 1811. https://eaf.ku.edu.tr/sites/eaf.ku.edu.tr/files/erf_wp_1811_tr.pdf

Dickey, D. A., & Fuller W. A. (1981). Likelihood ratio statistics for autoregresssive time series with a unit root. *Econometrica*, *49*, 1057–1072.

Eğilmez, M. (2020). *Türkiye Ekonomisi*. İstanbul: Remzi Kitabevi.

European Commission. (2016). *Taxation Trends in the European Union – Data for the EU Member States, Iceland and Norway.* Luxembourg: Publications Office of the European Union.

Göktaş, Ö. (2005). *Teorik ve Uygulamalı Zaman Serileri Analizi*. İstanbul: Beşir Kitabevi.

Gültekin, E., & Hayat, E. A. (2016). Altın fiyatını etkileyen faktörlerin var modeli ile analizi: 2005–2015 dönemi. *Ege Akademik Bakış Dergisi, 16*(4), 611–625.

Güvenek, B., Alptekin, V., & Çetinkaya, M. (2010). Enflasyon ve dolaylı vergilerden elde edilen gelirler arasındaki ilişkinin VAR yöntemiyle analizi. *Kamu–İş Dergisi*, *11*(3), 1–28. https://www.tuhis.org.tr/pdf/1131.pdf

Jenkins, G. P., & Lahouel, H. M. (1981). *Inflation and Taxation, Aspects of Fiscal Policy, Legislation and Administration.* 1. Venezuela. https://ideas.repec.org/p/qed/dpaper/55.html

Karadağ, M., & Westaway, T. (1999). The impact on consumer and producer prices in Turkey of VAT changes designed to meet EU membership criteria: a computable general equilibrium approach. *Economic Research Paper*, *99/19*, Loughborough University Department of Economics.

Korkmaz, T., & Uygurtürk, H. (2008). Türkiye'deki emeklilik fonları ile yatırım fonlarının performans karşılaştırması ve fon yöneticilerinin zamanlama yetenekleri. *Kocaeli* Üniversitesi *Sosyal Bilimler Enstitüsü Dergisi*, *15*(1), 114–147. https://www.researchgate.net/publication/242775635

Koutsouvelis, P., & Papastathopoulos, A. (2013). The effects of indirect taxes on consumer prices: empirical evidence for Greece. *Advances in Management and Applied Economics*, *3*(1), 61–76.

Kurtoğlu, R. (2014). *Türkiye Ekonomisi 1838–2010 Mali Bağımlılık Büyüme Krizler ve Siyasi Sonuçları*. Ankara: Orion Yayıncılık.

Ministry of Treasury and Finance. (2007). *General Annual Report 2006,* https://www.hmb.gov.tr/pergen-faaliyet-raporlari

Ministry of Treasury and Finance. (2008). *General Annual Report 2007,* https://www.hmb.gov.tr/pergen-faaliyet-raporlari

Ministry of Treasury and Finance. (2010). *General Annual Report 2009,* https://www.hmb.gov.tr/pergen-faaliyet-raporlari

Ministry of Treasury and Finance. (2021). *Budget Financing Statistics*, https://en.hmb.gov.tr/public-finance

Moździerz, A. (2017). The impact of changes in indirect tax rates on inflation in selected EU countries. Annales Universitatis Mariae Curie–Skłodowska, *Sectio H Oeconomia*, *51*(4), 257–267. https://journals.umcs.pl/h/article/viewFile/5127/4311

Müstakil Sanayici ve İşadamları Derneği. (2012). *Türkiye Ekonomisi 2012*. https://musiad.org.tr/uploads/yayinlar/arastirma-raporlari/pdf/turkiye_ekonomisi_raporu_2012.pdf

Özatay, F. (2009). *Finansal Krizler ve Türkiye*, İstanbul: Doğan Yayıncılık.

Phillips, P. C. B., & Perron P. (1988). Testing for Unit Roots in Time Series Regression. *Biometrika*, *75*(2), 335–346. https://finpko.ku.edu/myssi/FIN938/Phillips%20%26%20Perron_Biometrika_1988_Unit%20Root%20Test.pdf

Sevüktekin M., & Nargeleçekenler, M. (2010). *Ekonometrik Zaman Serileri Analizi: EViews Uygulamalı,* 3. Baskı, Ankara: Nobel Yayın Dağıtım.

Sevüktekin, M., & Çınar, M. (2017). *Ekonometrik Zaman Serileri Analizi: EViews Uygulamalı*, 5. Baskı, Bursa: Dora Yayınevi.

Sugözü, İ. H. (2008). *Kayıt Dışı Ekonomiyi* Önlemede *Vergi Politikaları (1980–2004) Türkiye* Örneği. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü, Doktora Tezi, Konya.

Şahin, H. (1995). *Türkiye Ekonomisi*. Bursa: Ezgi Yayınları, 167.

Tarı, R. (2010). *Ekonometri, 6*. Baskı, Kocaeli: Umuttepe Kitabevi.

Tepekule, U. (2016). *Ekonomik* İstikrarın *Sağlanmasında Maliye Politikasının Etkisi: Mali Etki Analizi ve Türkiye* Örneği. Doktora Tezi. Celal Bayar Üniversitesi Sosyal Bilimler Enstitüsü, Manisa.

Torun, M. & Karanfil, M. (2016). 1980–2013 dönemi Türkiye ekonomisinde enflasyon ve faiz oranı arasındaki ilişki. *Yönetim Bilimleri Dergisi, 14*(27), 473–490. https://dergipark.org.tr/tr/pub/comuybd/issue/43601/533917

Turkish Statistical Institute. (2021). *Tüketici Fiyat Endeksi ve Değişim Oranları*. https://data.tuik.gov.tr/Bulten/Index?p=T%C3%BCketici-Fiyat-EndeksiMay%C4%B1s-2021-37383&dil=1

Türk Sanayicileri ve İşadamları Derneği. (2009). *2009 Yılına Girerken Türkiye Ekonomisi*. https://www.tusiad.org/tr/yayinlar/raporlar/item/1950-2009-yilina-girerken-turkiye-ekonomisi