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Inflation and Cold Progression: An Analysis of Turkish Income Tax between 2006-2021

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Enflasyon ve Soğuk Artan Oranlılık: 2006-2021 Dönemi İçin Türk Gelir Vergisi Üzerine Bir İnceleme

Abstract

Inflation causes high taxation -although real income does not increase- because the income tax base targets nominal income. This situation results in taxation as if the ability to pay has increased, although it has not. Compensation for this deflecting effect of inflation in the income tax tariff requires growing the income segments included in the tariff at the rate of inflation regularly experienced yearly. However, the current need for public revenue can cause governments to make regulations in favour of the administration and against taxpayers -almost by creating an undervaluation- while providing this requirement. It is called "cold progression" in the literature. In this study, which draws attention to the distortions caused by inflation in the tax system, the evidence obtained shows the existence of cold progression.

Keywords : Inflation, Personal Income Tax, Cold Progression, Inflation Tax.

JEL Classification Codes : H2, H24, E31.

Öz

Enflasyon, gelir vergisi matrahının nominal geliri hedef almasından dolayı -reel gelir artmasa da- yüksek orandan vergilemeye sebep olur ve bu, aslında ödeme gücü artmadığı halde artmış gibi vergilendirilmesi sonucunu doğurur. Enflasyonun gelir vergisi tarifesinde meydana getirdiği bu saptırıcı etkinin telafisi, tarifede yer alan gelir dilimlerinin her yıl düzenli olarak yaşanan enflasyon oranında arttırılmasını gerektirir. Lakin var olan kamusal gelir ihtiyacı, hükümetlerin bu gerekliliği sağlarken -adeta eksik değerleme yaparak- idare lehine ve mükellefler aleyhine olacak şekilde düzenleme yapmalarına sebep olabilir ki, literatürde buna "soğuk artan oranlılık" adı verilir. Enflasyonun vergi sisteminde yol açtığı bozulmalara dikkat çeken bu çalışmada elde edilen kanıtlar soğuk artan oranlılığın varlığını göstermektedir.

Anahtar Sözcükler : Enflasyon, Kişisel Gelir Vergisi, Soğuk Artan Oranlılık, Enflasyon Vergisi.

1. Introduction

The effects of inflation are divided into payment and declaration effects. The payment effect shows which categories bear the burden of the revenues provided to the government due to inflation, and the declaration effect indicates what kind of changes taxpayers will make in their preferences, considering that inflation will continue (Bulutoğlu, 1962: 247). Accordingly, household members filling the gas tank of their vehicles, storing food in their refrigerators, stocking canned food and pasta in their cellars, and buying one or two-sizes larger shoes and clothes for their young children are examples of the declaration effect of inflation. The main reason behind such behaviour, which means forwarding of consumption, is the expectation that the purchasing power, which has decreased with inflation, will also decrease further in the future. The resource that makes this behaviour, which gives protection against inflation for a while, possible, is their budget. The protection afforded by those with large budgets, namely those with higher incomes, is more significant in volume and prolonged in duration. The ones with low and fixed incomes have limited opportunities, like their budgets, to protect themselves from inflation by engaging in such behaviours.

The income effect of inflation occurs when inflation decreases the real income of those whose incomes increase slower and less than prices, while there is an increase for those whose incomes rise faster and more. Accordingly, with the assumption that the per capita income is constant during the period, inflation provides an implicit income transfer from the first group to the second one. This transfer of real income also applies to those whose assets increase less than current prices and those whose assets increase more (Bulutoğlu, 1962: 248). The income effect of inflation is also valid for debt relationships and taxation, which is the forced version of this relationship. Thus, inflation is satisfactory for the borrower party in debt contracts settled in national currency. Because of the burden of real interest, which will be paid due to inflation, it lightened. This effect is also valid for reducing the tax burden on taxpayers. On the opposite side, inflation reduces the real value of the state's tax revenue, called the Olivera-Tanzi Effect in the literature. However, since inflation affects all kinds of monetary values in the tax system, it also has consequences for taxpayers. One of these outcomes is cold progression, which is likely to be realised because of the progressive tax tariffs. To give an idea at the start, cold progression can be expressed as "*the government update the income brackets in the progressive tariff in an inflationary environment by making an undervaluation for the next period and thus exposing the increased nominal income to the upper bracket tax rates*".

This study, which focuses on determining the scope of cold progression and investigating its existence for the Turkish Income Tax, consists of five chapters apart from the introduction and conclusion. The literature is given in the first chapter. In the second chapter, the challenges caused by inflation in terms of taxation are revealed, and these are elaborated on the destructions in tax systems and deviations from ideal taxation. In the third chapter, progressive taxation is briefly analysed in terms of taxation techniques, and its advantages for fair taxation are emphasised. In the fourth chapter, cold progression, the subject of our study, is defined and demonstrated through solid examples. Its relationship

with the automatic stabilisation feature of the progressive tariff is established. In the fifth chapter, the cold progression that has been caused is revealed. The implicit real income transfer that it causes - in other words, the deviations from tax justice - is presented concretely by making a recent period analysis of the Turkish Income Tax tariff for fifteen years in two different categories: between 2006-18 and between 2019-21. The study ends with the conclusion part, in which possible solutions are discussed to compensate for the deviations derived from the cold progression.

2. Literature

Studies on cold progression are very limited in the literature. The studies within this context that are conducted for the USA, Austria and Germany are as follows: Heer and Süssmuth (2003), who examined the effects of cold progression on income distribution in the US economy, primarily focused on the impact of income tax brackets and found the development of high inflation on income distribution to be smaller with the model they have developed. However, they found that the long duration of adjustments in income tax tariffs significantly reduces production, employment and savings. Kucsera and Lorenz (2016) examined the effects of cold progression in Austria between 2016-21. They found an additional tax burden of 1,356 Euros occurred for five years due to the hidden tax increase. To avoid the effects of cold proportionality, they suggested changing the tax bracket thresholds and automatically determining tax rates in line with annual inflation in case inflation reaches a certain percentage. Gottfried and Witczak (2008) estimated the total income from income tax for 2010-12 with the microsimulation model in their study on cold progression in Germany. According to that, because of the annual growth of 1.97% and the cold progression, approximately 9 billion Euros of tax revenue will be gained from 2010-12. The taxpayers who are affected by cold progression are particularly low-income taxpayers. Despite that, taxpayers with high/very high taxable income are not affected by the course of cold progression. Tax rates are the reason for this unequal situation in question.

Although there is no specific study directly under the name of cold progression in Turkey, studies discuss the relationship between inflation and income tax in various dimensions. For example, Akbulut (2021) examined the effects of interest, inflation and income tax on income distribution in Turkey. Accordingly, it has been concluded that inflation and interest negatively affect fair income distribution. Şanver and Saygı (2019) analysed the income tax tariff regarding fiscal drag between 2009-19 in Turkey. According to the study, the income tax tariff steps should be adjusted yearly to avoid the fiscal drag effect. Öztürk et al. (2019) examined the impact of economic variables on tax revenues and handed the period between 1980-2017 in their study. According to that, inflation affects tax revenues negatively in Turkey. Şahan (2005) examined the effects of inflation on the income tax tariff between 1980-2004 in Turkey. Three main findings were achieved in the study. Accordingly, inflation destroys the income tax, increases the taxpayer's income tax assessment and causes deviations in the objectives of the tax system.

Looking at the literature, it can be stated that the calculation of cold progression in Turkey is neglected. The cold progression between 2006-21 is calculated in this study. This study will try to show that inflation will prevent or even annihilate an effective tax system through cold progression. The primary motivation of the study is to show that if the necessary tariff updates are not made, the income tax will not have effective results in the face of cyclical phenomena such as inflation. The study is expected to contribute to the literature in the context of re-discussing problematic tax practices in terms of tax justice.

3. Challenges of Inflation on Taxation

Inflation, one of the most familiar concepts in an economy, is a phenomenon that confronts economies with long periods of instability. Although inflation is generally defined as the rate of continuous increase in prices in a certain period, it can also be considered a large scale that occurs in fees or living costs. No matter in which context it is being discussed, inflation represents how expensive the relevant goods and services have become for a certain period (Oner, 2010: 44). Inflation means the increase in the general level of prices in a certain period affects all kinds of *quantity variables* determined in national currency in terms of devaluation. For example, it is highly wrong to announce GDP increases as the *"growth rate"* without removing the effect of inflation since growth shall be real. The same is also valid for wages. Accordingly, transferring the wage amount to the next period by increasing the wage in the amount of the inflation rate raises it but does not increase the purchasing power. Again, inflation devalues quantity variables. Since taxation is a technical field, it is essential to have many quantity variables in tax systems. Exception limits, deduction amounts, exemption limits, minimum living levels, administrative penalty amounts, and tax tariffs can be examples of quantitative variables in the tax system. Inflation requires constant updates of such quantity variables in the system. Otherwise, the tax system will be out of date.

3.1. Deviations from Ideal Taxation Due to Inflation

Taxes, which governments use as the primary means of financing increased public expenditure, should have a set of principles. These are fairness, efficiency, impartiality, certainty, simplicity and flexibility (OECD, 2014: 30-31). In addition, equality before the law, utility, generality, general response, non-retroactivity, economy, and consistency, prohibition of comparison, interference, proportionality, simplicity, allocation and conformity are among such principles (Saraç & Eroğlu, 2021: 7). Inflation has deviating effects on ideal taxation. These effects appear in the form of destruction in terms of taxation principles. It is possible to summarise them as follows:

Fairness: It is one of the principles that inflation primarily harms. To achieve tax justice, techniques such as exemption, exclusion, minimum living allowance, progressiveness, and rate differentiation are used. The goal is to reveal the taxpayers' ability to pay. Inflation intensifies progressivity and increases the real tax burden (Öncel, 1995: 493). Adoption of the progressive tariff in taxation ensures that the

taxpayer with higher paying ability pays more tax proportionally than the taxpayer with less ability to pay (Sağbaş & Saruç, 2020: 97). However, as a result of tax bracket drag that occurs in the presence of inflation causes the taxpayer's purchasing power does not increase, but the taxpayer enters a higher income bracket, and the increasing proportionality, which is desired to serve justice, has the opposite results.

Certainty: This principle, which emphasises the inevitability of taxes, reveals the necessity of the absence of arbitrariness in taxation. Since inflation creates monetary and real value differences, it creates uncertainty in taxation. It makes it difficult for taxpayers to predict their tax payments (Öncel et al., 1992: 47). The dominance of uncertainty in taxation paves the way for injustice or, even if there is none, creates an acceleration in this direction. The thought that there is no justice and trust disturb taxpayers and increases their reaction to taxes. Thus, the management of the system becomes difficult (Sarac & Eroğlu, 2021: 25).

Flexibility: The principle of flexibility, which emphasises the ability of taxes to follow changes in the ability to pay, suffers in an inflationist environment. Since inflation causes increases in monetary income, it grinds all kinds of quantity variables in the tax system. For example, monetary income increases may cause the exception limit to be exceeded. This causes taxpayers to be treated as if their ability to pay has increased, even though it has not. Inflation can give opposite results to the flexibility principle by taxing taxpayers who do not have an increased ability to pay due to the high-income elasticity of the progressive tariff.

Economy: The principle of economy, which is about collecting taxes with the least possible expense, suffers from inflation. Because in an inflationary environment, it becomes difficult for taxpayers and the administration to adapt to the tax system. Inflation makes the operation of the tax system costly. The system has to be constantly revised due to inflation. The inflationary environment increases the costs incurred by both the administration and taxpayers.

Consistency: The principle of consistency, which emphasises the importance of not changing tax regulations too often, has to be suspended in an inflationary environment. Because all amount variables in the tax system, which are worn out due to inflation, need to be updated. In countries with chronic inflation, the frequency of such adjustments may occur several times a year. Governments that take inflation for granted may make fewer adjustments with the concept called revaluation rate. However, it should be monitored whether this ratio is applied as much as it should be in this case. Inflation, which deviates from the principle of consistency in taxation in this aspect, makes the system's operation expensive and makes it difficult for taxpayers to comply with the tax.

Simplicity: The principle of simplicity, which means clarity in taxation, is perhaps the most easily accepted by inflation. Because the tax authority should eliminate the erosion caused by inflation in quantity variables, this can be done with continuous adjustments. Still, it deviates from the principle of stability, as stated. Techniques such as inflation accounting demanded by taxpayers in countries experiencing

chronic inflation, although necessary for tax justice, further increase the violations of simplicity experienced due to inflation and increase the audit costs of the system.

Impartiality: The principle of impartiality, which means that taxes do not have a diversion effect on taxpayer behaviour, naturally wears out as inflation is a kind of deviation. The damage to the tax bases due to inflation may disrupt the savings and investment decisions of taxpayers who have to pay high taxes (Poterba & Rotemberg, 1990: 1). The system's loss of impartiality results in increased taxpayer reactions and tax non-compliance. After all, the impartiality of the tax system is one of the most important values that the liberal rhetoric adopts, making it their motto.

Efficiency: The value of the revenue obtained decreases due to delays in the taxation process due to inflation (Saraç & Eroğlu, 2021: 37). Inflation destroys the fiscal purpose of taxes and pushes the government to seek new sources of income constantly.

The damage caused by inflation to taxation principles and the deviations from the ideal taxation it creates reveals the necessity of fighting against inflation since the principles cannot be shaped and stretched according to the conjuncture. Taxes are already a tool in the fight against inflation. Successful tax policies followed by governments can provide solutions to inflation. On the other hand, the government's attitude towards accepting inflation and short-term solutions for the bypass may cause an escalation of problems. Since inflation destroys many taxation principles, it is impossible to establish *an ideal tax system* despite inflation. However, the research question of this study is to discuss the tax damages caused by inflation in the context of cold progression. For this reason, discussions on eliminating the damage caused by inflation with tools such as inflation accounting have not been discussed within this scope.

3.2. The Destruction Inflation Creates in the Tax System

A continuous and high inflation rate causes severe adverse effects on the economy. When viewed from the interaction processes' perspective, these destructive effects transition from micro decision level to macro imbalances. The interest of analysis and research is mainly on the relationship between inflation and macro balances. After all, inflation is a macro-level phenomenon by definition and nature (Berksoy, 1996: 1). taxes are the indicator of inflation, which impacts many macroeconomic indicators, and that is the focus of this study. Calculating tax as a fraction of nominal variables causes inflation to increase effective tax rates. The relationship between the nominally defined tax system and inflation ultimately disrupts the vertical justice of the tax burden and causes unfair distribution (Immervoll, 2000: 2-5). In many countries, tax systems still need to be fully integrated into inflation. However, the possible effects of inflation on the tax system must be considered for healthy public finance. The best way is to keep inflation under control; since this will not always be possible, adjusting tax systems according to inflation is indispensable (Thuronyi, 1996: 434).

Inflation can affect taxpayers through three different channels. These are listed as (i) effects on the calculating of taxable income, (ii) changes in real factor incomes, and (iii)

changes in the real value of all deductions, exemptions, and legally nominal tax provisions (Aaron, 1976: 193). These effects vary depending on whether the tax laws are designed for inflation. While tax laws are concerned with calculating received income, they may ignore income-generating factors (Aaron, 1976: 193). Inflation affects real tax burdens through channels such as tax liabilities and tax base (Immervoll, 2000: 2-3).

Since tax liabilities are nominal amounts, they are only one of the most apparent distortions in the tax burden. Especially from the perspective of income taxpayers, this situation arises from collection delays. Failure to fix this may lead to unequal tax practices. Another negative aspect arises regarding tax bases. Thus, an income tax base defined as nominal does not consider the changes in consumption potential due to the difference in the purchasing power of money that will occur due to inflation. Ignoring the effects of changes in the value of money on income will result in an unfair distribution of the tax burden. Failure to adjust the tax base to changes in value due to currency depreciation often leads to significant deviations in tax. Another critical issue is moving to higher tax brackets in progressive tariffs due to inflation. This situation, which varies according to the severity of inflation, needs to be fully understood by the public as it needs to be approved by the political process. So, the issue in question means an automatic tax increase. This situation is attractive for politicians as it is a suitable financing way for increased public expenditures (Immervoll, 2000: 3-4). Inflation may affect the amounts of exceptions and exemptions in the tax system and cause low incomes that should be excluded from taxation to be included in the tax scope. This development is against low-income groups and causes the tax burden to become heavier for this group because incomes exempt from tax before inflation may not benefit from the exemption as nominal income increases because of inflation (Pamak, 1978: 121).

Inflation also affects the relative returns of taxes, depending on the tax type. This effect varies according to the different elasticity of tax types to price increases. The flexibility in question is higher in income taxes than in consumption taxes. In this case, inflation tends to increase income tax. If the taxes are based on nominal values, the longer the time factor determines the tax base, the more effective the inflation will be. The long periods while calculating the tax base cause the effects of inflation to be more evident. Inflation, which lowers the real value of nominally fixed cuts and exemptions, narrows the real margin of tranche rates. Income increases only nominally, but this increase also increases real tax burdens (Nowotny, 1980: 1025-1029). The effects of inflation also differ in countries with longer delays in tax collection. Especially when inflation is high, the said effects become quite evident. Because in such a case, tax revenue is subject to erosion due to inflation. (Tanzi, 1977: 154).

4. Short Analysis of Progressivity in Taxes and Their Relationship with Inflation

As the tax base grows, the tax rate and burden do not remain constant but increase; this is called *progressivity*. In progressive taxes, everyone subject to these taxes pays the same rate corresponding to their income share. Progressive taxation is based on the idea of

proportional taxation, which is also called vertical justice. Accordingly, as income increases, the paid tax increases proportionally. Progressive taxation can also be defined broadly as a more equal distribution of post-tax income than pre-tax income (Pamak, 1978: 138; Piketty & Saez, 2007: 4-5). This means that someone who earns more pays taxes with a higher average than someone who makes less (IONOS, 2020). Progressivity, one of the means of providing social justice through tax justice, adopts the idea that the ability to pay taxes increases at a higher rate than income. Progressivity is being applied, especially in income and wealth taxes today. The reason for the application of progressivity in income tax is the fact that the importance that is being given to each additional income unit decreases as the income of the taxpayer increases (as the income increases, the marginal utility of income decreases) and thus the solvency increases at a higher rate as income increases. The reason for applying progressivity to the wealth taxes is that the wealth of the enormous wealth owners increases faster than the total capital stock with economic development. Progressivity also prevents wealth distribution inequalities from becoming excessive (Pamak, 1978: 138).

The progressive income tax allows more equitable income distribution, faster growth and less economic and financial volatility. By addressing these issues, Weller (2007) establishes a link between progressive taxes, high income, and fair income distribution[1]. Accordingly, since the tax base is more significant in countries with progressive taxes, it is possible to implement more comprehensive fiscal policies. Ensuring income equality leads to fair demand growth, on the other hand, provides an indirect relationship between progressive taxation and economic stability (Weller, 2007: 371). The progressive taxes that countries put into practice to ensure income equality may only sometimes provide income equality. Considering African countries, although higher progressive income taxes are applied for high-income groups, income inequalities in these countries are quite high. South Africa, the country with the highest (vertical) progressive income tax in the continent, has unequal income distribution. This is important as it shows that progressive taxation alone is insufficient to reduce income inequalities (Shahir & Figari, 2021: 1). After all, taxes regulate income redistribution, not its primary distribution.

Fair income distribution should be supported by primary means of distribution, such as employment opportunities and wage justice. Undoubtedly, the informal economy, tax evasion, and increasing inflation cause income inequalities in African countries. For example, despite an average inflation rate of 8.5% in Sub-Saharan Africa in 2018, the country still needs to implement a consistent indexation procedure for tax systems. The absence of inflation adjustments creates a high real tax burden or fiscal drag as a result of the increase in nominal incomes in the presence of a progressive tax tariff (Shahir & Figari, 2021: 1). In this context, non-indexing of the tax system leads to a hidden increase in tax

[1] *A progressive tax system is not always successful in preventing inequalities in income distribution. Piketty and Saez (2007), in their study investigating the evolution of progressive taxation in the USA from 1960 to the present, find that the effect of progressive taxation on income distribution is gradually decreasing.*

rates, allowing governments to generate revenue without asking anyone explicitly (Musgrave, 1979: 702).

Fiscal drag occurs in the face of the structure of progressivity that can prevent income distribution inequalities due to inflation is an undesirable result of progressivity in the sense of equality. This can also be described as a progressive income tax, in which tax rates are calculated according to nominal income, pushing the taxpayer to higher tax brackets even though there is no increase in the taxpayer's real income due to inflation. In the absence of compensating legislation, taxpayers make more real payments. The narrowness of the income brackets further increases this negativity (Muresianu & Harrison, 2021; Nowotny, 1980: 1026-1027). Because the income bracket structure of a progressive income tax and the real value of tax cuts, if any, are affected by inflation. The real value of many deductions in the income tax system decreases due to inflation (Nowotny, 1980: 1026-1027). Therefore, although a progressive income tax, which is superior in providing tax justice, is not updated according to inflation, the opposite results may occur. At this point, the *automatic stabilisation* ability of progressive income tax gains the feature of being a preferable alternative to tax justice by governments.

For governments seeking stability in aggregate demand, there are two paths. These are (i) discretionary fiscal policies and (ii) automatic stabilisers. In discretionary fiscal policies, governments can increase or decrease public expenditures and/or taxes. The intricate and cumbersome nature of the political decision-making process, its inelasticity, and the difficulties in predicting economic forecasts are the shortcomings of this method. These shortcomings are out of the question for the second option, automatic stabilisers. According to the conjuncture, automatic stabilisers provide desired changes in public expenditures and revenues without needing government action. The advantage of automatic stabilisers over discretionary fiscal policies is that they allow quick and timely action (Şen & Kaya, 2013: 303-304). Automatic stabilisers are rules embedded in the financial system that automatically make the necessary changes in public revenues and expenditures (McKay & Reis, 2016: 6). There are many tools with this feature, such as autonomous public expenditures, household and corporate savings, self-generated budget deficits, unemployment insurance (Musgrave & Miller, 1948: 122) in the system and progressive taxes are, in our opinion one of the most important ones, among these automatic stabilisers that help balance cyclical fluctuations (Weller, 2007: 370).

Automatic stabilisers are the subject of a more income tax-focused discussion. The reason for this lies in the great importance of income tax in terms of tax revenue and the higher tax rates applied as income increases, which means it is progressive (Şen & Kaya, 2013: 305). The progressive nature of the income tax allows it to be an automatic stabiliser without any additional decision or regulation in the existing system. Thus, taxation of the nominal income, which increases in the inflationary period, from the upper bracket in the progressive tariff increases the personal tax and decreases the disposable income. What this means in terms of fighting inflation is the decreasing aggregate demand. Let's explain with the help of a simple example:

Year t Income Tax Tariff		
1.000 liras		*10%*
2.000 liras	*(100 liras) for 1.000 liras, for the exceed*	*20%*
4.000 liras	*(300 liras) for 2.000 liras, for the exceed*	*30%*
4.000 liras and more	*(900 liras) for 4.000 liras, for the exceed*	*40%*
Tax of 5.000 liras : 1.300 lira		
Disposable Income : 3.700 lira		

Accordingly, let's assume that the general price level in year t is 100 and that the disposable income obtained over this level is 1,850 units of purchasing power (according to disposable income after tax) in exchange for 2 liras of good A. Then, let's assume that there is 100% inflation in the transition to year t+1, and let's calculate the income tax of 10,000 liras on the same tariff:

Year t+1 Income Tax Tariff		
1.000 liras		*10%*
2.000 liras	*(100 liras) for 1.000 liras, for the exceed*	*20%*
4.000 liras	*(300 liras) for 2.000 liras, for the exceed*	*30%*
4.000 liras and more	*(900 liras) for 4.000 liras, for the exceed*	*40%*
Tax of 10.000 : 3.300 liras		
Disposable Income : 6.700 liras		

Since the inflation rate is 100%, this should be reflected in our example as doubling the tax paid and disposable income. But this has not happened. Let's go step by step. (i) The equivalent of TL 5,000 for year t is TL 10,000 for year t+1. So, (ii) the tax equivalent of 1,300 liras paid in year t in year t+1 should be doubled and become 2,600 liras. However, the tax paid is not 2,600, but 3,300 liras, that is, 700 liras more. (iii) This 700 liras loss can be found by tracking disposable income. Accordingly, the disposable income of the year t, which was 3,700 TL, should have doubled to 7,400 TL in the t+1 year, but this did not happen, and 700 TL decreased. (iv) The explanation for this decrease in terms of good A that the taxpayer can buy in t+1 is as follows: Since inflation is 100%, the price of good A doubled in t+1 and increased to 4 liras. Accordingly, the amount of good A that a disposable income of 6,700 lira can purchase is 1,675 units. As can be seen, the taxpayer can now purchase 1.675 good A instead of 1,850, which reveals the progressive tariff's automatic stabilisation feature when interpreted in terms of total demand. On the other hand, 175 A goods, which the taxpayer could not buy, since additional tax revenues with the ability of the progressive tariff. But the question to be asked here is the cost of this automatic stability provided. The answer is taxpayers lost in terms of disposable income, that is, purchasing power, and there is a deviation from justice in taxation. This is an important finding as it shows that automatic stabilisation takes place at the expense of deviating from justice.

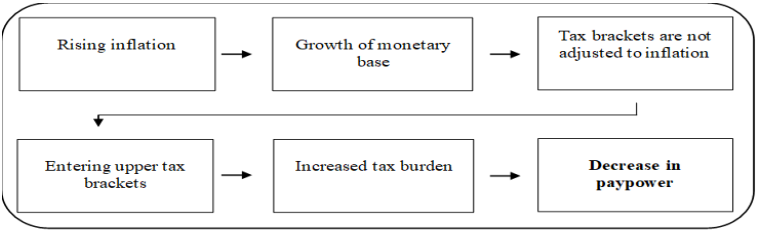
5. Theoretical Frame of Cold Progression

Inflation erodes quantity variables in all tax laws. Since the tranches in the progressive tariff are quantity variables, inflation will also erode them. In such a case, they are expanding the brackets as much as the inflation rate should be done, which means updating them. Today, these updates are being made by a revaluation rate. Although the process is simple, it also has some problems. First, inflation must be determined correctly. Otherwise, deviations are inevitable. In addition, the taxation period and the period in which

inflation is determined must be the same. Undoubtedly, such updates increase taxpayer compliance costs and the explicit costs that the administration bears. Updating the tax brackets at an incomplete rate, which is contrary to what it should be, for example, revaluation of 80% while the inflation is 100%, as in the example in the third section, causes taxation of some, while not all, of the increased nominal income from the upper brackets. The deviation caused by this difference is called cold progression[2]. Cold progression is also referred to as income bracket drag and tax hook. The deviation caused by this difference is called cold progression.

Cold progression[3], also expressed as *cold* progressivity *or cold progress*[4], is the situation in which the base increases due to inflation in a country where a progressive income tax tariff is applied, and inflation occurs at high rates. This case causes the tax bases to be taxed from higher brackets (Sağbaş & Saruç, 2020: 103; IONOS, 2020). Cold progression can also be defined as *"the burden imposed on taxpayers by inflation as a result of the progressive nature of tax rates"* (Hänni, 2021: 257). Cold progression describes increases in tax burdens that do not consider inflation and are based on increases in nominal incomes (Manz, 2021).

Figure: 1
Stages and Emergence of Cold Ascending Progression



Cold progression is the fact that the monetary tax bases that have grown due to inflation are not expanded at the rate of inflation or are incompletely expanded due to the progressive tax tariffs, which bring extra taxation to taxpayers even though their ability to pay does not increase (IONOS, 2020). Therefore, we can define cold progression as an additional income tax burden based on progressive taxation. The most critical factor in the emergence of the said burden is that tax brackets are not adjusted according to the course of inflation, that is, undervaluation (CA18, 2021). Taxpayers being subject to an additional

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[2] *In their report for Austria, Kucsera and Lorenz (2016) evaluate cold progression as an expression in the German language (Kalte Progression) and define it as follows: "Income bracket drag, a phenomenon known as "cold progression" in German. The Economist (2014) also makes a similar statement in some news it published on German taxes: "Tax bracket drag or what the Germans call "cold progression" is that salary increases only compensate for inflation, resulting in taxpayers being pushed into a higher tax base".*

[3] *In the study, "cold progression" was preferred in order to achieve unity in the terminology.*

[4] *The word "progress" here is defined in the OECD (2022) Dictionary of Tax Terms as the payment of an income tax at an increasing rate as income increases. Therefore, the opposite situation occurs in cold progression.*

burden without legal regulation strengthens executive power in using taxation authority. Also, governments receive additional taxes from taxpayers without making them feel this way because of financial anaesthesia.

Cold progression occurs when real incomes fall, but the government do not reduce its tax burden. Accordingly, monetary income increases, but real income decreases. That is, the nominal income increase is smaller than inflation. In case the tax brackets are not expanded or incompletely expanded according to inflation, the monetary income of the taxpayer falls into the upper tax brackets, and the personal tax burdens increase. Since the effect of this increase in disposable income is decreasing, the result is a decrease in the ability to pay. Cold progression is a kind of *hidden tax increase*. The reason for this is not the increase in prices but the increase in the monetary income of the taxpayer and the increase in the tax burden without being noticed as a result of the income increase (IONOS, 2020).

Tanzi, who contributed to the field of taxation with his original ideas, begins the preface of his book Inflation and Personal Income Tax, which he published in 1980, with the following sentence, quoting Andre Maurois: *"Inflation is the devil's work because it destroys facts, not appearances"*. According to Tanzi, *"inflation distorts tax systems and affects the relationship between the level of taxation and its incidence among taxpayers. But these distortions are often not obvious, and sometimes so subtle that unsophisticated observers and even highly sophisticated ones may be deceived into concluding that nothing has changed in reality"* (Tanzi, 1980). Cold progression creates the perception that nothing has changed, just like the determination here. Although it is not easy to detect at first glance, it is possible to reveal the increase in the tax burden on taxpayers with some calculations. Thus, the method to be followed becomes concrete through the following determination:

[Cold Progression = Inflation Rate > Rate of Increase in Tariff Brackets]

This given determination is the necessary condition for governments to establish cold progression. The difference between the current inflation rate and the increase rates applied to the tariff brackets is focused on in the analyses to be made, and the cold progression, if there is any, is tried to be revealed through a cumulative example.

6. Analysis of Turkish Income Tax Tariff

The study's hypothesis is: *There is a cold* progression *in Turkish Income Tax applications*. Cold progression needs to be addressed regarding periods, which have been chosen as (i) 2006-2018 and (ii) 2019-2021. In the first of these periods, the Income Tax tariff was applied at a rate of 15, 20, 27 and 35%, respectively. In the second period, the existing range was increased from 20% to 25% by applying the tariff at 15, 20, 27, 35 and

40%[5]. Annual changes in progressive taxation should be monitored to indicate the change in tax and disposable income against inflation and, if any, cold progression.

6.1. Methodology

In the study, a method in the form of a "*comparison of the annual inflation rates with the increase rates applied to the tariff brackets*" will be used. Since the income tax payment schedule is annual, the annual inflation published by TURKSTAT is used in the study. Accordingly, starting from 2006, a sample base amount (100,000 lira), which covers all tariff brackets, was selected. This amount was expanded by the inflation rate for each year and taxed according to the tariff that should be. Thus, cold progression is revealed if the applied tariff's tax amount is more than the actual tariff to be used.

The mathematical formulation of this method that is being used is as follows:

$$R_G^c = \sum_{t=1}^{n}(1+\pi_t)\alpha_{1t}Y_{1t} + (1+\pi_t)\alpha_{2t}Y_{2t} + (1+\pi_t)\alpha_{3t}Y_{3t} + (1+\pi_t)\alpha_{4t}Y_{4t} + (1+\pi_t)\alpha_{5t}Y_{5t}$$

$$R_G^o = \sum_{t=1}^{n}(1+\pi_t^o)\alpha_{1t}Y_{1t} + (1+\pi_t^o)\alpha_{2t}Y_{2t} + (1+\pi_t^o)\alpha_{3t}Y_{3t} + (1+\pi_t^o)\alpha_{4t}Y_{4t} + (1+\pi_t^o)\alpha_{5t}Y_{5t}$$

$$Y_5 = Y - (Y_1 + Y_2 + Y_3 + Y_4)$$

$$L = \sum_{t=1}^{n} R_{G_t}^o - R_{G_t}^c$$

The explicit names of the variables and parameters in the formula are as follows:

Y : Taxable Income

α : Tax Rates in Brackets

R : Provided Tax Revenues

R_G^c : Tax Revenues Calculated on Current Inflation

R_G^o : Tax Revenues Calculated on the Valuation Rate Used by the Government

π_t : Current Inflation Rate

π_t^o : Valuation Rate Used by the Government

L : Total Loss of Revenue from Cold Progression

6.2. Application

The Income Tax schedule for 2006, which we consider the base year, is as follows:

[5] *This change in the tariff structure has caused a four-bracket evaluation in the 2006-2018 period and a five-bracket evaluation in the 2019-2021 period in the mathematical equation given below. The given equation represents the five-bracket tariff, and it is sufficient to remove the fifth income bracket from the formula in order to reduce it to the four-bracket tariff.*

Income Tax Tariff (2006)		
7.000 liras		15%
18.000 liras	(1.050 liras) for 7.000 liras and for the exceed	20%
40.0000 liras	(3.250 liras) for 18.000 liras and for the exceed	27%
More than 40.000 liras	(9.190 liras) for 40.000 liras and for the exceed	35%
Tax of 100.000 liras *: 30.190 liras*		
Disposable Income *: 69.810 liras*		

The amount of Income Tax calculated based on 100,000 TL, which we have chosen as the study example, and the disposable income remaining after this tax is taken as given above. *The official CPI rate in 2006 was 0.0965*. The 100,000 liras base used in the example has been expanded with this ratio, and its real value has been preserved. The tariffs applied and to be involved in 2007 and the Income Tax and disposable income calculated over these tariffs are as follows:

The equivalent of 100,000 liras in 2006 was 109,650 liras in 2007.

Income Tax Tariff (2007) (Applied)		
7.500 liras		15%
19.000 liras	(1.125 liras) for 7.500 liras and for the exceed	20%
43.000 liras	(3.425 liras) 19.000 liras and for the exceed	27%
More than 43.000 liras	(9.005 liras) for 43.000 liras and for the exceed	35%
Tax of 109.650 liras *: 33.232,5 liras*		
Disposable Income *: 76.417,5 liras*		

While the CPI rate in 2006 was 0.0965, the official reassessment rate announced by the Government is 0.0780. Even keeping the reassessment rate lower than the inflation rate alone is evidence of cold progression. Besides, the valuation rates of the income brackets in the tariff are 0.0714 in the first bracket, 0.0555 in the second bracket, and 0.0750 in the third and fourth brackets, respectively. However, the tariff to be applied using the inflation rate and the Income Tax calculated according to this tariff, and the disposable income amounts are as follows:

Income Tax Tariff (2007) (Updated with CPI)		
7.675,5 liras		15%
19.737 liras	(1.151 liras) 7.675,5 liras and for the exceed	20%
43.860 liras	(3.563 liras) 19.737 liras and for the exceed	27%
More than 43.860 liras	(10.076 liras) 43.860 liras and for the exceed	35%
Tax of 109.650 liras *: 33.102,5 liras*		
Disposable Income *: 76.547,5 liras*		

The outcomes for 109,650 liras according to the tariffs applied and should be applied can be followed from the operations made on the bottom line of the tariffs. Accordingly, the conclusion that whether cold progression exists or not can be seen by the following calculation:

Indirectly Received Excess Tax: (33.232,5 - 33.102,5) = 130 liras
Loss of Disposable Income: (76.417,5 - 76.547,5) = - 130 liras
Outcome: Cold Progression Exists!

6.3. Consolidation of the Application

As can be seen, the hypothesis of "*There is a cold progression in Turkish Income Tax applications*", which constitutes the core of the study, has been confirmed through the comparison of tariffs applied to 2006 income, and tariffs should be applied[6]. The results obtained by using the developed method for the entire period are as follows:

Table: 1
The Course of Cold Progression in the Turkish Income Tax Tariff, 2006-2021

	CPI (%) (Annual Change)	Base (*)	Tax Calculated According to the Tariff in the Application	Tax Calculated to the Updated Tariff according to CPI	Loss of Disposable Income *(Cold Progression)*
2006	9,65	100.000	30.190,0	-	-
2007	8,39	109.650	33.232,5	33.102,5	130,0
2008	10,06	118.850	36.245,5	35.881,5	364,0
2009	6,53	130.806	39.807,0	39.491,0	316,0
2010	6,40	139.348	42.792,0	40.167,0	2.625,0
2011	10,45	148.266	45.573,0	44.762,0	811,0
2012	6,16	163.760	50.426,0	49.440,0	986,0
2013	7,40	173.848	53.692,0	52.486,0	1.206,0
2014	8,17	186.713	58.110,0	56.369,0	1.741,0
2015	8,81	201.968	62.779,0	60.974,0	1.805,0
2016	8,53	219.761	68.666,0	66.746,0	1.920,0
2017	11,92	238.507	75.127,0	72.114,0	3.013,0
2018	20,30	266.937	83.908,0	80.709,0	3.199,0
2019	11,84	321.125	100.854,0	97.096,0	3.758,0
2020	14,60	359.146	111.571,0	108.593,0	2.978,0
2021	36,08	411.581	128.743,0	124.447,0	4.296,0

(*) The base is updated cumulatively according to the CPI rate of the previous year.

The information obtained with the help of the table can be summarised as follows: (i) There is cold progression throughout the period under consideration. (ii) The degree of cold progression increased dramatically in 2010, eight times the previous year. (iii) The degree of cold progression experienced in 2006-2021 has generally increased, which means the trend has a positive slope. While the cold progression ratio to be taken as a base in 2006 was 0.130% from (130/100,000) to 0.130%, this ratio increased to (4,296/359,146) 1,196% in 2021 and increased 9,2 times in total. This result shows that in Turkey, more taxes are taken from personal income without being felt, and inflation is used as a tool by the Government to generate tax revenues. Another evaluation that the result gives an opportunity is that the progressivity that should serve fairness in taxation has been weakened in this direction.

7. Outcome

Turkey was also dragged into the chronic inflation process, as many developing countries were in the 1970s, and this has been the main problem in Turkey for about thirty years. Because of the stabilisation measures taken after the 2001 Crisis and the political stability achieved in the country, inflation was reduced to single digits for the first time in many years. After this severe disinflation period, inflation remained around 8% until 2017

[6] *For the Income Tax Tariffs applied in Turkey in the period of 2006-2021 and the Income Tax Tariffs updated according to the CPI, see, Appendix 1 and Appendix 2, respectively.*

(except 10.08% in 2008 and 10.45% in 2011), but after this year, it increased to double figures. Inflation, which was 20.30% in 2018, decreased to 11.84% in 2019 but started to rise afterwards and reached an extraordinary level of 36.08% in 2021 with the effect of the pandemic.

In the theoretical discussions on the social state and tax justice, it is clear that the progressive rate is superior to the fixed rate[7]. However, the progressive rate can be disabled or weakened in presenting the expected effects of inflationary processes. It's the responsibility of governments that make it ineffective, not a progressive rate. The reason why governments take decisions in this direction is mostly due to increased income needs. Governments can easily disguise this to fight against inflation. At this point, it has been revealed from 2006 to 2021 regarding Turkish Income Tax, that the cold progression, which is the subject of this study, has eroded the advantages of the progressive tariff and created undesirable effects in terms of the income distribution.

Progressive income tax may abandon its expected justice function as inflation rises. Namely, an increase in inflation may increase the nominal income and expose the taxpayer to a progressively higher tax payment. High tax rates mean a high tax burden. The cold progression, which we have discussed by sticking to the use of German within the study, creates a kind of hidden tax on taxpayers whose purchasing power decrease but pays more taxes. As a result of cold progression, governments can increase their tax revenues while taxpayers' incomes increase in nominal terms, reducing their purchasing power. Cold progression has two basic dimensions in this context. One is political, and the other is social. Cold progression is a tool to fight against inflation in the political dimension. Accordingly, since it is difficult to notice what has been done about the decisions taken, it is unlikely that the cold progression will cause the governments to lose votes. In the social dimension, cold progression further distorts the income distribution and puts disadvantaged taxpayers in a much more disadvantageous position. This is worrisome as it results in even more inequitable distribution.

Income Tax generates approximately one-fifth of tax revenue in Turkey. The cold progression caused by the government imposes a more significant tax burden on the taxpayers of this tax as a whole. In addition, the relatively narrow Turkish income tax brackets cause taxpayers to be taxed from the upper-income brackets in the tariff. This mainly affects wage earners in an unfair position to a greater extent. For these reasons, finding solutions to the cold progression problem is essential because inflation will likely follow at much higher rates soon.

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[7] *There will probably be objections to this determination by those who defend fixed tax. However, this study is not suitable for responding to objections due to the known page limits. The author/s will discuss with this aspect of the subject in a separate study.*

The suggestions that come to mind in the first determination of the solution to the cold progression problem are as follows:

- ***Abandoning the Use of Progressive Tariffs:*** In our opinion, this recommendation is *not to bandage the bleeding finger but to cut it*. Because as stated earlier, progressive tariffs are superior in making the redistribution of income more equitable. In terms of taxation technique, it is a practical solution to defend fixed income tax instead of a progressive tax. After all, since there are no upper-income brackets in the fixed rate tariff, there is no opportunity for governments to tax more effectively without being noticed. However, the fixed rate in question contradicts the social state principle. In our opinion, the problem should be solved within the progressive tariff itself.
- ***Linking Tariff Brackets to Price Increases (Indexing):*** The brackets in the tariff should be expanded and updated as much as the inflation rate experienced in each period; that is, they should be indexed. Indexing can prevent the adverse effects of cold progression. Still, since the period in which inflation is measured and the period in which tax is paid are different, it is appropriate to keep the delays as short as possible. In our opinion, this period should be monthly, and the income tax schedule should be expanded monthly in order not to cause injustice in wages.
- ***Inflation Accounting Application:*** It is the accounting process of all kinds of nominal values that will affect taxation, that is, the amounts to be taken into account in inflation adjustment, by multiplying the adjustment coefficient determined every month. Inflation accounting is much more effective as it solves the costs that high inflation will impose on the tax system based on the taxpayer. However, inflation accounting is costly as it imposes additional burdens on public accountants who are intermediaries in the system. Also, since this method accepts inflation as data, it is prestige-losing for the political authority, namely the government.
- ***Determining the Tariff Increase Rate Same with the Inflation Rate:*** The emergence of cold progression is possible by increasing the income tax brackets at a lower rate than the inflation rate, which means making a kind of undervaluation in a sense. Accordingly, increasing the income brackets at the rate of inflation and offsetting the wage earners taxed on the net income at the end of the year can resolve the obvious negativity. However, the point to be considered here is the methods used in calculating inflation - Laspeyres and Paasche indexes are referred to here-. This recommendation is of no value if inflation is calculated under the real value.

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Appendix: 1
Applied Income Tax Tariffs (2006-2021)

	First Bracket		Second Bracket		Third Bracket		Fourth Bracket		Fifth Bracket
2006	Up to 7.000 TL	15%	(1.050) for 7.000 TL for the exceed	20%	(3.250) for 18.000 TL for the exceed	27%	(9.190) for 40.000 TL for the exceed	35%	
2007	Up to 7.500 TL	15%	(1.125) for 7.500 TL for the exceed	20%	(3.425) for 19.000 TL for the exceed	27%	(9.005) for 43.000 TL for the exceed	35%	
2008	Up to 7.800 TL	15%	(1.170) for 7.800 TL for the exceed	20%	(3.570) for 19.800 TL for the exceed	27%	(10.293) for 44.700 TL for the exceed	35%	
2009	Up to 8.700 TL	15%	(1.320) for 8.800 TL for the exceed	20%	(3.960) for 22.000 TL for the exceed	27%	(11.520) for 50.000 TL for the exceed	35%	
2010	Up to 8.800 TL	15%	(1.320) for 8.800 TL for the exceed	20%	(3.960) for 22.000 TL for the exceed	27%	(11.520) for 50.000 TL for the exceed	35%	
2011	Up to 9.400 TL	15%	(1.410) for 9.400 TL for the exceed	20%	(4.130) for 23.000 TL for the exceed	27%	(12.230) for 53.000 TL for the exceed	35%	
2012	Up to 10.000 TL	15%	(1.500) for 10.000 TL for the exceed	20%	(4.500) for 25.000 TL for the exceed	27%	(13.410) for 58.000 TL for the exceed	35%	
2013	Up to 10.700 TL	15%	(1.605) for 10.700 TL for the exceed	20%	(4.665) for 26.000 TL for the exceed	27%	(13.845) for 60.000 TL for the exceed	35%	

2014	Up to 11.000 TL	15%	(1.650) for 11.000 TL for the exceed	20%	(4.850) for 27.000 TL for the exceed	27%	(13.760) for 60.000 TL for the exceed	35%			
2015	Up to 12.000 TL	15%	(1.800) for 12.000 TL for the exceed	20%	(5.200) for 29.000 TL for the exceed	27%	(15.190) for 66.000 TL for the exceed	35%			
2016	Up to 12.600 TL	15%	(1.890) for 12.600 TL for the exceed	20%	(3.570) for 19.800 TL for the exceed	27%	(15.900) for 69.000 TL for the exceed	35%			
2017	Up to 13.000 TL	15%	(1.950) for 13.000 TL for the exceed	20%	(3.570) for 19.800 TL for the exceed	27%	(16.150) for 70.000 TL for the exceed	35%			
2018	Up to 14.800 TL	15%	(2.220) for 14.800 TL for the exceed	20%	(3.570) for 19.800 TL for the exceed	27%	(18.480) for 80.000 TL for the exceed	35%			
2019	Up to 18.000 TL	15%	(2.700) for 18.000 TL for the exceed	20%	(7.100) for 40.000 TL for the exceed	27%	(22.760) for 98.000 TL for the exceed	35%	(163.460) for 500.000 TL for the exceed	40%	
2020	Up to 22.000 TL	15%	(3.300) for 22.000 TL for the exceed	20%	(8.700) for 49.000 TL for the exceed	27%	(27.870) for 120.000 TL for the exceed	35%	(195.870) for 600.000 TL for the exceed	40%	
2021	Up to 24.000 TL	15%	(3.600) for 24.000 TL for the exceed	20%	(9.400) for 53.000 TL for the exceed	27%	(30.190) for 130.000 TL for the exceed	35%	(212.190) for 650.000 TL for the exceed	40%	

Source: It was created by us using the transcripts prepared by the Revenue Administration of the Ministry of Treasury and Finance.

Appendix: 2
Income Tax Tariffs Updated According to CPI (2006-2021)

	Income Tax Tariff First Bracket		**Income Tax Tariff Second Bracket**		**Income Tax Tariff Third Bracket**		**Income Tax Tariff Fourth Bracket**		**Income Tax Tariff Fifth Bracket**	
2006	Up to 7.000 TL	15%	(1.050) for 7.000 TL for the exceed	20%	(3.250) for 18.000 TL for the exceed %27	27%	(9.190) for 40.000 TL for the exceed	35%		
2007	Up to 7.675,5 TL	15%	(1.151) for 7.675,5 TL for the exceed	20%	(3.563) for 19.737 TL for the exceed	27%	(10.076) for 43.860 TL for the exceed	35%		
2008	Up to 8.320 TL	15%	(1.248) for 8.320 TL for the exceed	20%	(3.863) for 21.393 TL for the exceed	27%	(10.923) for 47.540 TL for the exceed	35%		
2009	Up to 9.157 TL	15%	(1.374) for 9.157 TL for the exceed	20%	(4.252) for 23.545 TL for the exceed	27%	(12.022) for 52.322 TL for the exceed	35%		
2010	Up to 9.755 TL	15%	(1.463) for 9.755 TL for the exceed	20%	(3.066) for 25.083 TL for the exceed	27%	(19.807) for 55.739 TL for the exceed	35%		
2011	Up to 10.379 TL	15%	(1.557) for 10.379 TL for the exceed	20%	(4.819) for 26.688 TL for the exceed	27%	(13.626) for 59.306 TL for the exceed	35%		
2012	Up to 11.464 TL	15%	(1.720) for 11.464 TL for the exceed	20%	(5.323) for 29.477 TL for the exceed	27%	(15.050) for 65.503 TL for the exceed	35%		
2013	Up to 12.170 TL	15%	(1.826) for 12.170 TL for the exceed	20%	(5.651) for 31.293 TL for the exceed	27%	(15.977) for 69.538 TL for the exceed	35%		
2014	Up to 13.071 TL	15%	(1.961) for 13.071 TL for the exceed	20%	(6.069) for 33.609 TL for the exceed	27%	(17.159) for 74.684 TL for the exceed	35%		
2015	Up to 14.139 TL	15%	(2.121) for 14.139 TL for the exceed	20%	(6.564) for 36.355 TL for the exceed	27%	(18.560) for 80.786 TL for the exceed	35%		
2016	Up to 13.385 TL	15%	(2.308) for 13.385 TL for the exceed	20%	(7.543) for 39.558 TL for the exceed	27%	(20.596) for 87.903 TL for the exceed	35%		
2017	Up to 14.527 TL	15%	(2.179) for 14.527 TL for the exceed	20%	(7.860) for 42.932 TL for the exceed	27%	(22.027) for 95.401 TL for the exceed	35%		
2018	Up to 16.259 TL	15%	(2.439) for 16.259 TL for the exceed	20%	(8.797) for 48.049 TL for the exceed	27%	(24.652) for 106.773 TL for the exceed	35%		
2019	Up to 19.560 TL	15%	(2.934) for 19.560 TL for the exceed	20%	(10.576) for 57.769 TL for the exceed	27%	(29.659) for 128.448 TL for the exceed	35%	(159.702) for 500.000 TL for the exceed	40%
2020	Up to 21.876 TL	15%	(3.281) for 21.876 TL for the exceed	20%	(11.828) for 64.609 TL for the exceed	27%	(33.171) for 143.656 TL for the exceed	35%	(178.611) for 559.200 TL for the exceed	40%
2021	Up to 25.070 TL	15%	(3.761) for 25.070 TL for the exceed	20%	(13.555) for 74.042 TL for the exceed	27%	(38.014) for 164.630 TL for the exceed	35%	(204.689) for 640.843 TL for the exceed	40%

Source: It was created by us using the CPI rates prepared by TURKSTAT.