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Is Inflation a Trigger of Growth or a Harbinger of Economic Slowness? A Dynamic Threshold Model Analysis on 26 Sub-Regions of Turkey

Enflasyon Büyümenin Tetikleyicisi mi Yoksa Ekonomik Yavaşlığın Habercisi mi? Türkiye'nin 26 Alt-Bölgesi Üzerine Dinamik Eşik Modeli Analizi

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Abstract

This study aims to explain the effects of regional inflation thresholds on regional economic growth in 26 sub-regions (NUTS-2 level) in the Turkish economy by using dynamic threshold model analysis for the period 2004-2020. The findings of the analysis show that increases in regional inflation rates affect regional growth positively until reaching the threshold value, but negatively after exceeding the threshold value in 20 of 26 sub-regions. This result is in parallel with the findings frequently questioned in the literature in recent years and points out the phenomenon that is composed of the synthesis of the monetarist and the structural views. Besides, analysis findings showing that steady-state income convergence process is valid in 25 sub-regions reflect that increases in regional population ratios have statistically insignificant effects on regional economic growth. In addition, it has been observed that employment increases accelerate the growth processes of relatively developed regions, while statistically insignificant effects have been detected in underdeveloped regions. A similar result shows itself in terms of foreign trade data, and it is seen that the effect of foreign trade on regional growth is quite limited. When the results are evaluated as a whole, it can be mentioned that the distinction between developed and underdeveloped regions in the Turkish economy is sharp and that macroeconomic indicators affect the economic growth of the regions according to their development level.

Jel Codes: *C34, E31, R11*
Keywords: *Regional Inflation, Regional Economic Growth, Analysis of Dynamic Threshold Model, Turkish Economy*

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Öz

Bu çalışma, Türkiye ekonomisinde bölgesel enflasyon eşiğinin bölgesel ekonomik büyüme üzerindeki etkilerini 26 alt-bölge itibariyle 2004-2020 dönemi için dinamik eşik modeli analizini kullanarak açıklamayı amaçlamaktadır. Analiz bulguları, 26 alt-bölgenin 20'sinde eşik düzeye ulaşıncaya kadar bölgesel enflasyon oranlarındaki artışların bölgesel büyümeyi pozitif, ancak eşik değerin aşılmasından sonra ise negatif yönlü olarak etkilediğini göstermiştir. Ayrıca, 25 alt-bölgede kararlı durum gelir yakınsama sürecinin geçerli olduğunu gösteren analiz sonuçları, bölgesel enflasyon oranlarındaki artışların bölgesel ekonomik büyüme üzerinde istatistiki olarak anlamsız etkilere sahip olduğunu yansıtmıştır. İlaveten, istihdam artışlarının nispeten gelişmiş bölgelerde büyüme sürecini hızlandırdığı gözlenmiş, ancak azgelişmiş bölgelerde ise istatistiki bakımdan anlamsız etkilerin varlığı tespit edilmiştir. Benzer bir sonuç dış ticaret bağlamında da ortaya çıkmış ve dış ticaretin bölgesel büyüme üzerindeki etkisinin oldukça sınırlı olduğu görülmüştür. Sonuçlar bir bütün olarak değerlendirildiğinde, Türkiye ekonomisinde gelişmiş ve gelişmekte olan bölgeler arasında keskin bir ayrımın geçerli olduğu ve makroekonomik değişkenlerin bölgelerin ekonomik büyüme düzeyini sahip oldukları kalkınma seviyesine göre etkilediği söylenebilir.

Jel Kodları: *C34, E31, R11*
Anahtar Kelimeler: *Bölgesel Enflasyon, Bölgesel Ekonomik Büyüme, Dinamik Eşik Modeli Analizi, Türkiye Ekonomisi*

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1. Introduction

The stable macroeconomic conditions determine the basis of sustainable growth policies of countries, whether they are developed or underdeveloped. Undoubtedly, good sustainable growth conditions are shaped depending on the structural characteristics of the countries and the stable balance of growth process is related to the provision of a consistent macroeconomic infrastructure (Fischer, 1993). While there are many economic factors affecting sustainable growth dynamism, one of the most important determinants among them is the stability of general price level. With the price stability that manifests itself as a result of a low and sustainable inflation rate, investment, consumption and savings decisions of economic agents can stabilize both in current and future periods, otherwise investors and savers are pushed into indecision triggered by uncertainties. In this context, price stability contributes to sustainable economic growth and economic welfare by helping to eliminate the uncertainty created by high inflation. As a matter of fact, many central banks are trying to maintain price stability by keeping inflation under control. In this respect, the effects of inflation on economic growth process are among the issues that policy makers and economists frequently focus on. Although the relations between inflation level and growth occupy an important place in the economic literature, they constitute one of the subjects on which a definite agreement cannot be reached.

The nature of the links between inflation and growth has been shaped around two schools of thought: *the Structuralists* and *the Monetarists*. Despite the structuralist view, which argues that inflation is an important determinant in triggering economic growth dynamism, the monetary view has highlighted the negative effects of inflation on economic growth (Munir et al., 2009). *The Tobin Effect* stands out as an element used to explain the nature of the links between inflation and growth in the context of the structuralist view. Tobin (1965), who argues that an increase in money supply will increase inflation rates and that rising inflation will increase the opportunity cost of liquidity, states that at a certain level of savings, the redistribution of funds will occur from liquidity to capital accumulation. Emphasizing that individual savers who want to get rid of the distorting effects of inflation on income distribution will transfer their savings to interest-earning securities, Tobin (1965) indicates that this process will accelerate capital accumulation. Arguing that increases in capital accumulation will increase the capital/labor ratios and the productivity of the workforce, the author argues that growth performance of the economies will also accelerate (Jones & Manuelli, 1995; Terzi, 2004; Gillman et al., 2004).

The view that increases in inflation rates will negatively affect growth is considered within the framework of the monetarist view. The monetarist view, which suggests that the future profit rates of investments will become uncertain due to inflation, states that the realization period of investments will be longer due to the volatilities in general level of prices, more prudent and even abstaining will be acted on when choosing investment projects, and as a result, growth will slow down. In addition, it has been argued that inflation rates, which relatively increase the prices of export goods, will reduce the competitive potential in foreign markets and therefore create negative pressures on the balance of payments. Besides, it is emphasized that high inflation rates, which are claimed to disrupt the optimum functioning of taxation

policies, will accelerate the uncertainties by corrupting the borrowing and lending systematics (Gokal & Hanif, 2004). Furthermore, the monetarist view, which argues that high interest rates caused by increasing inflation will crowd out investments, indicates that production volume and acceleration of growth process will be lost due to decrease in investments and capital stock. Also, monetarists, stating that high interest rates combined with inflation will increase the fluctuations in exchange rates, have revealed that balance of payments management will become increasingly difficult. Undoubtedly, upward pressures in exchange rates with inflation, as well as the relative increase in the value of the national currency due to increases in interest rates can be considered as additional factors that complicate exchange rate, budget and balance of payments management (Sevinç & Akıncı, 2015).

In addition to the structuralist and monetarist views, one of the main focal points of the Keynesian policies, which took their place on the world agenda especially after the Second World War, is to increase the aggregate demand. Although Keynesian policies state that increasing aggregate demand can accelerate inflation, they argue that triggering production increases is the key point. Therefore, the Phillips Curve approach has been used frequently to explain the relationship between inflation and growth. The Phillips Curve approach, which generally focuses on the relationship between inflation and unemployment, argues that high inflation causes low unemployment rate and therefore has a positive effect on growth. In addition, Bruno & Easterly (1998) attribute the positive effect of high inflation on growth to the mandatory increase in savings because of high inflation. Undoubtedly, increased savings due to high inflation are directed to investments and rising investments accelerate growth. On the other hand, another mechanism that determines the relationship between inflation, investments, and growth is relative price changes. According to Fischer (1981), it is very difficult to determine the source of the increase in inflation rates in an economic system with imperfect competition and price rigidities. In other words, it is impossible to determine the nominal and real macroeconomic conditions that cause high inflation due to incomplete information conditions. Since the source of price movements cannot be determined in such an economic structure and consistent economic forecasts for the future cannot be made, efficiency in resource allocation will deteriorate. Informative price process, which causes current price fluctuations and therefore inflation rates to increase, makes it difficult for decision-makers to receive market signals which are necessary to protect themselves from price fluctuations. This process, which causes the efficiency in resource allocation and the perception of investment to deteriorate, has a negative impact on economic growth. It is also emphasized by Friedman (1977) that high inflation and excessive price fluctuations will impair efficiency in resource allocation, negatively affect economic efficiency, weaken the information transfer between decision-making units, and therefore hinder economic growth.

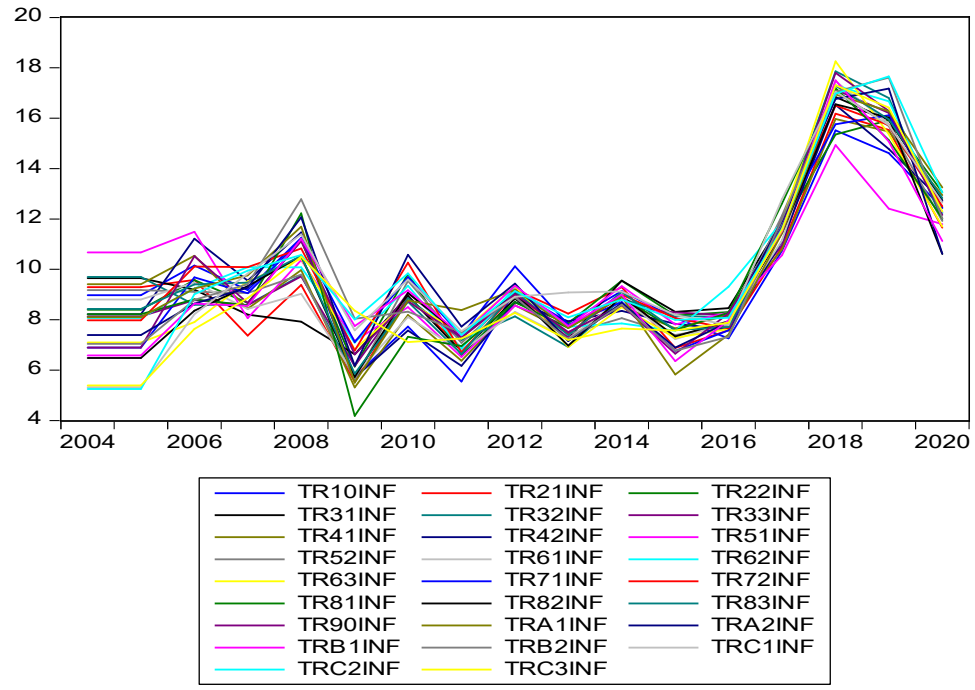
As can be understood from the theoretical discussions, the first studies examining the relationships between inflation and economic growth focus on the existence of linear relationships between the related variables. In other words, it is argued that the effect of inflation on economic growth is positive or negative. Levine & Renelt (1992), Levine & Zervos (1993) and Barro (1995) are the pioneers of these kind of studies. However, recent studies pioneered by Fischer (1993), Sarel (1996), Ghosh & Phillips (1998), Bruno & Easterly (1998),

Gylfason & Herbertsson (2001) and Khan & Senhadji (2001) have shown the existence of non-linear relationships between inflation and economic growth. New generation studies brought to the literature have revealed that the effect of inflation on economic growth occurs with a certain inflation threshold value and the character of the relations changes after the threshold value is exceeded. Studies have generally shown that the effect of low and predictable inflation on economic growth is generally positive, but after the threshold inflation rate is exceeded, inflation affects growth negatively. In this context, as noted by Sekmen & Topuz (2019), central banks, whose main task is to ensure price stability, have often started to dwell on the question of what the optimum inflation rate should be for sustainable economic growth.

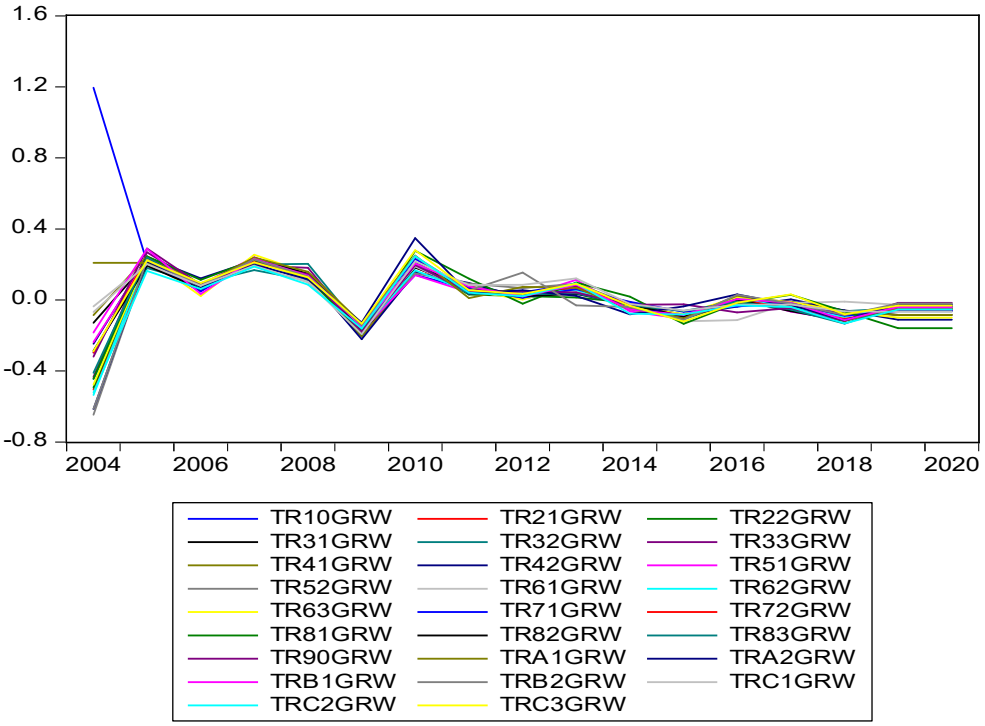
Inflation-growth links, where consensus could not be established due to the positive and negative effects it has on economic growth, has become one of the fields of study where a common opinion revealed and a synthesis of monetarist view and structural view have begun to be achieved as a result of regression analyzes created using new econometric techniques that have been developed recently. Inflation-growth relations, especially explained by regression analyzes based on threshold values and regime processes, revealed that increasing inflation rates affect growth positively until the inflation threshold is reached, but negatively after exceeding the threshold. Starting from a similar problematic, the main purpose of this study is to question whether regional inflation has any threshold on regional growth in the Turkish economy. To be more specific, this study aims to explain the effects of regional inflation threshold on regional growth in 26 sub-regions (NUTS-2 level) in the Turkish economy by applying dynamic threshold model analysis for the period from 2004 to 2020. One of the biggest problems faced by all countries, regardless of their level of development, is high inflation. High inflation, which can undermine both internal and external economic stability and disrupt expectations for the future, has become one of the main chronic problems for the Turkish economy. It has been observed that even after the periods when the high inflation problem in the Turkish economy, which is closely tied to the capitalist system, could be solved relatively, inflation got out of control again and it was seen that the economic policies implemented to solve the problem could be a part of the deadlock. In this process, which has been observed more clearly since the 2000s, serious decreases were achieved in inflation rates until 2006 due to the strict adherence to the stabilization programs offered by the IMF and the positive cycle provided by the external economic conjuncture. Inflation rates, which have been in an upward trend since 2006, have seen their lowest levels due to the recession caused by the 2008 Global Financial Crisis and have started to rise since then. The termination of the quantitative easing programs implemented in order to overcome the effects of the economic crisis, especially in the USA and Europe, and thus the reduction in the money supply, caused an intense exchange rate and inflation pressure in Turkey, as in many developing countries. In addition to all this negative conjuncture, the lack of using effective monetary policy instruments, the applying of indirect measures to suppress inflation and the exchange rate pressures, and the economic policy instruments that are incompatible with the realities of economics have increased the exchange rate and inflation pressures. As a result of this whole process, the inflation rate increased to 70% and the US dollar exchange rate increased to 16 TL in May in 2022. Undoubtedly, high inflation and exchange rate pressure also affected

economic growth and paved the way for a decline in growth rates. At this point, it should be noted that the negative economic conjuncture, which made its impact felt on a macro basis, also emerged intensely on a regional basis. In this context, Graph 1 and Graph 2 show the regional inflation and regional growth process for the period of 2004-2020, respectively.

Graph 1: Regional Inflation Rates in 26 Sub-Regions



Graph 2: Regional Growth Rates in 26 Sub-Regions



As can be seen from the charts, regional growth rates accelerated upwards with the relatively low regional inflation rates, which remained at single-digit levels until 2006. It was observed that regional economic growth lost dynamism with the increasing regional inflation rates in 2006, however, this process reversed and the regional inflation rates decreased and the regional growth rates increased in 2007. The regional inflation rates, which started to rise in 2008, began to be accompanied by a falling regional growth rate, and the stagnation process caused by the Global Financial Crisis paved the way for regional growth to lose momentum along with regional inflation. Regional inflation rates, which have been following a rather unstable course since 2009, caused downward movements by losing momentum in regional growth rates and since 2016 regional inflation rates have reached their peak value, while regional growth rates have dropped to the bottom level. In particular, the year of 2018 has come to the fore as the main year, revealing the impression that there may be negative links between regional inflation and regional growth.

At this point, it should be noted that the study does not focus on the regional determinants of growth but considers the threshold effects of regional inflation on regional growth. It also examines the effects of some variables such as population, employment, openness rate, and terms of trade, which can affect regional growth as well as inflation and are frequently used in the literature within the framework of this subject, on regional growth. In addition, the fact that no previous study on inflation-growth relations has been carried out on the basis of each sub-region in the Turkish economy distinguishes this study from other studies in the literature and represents a superior aspect. Moreover, estimating the inflation threshold for each sub-region in the economic growth process constitutes one of the main elements that differentiate this study from other studies. One of the most important reasons for the absence of such a study by sub-regions in the literature may be due to the difficulty of obtaining regional data set. Moreover, the fact that the regional data set contain a very limited time period and the data have a discrete structure can be considered as a reason why a study in this way has not been presented before. At this point, it should be noted that the fact that this study covers a period of 17 years can be considered as relatively inadequate for time series analysis. However, the fact that this paper tries to calculate the series with missing data and tries to guide future studies with more comprehensive data sets forms the main motivation for this study. Undoubtedly, determining the effects of regional inflation on regional growth and determining regional growth dynamics can also lead to macroeconomic policy making processes on a national basis. For this purpose, the study consists of five parts. After the introduction section, a summary of the literature reviews on the linkages between inflation and economic growth is represented in the second part, and the methodological information and data set is introduced in the third part. After the fourth part, in which the econometric application findings are presented, the study is concluded with the conclusion part where a general evaluation is made.

2. Literature Review

There are intensive researches on the nature of the nexus between inflation and economic growth in the economics literature. Although there is no consensus on the magnitude,

direction and sign of the effects of inflation on economic growth, it has reached a wide audience of supporters that inflation-growth links do not emerge in a linear form and non-linear relationships can manifest themselves.

Non-linear inflation-growth relationships has begun to take shape with the pioneering work by Fischer (1993), and the author states that inflation rates contribute to growth until they reach the threshold value, but they hinder growth once the threshold is passed. Based on this view, Sarel (1996) interprets the positive and negative effects of inflation on growth in terms of the 8% inflation threshold. Ghosh & Phillips (1998), who calculate the 2.5% inflation threshold rate in order to determine the positive and negative effects on growth, argue that inflation is one of the most basic determinants of growth dynamism. Christoffersen & Doyle (1998) calculate the inflation threshold as 13% and Kannan & Joshi (1998) as 6% in their studies, which take into account the transition economies, and they state that growth is affected positively at inflation levels below the specified threshold, but negatively if it is above the threshold. Bruno & Easterly (1998), who estimate the inflation threshold as 40% in their study, suggest that inflation may interrupt the growth process after the 40% threshold is passed.

Unlike these studies, in which the inflation level is chosen arbitrarily, econometric methods are used in which the threshold level can be determined by the model in new generation works. Stating that the inflation threshold is between 1% and 3% for developed countries and 11-12% for developing countries, Khan & Senhadii (2001), using the threshold value estimation method of Hansen (1999), claim that when the threshold values are exceeded, inflation affects the growth process negatively. Gylfason & Herbertsson (2001) argue that such a relationship is valid if the inflation threshold is between 10% and 20%. In addition to Sweidan (2004) arguing that the negative effects of inflation on economic growth will emerge only after the threshold value of 2% is exceeded, Mubarik (2005) points out that these negative effects manifest themselves after the inflation threshold of 9%. Following Drukker et al. (2005) who claim that the inflation threshold is 2.57% for developed countries and 12.61% for developing countries, Vaona & Schiavo (2007) analyzes the inflation-economic growth nexus with the help of semi-parametric and non-parametric instrument variable estimators and the threshold level of inflation is estimated to be 12% for developed countries. Similarly, Munir et al. (2009) calculate the inflation threshold for the Malaysian economy as 3.89%. Adding a constant regime coefficient to the panel threshold model put forward by Hansen (1999) to solve the deviation problems arising from the variables that are not taken into account, Bick (2010) calculates the inflation threshold as 12% for 40 countries. Using the static panel data model developed by Hansen (1999), Sekmen & Topuz (2019) calculate the inflation threshold as 3.6% for OECD countries in the period of 1996-2016.

As emphasized by Sekmen & Topuz (2019), in most of the early studies in this field, the threshold level is determined externally and unobservable heterogeneity is not taken into account. After all, most of the recent work has used PSTR analysis, which is the extended version of Hansen (1999) model, introduced by González et al. (2005). This model allows the threshold value to be determined internally and can solve the problems of internality and heterogeneity (Sekmen & Topuz, 2019). Using the developed country sample and PSTR

analysis technique, Omay & Kan (2010) estimate the inflation threshold as 2.52%. On the other hand, using LSTR analysis technique, which is another version of PSTR analysis, Espinoza et al. (2010) estimate the inflation thresholds for developed and developing countries as 1% and 10%, respectively. Other studies that try to determine the inflation threshold using PSTR and GMM analyzes are done by Lopez-Villavicencio & Mignon (2011) and Tung & Thanh (2015). Lopez-Villavicencio & Mignon (2011) calculate the inflation threshold for developed and developing countries as 1.2% and 14.5%, respectively, and Tung & Thanh (2015) estimate the inflation threshold for the Vietnamese economy as 7%.

Studies on what the inflation threshold should be in the relationship between inflation and growth are also examined using dynamic panel threshold models developed by Caner & Hansen (2004). One of the most remarkable studies trying to determine the inflation threshold for 120 countries using the dynamic panel threshold model is done by Kremer et al. (2013). The authors suggest that the 2.5% inflation threshold for developed countries and 17% for developing countries are determinants of growth. Following Kremer et al. (2013), Vinayagathasan (2013) calculates the inflation threshold, which is effective on growth, as 5.43% for 32 Asian countries and Bağlan & Yoldaş (2014) estimate it as 12% for 92 countries. Underlining that the 6.7% inflation threshold for African countries is the basis for the growth process, Ndoricimpa (2017) expresses that when the threshold is exceeded, growth is interrupted. Ekinci et al. (2020) calculate the inflation threshold value is 4.18% in 24 countries with inflation targeting, and declare that if the threshold is exceeded, the effect of inflation on economic growth is negative. Some studies in the economics literature are based on the estimation of the inflation threshold with the help of FGLS analysis. One of the most important of these studies is carried out by de Carvalho et al. (2018) and Azam & Khan (2020). Examining the relationship between inflation and economic development in 65 countries for the period 2001-2011, de Carvalho et al. (2018) conclude that there is an inverse relationship between inflation persistence and economic development. On the other hand, trying to determine the inflation threshold for developed and developing countries, Azam & Khan (2020) emphasize that the inflation threshold of 5.36% for developed countries and 12.23% for developing countries is the main determinant of growth.

The threshold effects of inflation on economic growth have also been examined to a very limited extent by considering the Turkish economy. Kaya & Yılmaz (2006) explain the effects of regional inflation on regional growth by using time series and panel data analysis in their study, which took into account the 1983-2001 period. Analysis findings show that inflation affects growth negatively in both analysis methods and the validity of causality and cointegration relations between the variables are determined. Akgül & Koç (2008), Akgül & Özdemir (2012) and Sevinç & Akıncı (2015) explain the negative and positive effects of inflation on growth by the inflation threshold of 10.63%, 1.26% and 15%, respectively.

To summarize, it is generally accepted that the effect of increasing inflation on growth is positive until a certain inflation threshold is reached, but negative after exceeding the threshold. Inspired by the studies in the literature, this paper, which bases on what the inflation threshold should be in the relations between inflation and growth, focuses on the relations between the regional inflation threshold and regional growth in 26 sub-regions of

the Turkish economy. While examining the relationships between the relevant variables, the dynamic threshold model developed by Caner & Hansen (2004), which is one of the most popular methods in the estimation of the inflation threshold, is applied.

The literature findings reveal that the inflation threshold relations are valid between inflation and economic growth and that inflation triggers economic growth in low inflation rate regimes, but increasing inflation hinders growth in high inflation rate regimes. In the light of these explanations, Table 1 presents a summary of the literature including studies with inflation threshold values on the relationship between inflation and economic growth.

Table 1: Literature Summary Containing Threshold Inflation Studies on the Inflation-Growth Relationship

Author(s)	Country	Time Span	Method	Independent Variables	Inflation Threshold Value	Findings (BIT, AIT)
Sarel (1996)	87 Countries	1970-1990	Panel Data Analysis	Population (-), GDP (+), Inflation (+, -), Terms of Trade (+), Exchange Rate (-), Gov. Expenditures (-), Investment (+)	8%	+, -
Ghosh & Phillips (1998)	145 Countries	1960-1996	Panel Data Analysis	GDP (+), Inflation (+, -), Population (-), Investment (+), Openness (+), Exchange Rate (-), Death Rate (-)	2.5%	+, -
Christoffersen & Doyle (1998)	16 Transition Countries	1990-1997	Panel Data Analysis	Inflation (+, -), Export (+), War (-), Transition Index (+)	13%	+, -
Bruno & Easterly (1998)	31 Countries	1961-1994	Panel Data Analysis	Inflation (+, -), Economic Crises (+, -), Investment (+), Capital Per-Labour (+)	40%	+, -
Khan & Senhadji (2001)	140 Developed and Developing Countries	1960-1998	Panel Threshold Analysis	Inflation (+, -), Population (-, +)	1%-3% for DCs, 11%-12% for DLCs	+, -
Gylfason & Herbertsson (2001)	170 Countries	1960-1992	Panel Data Analysis	Inflation (+, -), Investments (+), Openness (+), Primary Goods Export (-), Education (+)	10%-20%	+, -
Sweidan (2004)	Jordan	1976:01-2003:10	ARCH	Inflation (+, -), Money Supply (+), Gross Domestic Capital Formation (+)	2%	+, -
Mubarik (2005)	Pakistan	1973-2000	Threshold Regression	Inflation (+, -), Population (+), Investments (+)	9%	+, -
Drukker et al. (2005)	138 Countries	1950-2000	Panel Threshold Analysis	Inflation (+, -), Population (+), Terms of Trade (+, -), Openness (+)	2.57% for DCs, 12.61% for DLCs	Statistically Insignificant, -
Akgül & Koç (2008)	Turkey	1950-2005	Threshold Regression	Inflation (+, -)	10.63%	+, -
Munir et al. (2009)	Malaysia	1970-2005	TAR	Inflation (+, -), Financial Development (+), Gross Domestic Capital Formation (+)	3.89 %	+, -
Omay & Kan (2010)	6 Developed Countries	1972-2005	PSTR Model	Inflation (+, -), Investments (+), Openness (+)	2.52%	+, -
Frimpong & Oteng-Abayie (2010)	Ghana	1960-2008	Threshold Regression	Inflation (+, -)	11%	+, -
Fakhri (2011)	Azerbaijan	2001-2009	Threshold Regression	Inflation (+, -), Gross Domestic Capital Formation (+)	%13	+, -

Note: BIT and AIT imply “Before Inflation Threshold” and “After Inflation Threshold”, respectively.

Table 1: Continued

Author(s)	Country	Time Span	Method	Independent Variables	Inflation Threshold Value	Findings (BIT, AIT)
Akgül & Özdemir (2012)	Turkey	2003:01-2009:12	TAR	Inflation (+, -)	1.261%	+, -
Kremer et al. (2013)	124 Countries	1950-2004	Dynamic Panel Threshold Analysis	Inflation (+, -), Population (+, -), Terms of Trade (-), Openness (+)	2.5% for DCs, 17% for DLCs	+,- for DCs; Statistically Insignificant for DLCs, -
Vinayagathasan (2013)	32 Asian Countries	1980-2009	Dynamic Panel Threshold Analysis	Inflation (+, -), Population (-), Openness (+), Terms of Trade (+)	5.43%	Statistically Insignificant, -
Bağlan & Yoldaş (2014)	92 Developing Countries	1975-2004	Dynamic Panel Threshold Analysis	Inflation (+, -), Population (-), Terms of Trade (+), Openness (-)	12%	+, -
Tung & Thanh (2015)	Vietnam	1986-2013	TSLS and GMM Analysis	Inflation (+, -), Investment (+), Population (+), Openness (-), Terms of Trade (+)	7%	+, -
Sevinç & Akıncı (2015)	26 Sub-Regions in Turkey	1995-2013	Dynamic Panel Threshold	Inflation (+, -), Population (+), Employment (+), Openness (+), Terms of Trade (+), Investment (+), Credit Volume (+)	15	+, -
Aydın et al. (2016)	24 Emerging Countries	1980-2013	Dynamic Panel Threshold	Inflation (+, -), Population (+), Terms of Trade (-), Openness (+)	13.68%	+, -
Ndoricimpa (2017)	47 African Countries	1970-2013	Dynamic Panel Threshold	Inflation (+, -), Population (+), Investment (+), Terms of Trade (-), Openness (+), Gov. Expenditures (-), Politic Instability (-), Institutional Development (+)	6.7%	+, -
Ekinci et al. (2020)	24 Countries	Inflation Targeting Periods	Dynamic Panel Threshold	Inflation (-, -), Population (+), Terms of Trade (+), Openness (+)	4.182%	Statistically Insignificant, -
Azam & Khan (2020)	11 Developed and 16 Developing Countries	1975-2018	FGLS Model	Inflation (+, -), Gross Capital Formation (+), Gov. Expenditures (+), Household Consumption (+), Export (+), Population (-)	5.36% for DCs, 12.23 % for DLCs	+, -

Note: BIT and AIT imply “Before Inflation Threshold” and “After Inflation Threshold”, respectively.

3. Data Set, Econometric Model and Methodology

This study aims to explain the effects of regional inflation threshold on regional growth for the period of 2004-2020 by using dynamic threshold model analysis for 26 sub-regions (NUTS-2 level) in the Turkish economy. The main reason for considering the relevant period is due to the availability of regional data. At this point, it should be noted that the results and policy bundles obtained in the study cover a relatively short period of 17 years. Since regional data and variables are relatively few and difficult to reach, keeping the period relatively short is a necessity. The data period and the number of variables of this study, which aims to provide at least a contribution to researchers who will focus on regional studies and to show which factors can affect the growth structure of regions, can undoubtedly be increased in the coming years. Therefore, repeating the studies with a larger data set, period and number of variables would be a great step towards monitoring the course of regional development and planning the future.

Before introducing the data sets and econometric methodology, it should be emphasized that not all of the data obtained from the official website of the Turkish Statistical Institute (TUIK) has been accessed and the problem of missing data has been encountered. In order to solve this problem, the missing data are estimated using the interpolation method. For the purpose of the study, in order to measure the regional economic growth, the dependent variable of the model, the annual change rate of the Gross Domestic Product per capita is taken in US Dollars, based on the year of 2009. The independent variable of the model is the regional inflation rate. The regional inflation rate is considered as the annual percentage change in the Consumer Price Index (CPI) according to the 12-month averages as of the end of the year. In addition, various control variables are included in the econometric model to control the robustness of the effects of regional inflation on regional economic growth. Control variables are included in analyzes based on the variables used in studies in the literature. In this context, Table 2 presents basic information about the variables to be used in the analyses.

Table 2: The Basic Information on Variables

Definition of the Variable	Abbr.	The Scope of the Variable	The Original Data Period	The Calculated Data Period	The Data Period of the Study	Unit	Source
The Main Variables							
Regional Inflation Rate	INF	Annual CPI Change Rate According to 12-Month Averages as of the End of the Year	2005-2020	2004	2004-2020	%	Turkstat
Regional Economic Growth	GRW	Annual Change Rate of Gross Domestic Product Per Capita	2004-2019	2020		%	Turkstat
The Control Variables							
Regional Initial Income Level	GDP_{t-1}	The natural logarithm of Gross Domestic Product Per Capita in the Previous Period	2004-2019	2020		Log of Income Level	Turkstat
Regional Population	POP	Annual Population Change Rate	2008-2020	2004-2007		‰	Turkstat
Regional Employment	EMP	Employed People as Those Aged 15 and over	2004-2020	-	2004-2020	%	Turkstat
Regional Openness	OPEN	Ratio of the Sum of Total Real Exports and Real Imports to GDP $(EXP + IMP/GDP)$	2013-2020	2004-2012		% GDP	Turkstat
Regional Terms of Trade	TOT	Ratio of Real Export to Real Import (EXP/IMP)	2013-2020	2004-2012		%	Turkstat

The basic regression equation to be estimated by considering the related variables can be shown with the help of equation numbered (1):

$$GRW_t = \beta_0 + \beta_1 INF_t + \left(\beta_2 GDP_{t-1} + \beta_3 POP_t + \beta_4 EMP_t + \beta_5 OPEN_t + \beta_6 TOT_t\right) + \varepsilon_t \quad (1)$$

Dynamic threshold model developed by Hansen (1999) and improved by Caner & Hansen (2004) and Kremer et al. (2013) is the econometric analysis for forecasting the non-linear nexus among the variables. As Greene (2003) explained, in standard time series models the lagged dependent variable may be interrelated with the error terms. Such a relationship makes the results contradictory and spurious. For this reason, the nexus between mentioned variables must be decomposed by applying the dynamic threshold model. Therefore, the dynamic threshold model estimation is used in this study. Because this paper tests the impacts of the regional inflation threshold on the regional economic growth, the endogenous variable is chosen as initial per-capita GDP $\left(PCGDP_{t-1}\right)$ (Bick, 2010). In this manner, a general design of dynamic threshold model may be written as follows:

$$y_t = \mu_t + \beta_1' z_t I(q_t \leq \gamma) + \beta_2' z_t I(q_t > \gamma) + \varepsilon_t \quad (2)$$

where t $\left(t = 1,\ldots,T\right)$ is the time, y_t is the dependent variable, μ_t is the regional-specific effect and ε_t is the white-noise error term. The indicator function, $I(.)$, represents the regime movements presented by the threshold of q_t. γ is the threshold and z_t is set of independent variables which is consists of *m*-dimensional vector (Akıncı et al., 2018; Sevinç & Akıncı, 2015; Kremer et al., 2013).

Dynamic threshold analysis begins with regulation of the regional-specific effects, μ_t. Therefore, the paper applies the forwards orthogonal deviations transformation developed by Arellano & Bover (1995) to regulate the regional-specific effects. The process may be estimated applying the following equation numbered (3):

$$\varepsilon_t^* = \sqrt{\frac{T-t}{T-t+1}}\left[\varepsilon_t - \frac{1}{T-t}\left(\varepsilon_{(t+1)} + \cdots + \varepsilon_T\right)\right] \quad (3)$$

As Kremer et al. (2013) cited, the main characteristic of the regulation phase is to avoid the serial correlation of the transformed error terms. This method permits to convert a cross sectional model into a dynamic threshold model.

In order to determine the regional inflation threshold level, Two Stage Least Squares (2SLS) method must be applied. The 2SLS method, which is one of the simultaneous system of equations solution techniques, is based on estimating the equation to be analyzed twice using the Ordinary Least Squares (OLS) method. In the first step of this method, reduced pattern equations are created and the reduced pattern equations and the estimated value of the endogenous variable are obtained with the OLS method. In the second stage, the internal variables in the examined structural equation are replaced by their estimates obtained from the reduced equations in the first stage, and the created equation is estimated by the OLS method. The results obtained are 2SLS estimates (Güriş et al., 2011: 477-478; Yüce Akıncı &

Akıncı, 2016: 68). In general, 2SLS analysis can be represented with the help of equation patterns such as:

$$Y_1 = \alpha_0 + \alpha_1 Y_2 + \beta_1 X_1 + \varepsilon_1 \quad (4)$$

$$Y_2 = \alpha_2 + \alpha_3 Y_1 + \beta_2 X_2 + \varepsilon_2 \quad (5)$$

By calculating the regression of the endogenous variables on the right side of the structural equation to be estimated on all the exogenous variables in the model, the regression values of the endogenous variables are obtained. In this case, while Y_2 is the internal variable of the model, X_1 and X_2 represent the external variables. Therefore, the basic relationship between the variables can be written as:

$$Y_2 = \pi_1 + \pi_2 X_1 + \pi_3 X_2 + \varepsilon_1 \quad (6)$$

The estimation equation of the Y_2 variable is calculated by applying OLS to the reduced equation. The original values of the endogenous variables on the right side of the structural equation to be estimated are replaced by the regression values and a new equation is reached. As a result, the following regression pattern is obtained and the estimations obtained is called as the estimations of 2SLS.

$$Y_1 = \alpha_0 + \alpha_1 Y_2 + \beta_1 X_1 \quad (7)$$

For this purpose, a reduced pattern of the regression for the independent variables of z_t as a function of the instrumental variants of x_t must be predicted and the estimated values of independent variables of $\hat{z}_t$ must be substituted in the structural model for the independent variables of z_t. After that the regression equation numbered (2) must be predicted applying Ordinary Least Squares analysis for a threshold level of γ. This method is repeated till obtaining an appropriate threshold value of $\hat{\gamma}$ that has the smallest sum of squared residuals. In other words, $\hat{\gamma}$ is known as the threshold estimator that minimizes the sum of squared error terms (Hansen, 2000):

$$\hat{\gamma} = argmin\, S_n(\gamma) \quad (8)$$

where $S(\gamma)$ is the sum of the squared residuals. To calculate the critical values for regional inflation threshold, the 95% confidence interval must be computed. Hansen (1999), Caner & Hansen (2004) and Kremer et al. (2013) propose a way to find the optimal confidence values:

$$\Gamma = \{\gamma : LR(\gamma) \leq C(\alpha)\} \quad (9)$$

where, $LR(\gamma)$ is the asymptotic distribution of the likelihood ratio and $C(\alpha)$ is the 95% percentile regarding the distribution process. Hansen (1999) suggests that the most effective form of determining confidence intervals for γ is to establish the "no-rejection region" using

likelihood ratio statistics for tests on gamma. To test the hypothesis of $H_0 : \gamma = \gamma_0$, the likelihood ratio test must reject for large values of $LR_n(\gamma_0)$. Under the assumption that e_i is iid $N(0, \sigma^2)$, following the basic study of Hansen (1999) the likelihood ratio test statistic for determining confidence intervals can be used, $LR_n(\gamma) = n\dfrac{S_n(\gamma) - S_n(\hat{\gamma})}{S_n(\hat{\gamma})}$.

To analyse the effect of the regional inflation on the regional economic growth in 26-sub regions in Turkey, the following dynamic threshold model is applied:

$$GRW_t = \mu_i + \beta_1 INF_t I(INF_t \le \gamma) + \delta_1 I(INF_t \le \gamma) + \beta_2 INF_t I(INF_t > \gamma) + \psi z_t + \varepsilon_t \qquad (10)$$

where INF_t is the regional inflation rate for the two regime types and z_t is the vector of control variables. β_1 and β_2 are the regime coefficients, and δ_1 is the regime constant coefficient.

4. The Results of the Analysis

While working with time series data, it is an important issue to question the basic statistical information of the variables. In this context, the descriptive statistics for the variables used in analyzes for each sub-region are shown in Appendix 1. In addition, measuring the degree of relationship between variables before running the estimation process is of great importance in terms of determining the nature of possible relationships between variables. Therefore, the correlation coefficients between the regional variables are calculated and presented in Appendix 2. Correlation analysis findings showed that, in line with expectations, there are generally strong negative relations between regional inflation and regional growth.

It is highly likely that the variables used in the time series data are not stationary. For this reason, time series analyzes usually start with various unit root tests in which variables are tested for whether they are stationary or not. It is very important to perform unit root tests, since regression estimates to be obtained by using non-stationary variables may lead to spurious regression problems. In this context, Table 3 reflects the results of the ADF unit root test. The results of the ADF unit root test, operated with a constant and trend process, show that the variables considered within the scope of the analyzes for each sub-region are stationary at the first difference, in other words, the integration levels of the variables are *I(1)*.

After obtaining the stationarity information of the variables, dynamic threshold model analysis is applied and the effects of inflation threshold on the economic growth process and the effects of control variables on growth are examined within the scope of 26 sub-regions. Therefore, the findings of the dynamic threshold model analysis are shown in Table 4.

Akıncı, M., Yüce Akıncı, G. & Yılmaz, Ö. (2023). Is Inflation a Trigger of Growth or a Harbinger of Economic Slowness? A Dynamic Threshold Model Analysis on 26 Sub-Regions of Turkey. *Fiscaoeconomia, 7*(Özel Sayı), 671-707. Doi: 10.25295/fsecon.1351453

Table 3: The Results of the ADF Unit Root Test

	TRA1 (Erzurum, Erzincan, Bayburt)		TRA2 (Ağrı, Kars, Iğdır, Ardahan)		TRB1 (Malatya, Elazığ, Bingöl, Tunceli)		TRB2 (Van, Muş, Bitlis, Hakkâri)		TRC1 (Gaziantep, Adıyaman, Kilis)	
Variables	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
INF	-2.151(0)	-3.401(2)*	-3.153(2)	-3.793(2)*	-2.265(2)	-4.398(2)**	-2.980(2)	-3.456(2)*	-2.217(0)	-3.533(2)*
GRW	-1.374(1)	-6.933(1)***	-2.381(1)	-4.139(3)**	-2.774(3)	-4.411(3)**	-1.479(0)	-4.943(3)***	-2.766(0)	-3.575(3)*
PCGDP	-1.220(0)	-4.534(1)**	-1.214(0)	-5.231(0)***	-1.472(0)	-4.929(1)***	-1.359(0)	-4.719(0)**	-1.119(0)	-4.176(0)**
POP	-1.562(0)	-3.935(3)**	-3.106(0)	-4.376(1)**	-3.172(1)	-3.707(3)*	-2.394(3)	-5.735(1)***	-3.090(3)	-6.243(3)***
EMP	-3.271(0)	-3.982(3)**	-0.197(0)	-3.376(0)*	-1.110(0)	-3.628(0)*	-1.451(0)	-4.018(0)**	-3.302(0)	-5.919(0)***
TOT	-1.563(2)	-5.461(0)***	-3.343(0)	-3.924(3)**	-1.128(2)	-3.956(3)**	-1.336(0)	-4.078(0)**	-3.260(1)	-4.926(1)***
OPEN	-1.998(2)	-3.447(2)*	-1.513(1)	-4.446(3)**	0.001(2)	-6.714(1)***	-3.141(3)	-3.619(0)*	4.268(1)	-3.944(1)**
Critical Values	**%1:** -4. 667	-4.886	-4.800	-4.886	-4.800	-4.886	-4.800	-4.886	-4.667	-4.886
	%5: -3.733	-3.828	-3.791	-3.828	-3.791	-3.828	-3.791	-3.828	-3.733	-3.828
	%10: -3.310	-3.362	-3.342	-3.362	-3.342	-3.362	-3.342	-3.362	-3.310	-3.362
	TRC2 (Şanlıurfa, Diyarbakır)		**TRC3 (Mardin, Batman, Şırnak, Siirt)**		**TR10 (İstanbul)**		**TR21 (Tekirdağ, Edirne, Kırklareli)**		**TR22 (Balıkesir, Çanakkale)**	
Variables	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
INF	-3.158(2)	-3.551(2)*	-2.482(1)	-3.514(1)*	-2.283(0)	-4.948(3)**	-3.330(2)	-5.893(3)***	-2.503(0)	-3.707(2)*
GRW	-2.365(1)	-4.333(3)**	-3.195(1)	-3.864(3)**	-2.768(1)	-3.787(3)*	-2.602(3)	-6.438(3)***	-3.229(3)	-6.906(3)***
PCGDP	-1.322(0)	-4.169(1)**	-1.317(0)	-4.785(0)**	-1.604(0)	-4.024(1)**	-1.870(0)	-4.809(1)**	-1.863(2)	-4.642(1)**
POP	-1.076(1)	-3.926(3)**	-2.328(1)	-5.849(1)***	-2.130(2)	-3.423(2)*	-3.062(0)	-5.020(1)***	-3.131(2)	-4.398(3)**
EMP	-1.618(0)	-3.995(0)**	-2.289(0)	-3.834(1)**	-1.487(1)	-3.633(0)*	-2.912(1)	-3.687(1)*	-2.425(0)	-5.380(0)***
TOT	-2.398(3)	-3.864(1)**	-1.897(0)	-5.127(0)***	-0.737(2)	-9.625(1)***	-2.377(0)	-4.231(1)**	-1.533(3)	-3.549(2)*
OPEN	-2.688(3)	-3.411(3)*	-0.953(0)	-3.663(0)*	-2.174(3)	-8.572(3)***	-2.911(2)	-3.830(3)*	-3.163(3)	-3.712(3)*
Critical Values	**%1:** -4.800	-4.886	-4.728	-4.800	-4.667	-4.992	-4.800	-4.992	-4.667	-4.886
	%5: -3.791	-3.828	-3.759	-3.791	-3.733	-3.875	-3.791	-3.875	-3.733	-3.828
	%10: -3.342	-3.362	-3.324	-3.342	-3.310	-3.388	-3.342	-3.388	-3.310	-3.362
	TR31 (İzmir)		**TR32 (Aydın, Denizli, Muğla)**		**TR33 (Manisa, Afyon, Kütahya, Uşak)**		**TR41 (Bursa, Eskişehir, Bilecik)**		**TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)**	
Variables	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
INF	-2.107(0)	-4.756(2)**	-2.186(0)	-3.770(2)**	-2.265(0)	-3.569(2)*	-2.038(0)	-4.769(3)**	-2.115(0)	-3.505(2)*
GRW	-2.552(1)	-4.983(3)***	-2.908(2)	-5.511(3)***	-2.647(3)	-6.272(2)***	-2.285(0)	-4.915(3)**	-2.752(3)	-6.020(3)***
PCGDP	-1.708(0)	-4.116(1)**	-1.750(0)	-4.078(1)**	-1.648(0)	-4.588(1)**	-1.876(0)	-3.789(3)*	-1.821(0)	-4.025(3)**
POP	-3.202(0)	-4.131(1)**	-2.835(0)	-3.788(1)*	-3.158(1)	-5.161(1)***	-3.175(0)	-4.596(1)**	-1.985(0)	-3.614(0)*
EMP	-0.708(0)	-3.864(0)**	-1.727(1)	-3.506(1)*	-1.637(1)	-3.487(1)*	-2.665(1)	-3.530(0)*	-0.084(0)	-4.172(0)**
TOT	-0.681(0)	-3.590(09*	-1.096(0)	-3.725(3)*	-2.011(3)	-3.944(2)**	-3.285(2)	-4.711(3)**	-1.434(0)	-5.446(3)***
OPEN	4.805(2)	-3.922(2)**	-1.765(0)	-5.273(1)***	1.628(2)	-3.588(3)*	-2.272(2)	-3.482(2)*	-2.830(1)	-5.810(3)***
Critical Values	**%1:** -4. 667	-4.886	-4.667	-4.886	-4.667	-4.886	-4.667	-4.992	-4.667	-4.886
	%5: -3.733	-3.828	-3.733	-3.828	-3.733	-3.828	-3.733	-3.875	-3.733	-3.828
	%10: -3.310	-3.362	-3.310	-3.362	-3.310	-3.362	-3.310	-3.388	-3.310	-3.362

Note: *, ** and *** indicate that the coefficient is stationary at 10%, 5% and 1% significance level, respectively. The values in parentheses show the optimum lag lengths determined according to the Schwarz Information Criteria over a maximum of 3 lag lengths.

Table 3: (Continued)

	TR51 (Ankara)		TR52 (Konya, Karaman)		TR61 (Antalya, Isparta, Burdur)		TR62 (Adana, Mersin)		TR63 (Hatay, Kahramanmaraş, Osmaniye)	
Variables	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
INF	-2.294(0)	-6.222(2)	-2.210(0)	-3.529(3)*	0.456(3)	-4.720(3)**	-3.156(2)	-3.957(2)**	-2.234(0)	-3.557(2)*
GRW	-1.091(0)	-4.856(3)**	-2.677(1)	-4.863(3)**	-3.178(2)	-4.548(1)**	-2.972(3)	-5.822(3)***	-2.834(2)	-6.692(3)***
PCGDP	-1.787(0)	-4.262(1)**	-1.145(0)	-4.044(0)**	-1.865(0)	-3.987(0)**	-1.708(0)	-4.245(1)**	-0.893(2)	-6.001(1)***
POP	-1.157(3)	-6.224(2)***	-3.082(0)	-5.422(3)***	-2.424(1)	-3.474(3)*	-2.335(0)	-5.389(0)***	-2.070(0)	-5.339(0)***
EMP	-0.508(1)	-3.474(1)*	-0.813(0)	-3.836(0)*	-1.668(0)	-3.441(3)*	0.435(2)	-4.539(1)**	-2.930(1)	-3.893(2)**
TOT	0.596(3)	-7.517(2)***	-2.079(3)	-5.092(3)***	-2.823(2)	-3.692(2)*	-2.059(0)	-3.717(3)*	-1.425(0)	-3.376(2)*
OPEN	9.570(3)	-3.558(3)*	0.092(0)	-3.394(1)*	-1.803(1)	-3.601(1)*	-1.922(3)	-4.269(1)**	-1.630(0)	-7.931(3)***
Critical Values	**%1:** -4. 667	-4.992	-4.667	-4.992	-4.886	-4.886	-4.800	-4.886	-4.667	-4.886
	%5: -3.733	-3.875	-3.733	-3.875	-3.828	-3.828	-3.791	-3.828	-3.733	-3.828
	%10: -3.310	-3.388	-3.310	-3.388	-3.362	-3.362	-3.342	-3.362	-3.310	-3.362

	TR71 (Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir)		TR72 (Kayseri, Sivas, Yozgat)		TR81 (Zonguldak, Karabük, Bartın)		TR82 (Kastamonu, Çankırı, Sinop)		TR83 (Samsun, Tokat, Çorum, Amasya)	
Variables	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
INF	-3.105(2)	-3.553(2)*	-2.291(0)	-3.393(2)*	-2.575(0)	-4.254(3)**	-2.507(0)	-3.567(2)*	-2.189(0)	-3.879(0)**
GRW	-2.376(2)	-5.883(3)***	-2.990(2)	-4.944(3)***	-2.247(1)	-5.455(3)***	-3.135(3)	-5.960(3)***	-2.203(2)	-6.888(3)***
PCGDP	-0.536(0)	-5.174(1)***	-1.453(0)	-4.351(1)**	-0.220(2)	-5.440(1)***	-1.475(0)	-4.849(1)**	-0.938(0)	-4.889(1)***
POP	-3.263(0)	-6.133(0)***	-2.263(0)	-3.674(2)*	-3.300(0)	-5.757(0)***	-3.267(3)	-7.364(3)***	-2.714(0)	-4.735(0)**
EMP	-1.483(0)	-3.906(1)**	-1.258(1)	-3.452(1)*	-2.614(0)	-5.854(1)***	-3.104(1)	-5.283(0)***	-3.020(0)	-4.538(0)**
TOT	-3.306(3)	-3.747(3)*	1.256(3)	-11.554(2)***	0.688(2)	-5.699(1)***	-1.741(1)	-3.432(1)*	2.570(3)	-3.376(3)*
OPEN	5.358(3)	-3.391(3)*	8.426(2)	-3.388(2)**	-2.553(1)	-5.477(2)***	-2.967(2)	-6.632(3)***	3.436(3)	-3.477(1)*
Critical Values	**%1:** -4.800	-4.886	-4.667	-4.886	-4.667	-4.992	-4.667	-4.886	-4.667	-4.886
	%5: -3.791	-3.828	-3.733	-3.828	-3.733	-3.875	-3.733	-3.828	-3.733	-3.828
	%10: -3.342	-3.362	-3.310	-3.362	-3.310	-3.388	-3.310	-3.362	-3.310	-3.362

	TR90 (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane		Turkey	
Variables	**Level**	**First Difference**	**Level**	**First Difference**
INF	-3.110(3)	-3.728(2)*	-2.152(0)	-4.837(0)**
GRW	-3.172(3)	-5.280(3)***	-2.647(1)	-3.676(1)*
PCGDP	-1.690(0)	-5.127(0)***	-1.593(0)	-4.981(1)**
POP	-2.760(0)	-9.784(0)***	-2.029(0)	-4.712(0)**
EMP	-2.064(0)	-3.552(0)*	-1.396(1)	-3.480(0)*
TOT	-2.840(0)	-6.794(1)***	-0.626(2)	-5.441(1)***
OPEN	-1.422(1)	-4.789(3)**	-2.062(0)	-6.256(0)***
Critical Values	**%1:** -4.800	-4.886	-4.667	-4.992
	%5: -3.791	-3.828	-3.733	-3.875
	%10: -3.342	-3.362	-3.310	-3.388

Note: *, ** and *** indicate that the coefficient is stationary at 10%, 5% and 1% significance level, respectively. The values in parentheses show the optimum lag lengths determined according to the Schwarz Information Criteria over a maximum of 3 lag lengths.

Table 4: The Results of the Dynamic Threshold Model Analysis

Dependent Variable: ΔGRW										
Inflation Thresholds and 95% Confidence Intervals										
Sub-Regions	**TRA1**	**TRA2**	**TRB1**	**TRB2**	**TRC1**	**TRC2**	**TRC3**	**TR10**	**TR21**	**TR22**
Threshold (γ)	13.250%	9.269%	15.069%	9.409%	8.909%	.9.949%	8.859%	9.998%	9.579%	8.689%
Confidence Int.	(9.058%, 16.78%)	(6.575%, 12.22%)	(12.99%, 18.88%)	(6.003%, 12.35%)	(5.778%, 11.11%)	(6.581%, 12.22%)	(5.857%, 11.51%)	(6.171%, 12.95%)	(6.552%, 12.29%)	(5.559%, 11.26%)
Regime-Dependent Regressors: The Effects of Regional Inflation Regimes on Regional Economic Growth										
Low Inflation (β_1)	0.034** (0.048)	0.018* (0.075)	0.057** (0.048)	0.036** (0.025)	0.044** (0.039)	0.055* (0.094)	0.075** (0.016)	0.041** (0.026)	0.036** (0.047)	0.064** (0.035)
High Inflation (β_2)	-0.041* (0.082)	-0.032* (0.055)	-0.051** (0.037)	-0.048** (0.029)	-0.053* (0.072)	-0.067* (0.098)	-0.053* (0.072)	-0.033*** (0.000)	-0.027* (0.076)	-0.051** (0.029)
Regime-Independent Regressors: The Effects of Control Variables on Regional Economic Growth										
Constant	0.021 (0.682)	0.090 (0.112)	0.145* (0.054)	0.091** (0.031)	0.056 (0.128)	0.064 (0.171)	0.064* (0.071)	-0.056 (0.234)	0.056 (0.705)	0.068 (0.684)
$\Delta PCGDP_{t-1}$	-0.003* (0.051)	-0.006*** (0.000)	-0.004*** (0.001)	-0.002*** (0.006)	-0.003*** (0.000)	-0.001** (0.023)	-0.004*** (0.005)	-0.007** (0.014)	-0.006** (0.037)	-0.007*** (0.009)
ΔPOP	-0.007 (0.442)	0.005 (0.622)	0.010 (0.286)	0.010* (0.054)	0.002 (0.127)	0.005 (0.438)	0.004 (0.387)	0.002 (0.601)	0.005 (0.421)	0.003 (0.622)
ΔEMP	-0.003 (0.939)	0.029 (0.199)	0.005 (0.711)	-0.022 (0.124)	0.010 (0.581)	-0.011 (0.348)	0.026 (0.399)	0.034* (0.063)	0.009 (0.856)	-0.002 (0.975)
ΔTOT	-0.137 (0.659)	-0.039 (0.570)	0.056 (0.502)	0.063 (0.481)	-0.306 (0.400)	0.011 (0.917)	0.056 (0.243)	0.905** (0.048)	0.172* (0.076)	1.128*** (0.000)
ΔOPEN	8.102 (0.550)	3.881 (0.247)	3.226 (0.487)	0.465 (0.820)	0.078 (0.888)	2.936 (0.667)	2.583 (0.209)	0.397* (0.066)	0.094 (0.911)	0.647 (0.762)
EC_{t-1}	-0.063 (0.763)	-0.019 (0.931)	-0.040 (0.816)	-0.017 (0.916)	-0.042 (0.789)	-0.058 (0.769)	-0.028 (0.887)	-0.218** (0.044)	-0.117* (0.087)	-0.097** (0.022)
Statistics of Models										
R^2	0.730	0.710	0.780	0.806	0.729	0.754	0.833	0.858	0.805	0.799
DW	2.022	1.996	2.027	2.033	2.135	2.153	2.110	2.117	2.118	2.013
BG LM (Prob)	1.775 (0.342)	1.662 (0.283)	1.778 (0.350)	1.812 (0.402)	1.879 (0.433)	1.881 (0.426)	1.756 (0.351)	1.796 (0.394)	1.806 (0.402)	1.779 (0.347)
White χ^2 (Prob)	0.756 (0.451)	0.884 (0.339)	0.892 (0.345)	0.816 (0.323)	0.792 (0.401)	0.853 (0.357)	0.781 (0.436)	0.801 (0.371)	0.811 (0.368)	0.880 (0.341)
F (Prob)	3.664* (0.058)	6.995*** (0.007)	5.066** (0.024)	9.117*** (0.000)	8.662*** (0.000)	4.394** (0.043)	9.511*** (0.000)	4.342** (0.031)	3.469* (0.054)	6.526*** (0.005)

Note: Δ is the difference operator. *, ** and *** indicate that the coefficient is statistically significant at 10%, 5% and 1% significance level, respectively. *EC* represents the error correction mechanism obtained from the cointegration equations. The values in parentheses are the probability of the coefficient. The natural logarithm of the initial per capita income variable is used to determine whether the sub-regions will converge to their steady-state balances.

Table 4: (Continued)

Dependent Variable: ΔGRW										
Inflation Thresholds and 95% Confidence Intervals										
Sub-Regions	**TR31**	**TR32**	**TR33**	**TR41**	**TR42**	**TR51**	**TR52**	**TR61**	**TR62**	**TR63**
Threshold (γ)	7.919%	7.189%	16.209%	8.529%	11.219%	10.669%	9.109%	9.469%	7.559%	9.529%
Confidence Int.	(4.556%, 10.41%)	(4.881%, 10.77%)	(13.99%, 19.01%)	(5.663%, 11.36%)	(8.556%, 14.74%)	(7.553%, 13.88%)	(6.661%, 12.52%)	(6.775%, 12.66%)	(4.226%, 10.82%)	(6.885%, 12.84%)
Regime-Dependent Regressors: The Effects of Regional Inflation Regimes on Regional Economic Growth										
Low Inflation (β_1)	0.037* (0.059)	0.026* (0.069)	0.052 (0.114)	0.062* (0.069)	0.031* (0.059)	0.022** (0.036)	0.041* (0.065)	0.024* (0.071)	-0.037** (0.024)	-0.047* (0.033)
High Inflation (β_2)	-0.022* (0.075)	-0.018* (0.087)	-0.038* (0.075)	-0.051* (0.072)	-0.024** (0.027)	-0.016* (0.061)	-0.033* (0.072)	-0.016* (0.088)	-0.044** (0.019)	-0.039 (0.155)
Regime-Independent Regressors: The Effects of Control Variables on Regional Economic Growth										
Constant (δ)	0.142** (0.048)	-0.045 (0.656)	0.013 (0.972)	0.031 (0.963)	-0.101 (0.164)	-0.177* (0.056)	-0.063 (0.551)	-0.033** (0.021)	-0.071 (0.253)	0.085 (0.388)
$\Delta PCGDP_{t-1}$	-0.008*** (0.000)	-0.011** (0.048)	-0.009** (0.047)	-0.007** (0.024)	-0.007*** (0.001)	-0.010*** (0.000)	-0.011*** (0.007)	-0.008*** (0.000)	-0.009*** (0.000)	-0.004*** (0.000)
ΔPOP	0.005 (0.675)	0.002 (0.792)	-0.003 (0.988)	-0.006 (0.637)	0.010 (0.244)	-0.007 (0.164)	-0.005 (0.702)	-0.003 (0.581)	0.026 (0.123)	0.010 (0.211)
ΔEMP	0.037*** (0.002)	0.013 (0.412)	0.012 (0.267)	0.024* (0.068)	0.025** (0.042)	0.033*** (0.008)	0.006 (0.565)	0.041** (0.034)	0.047** (0.029)	0.010 (0.358)
ΔTOT	0.206* (0.052)	-0.052 (0.768)	-0.003 (0.983)	-1.226 (0.129)	0.153** (0.019)	0.637* (0.081)	-0.206** (0.024)	0.122* (0.050)	0.075* (0.081)	0.391 (0.436)
ΔOPEN	0.608 (0.446)	0.426 (0.505)	2.586 (0.122)	-0.242 (0.807)	-0.306 (0.506)	-0.193 (0.771)	-0.127 (0.103)	0.054* (0.079)	0.282 (0.588)	-2.097*** (0.001)
EC_{t-1}	-0.139* (0.063)	0.061 (0.757)	-0.097 (0.483)	-0.096* (0.076)	-0.133** (0.013)	-0.116** (0.013)	0.063 (0.771)	-0.092* (0.059)	0.023 (0.924)	-0.064 (0.642)
Statistics of Models										
R^2	0.811	0.553	0.637	0.788	0.806	0.835	0.657	0.887	0.791	0.708
DW	2.123	2.224	2.156	2.116	2.101	2.117	2.133	2.097	2.162	1.916
BG LM (Prob)	1.822 (0.384)	1.898 (0.426)	1.873 (0.430)	1.876 (0.420)	1.795 (0.393)	1.891 (0.417)	1.896 (0.423)	1.912 (0.377)	1.863 (0.427)	1.778 (0.312)
White χ^2	0.826 (0.374)	0.774 (0.411)	0.790 (0.399)	0.850 (0.362)	0.800 (0.370)	0.862 (0.362)	0.875 (0.356)	0.898 (0.322)	0.785 (0.386)	0.856 (0.347)
F (Prob)	8.636*** (0.000)	3.226* (0.054)	4.085** (0.033)	5.336*** (0.009)	8.220*** (0.000)	10.889*** (0.000)	5.176*** (0.008)	7.728*** (0.000)	6.212*** (0.008)	7.573*** (0.002)

Note: Δ is the difference operator. *, ** and *** indicate that the coefficient is statistically significant at 10%, 5% and 1% significance level, respectively. *EC* represents the error correction mechanism obtained from the cointegration equations. The values in parentheses are the probability of the coefficient. The natural logarithm of the initial per capita income variable is used to determine whether the sub-regions will converge to their steady-state balances.

Table 4: (Continued)

Dependent Variable: ΔGRW							
Inflation Thresholds and 95% Confidence Intervals							
Sub-Regions	**TR71**	**TR72**	**TR81**	**TR82**	**TR83**	**TR90**	**Turkey**
Threshold (γ)	7.369%	11.969%	8.899%	10.019%	9.099%	7.899%	12.776%
Confidence Int.	(4.771%, 10.823%)	(8.991%, 14.985%)	(5.774%, 11.529%)	(7.882%, 13.759%)	(6.812%, 12.773%)	(4.993%, 10.893%)	(9.566%, 15.841%)
Regime-Dependent Regressors: The Effects of Regional Inflation Regimes on Regional Economic Growth							
Low Inflation (β_1)	-0.032* (0.079)	0.037* (0.086)	0.010 (0.722)	0.044** (0.028)	0.059* (0.057)	-0.055** (0.024)	0.042*** (0.006)
High Inflation (β_2)	-0.044* (0.051)	0.022 (0.213)	0.024 (0.122)	-0.032* (0.076)	-0.042* (0.063)	-0.042* (0.069)	-0.053** (0.011)
Regime-Independent Regressors: The Effects of Control Variables on Regional Economic Growth							
Constant (δ)	0.077 (0.103)	-0.065 (0.244)	-0.117 (0.876)	0.027 (0.336)	0.088 (0.300)	0.133 (0.318)	-0.044 (0.282)
$\Delta PCGDP_{t-1}$	-0.010*** (0.004)	-0.011*** (0.000)	-0.003*** (0.000)	-0.011*** (0.000)	-0.007* (0.056)	-0.007 (0.136)	-0.012*** (0.007)
ΔPOP	-0.009 (0.179)	-0.003 (0.501)	-0.002 (0.639)	0.007 (0.663)	-0.013* (0.064)	-0.003 (0.240)	-0.052 (0.936)
ΔEMP	-0.004 (0.711)	0.007* (0.083)	-0.004 (0.803)	-0.005 (0.380)	-0.009 (0.590)	0.004 (0.963)	0.115* (0.076)
ΔTOT	-0.907 (0.182)	0.139* (0.062)	-0.697 (0.182)	0.022 (0.457)	-0.326 (0.247)	-0.063* (0.090)	1.076* (0.056)
ΔOPEN	-4.679 (0.172)	0.224 (0.853)	-1.977*** (0.000)	-0.864*** (0.001)	-0.141** (0.022)	-0.826 (0.541)	0.548* (0.058)
EC_{t-1}	0.072 (0.742)	-0.097* (0.057)	-0.031 (0.784)	-0.033 (0.767)	-0.048* (0.064)	0.013 (0.910)	-0.247** (0.026)
Statistics of Models							
R^2	0.422	0.789	0.602	0.787	0.729	0.563	0.775
DW	1.972	1.872	2.124	2.183	2.079	1.830	1.993
BG LM (Prob)	1.766 (0.374)	1.797 (0.337)	1.894 (0.400)	1.901 (0.397)	1.910 (0.370)	1.806 (0.347)	1.912 (0.388)
White χ^2	0.795 (0.447)	0.841 (0.328)	0.865 (0.370)	0.802 (0.410)	0.906 (0.305)	0.841 (0.362)	0.906 (0.339)
F (Prob)	3.683** (0.035)	5.356*** (0.007)	5.229** (0.019)	6.256*** (0.008)	4.998*** (0.007)	4.256** (0.017)	8.993*** (0.000)

Note: Δ is the difference operator. *, ** and *** indicate that the coefficient is statistically significant at 10%, 5% and 1% significance level, respectively. *EC* represents the error correction mechanism obtained from the cointegration equations. The values in parentheses are the probability of the coefficient. The natural logarithm of the initial per capita income variable is used to determine whether the sub-regions will converge to their steady-state balances.

The dynamic threshold model analysis findings presented in Table 4 indicate that increases in regional inflation rates accelerate regional economic growth until the threshold is reached in the sub-regions, excluding the TR33, TR62, TR63, TR71, TR72, TR81 and TR90 sub-regions, but not exceeding the threshold value. Subsequently, beyond the inflation threshold, the increases in regional inflation rates have reduced regional economic growth and dragged the regions into economic slowness. In other words, while the effect on the change in regional inflation on regional growth is positive and statistically significant until the threshold value is reached, it is negative and statistically significant beyond the threshold value. On the other hand, the fact that the negative effects on the change in regional inflation on regional economic growth are relatively close to the positive effects, and even that the negative effects are much more dominant in some sub-regions (TRA1, TRA2, TRB2, TRC1 and TRC2), implies that the growth gains may disappear after the inflation threshold value is exceeded or the net growth gain obtained may be minimal. In general, the analysis findings reveal that there are inverse-U relations between regional inflation and regional economic growth, in other words, the existence of parabolic relations. In this context, the results confirmed that the synthesis arising from the combination of the structuralist view, which suggests that regional inflation accelerates regional economic growth, and the monetary view, which states that regional inflation disrupts regional economic growth dynamism, is correct and that the positive and negative effects of inflation on growth can only be determined with a certain inflation threshold. In addition, it is observed that regional inflation does not have a statistically significant effect on regional economic growth until the threshold value is reached in the TR33 sub-region, and after exceeding the threshold value, regional inflation causes regional economic slowness. In the TR63 sub-region, it is observed that before the threshold value, regional inflation decreases regional economic growth, and beyond the threshold value, the negative effect on the change in regional inflation on growth is statistically insignificant. It is also found that regional inflation causes regional economic stagnation before and after the inflation threshold value in the TR62, TR71 and TR90 sub-regions. In the TR72 sub-region, until the threshold value is reached, regional inflation has a positive effect on regional economic growth, but after exceeding the threshold, the effect on the change in regional inflation on regional growth is statistically insignificant. Finally, it is calculated that regional inflation does not have a statistically significant effect on regional economic growth before and after the threshold value in the TR81 sub-region.

Analysis findings showing that income convergence process has taken place in all sub-regions, with the exception of the TR90 sub-region, reflect those sub-regions can reach their steady-state income levels. On the other hand, the findings implying that population increases in all sub-regions with the exception of the TRB2 and TR83 sub-regions do not have statistically significant effects on the level of regional economic growth support the predictions of Romer, who is one of the pioneers of endogenous growth theories. The findings reflecting that population increases in the TRB2 sub-region affect regional growth with a statistically significant but weak momentum, show that in the TR83 sub-region, population increases lead to regional stagnation. In this context, it is possible to say that the policy processes that support population growth do not contribute to regional economic growth. In addition, it has been observed that employment increases in relatively more developed sub-regions such as

TR10, TR31, TR41, TR42, TR51, TR61, TR62 and TR72 positively affect regional economic growth, while the contribution of employment increases to regional growth in underdeveloped regions is statistically insignificant. In this respect, it can be said that employment policies have not been effective enough to accelerate regional economic growth and more effective employment policies are needed. A similar situation has also manifested itself in the context of foreign trade policies. A favorable development in terms of trade in TR10, TR21, TR22, TR31, TR42, TR51, TR61, TR62 and TR72 sub-regions accelerate regional economic growth, but in other sub-regions, changes in terms of trade have either no statistically significant effect on regional economic growth or hamper regional economic growth (TR52 and TR90). A parallel result can also be confirmed in terms of the relationship between the level of regional openness to foreign trade and regional economic growth. It is observed that openness to foreign trade have a positive but statistically weak effect on the regional economic growth process only in the TR10 and TR61 sub-regions, however, in TR63, TR81, TR82 and TR83 sub-regions, it is determined that openness affects regional economic growth negatively and statistically strongly. In the remaining sub-regions, the existence of statistically insignificant relations between openness to foreign trade and economic growth has been determined. In addition, it can be argued that the export of high-tech products that can provide a competitive advantage in foreign markets is insufficient, the domestic market is directly exposed to foreign market competition without providing the necessary infrastructure in production and cost conditions, and therefore regional foreign trade cannot affect the regional growth process. However, in order to confirm the aforementioned possible results, it is necessary to access the related regional statistics and to prove the predictions with new analysis techniques. Confirming these predictions with the help of additional data sets will increase the robustness of the findings. Considering analyzes made for all sub-regions and the Turkish economy, it is seen that there is no autocorrelation and varying variance problem in the model estimations and that the models as a whole are statistically significant. In addition, the relatively high coefficients of determination obtained can be considered as proof of the high explanatory power of the models.

The dynamic threshold model analysis findings for Turkish economy presented in Table 4 indicate that increases in inflation rates accelerate economic growth until the threshold is reached, but beyond the inflation threshold the increases in inflation rates have reduced economic growth. In other words, while the effect of inflation on growth is positive and statistically significant until the threshold value is reached, it is negative and statistically significant beyond the threshold value. On the other hand, the fact that the negative effects of inflation on regional economic growth are higher to that of the positive effects, implies that the growth gains may disappear after the inflation threshold value is exceeded. In general, the analysis findings reveal that there are inverse-U relations between inflation and economic growth, in other words, the existence of parabolic relations. Analysis findings showing that income convergence process has taken place in Turkey reflect that Turkish economy can reach its steady-state income level. On the other hand, the results pointing out that population increases in Turkey do not have statistically significant effects on economic growth process. In addition, it has been observed that employment, terms of trade and openness have positive

impact on economic growth in Turkey. In general, Table 5 provides summary information about the regression findings.

Table 5: The Coefficient Signs of the Effect of Regional Inflation Threshold and Control Variables on Regional Economic Growth

Sub-Regions	Convergence	Inflation Threshold	INF		POP	EMP	TOT	OPEN
			Before Threshold	After Threshold				
TRA1 (Erzurum, Erzincan, Bayburt)	Yes	13.250%	+*	-*	-	-	-	+
TRA2 (Ağrı, Kars, Iğdır, Ardahan)	Yes	9.269%	+*	-*	+	+	-	+
TRB1 (Malatya, Elazığ, Bingöl, Tunceli)	Yes	15.069%	+*	-*	+	+	+	+
TRB2 (Van, Muş, Bitlis, Hakkâri)	Yes	9.409%	+*	-*	+*	-	+	+
TRC1 (Gaziantep, Adıyaman, Kilis)	Yes	8.909%	+*	-*	+	+	-	+
TRC2 (Şanlıurfa, Diyarbakır)	Yes	9.949%	+*	-*	+	-	+	+
TRC3 (Mardin, Batman, Şırnak, Siirt)	Yes	8.859%	+*	-*	+	+	+	+
TR10 (İstanbul)	Yes	9.998%	+*	-*	+	+*	+*	+*
TR21 (Tekirdağ, Edirne, Kırklareli)	Yes	9.579%	+*	-*	+	+	+*	+
TR22 (Balıkesir, Çanakkale)	Yes	8.689%	+*	-*	+	-	+*	+
TR31 (İzmir)	Yes	7.919%	+*	-*	+	+*	+*	+
TR32 (Aydın, Denizli, Muğla)	Yes	7.189%	+*	-*	+	+	-	+
TR33 (Manisa, Afyon, Kütahya, Uşak)	Yes	16.209%	+	-*	-	+	-	+
TR41 (Bursa, Eskişehir, Bilecik)	Yes	8.529%	+*	-*	-	+*	-	-
TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)	Yes	11.219%	+*	-*	+	+*	+*	-
TR51 (Ankara)	Yes	10.669%	+*	-*	-	+*	+*	-
TR52 (Konya, Karaman)	Yes	9.109%	+*	-*	-	+	-*	-
TR61 (Antalya, Isparta, Burdur)	Yes	9.469%	+*	-*	-	+*	+*	+*
TR62 (Adana, Mersin)	Yes	7.559%	-*	-*	+	+*	+*	+
TR63 (Hatay, Kahramanmaraş, Osmaniye)	Yes	9.529%	-*	-	+	+	+	-*
TR71 (Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir)	Yes	7.369%	-*	-*	-	-	-	-
TR72 (Kayseri, Sivas, Yozgat)	Yes	11.969%	+*	+	-	+*	+*	+
TR81 (Zonguldak, Karabük, Bartın)	Yes	8.899%	+	+	-	-	-	-*
TR82 (Kastamonu, Çankırı, Sinop)	Yes	10.019%	+*	-*	+	-	+	-*
TR83 (Samsun, Tokat, Çorum, Amasya)	Yes	9.099%	+*	-*	-*	-	-	-*
TR90 (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane)	No	7.899%	+*	-*	-	+	-*	-
Turkey	Yes	12.776%	+*	-*	-	+*	+*	+*

Note: * indicates that the relevant coefficient sign is statistically significant. The natural logarithm of the initial per capita income variable is used to determine whether the sub-regions will converge to their steady-state balances.

5. Conclusion

The main motivation of this study is to explain the effects of regional inflation threshold value on regional economic growth for the period of 2004-2020 by using dynamic threshold model analysis for 26 sub-regions (NUTS-2 level) in the Turkish economy. The findings of the analysis show that increases in regional inflation rates until the threshold value is reached in 20 of the 26 sub-regions positively affect regional growth, but regional inflation rates have negative impact on regional growth after exceeding the threshold value. This result is parallel with the findings frequently reached in the literature in recent years and points out the phenomena consisting of the synthesis of the monetarist view and the structural view.

The high level of regional inflation rates reached for the Turkish economy depends on the macroeconomic history of the country, the failure to take the theoretical and political steps necessary to solve the inflation problem, the failure to learn from these problems and their consequences, and the inflationary uncertainty arising from higher level of inflation. In addition, the indirect implementation of the monetary policy predictions of the Central Bank, which is obliged to ensure inflation stability and sustainability, undermines market confidence on the one hand and on the other hand, it can eliminate the dynamizing effect of inflation on growth and even reveal its growth-reducing effects. At this point, it should be noted that the determination of inflation targets, which are compatible with the market and macroeconomic indicators in terms of the inflation targeting regime implemented in Turkey since 2006, may positively affect the stable course of macroeconomic indicators related to inflation, especially economic growth. Moreover, the fact that the targets set in the context of inflation targeting regime have not been achieved so far has completely eliminated the stability of basic macroeconomic indicators like economic growth. In this context, the Central Bank should determine the optimum monetary policies on a scientific basis, the fiscal policies determined by the governments should be compatible with the monetary policies and the policies taken into account in order to prevent chronic inflation should not be compromised. With the help of a policy mix, low and stable inflation rates will be achieved and therefore this process serves the sustainability of macroeconomic indicators affected by inflation.

In addition, it should be taken into account that the population-increasing policies implemented do not contribute to regional economic growth, on the contrary, they can cause regional economic slowness. Considering that the important issue in this context is the quality of the population rather than its quantity, it can be said that there is a need for policies that will increase the quality of the existing population. Besides, considering the accelerating effect of employment on economic growth, it is very important for regional economic growth to create regional employment policies by taking into account regional differences. A similar situation is valid for foreign trade conditions. Regions that are not ready for foreign competition should be strengthened by the state and the private sector, especially in terms of production, cost and competition capacities. Directly entering into competition with the outside world without completing these preparations will not contribute to regional growth and may also cause regional economic slowness. The regional economic policy components that will be implemented based on regional differences will reflect positively not only on the growth dynamism of the regions, but also on the economic indicators related to growth, and

from this point of view, the macroeconomic development will be manifested on a country basis.

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Çıkar Beyanı: Yazarlar arasında çıkar çatışması yoktur.

Etik Beyanı: Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara uyulduğunu yazarlar beyan eder. Aksi bir durumun tespiti halinde Fiscaoeconomia Dergisinin hiçbir sorumluluğu olmayıp, tüm sorumluluk çalışmanın yazarlarına aittir.

Yazar Katkısı: Yazarların katkısı aşağıdaki gibidir:

Giriş: 1. yazar

Literatür: 2. yazar

Metodoloji ve Uygulama Bulguları: 1. yazar ve 3. yazar

Sonuç: 1. yazar, 2. yazar ve 3. yazar

1. yazarın katkı oranı: %50, 2. yazarın katkı oranı: %33, 3. yazarın katkı oranı: %17

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Author Contributions: Author contributions are below

Introduction: 1. author

Literature: 2. author

Methodology and Econometric Application: 1. Author and 3. Author

Conclusion: 1. Author, 2. Author and 3. Author

1st author's contribution rate: 50%, 2nd author's contribution rate: 33% and 3rd author's contribution rate: 17%**Appendix 1: Descriptive Statistics of the Variables**

	TRA1 (Erzurum, Erzincan, Bayburt)							TRA2 (Ağrı, Kars, Iğdır, Ardahan)						
	INF	GRW	PCGDP	POP	EMP	TOT	OPEN	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
Mean	9.791	0.047	6417.118	-3.065	46.970	0.751	0.011	9.752	0.002	4197.824	-0.435	47.752	1.700	0.053
Median	8.910	0.024	6645.000	-4.160	46.900	0.755	0.012	8.660	0.022	4199.000	-1.940	47.900	1.921	0.050
Maximum	16.940	0.249	8370.000	13.460	55.900	1.053	0.017	17.180	0.348	5341.000	20.850	54.400	2.408	0.072
Minimum	5.500	-0.130	3544.000	-12.920	41.900	0.577	0.009	6.180	-0.614	2324.000	-7.850	39.100	0.711	0.050
Skewness	0.987	0.262	-0.640	0.459	0.801	1.113	2.397	1.259	-1.409	-0.665	1.536	-0.374	-0.866	2.337
Kurtosis	3.231	1.786	2.630	2.074	4.123	4.944	9.995	3.669	6.595	2.440	5.507	3.138	2.519	7.830
JB	2.797	1.237	1.258	1.204	2.714	6.189	50.949	4.814	14.781	1.477	11.143	0.410	2.291	32.013
	TRB1 (Malatya, Elazığ, Bingöl, Tunceli)							TRB2 (Van, Muş, Bitlis, Hakkâri)						

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	INF	GRW	PCGDP	POP	EMP	TOT	OPEN	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
Mean	9.500	0.023	5911.353	9.275	42.011	4.944	0.056	9.787	0.003	3887.882	10.715	38.429	3.833	0.039
Median	8.640	0.004	6217.000	6.670	43.200	5.714	0.053	8.600	-0.019	3931.000	8.930	38.200	4.603	0.042
Maximum	17.500	0.287	7586.000	23.510	49.500	6.881	0.073	17.610	0.244	5101.000	18.140	42.600	7.770	0.055
Minimum	6.360	-0.183	3339.000	-3.610	34.300	2.857	0.046	6.770	-0.613	2138.000	-4.070	33.300	1.746	0.016
Skewness	1.384	0.442	-0.681	0.177	-0.148	-0.866	1.508	1.303	-1.623	-0.593	-0.400	-0.003	-0.755	-0.601
Kurtosis	4.255	2.369	2.834	1.983	1.701	2.142	4.894	3.526	6.564	2.743	2.229	1.829	1.043	3.887
JB	6.550	0.836	1.334	0.821	1.256	2.646	8.989	5.012	16.469	1.043	0.875	0.970	1.536	1.584
	TRC1 (Gaziantep, Adıyaman, Kilis)							**TRC2 (Şanlıurfa, Diyarbakır)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.771	0.028	6053.000	10.336	37.935	1.399	0.111	9.803	-0.014	4244.529	22.242	32.046	1.594	0.044
Median	9.080	-0.022	6034.000	7.781	38.700	1.329	0.153	9.010	-0.030	4356.000	20.190	30.700	1.559	0.045
Maximum	17.050	0.216	7819.000	25.118	42.000	1.610	0.196	17.660	0.246	5531.000	29.280	41.400	2.309	0.067
Minimum	5.320	-0.193	3550.000	-5.223	33.400	1.113	0.026	5.250	-0.521	2852.000	16.260	26.500	1.215	0.033
Skewness	0.826	0.098	-0.495	0.181	-0.258	1.023	1.526	1.056	-1.256	-0.113	0.356	0.538	1.717	2.015
Kurtosis	3.049	2.118	2.468	1.996	1.812	2.309	3.775	3.560	5.532	2.041	1.530	2.128	7.427	8.909
JB	1.937	0.578	0.897	0.837	1.187	3.306	3.375	3.382	9.018	0.686	1.890	1.358	22.243	36.251
	TRC3 (Mardin, Batman, Şırnak, Siirt)							**TR10 (İstanbul)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.215	0.024	4710.941	16.288	28.511	1.424	0.194	9.551	0.095	16710.82	14.461	44.382	0.605	0.807
Median	7.880	0.031	4862.000	17.420	28.200	1.486	0.206	9.140	0.043	17326.00	15.090	44.800	0.558	0.781
Maximum	17.310	0.279	6137.000	35.320	36.500	1.711	0.246	15.520	1.194	20883.00	29.530	50.200	0.812	1.108
Minimum	5.390	-0.288	2542.000	2.280	24.100	1.122	0.157	5.550	-0.182	10332.00	-3.670	38.800	0.558	0.727
Skewness	1.283	-0.141	-0.708	0.230	1.007	1.035	-0.027	0.719	2.940	-0.658	-0.055	0.093	1.595	2.783
Kurtosis	3.703	2.864	2.740	3.041	4.586	2.382	2.406	3.008	11.399	2.862	2.649	1.579	4.965	10.365
JB	5.016	0.070	1.471	0.152	4.658	3.385	0.251	1.467	74.473	1.240	0.095	1.454	9.948	60.381
	TR21 (Tekirdağ, Edirne, Kırklareli)							**TR22 (Balıkesir, Çanakkale)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.510	-0.005	11795.29	21.052	51.058	0.850	0.214	9.842	-0.001	9088.588	8.098	45.094	1.252	0.081
Median	9.290	0.001	12414.00	22.740	50.900	0.688	0.228	8.690	0.013	9418.000	6.640	44.600	1.154	0.084
Maximum	16.180	0.229	14168.00	31.100	55.300	1.189	0.257	15.920	0.237	10930.00	21.250	48.200	1.559	0.104
Minimum	5.530	-0.504	7572.000	6.180	47.000	0.688	0.164	6.140	-0.493	5528.00	-1.190	43.600	1.154	0.065
Skewness	1.171	-1.304	-0.772	-0.406	-0.093	0.564	-0.771	0.973	-1.126	-0.753	0.647	1.247	1.233	0.259
Kurtosis	3.876	5.516	2.874	1.861	2.326	1.531	2.769	3.077	5.247	2.828	3.205	4.139	2.982	4.212
JB	4.429	9.307	1.700	1.387	0.345	2.429	1.722	2.689	7.172	1.630	1.217	5.327	4.317	1.232

Appendix 1: Continued

	INF	GRW	PCGDP	POP	EMP	TOT	OPEN	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
	TR31 (İzmir)							**TR32 (Aydın, Denizli, Muğla)**						
Mean	9.807	0.016	11650.24	13.035	43.670	1.007	0.406	11.313	-0.033	9377.750	14.780	50.600	1.749	0.228
Median	8.950	0.011	12318.00	13.370	45.300	0.922	0.389	10.360	-0.041	9362.000	13.955	50.750	1.681	0.218
Maximum	16.840	0.212	14450.00	20.610	48.500	1.402	0.536	17.860	0.052	10922.00	22.230	53.000	2.193	0.300
Minimum	6.630	-0.190	7233.000	4.140	38.400	0.922	0.370	6.920	-0.109	8202.000	9.360	46.200	1.320	0.188
Skewness	1.305	0.142	-0.697	-0.406	-0.249	1.854	2.157	0.610	0.309	0.348	0.708	-1.148	0.385	0.867
Kurtosis	3.737	2.009	2.897	3.220	1.515	4.935	6.886	1.885	2.968	1.796	3.033	3.779	2.146	2.677
JB	5.212	0.752	1.386	0.503	1.737	12.397	23.882	0.911	0.128	0.644	0.670	1.960	0.440	1.039
	TR33 (Manisa, Afyon, Kütahya, Uşak)							**TR41 (Bursa, Eskişehir, Bilecik)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.628	0.008	8222.412	1.719	46.717	0.873	0.210	9.603	0.017	11524.12	18.247	45.400	1.170	0.407
Median	8.580	0.012	8843.000	6.170	47.600	0.843	0.190	8.580	-0.016	11964.00	18.680	45.500	1.140	0.365
Maximum	17.130	0.268	10134.00	21.730	52.400	1.226	0.303	15.970	0.244	14375.00	24.590	48.200	1.364	0.556
Minimum	6.170	-0.433	4648.000	-21.140	40.300	0.701	0.190	5.310	-0.205	7127.000	11.070	41.700	1.104	0.365
Skewness	1.550	-0.819	-0.886	-0.373	-0.285	1.561	1.631	0.965	0.261	-0.624	-0.441	-0.775	1.875	1.172
Kurtosis	4.401	4.191	3.051	2.632	1.534	5.112	4.998	3.299	2.281	2.852	2.037	3.415	5.247	2.903
JB	8.204	2.909	2.226	0.491	1.752	10.067	10.371	2.704	0.560	1.119	1.209	1.826	13.550	3.901
	TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)							**TR51 (Ankara)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**

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Skewness	1.418	-1.474	-0.760	0.333	-0.564	0.752	0.086	1.542	-0.878	-0.823	-0.352	-0.055	0.307	1.313
Kurtosis	4.040	6.061	2.921	1.474	1.974	1.826	4.776	4.557	4.429	2.892	2.261	2.264	3.745	4.792
JB	6.470	12.801	1.641	1.963	1.646	2.580	2.257	8.460	3.634	1.942	0.737	0.392	0.661	7.161

Appendix 1: Continued

	TR71 (Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir)							TR72 (Kayseri, Sivas, Yozgat)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.708	0.012	6921.412	6.795	42.270	1.246	0.063	9.920	0.010	7655.176	4.929	40.323	1.375	0.177
Median	9.050	-0.010	7169.000	7.770	42.700	1.342	0.055	9.030	0.004	8148.000	2.550	40.600	1.198	0.160
Maximum	16.120	0.234	8654.000	27.120	46.500	1.511	0.098	16.510	0.239	9665.000	18.290	47.200	2.287	0.292
Minimum	6.760	-0.295	4011.000	-5.660	33.900	0.933	0.055	6.710	-0.297	4531.000	-0.270	34.100	1.063	0.158
Skewness	1.010	-0.089	-0.670	1.154	-0.853	-0.962	1.591	1.062	-0.191	-0.587	1.157	-0.031	1.724	2.171
Kurtosis	3.023	2.915	2.577	4.605	3.206	2.595	3.887	3.259	2.713	2.634	3.794	1.537	4.645	6.919
JB	2.892	0.027	1.401	5.603	2.095	2.740	7.736	3.244	0.161	1.073	4.245	1.517	10.342	24.242
	TR81 (Zonguldak, Karabük, Bartın)							**TR82 (Kastamonu, Çankırı, Sinop)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.564	0.003	7119.706	2.488	47.929	0.339	0.292	9.305	0.007	7350.706	5.515	48.347	1.824	0.070
Median	8.570	0.018	7584.000	5.920	47.300	0.306	0.264	8.920	0.001	7559.000	6.150	49.800	2.409	0.045
Maximum	17.190	0.277	9292.000	11.330	53.900	0.473	0.489	16.550	0.236	9127.000	67.640	56.000	3.011	0.204
Minimum	4.180	-0.443	3838.000	-15.230	40.900	0.247	0.208	5.730	-0.286	4562.000	-32.280	33.800	0.545	0.044
Skewness	0.888	-0.579	-0.569	-1.281	-0.098	0.848	1.713	1.288	-0.104	-0.481	1.478	-1.310	-0.681	1.819
Kurtosis	3.297	3.104	2.505	4.152	2.629	2.600	5.006	3.896	2.695	2.241	7.129	4.002	1.640	5.275
JB	2.301	0.958	1.093	5.592	0.125	2.152	11.173	5.271	0.096	1.063	18.274	5.574	2.625	13.045
	TR83 (Samsun, Tokat, Çorum, Amasya)							**TR90 (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
Mean	9.774	0.004	6476.412	1.176	48.852	0.780	0.117	9.686	0.014	6824.588	6.068	53.647	8.698	0.108
Median	9.100	-0.009	6861.000	0.100	48.800	0.761	0.075	8.660	-0.016	7128.000	7.500	52.200	8.372	0.100
Maximum	17.290	0.239	8048.000	17.500	51.700	1.054	0.401	17.800	0.289	8460.000	32.020	61.300	10.756	0.148
Minimum	5.860	-0.410	3790.000	-8.410	45.900	0.510	0.075	6.620	-0.319	3905.000	-10.700	47.600	7.085	0.075
Skewness	1.221	-0.683	-0.621	1.071	0.047	0.451	2.285	1.304	-0.216	-0.694	0.970	0.360	0.982	1.902
Kurtosis	3.701	3.860	2.439	3.649	1.772	4.988	6.869	3.795	3.088	2.796	3.781	2.201	4.262	6.063
JB	4.577	1.847	1.316	3.549	1.072	3.377	25.405	5.272	0.138	1.395	3.101	0.820	3.865	16.901

Appendix 2: Correlation Coefficients

	TRA1 (Erzurum, Erzincan, Bayburt)							TRA2 (Ağrı, Kars, Iğdır, Ardahan)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.788	1.000						-0.665	1.000					
PCGDP	-0.261	-0.326	1.000					-0.280	-0.343	1.000				
POP	0.088	-0.488	0.513	1.000				0.051	0.005	-0.227	1.000			
EMP	-0.434	-0.102	0.605	0.148	1.000			-0.343	0.177	0.536	-0.167	1.000		
TOT	0.262	-0.074	-0.206	-0.320	-0.559	1.000		-0.649	-0.074	-0.099	0.127	0.384	1.000	
OPEN	0.160	0.047	-0.179	-0.221	-0.534	0.529	1.000	0.102	0.093	0.296	-0.344	0.107	-0.515	1.000
	TRB1 (Malatya, Elazığ, Bingöl, Tunceli)							**TRB2 (Van, Muş, Bitlis, Hakkâri)**						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**

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EMP	-0.117	0.412	-0.173	0.070	1.000			0.470	0.461	0.477	0.041	1.000		
TOT	-0.789	0.187	-0.122	0.065	0.001	1.000		0.665	0.351	0.003	0.043	0.729	1.000	
OPEN	-0.334	0.283	-0.300	0.128	-0.197	0.206	1.000	0.574	0.180	-0.183	-0.511	0.182	0.362	1.000

	TR21 (Tekirdağ, Edirne, Kırklareli)							TR22 (Balıkesir, Çanakkale)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.584	1.000						-0.335	1.000					
PCGDP	-0.177	-0.452	1.000					-0.130	-0.399	1.000				
POP	-0.101	0.075	-0.229	1.000				0.251	0.072	0.165	1.000			
EMP	0.555	0.209	0.082	0.020	1.000			0.053	-0.333	-0.080	0.285	1.000		
TOT	0.549	0.217	0.099	-0.199	0.723	1.000		0.850	0.187	-0.124	0.087	0.024	1.000	
OPEN	-0.062	0.088	-0.281	-0.155	-0.669	-0.494	1.000	0.207	0.041	-0.301	-0.238	-0.290	0.151	1.000

Appendix 2: Continued

	TR31 (İzmir)							TR32 (Aydın, Denizli, Muğla)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.690	1.000						-0.707	1.000					
PCGDP	-0.225	-0.158	1.000					-0.779	-0.584	1.000				
POP	-0.336	0.195	-0.221	1.000				-0.112	0.193	0.625	1.000			
EMP	0.393	0.211	0.670	-0.488	1.000			0.212	0.184	0.271	0.453	1.000		
TOT	0.806	0.415	-0.125	-0.492	0.370	1.000		0.622	-0.425	-0.877	-0.553	-0.552	1.000	
OPEN	0.734	0.326	-0.160	-0.521	0.198	0.868	1.000	0.629	0.266	-0.731	-0.470	-0.435	0.702	1.000

	TR33 (Manisa, Afyon, Kütahya, Uşak)							TR41 (Bursa, Eskişehir, Bilecik)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.500	1.000						-0.557	1.000					
PCGDP	-0.114	-0.307	1.000					-0.314	-0.144	1.000				
POP	0.287	-0.091	0.367	1.000				-0.127	-0.386	-0.305	1.000			
EMP	0.206	0.200	0.649	0.318	1.000			0.423	0.021	-0.001	-0.188	1.000		
TOT	0.733	-0.110	-0.192	0.134	-0.024	1.000		0.870	-0.340	-0.214	-0.267	0.210	1.000	
OPEN	0.709	0.256	0.063	0.298	0.282	0.612	1.000	0.767	-0.464	-0.140	-0.440	0.278	0.773	1.000

	TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)							TR51 (Ankara)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.681	1.000						-0.811	1.000					
PCGDP	-0.131	-0.278	1.000					-0.560	-0.274	1.000				
POP	-0.094	0.284	-0.267	1.000				-0.466	-0.057	0.160	1.000			
EMP	0.127	0.108	0.784	-0.441	1.000			0.104	0.246	0.481	-0.149	1.000		
TOT	0.363	0.253	-0.213	-0.164	-0.002	1.000		-0.390	0.240	0.053	0.477	-0.554	1.000	
OPEN	0.708	-0.204	-0.118	-0.432	0.193	0.010	1.000	0.696	-0.261	-0.261	-0.607	0.403	-0.426	1.000

	TR52 (Konya, Karaman)							TR61 (Antalya, Isparta, Burdur)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.776	1.000						-0.578	1.000					
PCGDP	-0.801	-0.646	1.000					-0.662	-0.302	1.000				
POP	-0.237	-0.328	0.490	1.000				0.115	-0.156	0.389	1.000			
EMP	0.120	0.306	0.129	0.267	1.000			-0.446	0.291	0.812	0.631	1.000		
TOT	0.854	-0.404	-0.921	-0.369	-0.270	1.000		0.663	0.595	-0.085	0.231	-0.233	1.000	
OPEN	0.509	-0.381	-0.755	-0.602	-0.677	0.779	1.000	0.555	0.072	-0.825	-0.675	-0.958	0.333	1.000

	TR62 (Adana, Mersin)							TR63 (Hatay, Kahramanmaraş, Osmaniye)						
	INF	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**	**INF**	**GRW**	**PCGDP**	**POP**	**EMP**	**TOT**	**OPEN**
INF	1.000							1.000						
GRW	-0.515	1.000						-0.661	1.000					
PCGDP	-0.128	-0.407	1.000					-0.275	-0.380	1.000				

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	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
INF	1.000						
GRW	0.520	1.000					
PCGDP	0.148	-0.308	1.000				
POP	0.033	-0.068	-0.266	1.000			
EMP	-0.372	-0.347	0.582	-0.225	1.000		
TOT	0.601	-0.254	0.068	-0.226	-0.380	1.000	
OPEN	0.694	-0.311	-0.126	-0.358	-0.431	0.704	1.000

	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
INF	1.000						
GRW	-0.645	1.000					
PCGDP	-0.168	-0.295	1.000				
POP	0.123	0.155	-0.018	1.000			
EMP	0.413	-0.080	0.595	0.037	1.000		
TOT	-0.407	0.361	-0.171	-0.077	-0.434	1.000	
OPEN	0.665	-0.272	-0.256	0.007	0.190	-0.370	1.000

TR83 (Samsun, Tokat, Çorum, Amasya)

	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
INF	1.000						
GRW	-0.791	1.000					
PCGDP	-0.231	-0.323	1.000				
POP	0.413	-0.327	0.080	1.000			
EMP	0.131	-0.262	-0.478	0.196	1.000		
TOT	0.441	-0.146	-0.039	0.536	0.452	1.000	
OPEN	0.677	-0.162	-0.227	0.057	-0.207	-0.078	1.000

TR90 (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane)

	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
INF	1.000						
GRW	-0.590	1.000					
PCGDP	-0.116	0.241	1.000				
POP	0.088	-0.207	-0.040	1.000			
EMP	-0.332	0.074	-0.664	0.106	1.000		
TOT	0.528	-0.167	-0.102	-0.020	-0.270	1.000	
OPEN	0.428	-0.198	0.001	-0.289	-0.587	0.269	1.000

Turkey

	INF	GRW	PCGDP	POP	EMP	TOT	OPEN
INF	1.000						
GRW	-0.814	1.000					
PCGDP	-0.215	-0.661	1.000				
POP	-0.487	0.126	-0.412	1.000			
EMP	0.581	0.577	0.506	0.068	1.000		
TOT	0.776	0.462	0.016	0.057	0.626	1.000	
OPEN	0.685	0.282	0.208	0.626	0.202	0.284	1.000