

## Economic Growth and Inflation in Turkey: 1980-2015

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**Abstract:** The aim of this study is to reveal the relation between economic growth and inflation in Turkey. The time series data used in the study covers the 1980-2015 period. The relationship has examined using the Augmented Dickey–Fuller Test (ADF), Johansen Co-integration Test and Granger Causality Test. As a result of the analysis, a uni-directional relationship between inflation and growth has determined.

**Key Words:** Economic growth, Inflation, Johansen Co-integration, Granger Casualty

### 1 INTRODUCTION:

It is quite possible to find analyzes in the economic literature that have been examined from different angles and different dimensions concerning the relationship between inflation and growth. It could be said that one of the main reasons for having this wide range of analyzes is the necessity of governments to determine the policies they will make according to this relationship. Because, continuous and high growth rates and inflation rates at low levels constitute the two main objectives of macroeconomic policies. At the same time, price stability plays a key role in determining the growth rate for the economy. Therefore, central banks of many countries resort to monetary policies in order to keep inflation rates at desired levels. While extremely high rates of inflation affect the economy severely, moderate inflation rates can slow down the growth rates of a country. (Vinayagathan, 2013). Hence, the question of whether the inflation-growth nexus is negative or positive has attracted attention of politicians as well as economists. The general belief in the literature is that high and fluctuating inflation rates will cause economic growth to slow down and low rates and stable inflation rates will support the growth process of the country's economy.

However, it should be noted at this point that the standard Keynesian perspective is clearly distinguished. The most prominent reason for this is that the Philips Curve will experience a decline in the unemployment rates resulting from an inflation increase. This decline in unemployment rates will support economic growth by increasing economic dynamism. Therefore, an increase in the rate of

inflation should support the growth rates of any country.

In addition to this, a different perspective is recently included in the literature of economics by Fischer (1993). This work by Fischer claims the existence of a non-linear relationship between inflation and growth. Which means that inflation rates that are at low levels, even converging to zero, will positively impact growth, while larger inflation rates will have a negative impact on growth.

In this article, the inflation-growth relation, which presents different results in many studies, will be checked by using the Turkish data.

### 2 LITERATURE REVIEW

There is extensive empirical and theoretical work in the literature on the topic of the effect of inflation on economic growth.

Bağlan and Yıldız (2014) used a semi-parametric panel data model in their study of 92 countries and argued that inflation would only affect growth after a certain threshold level negatively. The nonlinear effects of inflation on economic growth are discussed in the study. The partial effect of inflation has exhibited a high nonlinear pattern. In these findings, the marginal effect of growing inflation at the point where inflation reaches a certain height will be considerably reduced. Moreover, the estimations show that the effect of inflation on growth is much higher than the findings of linear and threshold models.

Burdekin (2004) investigated the relationship between economic growth and inflation and found a negative relationship in parallel with most previous studies in the literature. However, the magnitude of this negativity and its effect on growth may vary from country to country. In the econometric analysis, the data of industrialized and developing countries are

separated. The multiple threshold method previously used by Fischer (1993) and Judson and Orphanides (1999) was applied and threshold values were examined separately for developed and developing countries. In addition, it has been determined that the effect on growth may not increase in the same direction if the inflation continues to increase after a certain threshold value. As a result, the threshold value for developed countries is 8%, while for developing countries this value is 3%.

Valdovinos (2003), inspired by the work of Lucas (1980), concluded that the long-term relationship between inflation and growth has been investigated and is a long-term negative relationship. Valdovinos used a non-structural low-frequency perspective in his work with eight Latin American countries. The negative relationship between inflation and growth in previous horizontal cross-section regression estimates has been demonstrated by Barro (1991), Kormendi and Meguire (1985) and Fischer's (1993). In this study, the countries were handled one by one. The study finds that short-term outcomes are poorly blurred. The long-span relationship observed after filtering the time series was found to be strong and negative.

Bick (2010) adds Hansen's (1999) study of panel threshold model regime intersections in the study that puts the relationship between inflation and economic growth together. Similarly, the result is that the inflation rate above the threshold is a negative effect on growth. Forty different developing countries in the study were studied between 1960-2004.

K. Blackburn and J. Powell (2011) similarly examined the relationship between inflation and growth and found a negative correlation between variables. In the analysis, the population was assumed to be fixed and it was assumed that it consisted of agents with eternal life. In this context, the population is divided into individuals and public employees (bureaucrats). As a result of the study, inflation has a negative impact on existing and potential investments, which is similar to the effects of tax increase on consumption and capital goods.

Bittencourt (2011) studied the macroeconomic performance of four Latin American countries that had to struggle with hyperinflation in the 1980s and early 1990s in the time series analysis, and looked at the link between inflation and economic growth in this context. A clear negative relationship between inflation and growth was obtained in the study.

Table-1 Literature Review

Authors	Time Period	Countries	Variables	Method	Result
Valdovinos (2003)	1970-2000 (annual)	12 Latin American Countries	Inflation / Growth		Inflation affects growth in the long term negatively.
Burdekin (2004)	(1967-1992) and (1965-1992) (annual)	21 developed countries and 51 developing countries	Inflation / Growth	OLS/GLS	Inflation affects growth in the long run negatively. However, the results may differ from country to country.
Bick (2010)	1960-2004 (annual)	40 developing countries	Inflation / Growth	Panel Data	Inflation rates above the threshold impact growth on the negative side.
Bittencourt (2011)	1970-2007 (annual)	Argentina, Brazil, Peru, Bolivia	Inflation / Growth	Panel Data	Inflation affects growth in the long term negatively.
Blackburn and Powell (2011)	-	-	Inflation / Growth	Macroeconomic modeling	Inflation affects growth in the long term negatively.
Baglan and Yoldas (2014)	1975-2004 (annual)	92 countries	Inflation / Growth	Panel Data	Inflation affects growth in the long term negatively.

### 3 DATA AND METHODOLOGY

The data used in the study are annual data for 1980-2015. In this paper while the gross domestic product (at current prices) represents economic growth, consumer price index represents inflation rate. Gross domestic product (at current prices) data is obtained from the statistical data of the Central Bank of the Republic of Turkey. The inflation rate is obtained from the Turkish Statistical Institute.

#### 3.1 UNIT ROOT TEST

In the time series analysis, the data must be stationary. When non-stationary time series are used, spurious regression problem arises. In this case, the result obtained by the regression analysis does not reflect the real relationship.

In this paper, Augmented Dickey Fuller Test (ADF) is used to determine whether selected variables are stationary or not. Before applying ADF natural logarithm is applied to the selected variables which indicated as LNGDP and LNINF. Table 2 shows the ADF unit root test results. Economic growth and inflation series are stationary at first differences.

Table-2 Unit Root Test Results

AT LEVELS	TREND AND INTERCEPT	PROBABILITY
LNGDP	-1.693	0.7330
LNINF	-1.574	0.7827
AT FIRST DIFFERENCES		
DLNGDP	-6.008	0.0001
DLNINF	-6.125	0.0001

### 3.2 JOHANSEN COINTEGRATION TEST

The ADF test results show that both variables are stationary at the same level (I1). For this reason, it has been decided that the economic growth and inflation time series are appropriate for the cointegration analysis. Through this test it was determined whether there is a long-term relationship between economic growth and inflation or not. The first step in the Johansen Cointegration method is to determine the lag length. The lag length is five for our empirical analysis according to Akaike Information Criterion(AIC). Johansen test results are presented in Table 3.

Table-3 Johansen Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
Null Hypothesis	Eigen value	Trace Stat.	Critical value at 5%	Prob.
None	0.631596	32.73682	25.87211	0.0060
At Most	0.156839	4.776732	12.51798	0.6287
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Null Hypothesis	Eigen value	Max-Eigen Stat.	Critical value at 5%	Prob.
None	0.631596	27.96008	19.38704	0.0022
At Most	0.156839	4.776732	12.51798	0.6287

Trace test and max-eigenvalue test indicates one cointegrating, that is, the long-run relationship between economic growth and inflation.

### 3.3 GRANGER CASUALITY TEST

The causality analysis developed by Granger (1969) is the most commonly used method for determining causal relationships between time series. In this paper, Granger Causality Test is used to investigate the causality relationship between inflation and growth. The estimation results of the Granger causality test are presented in Table 4.

According to Granger Casualty Test, there is a uni-directional relation between economic growth and inflation. The direction of causality inflation to economic growth.

Table-4 Granger Casualty Test Results

Direction of Casualty		Probability
DLNGDP	DLNINF	0.6467
DLNINF	DLNGDP	0.0001

### 4 CONCLUSION

In this paper, using the annual GDP and consumer price index series for 1980-2015, the relationship between inflation and economic growth in Turkey

has been examined in terms of an econometric perspective. In order to investigate the relationship between economic growth and inflation-GDP represents economic growth and consumer price index represents inflation- Johansen cointegration and Granger causality tests were used.

According to the findings, there is a long-term relationship between inflation and economic growth. As a result of the Granger causality test, uni-directional relationship between economic growth and inflation was found.

It would be beneficial to add the determinants of economic growth as a variable to make the inflation economic growth relationship more meaningful for future studies.

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