Relationship Between Inflation and Financial Development: Evidence from Turkey[1]

Enflasyonun Finansal Gelişme Üzerindeki Etkileri: Türkiye İçin Bulgular

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ABSTRACT

Keywords:

Financial Development, Inflation, Turkey, Time Series Analysis

The interaction between inflation and economic growth as well as economic growth and financial development has been extensively investigated in the literature. Although the empirical findings on the subject are diverse, a large body of works point to a negative effect of inflation on long-term growth. It can be said that there exist a consensus among economists to be that high rates of inflation are detrimental to economic growth performance. However, much less agreement exists about the mechanisms by which inflation affects economic activity. Financial development is viewed as an important channel through which inflation can adversely affect growth. The obtained ARDL bounds test results support the previous empirical findings which assert a negative impact of inflation on financial development, in the case of Turkey.

JEL codes: E31, E44, O11, O52

ÖZET

Anahtar Kelimeler:

Finansal Gelişme, Enflasyon, Türkiye, Zaman Serisi Analizi

Literatürde hem enflasyon ve ekonomik büyüme arasındaki etkileşim, hem de ekonomik büyüme ve finansal gelişme arasındaki etkileşim yaygın olarak araştırılmıştır. Konuyla ilgili ampirik bulguları farklı olmasına rağmen, çok fazla sayıda çalışma enflasyonun uzun dönemli ekonomik büyüme üzerinde olumsuz etkide bulunduğuna işaret etmektedir. Yüksek enflasyon oranlarının ekonomik büyüme performansı üzerinde olumsuz etki yaptığı konusunda ekonomistler arasında bir konsensüsün varlığından söz edilebilir. Bununla birlikte enflasyonun ekonomik aktivite düzeyini hangi mekanizma yoluyla etkilediği konusunda daha az ortak görüş vardır. Finansal gelişme, enflasyonun ekonomik büyümeyi olumsuz etkileyebileceği önemli bir kanal olarak görülmektedir. Türkiye örneğinde elde edilen ARDL sınır testi sonuçları, enflasyonun finansal gelişme üzerinde olumsuz etkilerinin olduğunu savunan görüşleri desteklemektedir.

JEL Kodu: E31, E44, O11, O52

1. INTRODUCTION

There is a large body of literature devoted to investigate the interaction between inflation and economic growth as well as economic growth and financial development. Although the empirical findings on the subject are diverse, a large body of works point to a negative effect of inflation on long-term growth. It can be said that there exist a consensus among economists to be that high rates of inflation are detrimental to economic growth performance. However, much less agreement exists about the mechanisms by which inflation affects economic activity. Financial development is viewed as an important channel through which inflation can adversely affect growth. By creating uncertainty and financial market frictions, high rates of inflation make the financial system inefficient in allocating resources (Keho, 2009; Naceur and Ghazouani, 2004; Andres *et al.*, 1999). So it can be expected that high rates of inflation has negative impact on financial development as well as on economic growth.

During the last quarter of the 20th century, Turkey witnessed to quite high inflation levels. The most severe inflationary burst happened in 1994, 120.5 percent, the year in which Turkey has experienced one of her heaviest economic crisis followed by high rate devaluation. After the launching of four IMF-leaded Structural Adjustment Programs the inflation

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rate has been reduced to one-digit levels. Anti-inflationist policy measures have been applied successfully during the last ten years and low inflation levels have been pursued. During this period Turkish economy recorded high rate growth despite the recent global crisis. So in 1990's, the period in which Turkish economy was struggled with high and persistent rates of inflation, it would be expected that, besides other economic and politic factors, high inflation may weakened the financial structure and obstructed the growth of the economy.

In this study, we aimed to examine the abovementioned relation empirically in the case of Turkey. The related empirical literature, in large, contains a panel of a number of countries, so the single country examples are very scarce (for instance, Bittencourt, 2011; Lee and Wong, 2005). The panel data setting could not reflect the country-specific nature of the relationship under investigation. This study is a modest step on this way. The study has been planned as follow: the next section devoted to theoretical background of the finance – inflation relationship. A review of the related empirical literature is presented in Section 3. The data set, variables and findings of the analyses can be found in Section 4. The paper concludes in Section 5.

2. THEORETICAL BACKGROUND

As an empirical matter, there is a strong positive association between measures of both bank lending activity and the volume of trading in equity markets on the one hand and real activity on the other. In addition, inflation and real activity are negatively correlated, particularly for economies with relatively high rates of inflation. It is also evidenced that inflation and the development of the financial system are very negatively correlated, as are inflation and real equity returns (Huybens and Smith, 1999).

As put forward by Khan *et al.* (2001), if inflation affects the development of the financial system, it will have long-run real effects. The effects of an increase in the rate of inflation potentially can be quite different depending on whether the rate of inflation is above or below some threshold level. The theoretical and empirical findings suggest that there are thresholds – possibly more than one – in the relationship between inflation and financial activity and, therefore, in the relationship between inflation and real activity. This negative relationship can be explained by two theoretical mechanisms; adverse selection or moral hazard problems, and costly state verification frictions in credit markets (Khan *et al.,* 2001).

Higher rates of inflation make more costly holding required reserves. For the bank the latter is equivalent to more costs incurred when attracting additional external funds. Therefore, banks try to reduce these costs and lower real price they pay to depositors. Another reason, which may entail negative relationship between the rate of inflation and the rate of return, is nominal interest rate rigidity caused by regulatory measures. Whatever the reason of lower real interest rates at higher rates of inflation, a fall in returns may lead to the outflow of funds from the financial system and hence, to lower availability of investment capital. The latter limits the quantity of credits granted by financial system, depress activity in financial markets and thus, lower financial depth (Kulyk, 2002).

The theoretical literature on the relationship between inflation and financial markets – that is, both in terms of credit markets and equity markets, postulates following consequences of higher long run or permanent rates of inflation (Boyd *et al.*, 2001):

1. Higher rates of inflation are associated with greater inflation and stock return volatility.

2. Higher inflation implies less long-run financial activity, and equity markets will be smaller and less liquid.

3. Several inflation thresholds may characterize the relationship between inflation and financial sector conditions. That is, over a critical level, incremental increases in the (long-run) rate of inflation may have no additional impact on financial sector activity.

Huybens and Smith (1999) theoretically argue that in a steady state with relatively low capital stock in which both banks and equity markets are active, inflation and real activity must be negatively correlated. This negative relationship will become more pronounced at relatively high levels of inflation. Additionally, under the specific conditions real activity and the volume of financial market activity are positively correlated in the high activity steady state. In this case, inflation and financial market activity will be inversely related as well. Finally, they have illustrated that the high-capital-stock steady state may be a saddle for low rates of money growth. However, once the rate of money creation (inflation) exceeds some critical level, the high activity steady state can be transformed from a saddle to a source. Thus, thresholds can easily exist; the behavior of the economy must differ dramatically depending on whether the steady state rate of inflation is above or below this threshold level.

3. LITERATURE REVIEW

Despite the joint evolution of inflation, financial development attained by an economy and its rate of growth, the empirical growth literature has separately approached the study of the links among these variables by estimating the effect of financial development and inflation on growth (Andres *et al.*, 1999). However, the relationship between inflation and

financial development has been received growing attention in recent years. A number of recent empirical works have provided significant contributions to the finance, inflation and growth literature.

In their pioneering work, Boyd *et al.* (1996, 2001) concentrate on the links between sustained inflation and financial sector performance, regarding their substantial impact on the long run rates of economic growth. Employing various indicators for financial sector performance, they found that there is a significant, and economically important, negative relationship between inflation and financial development. This correlation emerges essentially independently of the time period considered, the empirical procedure employed, or the set of variables that appear in the conditioning information set. It is also not sensitive to inclusion or exclusion of countries that have experienced extraordinarily high rates of inflation. Finally, the negative relationship between inflation and financial sector performance emerges even after controlling for simultaneity and omitted variable biases. Thus, a preponderance of evidence indicates that sustained inflation and financial sector performance display a strongly negative association. They also found that the empirical relationship between inflation and financial sector activity is highly nonlinear. Furthermore, their findings reveal thresholds effect. The data suggest that for economies with annual inflation rates above about 15 percent, there is a large discrete drop in financial development relative to countries with inflation rates below this threshold.

The inferences of Boyd *et al.* (1996, 2001) rely on a cross-sectional data. Barnes (2000) reinvestigated the said trivariate relationship and the threshold effect within a panel framework. He has specified different models in order to separately test for thresholds in the relationship between banking sector development and inflation besides the other two. The results show positive and often significant relationships between growth and the financial market development measures in the single threshold specifications. In the presence of an interaction term between inflation and financial market development, this relationship becomes larger and more significant after the threshold level of inflation is reached.

Using financial depth as a proxy for the degree of financial development, Khan *et al.* (2001) investigated the impact of several factors on financial activity. Among them there are GDP per capita, the degree of openness, the share of public consumption in GDP, and inflation rate. They constructed an econometric specification which explicitly allowed for inflation threshold effects. Their findings reveal that a rise in inflation has a weak positive effect when initial rate of inflation is low and a negative effect at initially high inflation. It is also found that threshold rates of inflation lie in the range 3-6 percent a year depending on the specific measure of financial depth.

Naceur and Ghazouani (2005) examined the impact of inflation on the financial sector performance in the case of 11 MENA countries. Using the dynamic panel data with the Hansen's (1999) methodology to estimate threshold levels, they found that inflation has a negative and significant incidence on the financial sector development but with no evidence of thresholds levels even after controlling for simultaneity and omitted variable biases. In other words, they have shown that a marginal increase of inflation is harmless to stock market performance and banking sector development whatever the rate of inflation.

Interaction between inflation and financial development is of great interest for the less developed countries. In the way to reach higher growth pace, these countries have to keep a low inflation rate in order to create the conditions for sustainable growth. If inflation really affects financial development adversely, then the anti-inflationary policy within these countries is welcome. Keho (2009) empirically investigated the long run and causality relationship between inflation and financial development for the seven countries of the West African Economic and Monetary Union. The Bounds testing approach to cointegration showed no evidence of long-run relationship between inflation and financial development for six countries. Results from causality tests are mixed across the countries. In two cases he did not find any causality between inflation and financial development. In three cases, financial development contributes to inflation. There is only one case where inflation depresses financial development.

Rousseau and Wachtel (2002) tried to answer whether inflation inhibits the economic growth via negatively affecting the financial development, and in what extend varying level of inflation does affect the finance – growth nexus. Their findings indicate that inflation inhibits economic growth both directly and indirectly through its effect on financial development. However, the direct effects are due to high inflation situations and largely disappear when inflation rate is moderate. Secondly, they found that the strong and robust effect of financial sector depth on economic growth is largely unaffected by the presence of the inflation rate. However, the effect of financial depth is much weaker in high inflation environment.

As pointed out above there are a few studies which examines the financial development and inflation nexus on a single country basis. In such a paper, Bittencourt (2008) investigated the role of inflation for financial development in Brazil using data covering the period between 1985 and 2002 and 10 economically diverse regions. This time period encapsulates two distinct regimes in terms of macroeconomic performance in Brazil. Based initially on the time series variation and then on the panel time series analysis, he concludes that inflation is detrimental to financial development. His evidence is significant and robust for different data sets, different measures of financial development and different estimators.

In another paper Lee and Wong (2005) examined the relationship between financial development, inflation and economic growth for Taiwan and Japan. In this regard they employed the TAR approach to investigate the possible inflationary threshold effects in the relationship between financial development and economic growth. The empirical findings of their study show that there is one inflation threshold value in Taiwan, whereas there are two in Japan. These results suggest that changes in inflation contribute one of the factors that cause structural change in the relationship between financial development and economic growth.

4. EMPIRICAL ANALYSIS

In order to find out whether there is a significant long-run relationship between inflation and financial development, we employed the Autoregressive Distributed Lag (ARDL) approach to co-integration test which developed by Pesaran *et al.* (2001). Unlike the conventional Engle and Granger (1987), and Johansen and Juselius (1990) co-integration procedures, the ARDL approach does not require that variables under investigation are integrated of the same order, namely I(1). It can be applied irrespective of whether the regressors are I(0) or I(1). The ARDL approach also has better small sample performance compared to the said alternatives.

4.1. Indicators of Financial Development

There are a number of methods of measurement used to determine financial development in an economy. Some of these are general and some are more specific indicators. The number and the varieties of institutions in the financial market and the rise in the variety of financial instruments are general; and structural and quantitative indicators are specific indicators (Lynch, 1996).

The main indicator which measures the development of the financial system structurally is the ratio between M2 and M1. An increase in M2/M1 indicates an improvement in the structure of the financial system (Lynch, 1996). Another structural indicator is FIR (Financial Irrelations Ratio) which is the ratio between total financial assets and GDP. The higher the FIR is, the higher the level of financial development in a country (Goldsmith, 1987:26). Other than these indicators, positive real interest rate and low transaction costs are among the structural indicators. Other common measures are the ratios of liquid liabilities, bank assets, private credits and market capitalization to GDP.

4.2. Variables and Data

In this regard, inflation rate is measured by the Consumer Price Index (CPI_t) whereas financial development is proxied by two different indicators. The first one ($FD1_t$) is the ratio of credits provided by financial intermediaries to the private sector to GDP and the second ($FD2_t$) is the ratio of broad money (M2) to GDP. These measures of financial development are more reliable and more accurately represent the functioning of financial system development. Especially, $FD1_t$ is a measure of the quantity and quality of investment. Therefore, the credit to the private sector is more directly linked to investment and economic growth. It seems more relevant in developing countries in which most financial development occurs within the banking system (Keho, 2009). As a control variable the volume of real activity is used. The measure of real activity is defined as real per capita income level ($PGDP_t$). It is assumed that higher real activity or real income may result in more than proportional rise in the demand for financial services. As noted by Khan *et al.* (2001), per capita GDP is a good proxy for a variety of other variables which may affect financial depth. All necessary data has been gathered from World Development Indicators, an online database of the World Bank. The data frequency is annual and the time span covers the period 1971-2009.

4.3. Empirical Findings

Although it is not a necessary condition, prior to undertaken long- and short-run analysis, we first investigated the stationarity of the series. Results from the Augmented Dickey – Fuller (ADF) and Philips – Perron (PP) unit root tests reveal that all four variables are not stationary at their level values, but become stationary when differenced once, i.e. I(1).

Table 1. Results of the ADF and PP unit root tests.

	Levels		1st differences		
	Intercept	**Intercept + Trend**	**Intercept**	**Intercept + Trend**	
		ADF test results			
Variable	**Intercept**	**Intercept + Trend**	**Intercept**	**Intercept + Trend**	**Result**
FD1	-0.095	-0.634	-4.843*	-5.088*	I(1)
FD2	1.761	-0.243	-4.815*	-5.634*	I(1)
CPI	-2.013	-1.898	-7.140*	-7.333*	I(1)
PCGDP	0.425	-1.238	-4.691*	-4.765*	I(1)
		PP test results			
FD1	-0.466	-0.634	-4.865*	-5.021*	I(1)
FD2	5.497	1.272	-4.730*	-6.810*	I(1)
CPI	-1.944	-1,683	-7.298*	-10.773*	I(1)
PCGDP	0.425	-1.371	-4.686*	-4.763*	I(1)

Note: (*) denotes significance at 1% level.

At the second step, ARDL approach to co-integration test is used to find out whether there is a long-run relationship between the financial development indicators and inflation rate. Results of the test reveal that, the null hypothesis of no co-integration relation could not be rejected, thus, there is no long-run significant relationship between the inflation rate and financial development, in terms of *FD2*. But, when *FD1* is used as the financial development indicator, computed F-statistic is greater than the upper bound value, which implies that there is a significant long-run co-integration relationship between the financial development and inflation at the 5% significance level.

Table 2. Results of the ARDL cointegration tests

Variables	F-statistics	Critical bounds for F-statistics
F (*FD1 | CPI, PCGDP*)	6.1734	4.934 ; 5.764
F (*FD2 | CPI, PCGDP*)	4.7720	

So, the long- and short-run relations are estimated only based on *FD1*. Based on Schwarz Bayesian Criterion, the ARDL (6, 4, 1) model specification has been adopted (see, Table 3).

Table 3. Estimates of ARDL (6, 4, 1) model selected based on SBC

Variable	Coefficient	St. error	t-statistic [p-value]
FD1(-1)	0.8498	0.1493	5.6927 [0.000]
FD1(-2)	- 0.5921	0.2079	- 2.8477 [0.010]
FD1(-3)	0.3813	0.2109	1.8076 [0.087]
FD1(-4)	- 0.7816	0.2297	- 3.4023 [0.003]
FD1(-5)	0.0735	0.1863	0.3944 [0.698]
FD1(-6)	- 0.3667	0.1716	- 2.1366 [0.046]
CPI	- 0.0541	0.0185	- 2.9281 [0.009]
CPI(-1)	0.0490	0.0223	2.1980 [0.041]
CPI(-2)	- 0.0023	0.0224	- 0.1023 [0.920]
CPI(-3)	0.0454	0.0222	2.0451 [0.055]
CPI(-4)	- 0.0720	0.0183	- 3.9264 [0.001]
PGDP	- 0.0013	0.0061	- 2.1400 [0.046]
PGDP(-1)	0.0022	0.0067	3.2899 [0.004]
Costant	26.0402	5.6887	4.5775 [0.000]
R2 = 0.9300		Adjusted R2 = 0.8821	
S. S. E. = 1.7716		F(13, 19) = 19.4243 [0.000]	
AIC = - 70.5882		SBC = - 81.0637	
DW-statistic = 2.1833			

As seen from the table, long-run relation has a negative sign and significant at 10% level, which means that, parallel to the theoretical expectation, there is a negative association in long-run between the financial development and inflation rate in Turkey. The higher rate of inflation would cause to more weak and un-sufficient financial system.

Table 4. Estimated long-run coefficients of ARDL(6,4,1) selected based on SBC

Variables	Coefficient	Standard Error	t-statistic [Prob]
CPI	– 0.0237	0.0126	– 1.8829 [0.075]
PGDP	0.0062	0.0016	3.8151 [0.001]
Constant	18.1365	0.8412	21.5610 [0.000]

Note: Dependent variable is *FD1*

To complement the analysis, we proceed to estimate the short-run relationship between financial development and inflation. According to the estimation result, error correction term has a negative and significant coefficient. But the value is greater than one, which implies that error correction mechanism does not work, and hence, any divergence from long-run equilibrium does not correct at the following periods.

Table 5. Error correction representation for the Selected ARDL(6,4,1) Model based on SBC

Regressor	Coefficient	Standard Error	t-statistic [Prob]
d(FD1)1	1.2855	0.2926	4.3934 [0.000]
d (FD1)2	0.6934	0.2678	2.5886 [0.017]
d(FD1)3	1.0748	0.2565	4.1900 [0.000]
d(FD1)4	0.2931	0.1853	1.5821 [0.129]
d(FD1)5	0.3666	0.1716	2.1366 [0.045]
dCPI	- 0.0541	0.0184	- 2.9281 [0.008]
dCPI1	0.0289	0.0203	1.4228 [0.169]
dCPI2	0.0266	0.0193	1.3773 [0.183]
dCPI3	0.0720	0.0183	3.9264 [0.001]
dPGDP	- 0.0013	0.0061	- 2.1400 [0.044]
Costant	26.0402	5.6887	4.5775 [0.000]
ecm(-1)	- 1.4358	0.3142	- 4.5703 [0.000]
ecm = FD1 + 0.0237 CPI – 0.0062 PGDP – 18.1365			
R^2 = 0.7841		Adjusted R^2 = 0.6363	
S. S. E. = 1.7716		F(11, 21) = 6.2723 [0.000]	
AIC = - 70.5882		SBC = - 81.0637	
DW-statistic = 2.1833			

Nevertheless, the result of the short-run error correction mechanism should be assessed cautiously, given that in annual data most of the short-run variability is already averaged out. For this same reason, no tests were applied for causality on annual data.

5. CONCLUSION

In this paper we have investigated the relationship between inflation and financial development in case of a developing country, Turkey. As indicators of financial development we choose banking sector development indicators, namely the ratio of bank credits used by private firms to GDP and broad money supply (M2) to GDP. Using annual data belong to the 1971-2009 period and ARDL co-integration test, it is found out that there is no long-run co-integrating relation between inflation and financial development, in terms of the ratio of money supply to GDP indicator. When the ratio of credit to private sector to GDP is used as a proxy for financial development it is evidenced that a significant long-run relationship exits between inflation and financial depth. Long- and short-run estimates reveal that inflation has a negative effect on financial development as is the case in the related literature.

The important conclusion that emerged from the analysis is that the growth in credit to private sector has been an important contributor to the decrease in inflation in Turkey. So it can be concluded that lower inflation rates reached in last decade in Turkey partially stems from the rigorous banking sector, which has experienced a severe crisis in 2001.

The important policy implication is that in Turkey, low inflation levels facilitate the development of the financial system, and thereby, economic growth. In order to capture a sustainable growth pace and improved financial intermediation, low inflation policy should be carried on.

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