

# The Effect of Inflation on Financial Development: The Case of Iran

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# ABSTRACT

The recent growing concern literature about the financial development impacts on economic and social variables has persuaded experts to look for different pre-conditions of these effects which one of them is stable inflation rates. Since during the past three decades Inflation rates were two digits in Iranian economy, study the inflation-finance nexus is prominent. Thus, the purpose of this paper is to study the effect of inflation on financial markets performance is studied in Iran. For this purpose I derive a multilateral index –which calculated by Principle Component Analysis- as financial development measure and ARDL approach to investigate the effect of inflation on banking system financial performance in Iran from 1973 to 2007. The empirical findings revealed that high inflation rates in Iran made financial intermediaries not perform at their highest level. In fact, inflation had had a negative significant effect on financial development in Iran, so it can be considered as one of the critical challenges of financial intermediaries in Iran.

**KEYWORDS:** Inflation, Financial Development, Principle Component Analysis.

# **1. INTRODUCTION**

A vast growing recent theoretical and empirical literature has concluded that financial development promotes economic growth. Some empirical studies, such as De Gregorior and Guidotti (1995), have found that financial development significantly reduces economic growth for countries which experienced relatively high inflation rates in Latin America during the 1970s and the 1980s. This has led to the World Banks' Operating Directive on the financial sector to recommend developing countries not to pursue financial reforms unless their inflation rates are sufficiently low. Boyd, Levine, and Smith (2001) empirically have shown that inflation is negatively correlated with financial markets performance.

A growing theoretical literature describes mechanisms whereby even predictable increases in the rate of inflation interfere with the financial sector efficiency to allocate resources best. More specifically, recent theories emphasize the importance of informational asymmetries in credit markets and demonstrate that increases in the inflation rates, adversely affect credit market frictions with negative repercussions for financial sector performance and therefore long-run economic growth (Huybens and Smith, 1998, 1999).

Boyd and Champ (2003) find that inflation hurts economic growth through declining financial development, especially by damaging the operation of financial markets. Demirguc-Kunt and Maksimovic (1998) report positive relationship between inflation and financial crisis empirically due to frictions in financial markets.

According to Mundell (1963) and Tobin (1965), portfolio allocations are influenced by inflation due to low returns on capital, leading to improvements in investment activities. This situation spurs growth process in the economy. In the same way, English (1999) argues that higher rates of inflation compel the individuals to surrogate purchased transactions services for money balances that not only augment the supply of financial services and stimulate financial development as well.

Moore (1986), Choi et al. (1996), and Azariadis and Smith (1996) highlight the fact that if inflation is high enough, returns on savings are reduced, the pool of borrowers is swamped, informational frictions become more severe, and therefore credit becomes scarce in this situation.

Moreover, Schreft and Smith (1997), Boyd and Smith (1998), Huybens and Smith (1998), and Huybens and Smith (1999) explore the idea that economies with higher rates of inflation obviously present less efficient financial markets because of the higher interest rates that follow high rates of inflation. All the same, the Mundell–Tobin effect is reversed in a high-inflation environment.

Rousseau and Yilmazkuday (2009:312) state that financial intermediation becomes more difficult as the flow of information about real investment returns becomes more uncertain and less readily available. This will lead lenders to focus more on short-term objectives when building their portfolios and to curtail long-term lending. In the

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end, a larger fraction of credit will then be directed toward loans more likely be used to meet operating expenses than to fund long-term capital investments. Inflation can also repress financial intermediation by eroding the usefulness of money assets and leading to policy decisions that distort the financial structure.

Boyd, Levine and Smith (2001:223) summarized the theoretical literature on credit market frictions, finance, and growth delivers empirically testable implications regarding the consequences of higher long-run or permanent rates of inflation as follows:

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

2. Higher inflation implies less long-run financial activity. In economies with high inflation, intermediaries will lend less and allocate capital less effectively, and equity markets will be smaller and less liquid.

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

4. Higher long-run inflation implies lower long-run levels of real activity and/or slower long-run growth rates.

Naceur and Ghazouani (2007) by using GMM approach conclude that inflation deteriorates financial development. Kim et al. (2010) investigate the effect of inflation on financial development for 87 countries during 1965-2005. Their results indicate that inflation has inverse impact on financial development in long-run while positive effect in short span of time.

Wahid, et al (2011) examined the impact of inflation on financial development in case of Bangladesh for 1985-2005. They employed ARDL bounds testing approach and Error Correction Method (ECM). Empirical findings revealed that high trends of inflation impede the performance of financial markets.

Bittencourt (2011) examined the impact of inflation on financial development in Brazil between 1985 and 2004. The results suggest that inflation presented deleterious effects on financial development during the period investigated.

The aim of this paper is estimating the effect of inflation on macroeconomic financial performance of banks in Iran. This paper is organized by four sections. The next section is devoted to research method and data description. Section 3 presents empirical results and final section devoted to conclusion.

#### 2. RESEARCH Method

#### 2.1. Econometric Methodology

Principle component analysis was offered by Karl Pearson (1901). This analysis involves variance-covariance matrix Eigenvalues analysis. This method supposes that the attention of researcher in the primary stage of the research is focused on the variables that show the most changes from one observation to another. Principle component analysis is based on finding of linear combination from primary variables on the basis of variance-covariance matrix structure.

Principle components method in mathematical definition, is an orthogonal linear transformation that take the data to new coordinate system, in a way that the biggest variance set in the first coordinate axis and the second big variance on the second coordinate axis, thus for all variables. In this transformation, the variable data set which has more variance is given more weights.

If it is assumed that random vector  $X = (X_1, X_2, ..., X_p)'$  has a variance- covariance matrix  $\Sigma$  with eigenvalues  $\lambda_1 \ge \lambda_2 \ge \cdots \ge \lambda_p \ge 0$  .we consider linear combinations from X in this form:

$$Y_i = I'_i X = I_{1i} X_1, I_{2i} X_2, \dots, X_{pi} X_p \qquad i = 1, 2, \dots, p \quad (1)$$
  
Variance Y<sub>i</sub> and covariance Y<sub>i</sub> and Y<sub>i</sub>.equal to:

Variance  $Y_i$  and covariance  $Y_j$  and  $Y_k$  equal to:

$$Var(Y_i) = I'_i \Sigma I_i \qquad i = 1, 2, ..., p \quad (2)$$
  

$$Cov(Y_i, Y_k) = I'_i \Sigma I_k \qquad i \neq k \qquad i = 1, 2, ..., p \quad (3)$$
  
and the characteristic structure of the char

For making principle components  $l_i$ s should be chosen in a way that  $Y_i$ s uncorrelated with greatest variance. The role of *i*th principle components impact is measurable by the following quantity<sup>1</sup>:

$$\frac{\lambda_i}{\lambda_1 + \lambda_2 + \dots + \lambda_p} \tag{4}$$

The methodology used is the autoregressive distributed lag (ARDL) approach to cointegration proposed by Pesaran et al. (2001). The ARDL bounds cointegration technique has been selected to determine the long run and short run relationships between services sector and GDP per capita. The choice of this methodology is based on several considerations. First, as shown by Pesaran et al. (2001), the ARDL models yield consistent estimates of the long run coefficients that are asymptotically normal irrespective of whether the underlying regressors are I(1) or I(0). Second,

<sup>&</sup>lt;sup>1</sup>. For further details see Aboutorabi and Aboutorabi (2012: 49-52).

this technique generally provides unbiased estimates of the long run model and valid t-statistics even when some of the regressors are endogenous (Harris and Sollis, 2003). Inder (1993) and Pesaran (1997) have shown that the inclusion of the dynamics may help correct the endogeneity bias. Third, given the size of the sample and the number parameters to be estimated the bound approach appears more appealing than the Johansen cointegration technique, which would have required the estimation of a system of equations and thus a considerable loss in degree of freedom.<sup>2</sup>

## 2.2. Data Description

In the present research, the effect of inflation rate on financial development in Iran during 1973 to 2007 has been studied. I use principle components analysis method to derive a multilateral index for financial development on the basis of the four most common indicators of financial development in banking sector.<sup>3</sup> These indicators are: the ratio of liquid liabilities to GDP, the ratio of credit allocated to private enterprises to total domestic credit, the ratio of credit allocated to private enterprises to GDP, and the ratio of commercial banks domestic assets to the banking system assets.

So, the model estimated in ARDL form is as follow:

 $FD = \alpha_0 + \sum_{i=1}^{P} \alpha_i FD_{t-i} + \sum_{i=0}^{q_1} \beta_i INF_{t-i} + \sum_{i=0}^{q_2} \gamma_i LGDPNO_{t-i} + \sum_{i=0}^{q_3} \delta_i OIL_{t-i} + U_t$  (5) Where, FD is the multilateral financial development index in Iran based on Aboutorabi and Aboutorabi (2012), INF is inflation rate in based on Consumer Price Index (CPI), LGDPNO is logarithm neperian of real gross domestic product without oil at factor price, and OIL is oil revenue growth rate of Iran.

## **Financial Development indicators in Iran**

#### - The ratio of liquid liabilities to GDP:

Figure 1 shows the fluctuations of the ratio of liquid liabilities to GDP in Iran during 1973-2007. These values are calculated on the basis of Central Bank of Iran formal statistics.



Figure 1: The ratio of liquid liabilities to GDP (1973-2007)

Source: Research calculation on the basis of central bank statistics

Because of oil shock and the increase of oil price and thereby the increase of gross domestic income, this index has had a decreasing trend in 1974. Then during 1974-1980, it had an increasing trend that one of its reasons can be the expansion of private banking before Islamic revolution. But this index, because of credit limitations in bank operation and the cease of activity of private banks, first decrease by the beginning of war and from 1985, because of enforcement of usury-free banking operation which leads to providing security for deposits, increase and this

<sup>&</sup>lt;sup>2</sup>. For further information about ARDL approach see Tandrayen-Ragoobur (2010)

<sup>&</sup>lt;sup>3</sup>. This approach is based on Aboutorabi and Aboutorabi (2012).

increase is continued up to the end of war. After war this index has seen with a decreasing trend due to governmental monopoly in banking system of the country, lack of private banks, no necessary innovations in attracting resources and also increasing governmental investments for reconstruction of war damages and its inflation, but after 2000 this index is observed an increasing trend due to the increase of bank interest rate and the decrease of inflation rate and also expansion of private bank.

### - The ratio of credit allocated to private enterprises to total domestic credit:

#### The fluctuations of this index in Iran are offered in figure 2 during 1973-2007.

This index was over 0.7 from 1973 up to 1978. Then by the occurrence of revolution and war and because of government role increase in economic investments, this index has a decreasing trend in a way that it has declined to lower than 0.4 in 1988. After war because of credit expansion of financial system for several years, it has an increasing trend, but this trend again decreases to 0.5 because of rebuilding plans after war and reconstruction period. However, since 2001 this index has an increasing trend owing to decrease in government intervention in banking affairs lead to more attention of banking system to private sector and as well booming activities of private banking which has more emphasis on evaluation of projects and corporate control.





Source: Research calculation on the basis of central bank statistics

#### - The ratio of credit allocated to private enterprises to GDP:

Figure 3 indicates the value of this index in Iran during 1973 to 2007. Credit allocated to private enterprises to GDP in 1974 has decreased because of oil shock and increase in oil price and thereby the increase in GDP and inconsiderable increase in activities of private sector in economy of Iran. Then up to the beginning of war it has an increase trend but by the outbreak of war and decrease in economic activities of private sector has decreased and it was nearly stable up to the end of war and had a little fluctuation between 0.3 and 0.4. After war it has again decreased because of increase in governmental investments for reconstructing damages of war. By the beginning of socio-economic second plan and third plan, it had an increasing trend.



Figure 3: The ratio of credit allocated to private enterprises to GDP (1973-2007)

Source: Research calculation on the basis of central bank statistics

### - The ratio of commercial banks domestic assets to the banking system assets:

It is expected that the more developed the banking system of a country, the higher values this index has and it is nearer to one. So developed countries have special situation in relation to this index and its values is nearly equal to one for all these countries. This matter indicates the great importance of commercial banks in financial development of these countries in contrast to little shares of their central banks assets.



Figure 4: Ratio of commercial banks domestic assets to the banking system assets (1973-2007)

Source: Research calculation on the basis of central bank statistics

This index has some fluctuations due to increasing oil incomes near 0.5 from 1974 to 1977 and in general, it increases. Then from 1977 up to mid of the war period, it has a decreasing trend but it is increasing due to adopting usury-free banking rule which cause the increasing of commercial bank assets. Because of reconstruction expenditure after war and the effect of increasing of bank system debts to foreign countries, it faces with a sudden decline from 1993. After spending this situation again it has an increasing trend.

As observed this index has not experienced serious changes because of the following reasons: governmental monopoly of commercial banks, government intervention in banking system of the country and imposing foreign debts to it, controlling interest rates by government, the ratio of high required reserves for banking deposits, insufficient attention to evaluating projects for granting loans to projects which have the highest economic return and supervisory system problems of banks for borrower.

#### 3. Empirical Results

Table 1 shows the dynamic ARDL results of the effect of inflation on financial development in Iran, and table 2 shows the long-run ARDL results of this effect.

ARDL(1,0,0) selected based on Schwarz Bayesian Criterion					
Regressor	Coefficient	Standard Error	T-Ratio[Prob]		
FD(-1)	0.78560	0.057375	13.6923[0.000]		
INF	-0.0015472	0.6359E-3	-2.4331[0.022]		
LGDPNO	0.12746	0.021011	6.0665[0.000]		
С	-1.4229	0.24062	-5.9133[0.000]		
OIL	0.0077083	0.010341	0.74541[0.463]		
<b>R-Bar-Squared</b>	0.95761	F(4,25)	164.7618[0.000]		

#### Table 1: Autoregressive Distributed Lag Estimates ARDL(1.0.0) selected based on Schwarz Bayesian Criteric

Source: Research calculation

Table 2: Estimated Long Run Coefficients using the ARDL Appro	ach
ARDL(1.0.0) selected based on Schwarz Bavesian Criterion	

mal(1,0,0) selected based on Senwarz Dayesian Criterion					
Regressor	Coefficient	Standard Error	T-Ratio[Prob]		
INF	0072163	.0031023	-2.3261[.028]		
LGDPNO	.59449	.12314	4.8277[.000]		
С	-6.6364	1.5066	-4.4050[.000]		
OIL	.035952	.051002	.70492[.487]		

Source: Research calculation

These tables state that the impact of inflation on financial sector performance in Iran is significantly negative at 5 percent level of significance in both short-run and long-run. These results reveal that one percent increase in inflation rate in short-run causes about 2.4 unit reduction in the multilateral index of financial development in Iran. Moreover, the effect of one percent increase in inflation leads to 2.3 unit reduction in financial performance of banks in Iranian Economy. Furthermore, GDP growth significantly has a positive effect in both long and short-runs while in contrast oil revenues growth rate has not a significant impact on financial development in Iran. R-Bar-Squared investigates that the employed variables can explain 95 percents of changes in financial development in Iran during the period studied here.

#### 4. Conclusion

According to Tables 1 and 2, findings of this paper reveal that inflation has had a significant negative and harmful effect on the performance of financial markets in Iran. Since Iranian economy had experienced severe inflation rates in the past three decades, it seems that pressures of such high rates of inflation on infant and non-organized financial markets of the country had been relatively offensive. Therefore, it prevents financial markets (especially banking sector financing which is more concern in this article) to do their best with appropriate efficiency in financial intermediation. Due to the results of the present research, it seems that controlling the inflation is an undeniable and fundamental pre-condition to benefit from the positive and important effects of financial development in encouraging economic growth, capital formation, innovation, entrepreneurship, industrialization, trade flows, employment, human capital and etc. in such circumstances, the policies of government and central bank in controlling inflation, reducing liquidity, and financing budget deficit have a crucial role in the success of financial market of the country to improve resource allocation and thereby economic development. Therefore, stable inflation, and all that it encompasses, is a necessary first step to achieve a deeper and more active financial sector with all its attached benefits.

One of the most important reasons of high inflation rates is Iran is great continuous and pro-longed government's budget deficit, along with Central Bank dependence which made borrowing from Central Bank turn to the main and cheapest way of financing deficits for government. This issue similar to most developing countries,

made disorders in financial markets performance and hindered positive effects of financial institutions' roles in economic development process by means of considerable inflation rates.

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