The effect of government size on inflation in Iran

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Abstract: This paper explores the influence of government size on inflation with considering the major determinants of inflation in Iran. It has been tried to consider combination of theories about inflation to determine the important factors on inflation and to inference the role of government size. In order to investigating short run and long run relation between inflation and the government size in 1971-2008, the ARDL approach has been utilized. An empirical model has been constructed which considers the effects of liquidity, the government size, exchange rate, the investment of private sector, imported price index, the change of CPI in each year and two dummy variables for Iran-Iraq war and change in exchange system. The empirical results show that imported inflation, expected inflation and the size of government are the most important factors affecting on inflation in Iran. Also the findings indicate that a decline in the government size may lead to low inflation.
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1. Introduction

In developing countries, government plays an important role in planning organization and resources allocation. Revolution in Iran in 1978 and the Iran-Iraq war during1980-1989 were caused to increase in government size. Most of the economic and social centers like banks, insurance institutes, hospitals and so on, which had been managed by private sector before, transferred to government after revolution.

More ever, inflation rate in Iran was double digit in those years. There are a number of causes of inflation which are related to expansive monetary or physical policy (or both) and this type of inflation can be referred to as demand – pull in nature. Inflation can also stem from profit or wage rises and this is classified as either aggregate, sectoral or cost – push inflation. Inflation resulting from temporary causes, such as those initiated by war or natural disaster, are easily identified. Higher prices for goods and services imported from abroad and other external circumstances can also affect the domestic economy, causing inflation. This is import – induced inflation (Pahlavani,Rahimi).

Table1. Inflation rates based on CPI

Revolution period 1979-1980	War period 1980-1989	First development plan 1990-1994	Between first and second development plan 1995	Second development plan 1996-2000	Third development plan 2001-2005	forth development plan 2006-2008
10%	19.8%	18.8%	35%	22.5%	14.12%	14.7%

As in table 1 is reported, inflation in Iran during last three decades had ascendant progress. During 1974-1978, because of high increase in oil price, inflation rate reached to 15.6%. After the revolution in 1979-1980, inflation rate decreased to 10%. Then because of economic sanction during the Iran-Iraq war period, the rate of inflation raised to 19.8%. In the last year of the war the ratio of budget deficit to government budget reached the incredible rate (50%). After the war and during the first development plan, inflation rate decreased to 18.8%. Executing unsuitable strategies, especially in exchange market caused to economic crisis. In 1994, which was between the first and the second development plan, there was again increase in inflation rate. This process continued and reached to 49% in 1995.

On the other hand Positive effects of foreign incomes and production and oil price increase caused to decrease in inflation expectations. Using the exchange reserves increased the ratio of total demand to supply in the third year of third development plan. The bonds were sold in order to liquidity shrinking by central bank, caused to decrease in inflation rate in

the first year of the fourth development plan. Finally in 2006 because of increase in exchange reserves, a rapid increase in inflation was seen.

The literature on inflation determinants is relatively extensive. Examples include Adedeji and Liu (2000), Aljebrin (2006), Bahmani-Oskooee (1995), Delavano and Vilanueva (1993), Tashkini and Abasinegad (2004), Pahlavani and Rahimi (2009), Pesaran (2000). The focus of these earlier is mostly based on monetary viewpoint of inflation and sometimes on the effect of expectation on inflation forming. In previous studies, monetary aspect of inflation and its psychic affects were reviewed and in some studies the exchange rate has been applied in model as imported inflation.

However there are a few Studies on the government size effect on inflation. The paper closest to ours in motivation is that of Han and Mulligan (2008). They have shown the big government and inflation are related in special cases like war time. Contrary in peace time there is a weak positive correlation between government size and inflation.

This study focuses on the relationship between government size and inflation with considering the major determinants of inflation in Iran. To do so, a theoretical model of inflation is constructed here, based on the study of Aljebrin (2006). The study has been employed annual time series data (1971-2008) in order to investigate the effect of government size on inflation in Iran.

The rest of the paper is organized as follows. Section 2 describes the model and data. In section 3 and 4 the methodology and the empirical evidence are presented respectively. Finally, conclusions are summarized in section 5.

2. Material and Methods

Data set of this study is annual and based on studies done in 1971 – 2008 time period. These data are collected from statistics of central bank of Islamic republic of Iran statistic center. In order to analyze the impact of the government size on inflation, a theoretical model has been constructed. According to Aljebrin (2006) the theoretical framework of our model is as follows:

$$P = (GM_2)^{\alpha}_1 (EX)^{\alpha}_2 (G)^{\alpha}_3 (DP)^{\alpha}_4 (PM)^{\alpha}_5 \quad (1)$$

This function can also be written as:

$$Ln(p_t) = \alpha_1 Ln(GM_2) + \alpha_2 Ln(EX) + \alpha_3 Ln(G) + \alpha_4 Ln(DP) + \alpha_5 Ln(I) + \alpha_6 Ln(PM) \quad (2)$$

Where:

P_1 : domestic prices

GM_2 : growth rate of liquidity

EX : the exchange rate

G : the ratio of government expenditure to GDP (as an indicator of structural inflation)

DP : change in domestic prices (as an indicator of expectation inflation)

I: the ratio of private investment to GDP (as an indicator of cost – push inflation)

PM : foreign prices (as an indicator of imported inflation)

Furthermore, we consider two Dummy variables to capture the effect of revolutions (1977 , 1978) and exchange system change from fixed to managed float (1994 , 1995). Finally the following equation has been used as the estimation process:

$$Ln(P_t) = \alpha_0 + \alpha_1 Ln(GM_2) + \alpha_2 Ln(EX) + \alpha_3 Ln(G) + \alpha_4 Ln(DP) + \alpha_5 Ln(I) + \alpha_6 Ln(PM) + D_{57} + D_{74} \quad (3)$$

Where:

$$D_{57} = \begin{cases} 1 & \text{for: 1977, 1978} \\ 0 & \text{others} \end{cases} \qquad D_{74} = \begin{cases} 1 & \text{for: 1994, 1995} \\ 0 & \text{others} \end{cases}$$

To examine the existence of the long-run relation between inflation and it's determinants as formulated in equation (3) ،we apply the ARDL Co-integration approach.

The results of the ARDL Co-integration approach using traditional estimation methods is based on stationary of variables. But in many cases this is not true. So it's necessary to be sure about stability of variables and for this reason we use augmented Diki-Fuller test. According to the ADF Test، P، GM_2، EX، G and ΔP are I (1) and Pm is I (0). The autoregressive distributed lag (ARDL) approach is a new Co-integration technique for determining long-run relationship among variables under study. There are some advantages for ARDL approach as follow while other Co-integration

techniques require all of the repressors to be integrated of their order of integration. According to Ghattak and Siddiky (2001), ARDL approach is a better method in small samples. Moreover, with this approach، it is possible that different variables have different optimal numbers of lags. Because of these advantages, ARDL is used in this study. Following Pesaran (2001) the error correction representation of the ARDL model is as follows.

$$\Delta LP = a_0 + \sum_{j=1}^{n} b_j \Delta LP_{t-j} + \sum_{j=1}^{n} c_j \Delta LGM2_{t-j} + \sum_{j=1}^{n} d_j \Delta LEX_{t-j} + \sum_{j=1}^{n} e_j \Delta LG_{t-j}$$
$$+ \sum_{j=1}^{n} f_j \Delta LI_{t-j} + \sum_{j=1}^{n} g_j \Delta LPM_{t-j} + \sum_{j=1}^{n} h_j \Delta LDP_{t-j} + \delta_1 \Delta LP_{t-1} + \delta_2 \Delta LGM2_{t-1} \quad (4)$$
$$+ \delta_3 \Delta LEX_{t-1} + \delta_4 \Delta LG_{t-1} + \delta_5 \Delta LI_{t-1} + \delta_6 \Delta LPM_{t-1} + \delta_7 \Delta LDP_{t-1} + D74 + \varepsilon_{1t}$$

The parameter، δ_i where is i=1، 2، 3، 4، 5، 6 is the corresponding long-run multipliers. While the parameters bj ، cj ، dj ، ej ، fj ، gj … are short-run dynamic coefficients of the underlying ARDL model.

3. Results and discussions

To estimation the model we use 37 annual observation، according to the Schwarz–Bayesian criteria (SBC)، 4 was chorea as the maximum lag length.

Table2. Estimated short-run coefficients using the ARDL approach

Regressor	Coefficient	Standard Error	T-Ratio[Prob
LP(-1)	.861840	0.0098142	87.8155 (0.000)
LGM2	.0530790	0.012493	4.2486 (0.016)
LEX	-0.015652	0.015479	-1.0112 (0.324)
LG	0.052474	0.022683	2.7542 (0.012)
DLPM	0.10217	0.026179	3.9027 (0.001)
LDP	0.097373	0.0070113	13.8879 (0.000)
C	0.23944	0.027194	8.8049 (0.000)
LI1	-0.063986	0.018928	-3.3804 (0.006)
D57	0.0091095	0.0041716	2.1837 (0.041)
D74	0.021857	0.0047392	4.6157 (0.000)
$R^2 = 0.99$	$\bar{R}^2 = 0.99$	DW=2.1561	F = 158852.6

Table 2 reports the results of short-run estimation of the ARDL model. All the variables have the significant effect (at 5 % level) and the imported inflation is the most effective variable. The dummy variable coefficients are significant and positive imply that revolution and exchange policies have effected on inflation in Iran.

Table3. Estimated long-run coefficients using the ARDL approach

Regressor	Coefficient	Standard Error	T-Ratio[Prob
LGM2	0.01943	0.07246	2.6281 (0.016)
LEX	0.14405	0.047269	3.0474 (0.006)
LG	0.45218	0.17785	2.5425 (0.019)
DLPM	0.73949	0.21769	3.3971 (0.003)
LDP	0.78766	0.084548	9.3161 (0.000)
C	1.7331	0.18969	9.1362 (0.000)
LI1	-0.54483	0.16606	-3.2809 (0.013)
D57	0.065934	0.030619	2.1534 (0.044)
D74	0.15833	0.037476	4.2248 (0.000)

Now، we estimate the long-run ARDL model. Table 3 shows the long-run coefficients of variables under investigation. As expected, empirical results in tables 3 reveal that liquidity exchanges rate, government size, expected inflation and imported inflation are significant.

Table4. The results of error correction model (ECM)

Regressor	Coefficient	Standard Error	T-Ratio[Prob.
dLGM2	.0530790	0.012493	4.2486 (0.016)
dLEX	-0.015652	0.015479	-1.0112 (0.324)
dLG	0.052474	0.022683	2.7542 (0.012)
dDLPM	0.10217	0.026179	3.9027 (0.001)
dLDP	0.097373	0.0070113	13.8879 (0.000)
dC	0.23944	0.027194	8.8049 (0.000)
dLI	-0.063986	0.018928	-3.3804 (0.006)
dD57	0.0091095	0.0041716	2.1837 (0.041)
dD74	0.021857	0.0047392	4.6157 (0.000)
ECM	-0.13816	0.0098142	-14.0777 (0.000)

Table 4 reports the results of the error correction term shows the speed of adjustment of short-run model regarding to equilibrium state.

According to table 4 the ECM term is -.1386 and highly significant. It means that in each year about 13% of deviation is corrected.

The result of diagnostic tests for serial correlation، functional form، normality and heteroscedasticity are shown in table5. The result define that model was specified well.

Finally، that cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests were applied to test for parameter constancy. Figure plots the CUSUM and CUSUMSQ statistics. The results clearly indicate the absence of any instability of the coefficients during the investigated period.

Table 5-The results of diagnostic tests

Test Statistics	Aim	Prob.
LM	Serial Correlation	0.171
RAMSEY RESET	Functional Form	0.834
NORMALITY	Normality	0.294
WHITE	Heteroscedasticity	0.789

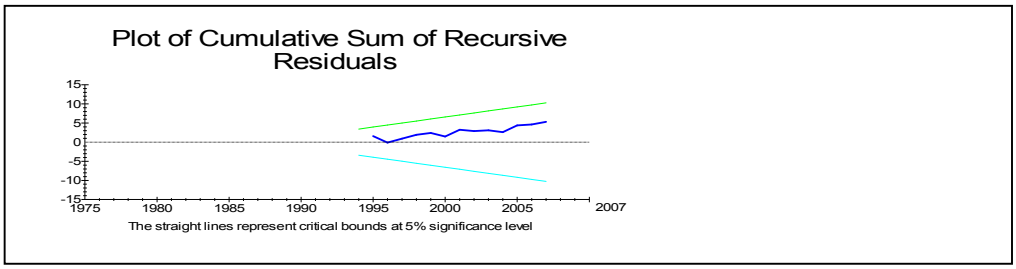

Figure 1. The plot of CUSUM statistics for coefficient stability test

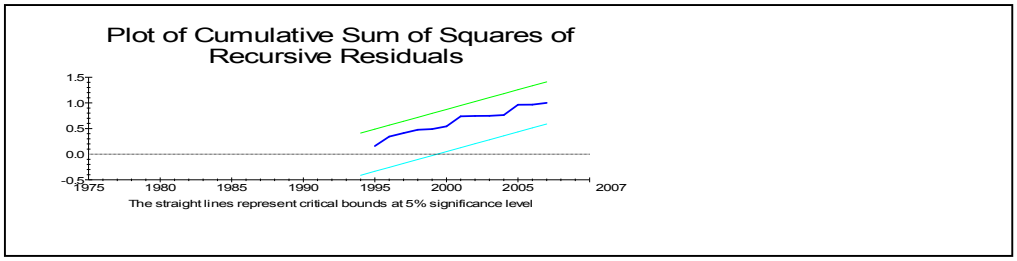

Figure 2. The plot of CUSUM statistics for coefficient stability test

4. Conclusion

Inflation is one of the most important problems in Iran. In this paper، we tried to determine the important factors on inflation in Iran during 1971-2008 with emphasizing on the role of government size by applying the ARDL approach.

Based on empirical results, the size of government has significant and positive effect on Iran's inflation. In both the long-run and short-run, imported inflation has the most significant impact on inflation, in which one percent increase in imported inflation rate leads to 0.1 percent increase in inflation. And the expected inflation has the second place in Iran's inflation.

Diagnostic and stability tests prove model specification is done well and ECM term shows that in each year about 15% of deviation is corrected and after 7 years will be completed.

Thus, considering obtained results, a decline in government size may lead to decline in inflation in Iran. It seems that Iranian's policy makers can decrease inflation with more emphasis on privatization and execute of Article 44 of the constitution.

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