INFLATION AND OPENNESS: EMPIRICAL EVIDENCES FROM IRAN (1965-2010)

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Abstract:

The aim of this paper is to examine the causal relationship between inflation and openness in Iran emphasizing long-run relations during 1965 - 2010. To do so, I used growth rate of the consumer prices as the indicator of inflation and total exports and imports as a percentage of GDP to measure trade openness. Then I applied Vector Error Correction Model to estimate the proposed model. The results show that there is a one-way causal relationship from inflation to openness in Iran during the observation period and inflation has a positively significant impact on trade openness, so that 1% increase in inflation rate has led to approximately 0.12% increase in trade openness in the next period and 0.19% increase in trade openness in the next two period.

Key words: Inflation; Openness; Iran`s Economy; Vector Error Correction Model (VECM)

1. Introduction

International trade is one of the main tools of the globalization process. According to economic theories, free trade encourages the production and export of goods and services and leads to the formation of the country's production system based on comparative advantages. Many researchers believe that openness leads to different outputs such as encourage competition, improve the quality of goods, accelerate economic growth and recruitment of skilled manpower. On the other hand, inflation has always been a concern for the policy makers as it creates uncertainty in the economic systems that may adversely affect growth. The concern with inflation stems not only from the need to maintain overall macroeconomic stability, but also from the fact that inflation hurts low-income individuals (Hanif and Batool , 2006). Open issues related to globalization and increasing the volume of international trade led many unsolved questions in macroeconomic. One of these questions is the relationship between trade openness and macroeconomic variables such as inflation.

The relationship between trade openness and inflation is one of the most controversial issues in international economics. Proponents of trade openness believe that openness is highly related to declining consumer prices but some evidences

presented in rejecting this claim in recent years (see for example Zakaria , 2010; Jafari Samimi et al, 2012). Based on conventional viewpoints, inflation rate is lower in more open economics (Romer, 1993) and a greater degree of trade openness will lead to lower the rate of inflation and may alter the influence of the real exchange rate on economic growth via the impact on the demand for exports and leakage of demand into imports (Aron and Muellbauer, 2007) while different theories explain the inverse relationship between trade openness and inflation in situation where competition is not perfect and nominal prices in non-tradable sector are rigid (Lane, 1997). Also according to new growth theories, openness reduces inflation rate through it`s positive impact on output, better allocation of resources, improving capacity utilization, and increasing foreign investment (Jin, 2000). Daniels et al (2005) argue that the effect of openness on inflation rate is negative by employing sacrifice ratio. In this regard, Okun (1981) postulates that the shocks to the domestic price level due to domestic output fluctuation are likely to ease as the economy opens up and Zakaria (2010) states that in small open economics prices of traded goods converge across counties because of the ability of free trade. Therefore, theories suggest a lower degree of price distortions in outward-looking countries. Moreover, in highly open countries conversion of domestic currency into foreign currency is very easy. Therefore, the inflation rate will be low in more open countries.

Based on the listed viewpoints, it is expected that there is a significant relationship between inflation and trade openness. So, in this paper I`m going to examine this relationship in Iran`s economy and compare the results with existing evidences.

2. Background

Romer (1993) tested the prediction of the effect of trade openness on inflation rate using cross-country data and showed a strong and robust negative link between openness and inflation.

Hanif and Batool (2006) tested the Romer (1993)`s hypothesis for Pakistan economy using annual time series data for the period 1973-2005 and showed that the openness variable such as growth in overall trade to GDP ratio has significant negative impact on the domestic price growth in Pakistan.

Aron and Muellbauer (2007) on their study for South Africa suggested that increased openness has significantly reduced the mean inflation rate and has reduced the exchange rate pass-through into wholesale prices.

Zakaria (2010) examined the relationship between trade openness and inflation in Pakistan using annual time-series data for the period 1947 to 2007 and showed that a positive relation holds between trade openness and inflation in Pakistan.

Cooke (2010) develops a general equilibrium model of a small open economy to analyze the optimal rate of inflation under discretion and showed that the openness-inflation relationship depends on the level of export demand.

Mukhtar (2010) using multivariate co-integration and Vector Error Correction Model examined the relationship between inflation and trade openness in Pakistan over the period of 1960 to 2007 and showed that there is a significant negative long-run relationship between inflation and trade openness.

Jafari Samimi et al (2012) using the panel data technique for both developed and developing countries during 1999 to 2009, tested the hypothesis documented by Romer (1993) and found out that there is a positive and significant association between trade openness and inflation which opposes the view of the Romer (1993) hypothesis.

Kurihara (2013) using Panel Data for Asian and OECD countries examined whether international trade openness is related with inflation and concluded that the relationship exists both in Asia and in OECD countries, however, it exists strongly in Asian recent period.

3. Methodology

3.1. Data

The share of total trade (exports plus imports) in GDP is the most common indicator of trade openness (see for example Hanif and Batool, 2006; Mukhtar, 2010). Thus to measure trade openness in Iran, I used total exports and imports as a percentage of GDP. To obtain trade openness measure and inflation rate, annually data collected from The World Bank Database over the period 1965 to 2010.

3.2. The Model

This paper employs a Vector Error Correction Model (VECM) to investigate the causal relationship between inflation and openness in Iran using annually data over the period 1965 to 2010. The general assumption in the proposed model is that there is at least one long-run co-integration vector among the variables and the value of each dependant variable can be defined as a function of past values of the dependent variable, past values of the independent variable and error term as follow:

(1) $\quad TO = f_1(TO_{(-1)}, TO_{(-2)}, ..., TO_{(-n)}, INF_{(-1)}, INF_{(-2)}, ..., INF_{(-n)}, e_1)$

(2) $\quad INF = f_2(INF_{(-1)}, INF_{(-2)}, ..., INF_{(-n)}, TO_{(-1)}, TO_{(-2)}, ..., TO_{(-n)}, e_2)$

Which TO and INF represent trade openness measure and inflation rate respectively and e_1, e_2 are error terms. To estimate such a model, the numbers of lags included, stationary of the time series and the results of the co-integration tests are of crucial importance. Thus using Schwarz (1978) Information Criterion (SIC), two optimal lags considered to specify the model as the following linear relations:

(3) $\quad TO = \alpha_1 TO_{(-1)} + \alpha_2 TO_{(-2)} + \alpha_3 INF_{(-1)} + \alpha_4 INF_{(-2)} + \alpha_5 e_1 + c_1$

(4) $\quad INF = \beta_1 INF_{(-1)} + \beta_2 INF_{(-2)} + \beta_3 TO_{(-1)} + \beta_4 TO_{(-2)} + \beta_5 e_2 + c_2$

4. Empirical Results

Using econometric methods in empirical studies is based on the stationary of the variables. Thus to test the stationary of the variables in level, I employed Phillips–Perron (1988) Unit Root Test using Eviews6, which the results are shown in Table 1.

Table 1: The results of Phillips–Perron Unit Root Test for variables in level

Variable	Adj. t-Stat	Test Critical Value In %1 Level	Test Critical Value In %5 Level	Test Critical Value In %10 Level
INF	-3.15	-4.19	-3.52	-3.19
TO	-2.02	-4.19	-3.52	-3.19

The results show that both variables are unstable in level. Therefore Phillips–Perron (1988) Unit Root Test for variables in 1st difference applied which the results are shown in Table 2.

Table 2: The results of Phillips–Perron Unit Root Test for variables in 1st difference

Variable	Adj. t-Stat	Test Critical Value In %1 Level	Test Critical Value In %5 Level	Test Critical Value In %10 Level
D(INF)	-15.84	-4.20	-3.52	-3.19
D(TO)	-4.04	-4.20	-3.52	-3.19

The results indicate both variables are stable in 1st difference in 5% level. Stationary of the variables at the same level could indicate the existence of a long-run relationship between them. Examining the co-integration between economic variables is performed by different methods such as Engle & Granger (1987), Stock & Watson (1988) and Johansen (1988), which Johansen`s approach has clearly better properties than the other two estimators in situations where there is more than one co-integration vector (Gonzalo, 1994). Therefore in the next step I applied Johansen (1988) Co-integration Test using Eviews6 to examine the long-run relationship between inflation and trade openness which the results are shown in Table 3.

Table 3: The results of Johansen Co-integration Test for variables

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.03 Critical Value	Prob
None *	0.24	17.36	16.95	0.02

* Denotes rejection of the hypothesis at the 0.02 level

According to the Table 3, Johansen`s trace statistic is greater than critical value at the 0.03 level which indicates that there is at least one long-run co-integration vector among the variables with the certainty of more than 97%. This provides the basis of using estimation methods. As mentioned earlier, in this paper I employed Vector Error Correction Model (VECM) using Eviews6 to estimate the model which the results are shown in Table 4.

Table 4: The results of Vector Error Correction Estimates for variables

Coefficient	Value	Standard Error	T-Statistics	Coefficient	Value	Standard Error	T-Statistics
α_1	0.39	0.15	2.58	β_1	-0.06	0.16	-0.35
α_2	0.15	0.16	0.93	β_2	-0.40	0.16	-2.52
α_3	0.12	0.10	1.06	β_3	-0.04	0.21	-0.17
α_4	0.19	0.10	1.68	β_4	0.14	0.22	0.64
α_5	-0.21	0.07	-2.99	β_5	-0.08	0.10	-0.84
c_1	0.02	0.90	0.03	c_2	0.45	1.24	0.36

Based on the estimated coefficients, the general linear relations can be described as follow:

(5) $\quad TO = 0.39TO_{(-1)} + 0.15TO_{(-2)} + 0.12INF_{(-1)} + 0.19INF_{(-2)} - 0.21e_1 + 0.02$

(6) $\quad INF = -0.06INF_{(-1)} - 0.40INF_{(-2)} - 0.04TO_{(-1)} + 0.14TO_{(-2)} - 0.08e_2 + 0.45$

5. Conclusion

This paper examined the causal relationship between inflation and openness in Iran using annually data over the period 1965 to 2010. For this purpose, measures of the variables introduced and the proposed model estimated via Vector Error Correction Model (VECM). The Results of this study can be outlined as follow:

Phillips–Perron (1988) Unit Root Test for variables showed that inflation rate and trade openness time series both have unit root and become stationary after first differencing (see Table 2.).

Based on the results of Johansen (1988) Co-integration Test for variables (shown in Table 3.), there is at least one significant long-run relationship between inflation and trade openness and at least one co-integration vector between the variables with the certainty of more than 97%.

According to the results of Vector Error Correction Estimates for variables (shown in Table 4.), coefficients of $\alpha_5 = -0.21$ and $\beta_5 = -0.08$ which called error correction coefficients, appeared in the model with the negative sign and their significance approves in 7% and 10% level respectively. Negative sign of error correction coefficients indicates the tendency for long-run equilibrium relationship among the variables. The significance of $\beta_3 = -0.04$ and $\beta_4 = 0.14$ which indicate the impact of trade openness on inflation, rejects. Also the significance of $\alpha_3 = 0.12$ and $\alpha_4 = 0.19$ which indicate the impact of inflation on trade openness approves in 10% level.

This finding shows that there is a one-way causal relationship from inflation to openness in Iran during the observation period and inflation has a positively significant impact on trade openness, so that 1% increase in inflation rate has led to

approximately 0.12% increase in trade openness in the next period and 0.19% increase in trade openness in the next two period.

The results of this paper are consistent with the results of the studies of Zakaria (2010) and Jafari Samimi et al (2012) for selected countries and are in contrast with the hypothesis documented by Romer (1993).

6.References

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