

Determinants of Inflation in India

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Abstract:- Main objective was to check the cointegration between inflation and import prices, interest rate, gross domestic product and money supply. Engle Granger cointegration (two step method) was applied to check the long run as well as short run relationship. ADF test was used to check the stationarity of variables. All the variables are stationary at first difference, so cointegration test was applied. Cointegration exists among inflation and import prices, interest rate, gross domestic product and money supply. There is long run relationship between inflation and independent variables including interest rate and gross domestic product. Import prices and money supply have no long run impact on inflation. There is short run relationship between inflation and interest rate and gross domestic product. No short run relationship is found between inflation and import prices and money supply.

Key words: Inflation, Import Prices, Interest Rate, GDP, Money Supply.

INTRODUCTION:-

There have been many papers that have examined pass-through of exchange rate fluctuations to import prices as well as some that have examined pass-through to domestic producer and consumer prices. Many recent studies have concentrated on the relationship between an industry's characteristics and the pass-through of exchange rate fluctuations in that industry. Goldberg and Knetter [1] find that many studies have concluded that the pass-through to import prices is smaller in more segmented industries - that is, industries where firms are able to engage in third-degree price discrimination.

Most of the literature on import prices in recent years has focused on the relationship between import prices and exchange rates. Obstfeld [2] believes that most researchers in recent years have concentrated on developing "models of pricing to market and destination-currency pricing of exports." Along these lines, Taylor [3], supported by Campa and Goldberg [4], argues that there has been a significant weakening in the desire or ability of firms to "pass through" price increases associated with unfavorable movements in exchange rates. Taylor [3] attributes this lack of pricing power mainly to the low inflation environment achieved in many countries. He concludes that this weakening has important implications for monetary policy because it impacts on forecasts of inflation and also on the relationship between changes in monetary policy and overall inflation. Olivei [5], however, finds little evidence of a relationship between pass-through percentages and a country's overall inflation experience.

Aggregate demand shifts in conjunction with exchange rate fluctuations will alter the profit margins of importers in an imperfectly competitive environment, thus reducing measured pass-through. If this hypothesis is true, we would expect that pass-through should be less in countries where aggregate demand (which will be proxied by the output gap) is more volatile. Most of the literature on import prices in recent

years has focused on the relationship between import prices and exchange rates. Obstfeld [6] believes that most researchers in recent years have concentrated on developing "models of pricing to market and destination-currency pricing of exports." Along these lines, Taylor [3], supported by Campa and Goldberg [4], argues that there has been a significant weakening in the desire or ability of firms to "pass through" price increases associated with unfavorable movements in exchange rates. Taylor [3] attributes this lack of pricing power mainly to the low inflation environment achieved in many countries. He concludes that this weakening has important implications for monetary policy because it impacts on forecasts of inflation and also on the relationship between changes in monetary policy and overall inflation. Olivei [5], however, finds little evidence of a relationship between pass-through percentages and a country's overall inflation experience.

OBJECTIVES OF THE STUDY:-

- Testing whether or not there is any long run relation between interest rate and inflation?
- Do the import prices affect inflation?
- To check the relationship between inflation and money supply as well as gross domestic product.

METHODOLOGY AND DATA

This section discusses the methodologies that are employed to meet the objectives of the study. The variables used in this study include l_{dr} stands for log of discount rate, l_{gdp} stands for log of gross domestic product, l_{imp} stands for log of import prices, and l_{ms} stands for log of money supply as independent variables and l_{cpi} stands for consumer price index is used as proxy of inflation as dependent variable. The secondary annual data (1950-2012) is taken from software IFS (2014) for country India.

Unit Root Test

Mostly time series may lead to Spurious Regression and the results of each statistical test can be nonsense. We apply unit-root test on the

each time series to compute model to ascertain the stability of each series.

One way of getting the interesting information about the stationary of time series is to plot the original series and making correlogram at both level and first difference. The second, most rigorous way is to use the Augmented Dickey Fuller (ADF) which is the wider version of the standard Dickey Fuller (DF). This test is employed to verify the presence of unit root in the series.

The ADF table is showing the results of unit root test of both variables that were calculated while using E.Views 8. At 1st difference all variables are stationary so we can use Engle Granger Co integration(two step method).Precondition for any co integration model is at least two variables should be I(1).

TABLE: ADF TEST RESULTS

Variables	ADF test			
	Level		1st Difference	
	intercept	Intercept & Trend	intercept	Intercept & Trend
lcp	-0.37*** (-2.60)	-3.15*** (-3.18)	-5.50* (-3.58)	-5.44* (-4.16)
ldr	-1.99*** (-2.60)	-1.86*** (-3.18)	-4.85* (-3.57)	-2.59*** (-3.18)
lgdp	-1.40*** (-2.60)	-2.64*** (-3.19)	-5.40* (-3.57)	-5.70* (-4.16)
limpp	-0.87*** (-2.60)	-3.14*** (-3.18)	-5.69* (-3.57)	-5.66* (-4.16)
lms	-1.32*** (-2.59)	-2.62*** (-3.18)	-5.44* (-3.57)	-5.81* (-4.16)

Note: * denotes the rejection of the null hypothesis at 1% level of significance, *** denotes the rejection of the null hypothesis at 10% level of significance and Values in the parenthesis are MacKinnon critical values for rejection of hypothesis of a unit root. Legend: lcp stands for log of consumer price index (proxy of inflation), ldr stands for log of discount rate, lgdp stands for log of gross domestic product, limp stands for log of import prices, and lms stands for log of money supply for country India.

MODEL SPECIFICATION:-

I used Engle Granger Cointegration method that has two steps.

STEP: 1:-TESTING FOR COINTEGRATION

In first step long run relationship is checked when at least two variables are stationary at first difference, remaining are stationary at level and no one is stationary at second difference. Model equation will be as under.

$$lcp_t = \beta_0 + \beta_1 ldr_t + \beta_2 lgdp_t + \beta_3 limpp_t + \beta_4 lms_t + \varepsilon_t$$

lcp: log of consumer price index used as proxy of inflation.

ldr: log of discount rate

lgdp: log of gross domestic product

limpp: log of import prices

lms: log of money supply

ε : Error term

TABLE:-LONG RUN RELATIONSHIP

Variables	Constant	ldr	lgdp	limpp	lms
lcp	-0.98 (-9.04)	0.13 (3.40)	0.83 (6.84)	0.03 (0.74)	-0.26 (-2.26)
P-Values	0.0000	0.0014	0.0000	0.4594	0.0282
R2	0.998				

Note: The values in parenthesis are t.values,

The residuals from eq.1 were tested for stationarity and the results are as follows. The residual series is stationary at level or series is I(0) means series is stationary at level. It implies that there is long run relationship between inflation and independent variables including interest rate and gross domestic product. Import prices and money supply have no long run impact on inflation. As it is the precondition of long run relationship that error correction term residual series should be stationary at level.

Variables	ADF test	
	level	P-value
ect	-3.21* (-2.61)	0.0019

STEP: 2:- ESTIMATING ERROR CORRECTION MODEL

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Second step deals with the short run relationship between dependent and independent variables. Following shape of model is used to find short run relationship.

$$dlcpi_t = \beta_1 dldr_t + \beta_2 dlgdp_t + \beta_3 dlmppt_t + \beta_4 dlmst_t + \beta_5 ect(-1) + \varepsilon_t \quad \text{-----2}$$

lcp_i: log of consumer price index used as proxy of inflation.

ldr: log of discount rate

lgdp: log of gross domestic product

limpp: log of import prices

lms: log of money supply

d: difference of current and previous values

ε: Error term

TABLE:-SHORT RUN RELATIONSHIP

Variables	dldr	dlgdp	dlmppt	dlms	Ect(-1)
dlcpi	0.10 (2.20)	0.72 (7.61)	0.03 (0.76)	-0.14 (-1.70)	-0.32 (-2.78)
P. Values	0.0329	0.0000	0.4525	0.0962	0.0080
R ²	0.58				

Note: The values in parenthesis are t.values,

Precondition of second step is that the coefficient of lag value of residual series should be negative which is fulfilling. There is short run relationship between inflation and interest rate and gross domestic product. No short run relationship is found between inflation and import prices and money supply.

CONCLUSION:-

Main objective was to check the cointegration between inflation and import prices, interest rate, gross domestic product and money supply. Engle Granger cointegration (two step method) was applied to check the long run as well as short run relationship. ADF test was used to check the stationarity of variables. All the variables are stationary at first difference, so cointegration test was applied.

Cointegration exists among inflation and import prices, interest rate, gross domestic product and

money supply. There is long run relationship between inflation and independent variables including interest rate and gross domestic product. Import prices have no significant long run impact on inflation. There is short run relationship between inflation and interest rate and gross domestic product. No short run relationship is found between inflation and import prices and money supply.

Monetary authorities should focus on interest rate, gross domestic product to control on inflation in case of India.

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