Impact of Imf Programme on Sacrifice Ratio in Pakistan

[1]Ibrar Hasan, [2]Muhammad Ramzan and [1]Mansoor Ahmed

[1]Superior University, Lahore, Pakistan
[2]Director Library, Lahore University of Management Sciences, Pakistan

Abstract: This study examines the impact of IMF programs on the inflation output trade off by using the time series data of Pakistan from the period 1973 to 2010. Results of cointegration approach found the long run relationship among variables. Moreover, results of binary logistic regression model shows that IMF loans do not extensively influence the output inflation tradeoff in the short run. But in the long run it leads to influence the sacrifice ratio.

Key words: IMF · Inflation · Pakistan

INTRODUCTION

The function of IMF in international lending have questioned by several economist and researchers. The IMF makes available help to LDCs and support borrowing from a number of its services. The purpose of all these services is to provide liquidity more suitable maturity periods and conditions. Developing countries borrow from IMF in the several conditions such as balance of payment deficits, stabilization of currency, rebuilding international reserves, budget deficit, current account deficit etc. The impacts of this borrowing put positive as well as negative impacts on borrower countries. Impacts of this borrowing might be different in different time periods.

In short run these borrowing may be helpful for economy but in the long run it might be create several conditions for the economy. Like there might be inflation in the period of repayment of loan because government might impose taxes of different types which might be lead to inflation. Inflation may also increase in the period of when money supply increases [1, 2]. IMF may impose certain restrictions on borrower country e.g decrease subsidy on especially agriculture sector etc on which most developing countries like Pakistan relies. So this is also questionable that due to increase in inflation what its impacts on output are?

Pakistan has borrowed eleven times loan from the IMF for different purposes. Six times in the management of Benazir Bhutto, Two times during the regime of Nawaz Sharif and three times in the Musharraf command.. IMF programs can also impact on the borrowing countries. For lowering the inflation, output cost should reduce due to the increase in credibility of declared course of action. Low income countries ca get loan at annually 0.05% interest rate through ESAF and SAF loans.

Even though concern of this paper is to examine whether IMF programs influence the Sacrifice Ratio. The Sacrifice Ratio is defined as an economic ratio that measures the costs associated with slowing down economic output to change inflationary trends [3]. The ratio is calculated by taking the cost of lost production and dividing it by the percentage change in inflation and its quotient gives the loss of output per 1% change in inflation.

Impacts of IMF supported programs on macroeconomic variables have been examined by the different researchers like Krueger (1998), Haq and Khan (1998), Joyce (2004) [4,5,6]. These studies found that in general, balance of payment improved by IMF programs on real economic growth and inflation is not statistically important.

This study used time series data of Pakistan to determine the impact of IMF supported programs on inflation output trade-off. There are different methodologies used by different researchers but the methodology in this paper is used inflation-output trade-off model. The results of this study would be helpful for policy makers in IMF borrowing countries and to fund designing programs.

Corresponding Author: Ibrar Hasan, Superior University, Lahore, Pakistan.

Rest paper is balanced as, part two discusses the review of literature, part three explains the data and methodology, part four presents the results and last part concludes the study and suggest some policy implications.

Literature Review: Chortareas *et al*. (2002) examined that how inflation and the costs linked with disinflation episodes are associated to monetary policy transparency. The study used cross section data and analysis of Barro–Gordon (1983) model suggests that central bank transparency results in lower inflation and lower costs of disinflation. This study also shows that transparency reduces inflation and the effect works in tandem with system and operations that bound governing borrowing from the central bank [7].

Diana and Sidiropoulos (2003) examined the impact of central bank independence on inflation persistence. The study used panel data and a simple one period Barro Gordon model. Their theoretical analysis predict that a higher degree of central bank independence leads to a lower inflation persistence and therefore to higher speed of disinflation. Central bank independence, throughout its influence on inflation persistence, is negatively linked to the sacrifice ratio [8].

Debelle and Fischer (1994) analysis experimental facts on the relationship between central bank independence and economic performance. The study used panel data and expectation Philips curve. This study found that the optimal level of conservatism of the central bank depends on the society's aversion to inflation and output fluctuations; Society will be improved if the central bank recommits to an inflation rate [9].

Fuhrer (1994) determines the correlation between the optimal policy frontier and the sacrifice ratio entailed in altering the inflation rate. Paper used panel data and Augmented Dickey-Fuller tests. And find out that actual performance of the economy lies quite close to the frontier [10].

Easton and Rockerbie (1999) focused that whether IMF conditions benefit lenders. This study used annual data 1977-1987. Due to Scale of default the study used a Tobit model. Their results recommend that the provision of immediate IMF liquidity give advantage to lenders but that the attached situations do not [11].

Andersen and Wascher (1999) used panel data and different approaches for the estimation from aggregate supply and price and wage equation. The study found that Lower inflation go along with by a draw down of aggregate supply curves so a greater quantity of a transform in nominal demand growth reproduced in real output. The output sufferer's occurring from tighter monetary policy does not depend only on CBI [12].

Ball (1993) investigates the determinants of the sacrifice ratio for disinflation. This study used quarterly and annual data and constructs sacrifice ratios for a sample of disinflations and determine that the ratio is lower when disinflation is fast and when wage setting is more elastic [13].

Moore (2000) examine whether IMF programs, impact the sacrifice ratio. The study used panel data and inflation –output trade – off model. For the estimation OLS and fixed effect technique. The major result of this study is that the IMF-supported program does not influence the inflation–output trade off [14].

Kugler and Baltensperger (2000) discuss two dangerous points Linked to the common procedures. One to discuss the matter of non-stationarity and the further discuss the relationship problem among the error terms for dissimilar disinflation occurrences in identical country. This study used panel data and for estimation OLS & FGLS. They found a positive correlation among central bank independence and sacrifice ratios [15].

Cukiermant (2002) shows that sacrifice ratios calculated during periods of inflation stabilization are usually higher in countries with higher levels of central bank independence. The main consequence was that there is a credibility bonus in the sense that expected social welfare is a monotonically increasing function of CBI and positively related level of reputation. This study also provides a clarification for a possible positive relation between the SR and central bank independence [16].

Senda and Smith (2008) determine whether negative association between inflation and the Phillips curve slope can show by episode-specific analysis. The study used quarterly and annual data on different countries. This study examined whether the episode-specific investigation produces the same effect of inflation on the Phillips curve and found a negative effect of inflation on the sacrifice ratio [17].

Bowdler and Nunziata (2010) provide indication Using OECD panel data1961–2000 that the output cost associated with disinflation decreases with coordination between wage-setters. Finding of this study was that coordination between wage-setters in the labor market reduces the sacrifice ratio. The study only found weak evidence for an inverse U-shape effect from coordination [18].

Cecchetti and Rich (1999) examine the statistical properties of the U.S. sacrifice ratio. The study used quarterly data and derived estimates from three structural VAR., the estimates of the sacrifice ratio necessitate that a permanent one percentage decrease in inflation entails a loss of 1.3-10 percent of a year's real GDP and show that at conventional levels none of the point estimates diverge from zero [19].

Data and Methodology: The study explores the dependability effect on sacrifice ratio by involving a country in an IMF supported programs. Several researchers used different methodologies for the estimation of output-inflation exchange. Ball *et al.* (1988) obtain approximation using the aggregate supply curve [20]. Wascher and Andersen (1999), on the other hand recommend that it may be not specified for the reason that it do not take into account supply shocks and inflation persistence [21]. So the expectations-augmented Phillips curve can use as a substitute.

$$\pi_t = \alpha \pi_t^e + \beta \gamma_t^g + \delta x_t \tag{1}$$

π   Inflation rate
π^e Expected inflation rate
Y^g Output gap
X   Other influences

This equation can be estimate if a series on inflation is on hand. If Inflation is build by subsequent unit root process.

$$\pi_t = \pi_{t-1} + A(L)\nabla \pi_{t-1} + \epsilon_t \tag{2}$$

where

A (L) Lag polynomial
ε   Inflation innovation

For the rational

$$\pi_t^e = \pi_{t-1} + A(L)\nabla \pi_{t-1} \tag{3}$$

Now substitute equation (3) into (1)

$$\pi_t = a(\pi_{t-1} + A(L)\nabla \pi_{t-1}) + \beta \gamma_t^g + \delta x_t + V_t \tag{4}$$

To explain the influence of stabilization programs of IMF on the trade-off parameter β. I assume that β is time changing.

$$\beta_t = \omega + \rho \beta_{t-1} + \eta IMF_t + \mu_t \tag{5}$$

where;

IMF …. Dummy variable

And assume that value lies between 0 and 1. Where 1 is to show stable IMF program and vise versa is zero.

I used equation 4 and 5 for the estimation purpose. Binary logistic approach is used for the estimation purpose.

Time series data of Pakistan from the period 1973-2010 is used in this study. Data is taken from the IMF's website on concerned variables like inflation, expected inflation and output gap etc. To define the inflation, consumer price index (CPI) is used as a proxy variable. The model also requires estimation of the output gap. To determine the output gap the difference between the actual and potential output is calculated.

RESULTS AND DISCUSSION

There are different approaches to test the properties of time series data. Augmented Dicky Fuller test and Phillips Perron test is used to check the stationarity of data [22, 23]. The results of both tests in Table 1 show that output gap is stationary at level. While the CPI is stationary at 2nd difference so for the stationarity generate series and as a result CPI is stationary at 1st difference.

Cointegration Analysis: In this segment the study estimate the dynamics and long run association among the two variables. The purpose is to check that there is a long run relationship among the output gap and consumer prices or not. Hidden hypothesis of this study is that there exist a long run relationship between the output gap and CPI. To check the reality of cointegration association between the output gap and CPI this study used Engle-Granger technique.

In the results of Table 2 our dependent variable is output gap and independent is CPI.

In the next step of the Engle-Granger method this study verify the assumption of unit root in the residual obtained from the estimation of Table 2, by applying ADF test and Phillips Perron test. The results of ADF test and Phillips Perron test shows that the residuals are stationary at level.

In the Table 3 our dependent variable is output gap and independent are CPI and residuals are also included. Value of ECM from the above table 3 shows that there is

Table 1: Results of Unit root tests

Variables	ADF				PP			
	level	P*	1st difference	P*	Level	Q*	1st difference	Q*
Output gap	417542*	1	0.06618	1	9.49052*	0	-1.33769	0
CPIS	-1.00406	1	-5.21859*	1	-1.98710	0	-6.42836*	0

P* shows lag difference and Q* shows truncation lag.

* Shows significant value and CPIS shows "CPI after generating series"

Table 2: Results of Engle-Granger Cointegration

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2530287.1501	271114.483127	-9.3329102991	3.80083078044
CPI	40000.4435458	3234.37400652	12.3672906922	1.59670984016
R-squared	0.80947328371	Mean dependent var	79583.8947368	
Durbin-Watson stat	0.08106627891	Prob(F-statistic)	1.59670984016	

Table 3: ECM results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2530287.15013	4.35655669584	-5807997753	0
CPI	40000.443546	5.19733714422	76963341873	0
ECM	1.00000000003	2.67817777303	37338820824	0
R-squared	0.8356	Mean dependent var	79583.89473	
Adjusted R-squared	0.9056	S.D. dependent var	2371011.054	
Durbin-Watson stat	2.4368087145	Prob(F-statistic)	0	

Table 4: Results of Binary logistic regression model

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-3.3473515061	1.1425077114	-2.929828370	0.003391492680
CPISS	0.28392700075	0.1504376710	1.8873397788	0.059114639348
OUTPUTGAP	-7.7347338049	4.9358163568	-1.5670627198	0.117100032042

no short run relationship between the variables but there exist a long run relationship between the output gap and CPI.

Binary Logistic Regression Model: The study used binary logistic model and this model is used when error terms are not normally distributed and variance is not same across the all observation. Our dependent variable IMF is a dummy variable that is equal to 1 if IMF program is taking place and otherwise zero.

The results of table 3 shows that coefficient of output gap and constant is negative and there is inverse relationship between IMF supported programs and output gap.

The negative sign shows that when a country gets loan from the IMF as a result output gap decreases. On the other hand positive sign of coefficient of CPI shows that IMF loan leads to higher inflation in the country.

CONCLUSION

The result of the study shows that IMF loans do not extensively influence the output inflation tradeoff in the short run. But in the long run it leads to increase the sacrifice ratio. The study uses annual data on Pakistan over from the time period 1973 to 2010. And the regression result of the study found that IMF loan to Pakistan results in higher inflation and reduces output gap. In order to control the problem the policy makers should not rely on the borrowing especially foreign borrowing. In order to meet the expenditure there is a need to increase the tax base not the tax rate. By increasing tax base some individual also included in the tax net.

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