

Inflation Targeting, Exchange Rate Distortion and Output Stabilisation A Case of Zimbabwe Disinflation

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Abstract

Inflation targeting (IT) is practised in many countries and the real effects of strict inflation targeting were investigated on several occasions and less on other variants of IT. The study investigates the effects of inflation targeting lite on output. In particular, the compatibility of inflation targeting lite with managed exchange rate regime on output stabilization. The inflation targeting regime, the operating environment and exchange rate regimes were reviewed for Zimbabwe. An ARDL model was adopted as the empirical strategy to investigate the compatibility problem and the real effects of IT lite. Modelling output as output gap, inflation targeting lite and the exchange rate regimes were found to be inconsistent with output stabilization. IT lite and exchange rate premium increased the output gap, however the interaction between IT lite and exchange rate premium had negative effects on output. These results hold for both the short run and long run. However, considering the official rate and parallel rate separately, parallel rate has a negative effect but its interaction with IT has positive effects. The study recommends that developing countries should consider the exchange rate systems before the adoption of IT as a monetary policy framework. A floating exchange rate seemed to be compatible with IT lite.

Keywords: Inflation Targeting; Managed Exchange Rate; Output Gap; Monetary Policy.

JEL: E31, E52, F31

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1. INTRODUCTION

Inflation targeting (IT) is now a popular policy framework practised in both developed and developing countries under the 1990s New Consensus Macroeconomics (NCM). IT is a relatively new monetary policy dimension which saw a movement away from surprise policies to greater transparency in line with forward – looking behaviour of economic agents. Its popularity emanates from the notion that IT promotes price stability by locking up inflation expectations of economic agents (Svensson, 1997; Fitzgerald, 2002). Thus, adopting IT under a disinflation may signal central bank's commitment for the promotion of price stability. In the literature¹, the aforesaid benefits have been met with scepticism. IT has been argued to undermine capacity utilization, as it is regarded as a nominal anchor (Barro, 1996) while Debelle (1999) warned that an exclusive focus on

returning inflation to the target rate as quickly as possible may come at the expense of creating excessive volatility in output. Countries in disinflation tend to overshoot the target thus compelling policymakers to further orient policy exclusively to fight inflation.

Carare and Stone (2003) identified three types of inflation targeting regimes that correspond to different welfare maximising combinations of policy objectives. Most Emerging Market economies practice inflation targeting lite (ITL) whereby monetary policy is not based on a clear and credible commitment to bring inflation to the targeted rate. This IT regime is consistent with exchange rate floating than rigid systems. However, most emerging markets are sceptical about floating their exchange rates instead opt for crawling peg or hard pegs regimes². In most emerging markets the risk of dual exchange rates is high that result in two parallel inflation forecasts which render policy effectiveness. Therefore the macroeconomic

¹ For the debate on IT, see Levin, Natalucci, and Piger (2004), Ball and Sheridan (2005), and Gurkaynak *et al* (2006), while for the summary of debate see Mishkin (2006). For detailed survey of critic of IT see Epstein (2000).

² See Bubula and Otker-Robe (1990) for various exchange rate regimes.

effects of an inflation targeting regime depend on the prevailing exchange rate system. The role of exchange rates in inflation targeting regimes is indeed a policy problem affecting countries. The reaction on exchange rate misalignment can inject noise into forecasting and may well be counterproductive (Hunt *et al.*, 2003; Epstein & Yeldan, 2013).

Countries practising IT must at least satisfy minimum conditions to ensure a successful IT framework; institutional aspects like central bank autonomy and fiscal stance must be considered. Countries that practice IT must at least pursue economies that are free from market distortions (Svensson 1996). The choice of the range and level of inflation targets must be tactically determined. Higher inflation targets and a larger inflation control range are associated with bigger output gaps especially if the time horizon is short (Gosselin, 2006; Erceg, 2002; Roger and Stone,--). Svensson (1997) warned that the time horizon of 6-8 quarters rather than 2-3 quarters might be acceptable since it reveals the policy maker's objective as a long run commitment rather than an unsustainable short period horizon of which the policy makers would not have used all relevant information for inflation forecasting (instability inherent in economic systems). In the empirical literature, the economic effects of IT are still debatable. Some researchers presented evidence which show that adopting IT under a disinflation lowers the output costs of disinflation (Goncalves and Carvalhvo, 2008). Brito and Bystedt, (2009) found a strong negative relationship between IT and output growth for a sample of the emergency markets while Mollick, *et al.*, (2011), found that full-fledged IT regime resulted in higher output/income per capita in emerging markets using a financial globalisation framework. Kelly *et al.*, (2012) argued that the real effects of IT depends on country specific effects and using a sample of developing countries and found positive effects of IT on real GDP in Latin American and Asian countries, and negative impact for African countries. Amira *et al.*, (2013) provide evidence that the average real economic growth increased more in IT countries than in nontargeters. Andersen *et al.*, (2014) found robust finding; countries with an IT regime with flexible exchange rates weathered financial crisis much better than those who implemented fixed exchange rate during the global financial crisis for Eurozone and positive effect of IT on growth. Junankar and Wong, (2020) found weaker negative effect of IT on inflation and insignificant effect on output growth and the results were not robust. However, these studies did not focus on the role of exchange rate regime. We intend to enrich this literature by incorporating the role of exchange rate regime in the effectiveness of IT in Emerging Market using Zimbabwe as a case study.

Notwithstanding these empirical differences, developing countries are adopting and implementing this New Consensus Monetary Policy framework. Some

in SSA for instance South Africa, Mauritius and Ghana have adopted full-fledged IT as a monetary policy framework while Kenya has a hybrid framework of IT and monetary target (Kasekende and Brownbridge, 2017). In Comparison, other countries have adopted inflation targeting lite. Zimbabwe faced severe economic downturn (higher inflation, capacity under utilisation and shortages of foreign currency) for the period 2000-2008. The monetary authorities singled out inflation "as the number one enemy in its economic stabilization programme." During the disinflation IT Lite was adopted, and the monetary policy emphasis was to control inflation and maintain it at or in 2 digits levels; however economic growth targets were not explicitly stated. In light of the above brief analysis, therefore this study shall concentrate on one central question; which exchange rate system is consistent with IT output performances, floating or crawling peg, in emerging markets' mostly small open economies? Unlike previous studies that investigated the real effects of full-fledged inflation targeting with flexible exchange rate, the study intend to extend this literature by assessing the real effects of IT Lite under a fixed exchange rate regime during the disinflation period 2000-2008 for Zimbabwe.

The rest of the study is organized as follows in section 2 we discuss an overview of Zimbabwe's IT framework, exchange rate policy and output performances, in section 3 we present the modelling strategy whilst in section 4 we present the empirical results and conclusion.

2. INFLATING TARGETING LITE, EXCHANGE RATE REGIMES AND OUTPUT PERFORMANCE

2.1 Inflation Targeting

Targets based monetary policy framework was the core of policy in Zimbabwe since the adoption of market based instruments in 1995; however, it became prominent over the disinflation period (2000-2008) where it was vigorously implemented. The Central Bank implemented a variant of IT (Inflation Targeting Lite) with no clear and credible commitment to bring inflation at the targeted rate. They set as usual an inflation target range to be achieved within a specified time horizon, and be accountable for deviations of actual from set targets. When ever they missed the target, the monetary policy authorities responded by tightening monetary policy so as to achieve this target in the shortest possible time. This can be regarded as strict IT which usually results in huge sacrifice ratios (for types of IT see Svensson (1997)). Moreover, they actively used the exchange rate as a complementary policy to manage inflation. The RBZ set an inflation target range from 6 digits to 2 digits inflation rate by year end 2007. However, the target horizon is small given the status quo of the productive sector which had on average excess capacity of 70%. Price targets must be endogenously determined by the production

capabilities of firms, which are dynamic and sensitive to macroeconomic policies (Erceg 2002). The target rate must be commensurate with the time horizon; reducing inflation rate from 66 000% to 99% over 12 months seemed to be unattainable given the state of technology and aggregate demand conditions.

In its inception the monetary authorities promised to avail all economic data to the public when ever due. The central bank frequently published reports on inflation developments weekly and monthly in its economic highlights (bulletins). In conjunction with the central statistics office (CSO) they would call for a press conference where inflation figures were communicated to the public. However the persistent missing of targets saw a reluctance to publicize the figures. Deviations of inflation from targets rates were so huge .With time, delays extending to 2 months were noticed in some cases. This set wrong signal to economic agents as they were deceived of promised timeously release of inflation data and begin to discredit the whole IT lite programme.

2.2 Policy Environment- Central Bank Independence

The disinflation period has several unfavourable conditions for a successful IT. The period was marked by political instability and fiscal dominance. Excess capacity³ in most industries reduced government revenue base, and given international isolation seigniorage revenue became the major source of finance. There was no central bank autonomy. Direct political interventions in central bank decisions and monetary financing of fiscal deficits and quasi fiscal operations denied central bank independence. Thus there is undisputable potential link between the political business cycle and the conduct on monetary policy⁴. The birth of competitive political systems during the period forced the government to aim at stabilizing the economy in the shortest possible time. Chronic anxiety and scepticism within the government complicated the Central Bank policy environment. The worsening political environment has denied the existence of central bank independence. The major reason might be that the executive have the freedom to fire central bank governor. Finance Act still empowers the Minister of Finance to give directives to the Central Bank governor. The Central Bank was directed from central government to implement selective funding at concessional rate across sectors but biased towards agriculture. Such an approach undermines the interlinkages of economic activities that exist within the productive sector. The failures of other sectors have ripple effect to well-funded sectors of the economy. Most beneficial firms were of new generation cropped out of the government indigenisation and black

empowerment policy. Outputs in these firms are volatile since the goal of profit maximisation overrides all other business goals. Thus move has forced the Central Bank to be the lender of last resort to private economic agents.

2.3 Exchange Rate Regime and Output Performance

Open economy inflation targeting requires an optimum exchange rate policy that promote stability to all sectors of the economy. The Central Bank adopted fixed exchange rate which was either improved to crawling peg or managed float in order to limit the effects of excessive exchange rate fluctuations due to speculative currency attack. This choice of exchange rate policy usually results in misalignment. Given the shortage of foreign currency, a vibrant parallel exchange rate market cropped out resulting in two exchange rates which led to bi- exchange rate transmission channels. The Central Bank responded by stringent exchange rate controls such as rationing limited foreign currency only to specific sectors and withdrawal limits to foreign currency accounts. Such policy perpetuated the dual exchange system with huge exchange rate premium (see Table 1).

Since most firms were import dependent the existence of two exchange rates is believed to have severely affected production. Firms to protect their infrastructure have to fetch foreign currency from the parallel market to import raw materials only to liquidate 75% of their export earnings using the overvalued official rate. These losses incurred there of, have hindered production in most industries resulting in shortages of goods and services.

This macroeconomic policy deficiency forced most industries to embark on importing finished goods from neighbouring countries, especially from the region's most industrialized country South Africa. Foreign production in this case is regarded to have substituted domestic capacity potentials, thus further undermining the idea of output stabilisation and foreign currency generation.

Most firms responded by having excess capacity of over 70% (CZI, 2007). Not withstanding these firms difficulties, the Government continuously intervened in the economy with ill advised and mostly unjustified price controls. Administered prices are mostly counter productive as firms may fail to recoup production costs. The stringent implementations of populist policies and policy reversals compounded by tight monetary policy have exacerbated the problem of capacity utilisation. Firms complied with these administered policies as a way of defending their licences otherwise shut down was the optimum decision. Government revenue base dwindled and budget deficit soared. IT central bank has to properly internalize the fiscal policy regime otherwise IT must

³ CZI (2007) report a 70% capacity underutilization.

⁴ See research on quasi fiscal operations and inflation

IMF

not be adopted. Figure 1 tracks output gap, inflation and

exchange rate distortion spread over the period.

Table 1: Official and Parallel exchange rates, on Zimbabwean dollar (Z\$) per US\$ 2003-2007

YEAR		OFFICIAL RATE	PARALLEL RATE	EXCHANGE RATE SYSTEM
2003	jun	824	2 500	Fixed
	dec	824	6 100	Fixed
2004	jun	5 348	5 950	Managed Float
	dec	5 729	8 400	Managed Float
2005	jun	9 994	23 000	Managed Float
	dec	83 333	100 000	Managed Float
2006	jun	101 195	420 000	Managed Float
	aug	250	650*	Fixed
	dec	250	2 500	Fixed
2007	jun	250	300 000	Fixed
	dec	30 000	1 500 000	Managed Float

Source: Makoto (2012); *There was revaluation of currency, 6 zeros were cancelled from the domestic currency

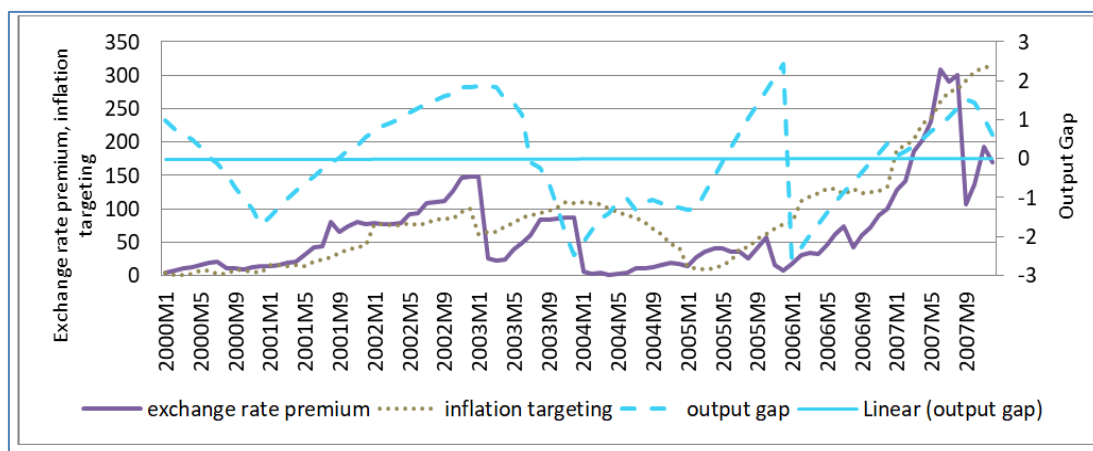


Figure 1: Output performance, exchange rate distortions and inflation targeting

Source: Author's compilation using data from RBZ (2009)

From fig.1, it can be concluded that the adoption of IT may not be the best policy to stabilize the economy. Decreases in prices have led to a depressed output resulting in huge output gap. The same is revealed by the foreign currency rate spread, existence have contributed to output dynamics. Increases in exchange rate distortions were accompanied by rising inflation targets and widening output gaps.

3. MODELLING STRATEGY

The study is going to model output function as an autoregressive model, AR(1) and adopt the Autoregressive Distributable Lag (ARDL) model of Pesaran *et al.*, (2001) where output depend on inflation targeting, exchange rate distortion and imports from other countries. This methodology is different from the VAR approach widely used in the literature which is effective in large samples. According to Pesaran *et al.*, (2001)⁵, ARDL models are reliable in short samples and given our sample size, this approach may be validated.

Moreover the ARDL model is the more statistically significant approach to determine the cointegration relation in small samples (Ghatak and Siddiki, 2001), while the Johansen cointegration techniques require large data samples for validity. The reduced form unrestricted error correction model or VECM (equation 1) is specified below:

$$\Delta GAP_t = \alpha + \sum_{t=2}^n \phi GAP_{t-1} + \sum_{t=1}^p \gamma ITL_{t-1} + \sum_{t=1}^q \rho EXPR_{t-1} + \sum_{t=1}^r \psi ITLEXP_{t-1} + \sum_{t=1}^m \theta SAIMP_{t-1} + \sum_{t=2}^{n_2} \lambda_1 \Delta GAP_{t-1} + \sum_{t=1}^{p_2} \lambda_2 \Delta ITL_{t-1} + \sum_{t=1}^{q_2} \lambda_3 \Delta EXPR_{t-1} + \sum_{t=1}^{r_2} \lambda_4 \Delta ITLEXP_{t-1} + \sum_{t=1}^{m_2} \lambda_5 \Delta SAIMP_{t-1} + \mu_t \dots (1)$$

Where ϕ, γ, ρ, ψ are long run coefficients and λ_i are short run error correction dynamics.

The estimation was extended to analyse the effects of different exchange rate systems, in particular fixed (official rate) and floating (parallel rate) regimes. Three models will be estimated.

⁵ For more advantages of ARDL model see Pesaran *et al.* (2001)

Table 2: Unit root test for variables

Variable	ADF – test stat.	Order of Integration
Output Gap (GAP)	-4.171757***	I(0)
Inflation Targeting Lite (ITL)	-5.067173***	I(1)
Exchange Rate Premium (EXCPR)	-7.576673***	I(1)
Inflation Targeting*Exchpremium (ITEXCPR)	-8.411437***	I(1)
Official Rate (OEX)	-9.204514***	I(1)
Inflation Targeting*Official Rate (ITOEX)	-4.951487***	I(1)
Parallel Rate (PEX)	-7.487862***	I(1)
Inflation Targeting*Parallel Rate (ITPEX)	-7.063630***	I(1)
SA Imports (SAIMP)	-11.14368***	I(1)

(***), (**) and (*) indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% significant level, respectively.

Table 3: Bounds test results

Model	F-stats	Sig. level	Lower Bound	Upper Bound
1	2.7134	5%	3.6299	4.7651
2	4.9608	10%	3.1180	4.1406
3	4.7853	10%	3.1180	4.1406

Definition of Variables

GAP is the output gap defined as $GAP = 100(\log Y - \log Y^P)$, where Y is real GDP and Y^P potential output calculated from the multivariate (simple) HP filter, ITL being inflation targeting modelled as $100(\log P - \log P^T)$, P is CPI inflation while P^T is inflation target rate. EXPR is the exchange rate premium calculated as $100(\log r^p - \log r^o)$ where r^p is parallel market real exchange rate and r^o official market real exchange rate. ITLEXPR is the interaction between inflation targeting and exchange rate premium. SAIMP real imports from major trading partners defined as a relative value to domestic GDP $100(\log P^M - \log GDP)$ where P^M domestic price of imports deflated by price level while GDP is real gross domestic product.

Econometric Considerations:

Bounds Test Procedure Stationarity test is going to be conducted using the Dickey-Fuller Generalized Least Square (DF –GLS) de-trending approach proposed by Stock *et al.*, (1996) which is reliable in small samples unlike the conventional ADF technique⁶. Under Bounds test procedure the degree of cointegration is not restricted to the same order, but it is applicable regardless of differences in the degree of cointegration provided it is at most I(2). The cointegration test is performed using the F-test on the joint hypothesis of the validity of long run coefficients (ϕ, γ, ρ, ψ). The following diagnostic tests were performed in order to assess the adequacy and validity of our specified model; normality test using the JB test, ARCH test for heteroskedasticity, RESET for model specification, and LM serial for autocorrelation. These econometric problems have serious consequences on OLS estimators.

DATA SOURCES

GDP and CPI inflation was collected from Zimstats, Inflation targets rates, official and parallel exchange rates and bank lending rates from Central Bank (RBZ), trade data (imports and exports) from Zimbabwe Trade (Zimtrade). All estimations are performed with Microfit Software as suggested by Pesaran *et al.*, (2003).

4. EMPIRICAL RESULTS

The stationarity results are presented in table 2 and they support the ARDL modelling procedure, since variables are integrated within the 0-2 band.

The empirical results are presented in table 3, 4 and 5. The bounds test for cointegration results (table 3) shows that the F-statistic is greater than the upper bound critical value of Pesaran *et al.*, (2001). This implies that there is a long run stable relationship, the series are cointegrated. The long run and short run models were estimated and the results are reported in table 4 and 5 respectively. The model specification test shows that the model is of good quality. The R-squared and the adjusted R-squared are above 83% and the null hypothesis is accepted for all tests of econometric problems. The test shows that there is no problem of serial correlation, heteroscedasticity and model misspecification.

⁶ See Dejong *et al* 1992, Harris (2003) for unsuitability of ADF and Ng –Perron tests in small samples.

Table 4: Estimated long run coefficients using the ARDL Approach selected based on Schwarz Bayesian Criterion

<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Inflation targeting	3.3717* (1.9820)	1.7046* (0.96012)	2.0013 (1.3316)
Exchange rate premium	7.0909* (3.7360)		
Inflatargeting*exchpreuim	-1.3420* (0.77325)		
Official rate		6.1302 (5.3869)	
Inflatargeting*official rate		-1.9361 (1.1852)	
Parallel rate			6.9580 (6.8618)
Inflatargeting*parallel rate			-2.2104 (1.5212)
SA imports	2.3504 (1.5724)	1.0007 (1.1488)	2.1794 (1.7946)
ARDL order	1,1,1,0,1	1,0,1,1,1	1,1,1,1,1
R-squared	0.86507	0.85085	0.85273
Adjusted R-squared	0.85043	0.83467	0.83477
AIC	-68.2263	-72.8850	-73.2953
SBC	-80.8893	-85.5480	-87.2246
Serial correlation	0.188***	0.087*	0.133***
Functional form	0.468***	0.056*	0.103***
Heteroscedasticity	0.447***	0.901***	0.595***

Intercept and trend were included in estimation but not reported the model, ***, **, * means significant on 1%, 5% and 10% respectively. Figures in parentheses are standard errors.

The results show that inflation targeting has a positive and significant effect on output gap in the long run, which implies a decrease in economic growth. The impact was larger in the long run than in short run (see tables 4 and 5). Policy inconsistencies of ITL tend to worsen over time. The strict adherence to target results in loss of output. This is consistent with evidence in other developing countries (Debelle, 1999; Brito and Bystedt, 2009; Kelly *et al.*, 2012, Junakar and Wong, 2020). However the finding deviates from studies that investigated the real effects of strict IT under flexible exchange rate (Andersen *et al.*, 2014). Inflation targeting undermined output stabilization possibly due to tight and conflict policies. Policies like tight money, price and exchange controls tend to undermine productivity. The same applies to the exchange rate distortion which is also positive and significant. The positive effect on output gap is explained by overvalued exchange rate which resulted in huge exchange premiums and high spillover costs of production. The Government imposed stringent exchange control measures following periods of exchange rate instability. The official rate was highly overvalued to the extent that the country experienced shortages of foreign currency. Firms would fetch foreign currency from parallel market and compelled by law to sell their

products at government administered prices. The losses incurred act as a hindrance to productivity and output growth.

However, the interaction of inflation targeting and exchange premium has an unexpected sign. The negative sign imply that IT lite under exchange rate distortion might lead to a decrease in output gap which signal the long run growth effects of availability and accessibility of foreign currency in the parallel market where exchange rate floating is practised. Persistent exchange rate overvaluation results in the dominance of the parallel rate in the long run.

The official rate was insignificant in both the short run and long run so as the interaction with inflation targeting. This shows that IT lite might not be consistent with overvalued fixed exchange rate system. In the short run, the parallel rate has a negative and significant effect which could imply that floating the exchange rate acted as an incentive for firms. However, the interaction with IT has a positive and significant effect with the implication that huge exchange rate distortions in the short run undermines output due to strict government enforcement while parallel market rates adjusts.

Table 5: Error Correction Representation for the ARDL model selected based on Schwarz Bayesian Criterion

<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
dLinflation targeting lite	0.84348*** (0.25451)	0.28922** (0.13906)	-0.67190 (0.44255)
dLexchange rate premium	0.50110** (0.28384)		
dLITL*exchange rate premium	-0.17947** (0.060900)		
dLofficial rate		-1.3655 (1.2073)	
dLITL*official rate		0.33476 (0.22936)	
dLparallel rate			-6.6920*** (2.4134)
dLITL*parallel rate			1.3341*** (0.48375)
dLSA imports	-0.72456*** (0.18084)	-0.79478*** (0.19938)	-0.89245*** (0.20431)
MA(1)	-0.13374** (0.052028)	-0.16968*** (0.054688)	-0.12449** (0.049607)

(***), (**), (*) means significant on 1%, 5% and 10% respectively. Figures in parentheses are standard errors.

The South African imports have a negative effect on GAP in the short run. This means that import penetration from South Africa were stimulating production in the short run. The major explanation could be that imports suppress domestic prices as the market become competitive. The low price regime encourages growth that stimulates firm investment and productivity. However in the long run imports discourage productivity as local firms will be crowded out in the market. Unfortunately the variable has the correct sign but insignificant in the long run. The error correction has the correct sign with a speed of adjustment of above 12% implying a lower rate and long persistence of output gap.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study investigated the impact of inflation targeting lite on output stabilisation under a managed exchange rate system. Zimbabwe adopted IT lite regime during the 2000-2008 disinflation programme. Interventionist from central government resulted in both prices and exchange rate distortions. The foreign exchange rate arrangement resulted in two rates: official (fixed) and parallel (floating). In such an arrangement, the empirical results showed that ITL has positive effect on output gap compared to a negative impact of the interaction term with exchange rate premium. The results contradict recent evidence of a positive effect of IT on growth from studies that probed the economic effects of full-fledged IT and those studies that explicitly controlled for the role of exchange rate policy (Andersen *et al.*, 2014). No effect of the interaction between IT and official rate, hence IT seems to be consistent with floating rates rather than rigid official rate. The study recommends that developing countries should be discouraged to adopt IT lite under exchange

rate distortions rather should implement a floating exchange rate regime for IT to be successful. Allowing a dual system would complicate the transmission channels. We conclude that the real effect of IT lite depends on the choice of the exchange rate policy framework. The results provide insights on the compatibility of exchange rate regimes with IT to countries that adopt IT as a monetary policy framework.

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