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EFFECTIVENESS OF MONETARY TRANSMISSION AND THE IMPACT OF INFLATION TARGETING STRATEGY: Evidence from Emerging Market Economies

Syed Zia ABBAS*, Syed Faizan IFTIKHAR and Shaista ALAM*****

Abstract

The objective of this paper is to investigate the impact of inflation targeting strategy on monetary policy transmission mechanism by estimating the impact of deposit rate on consumption to GDP ratio in emerging market economies. The study considers sixteen years of annual data from 2001 to 2016 comprising of thirty-six emerging market economies (EMEs) including 16 inflation targeting countries and 20 non-inflation targeting countries. This study implies Generalized Method of Moments (GMM) for empirical investigation. The evaluation of transmission mechanism in the presence of inflation targeting strategy by estimating the impact of rate of interest on one of the significant components of aggregate demand, i.e., household consumption instead of output is the major contribution of this research. The study found a significant impact of inflation targeting on monetary policy transmission mechanism.

Keywords: Monetary Policy, Inflation Targeting, Private Consumption.
JEL Classification: E52, E21, E42.

I. Introduction

In numerous countries, monetary policy is used to affect alter the pattern of economic growth and is also used to stabilize the general price level. The process in which monetary policy can have an impact on output and inflation is called monetary policy transmission mechanism [Taylor (1995)]. However, the monetary policy affects inflation and output through various channels.[1] Number of studies observed the significance of monetary transmission for developing economies [Mallick and Sousa (2009), Jayaraman (2008), Taylor (1995) and Modigilani (1971)] while various studies provided the evidence of insignificance of monetary transmission [Shabbir (2012) and Baig

* Lecturer, **Assistant Professor, ***Associate Professor, Applied Economics Research Centre, University of Karachi, Karachi, Pakistan.

[1] Interest rate channel, money channel, exchange rate channel, asset price and wealth channel, balance sheet and profitability channel, bank funding and lending channel, bank capital channel, risk-taking channel, expectations channel [Beyer (2017)].

(2011)] or at least low level of significance has been observed in the existing research [Noor, et al. (2005)]. The literature also highlights the importance of sector-specific variations and their role for the significance of monetary transmission [Alam and Waheed (2006) and Ifeakachukwu and Olufemi (2012)]. Apart from sector-specific variations, the level of income also contributes to the effectiveness of monetary policy transmission mechanism [Mishra and Montiel (2012)].

The literature provides evidence of a potential increase in the importance of suitable monetary and exchange rate policies, especially after the currency crisis of South East Asia and Mexico. It was the time when one could go for a fixed exchange rate system by adopting another currency or country board or could follow the flexible exchange rate system using different nominal anchor for monetary policy. It was the time of vanishing intermediate targets set by central banks of many countries. At that time, various countries switched their monetary strategy from exchange rate targeting to inflation targeting. Inflation targeting is the process in which inflation needs to be targeted directly instead of targeting inflation via intermediate variables. The short term interest rate may affect inflation and output through various factors such as interest rate and the exchange rate when a central bank follows the inflation targeting strategy. The literature revealed ambiguous outcomes of central bank strategies.[2] The number of studies discussed the significance of thirty-six bank strategies for the monetary transmission [Duman (2002), Mishkin (2000), Ahmed, et al. (2005) and Sevensson (1999)]. However, insignificance of central bank strategies for monetary transmission can be observed in many of other research documents. Ball and Sheridan (2004) concluded that targeting inflation does not bring any significant change in economic performance as all countries follow a similar type of policy rate.

This study empirically investigates the role of central bank strategies for the effectiveness of monetary policy transmission mechanism in Emerging Economies.Few studies in the literature have focused on the interest rate channel particularly for emerging economies under inflation targeting strategy. Moreover, number of studies in the literature observes the insignificance of interest rate channel in developing countries [Safia (2012) and Baig (2011)]. However, it has been observed through the literature[3] that the insignificance of interest rate channel can be the outcome of estimating the impact of interest rate on aggregate demand Mukherjee and Bhattacharya (2011). Therefore, we work on the component of aggregate demand and estimate the structural equation for private consumption instead of looking at overall output following Mukherjee and Bhattacharya (2011). The study provides a comparison between inflation targeting and non-inflation targeting emerging market economies for the effectiveness of interest rate channel of Monetary Policy Transmission Mechanism from

[2] Money targeting, interest rate targeting, exchange rate targeting and inflation targeting are the core central bank strategies of monetary policy available in the literature.

[3] See also Alam and Waheed (2006) and Ifeakachukwu and Olufemi (2012).

2001 to 2016. This study contributes in the literature in various ways. The empirical investigation of monetary policy transmission mechanism by working on a component of aggregate demand instead of aggregate demand is a significant contribution of this study in the literature of monetary policy. Moreover, the whole sample of countries has been sliced into inflation targeting and non-inflation targeting countries so that the policy level outcome can be achieved. This disaggregation may provide the guideline to the countries whether they should announce the inflation targeting or they should not go to target the inflation.

The paper is comprised of four sections. Following the introduction in Section I, Section II specifies the data, empirical model and the methodology. Section III consequently provides empirical results. At last, the conclusion is presented in Section IV along with policy recommendations.

II. Data and Methodology

1. Data Sources and Definitions of Variables

This study is based upon sixteen years of annual data for 36 emerging market economies (EMEs), including sixteen inflation targeting (IT) and twenty non-inflation targeting (NIT) countries. The list of countries is given in Appendix A-1, we worked with limited countries as limited data set have been available for emerging market economies. The annual data for all the variables used in this study has been collected from World Development Indicator (WDI), World Bank. The model used for empirical analysis comprises of seven variables, including consumption as the dependent variable, however, government expenditures, population, remittances, GDP per capita, deposit rate and financial development as independent variables. The descriptions of the variables are given as follows.

a) Household consumption (COY)

The household final consumption expenditure (constant 2010 US$)/GDP constant 2010 US$ is the dependent variable. The dependent variable is divided by GDP, similar to the existing literature [Fry (1978), Giovannini (1983), Greene and Villanueva (1991) and Serven (2003)].

b) Government expenditures (GOY)

GOY is a general government final consumption expenditure (constant 2010 US$)/(GDP constant 2010 US$). Government expenditures and household consumption may behave as substitutes of each other in the household utility function. The household consumption may have a positive (complement) relation with government

expenditures if government spends more on welfare and transfer payments. Earlier, government expenditure as an explanatory variable has been used by Gali, et al. (2004), to explore its impacts on household consumption.

c) Population (POTP)

POTP is the population of the sum of ages 0-14 (total percentage) and population of ages 65 and above (total percentage). Household consumption accelerates as the population exclusive of working age population increases [Arapova (2018)]. We expect positive sign for the coefficient of the population in our model.

d) Remittances (RMT)

We introduce foreign remittance (RMT) as an explanatory variable following Waqas (2017) as foreign remittances may directly hit household consumption. Remittances increase household consumption in the short run. However, in the long run, remittances may affect household consumption negatively [Alderman, et al. (1996) and Amjad, (2006)].

e) GDP per capita (YOP)

YOP is the GDP per capita. We used it as an explanatory variable in the log[4] form, i.e., the log of GDP constant 2010 US $ total population. Rossi (1988) used it earlier in a study. The increase in GDP per capita improves household consumption. However, it may affect household consumption negatively due to the capital account openness.

f) Rate of interest (ROI)

ROI is deposit rate of interest (per cent). The rate of interest may have a negative relation with household consumption if the household prefers to save due to the high rate of return [Blare (1978)]. However, the rate of interest may affect household consumption positively or at least the effect was found to be low because of target saving behavior [Bernanke and Gertler (1995)]. Earlier, rate of interest was used in many studies[5] [See Reinhart and Ostry (1995), McDonald (1983), Fry (1978) and Giovannini (1983)].

[4] All variables have been taken in percentage except GDP per capita. However, we have taken the GDP per capita in log form to adjust its scale with rest of the variables.

[5] For advanced economies [see Campbell and Mankiw (1989), Jonathan, G. (2006, Elmendorf (1996), Sarno and Taylor (1998)].

g) Financial development (FND)

FND is the sum of the market capitalization of listed domestic companies (per cent of GDP) and domestic credit to private sector by banks (per cent of GDP). Financial development may affect household consumption negatively. Funke (2002) found a small but statistically significant effect of stock market developments on private consumption. However, Mukherjee and Bhattacharya (2011) found the positive impact of financial development on household consumption if the interest rate elasticity of private consumption increases (becomes more negative) with the level of development of the domestic financial sector. That is, the substitution effect of changes in the real deposit becomes increasingly important as the financial sector develops.

2. Empirical Framework/Model

It has been observed through the literature that the interest rate channel of transmission mechanism found to be insignificant or at least loses its effectiveness in developing and emerging market economies [Shabbir (2012) and Baig (2011)]. The literature also argues that this insignificance can be the outcome of estimating the impact of rate of interest on aggregate demand [Mukherjee and Bhattacharya (2011)]. Therefore, this study fills this gap via empirically investigating the impact of the real cost of capital on one of the components of aggregate demand, i.e., consumption. We work on consumption out of all components of aggregate demand as repetition significantly contributes to GDP.

Our model based on the life cycle theory is similar to the model used by Mukherjee and Bhattacharya (2011). However, we used different and relatively new econometric techniques for empirical investigation. The study uses the following model to investigate the impact of inflation targeting strategy on the effectiveness of the monetary policy transmission mechanism.

$$COY_{i,t} = \beta_0 COY_{i,t-1} + \beta_1 GOY_{i,t} + \beta_2 POTP_{i,t} + \beta_3 RMT_{i,t} + \beta_4 LOG\_YOP_{i,t} + \beta_5 ROI_{i,t} + \beta_6 FND_{i,t} + \varepsilon_{it} \quad (1)$$

where *i* and *t* denote country and time period, respectively, the term $COY_{i,t}$ is a measure of consumption growth proxied by household consumption to GDP ratio, $GOY_{i,t}$ is government expenditures to GDP ratio, $POTP_{i,t}$ is used for population, $RMT_{i,t}$ represents the remittances to GDP ratio, $LOG\_YOP_{i,t}$ is used for GDP per capita in log form, $ROI_{i,t}$ denotes the rate of interest and $FND_{i,t}$ represents the financial development. The detailed description of variables used in this study has been given in Section II. Our model may incur a problem of autocorrelation because of the lag dependent variable used as an explanatory variable. Another problem which may arise in our model is the

correlation between explanatory variables and fixed individual effects. The fixed effects are the part of $\varepsilon_{i,t}$, which comprises of unobservable country-specific effects, μ_i and the time specific effect v_t.

In order to overcome these issues, this study implies the two steps System Generalize Moment Method (GMM), approach developed by Arellano and Bover (1995) and Blundell and Bond (1998). This method produces unbiased and consistent estimates after controlling for endogeneity. Furthermore, it is also appropriate to use in the case of a short time period; past experiences largely influenced linear functional relations and more importantly, in the period of economic and financial behavior. In addition, the study applies some diagnostic tests such as Sargan test and Auto-regressive test to investigate the validity of the estimates.

III. Empirical Results

Table 1 show the summary of descriptive statistics for all key variables used in this research and describes the units of measurements, minimum and maximum values of key variables of emerging economies from 2001 to 2016.

TABLE 1

Descriptive Statistics from 2001 to 2016

Variable	Obs[6]	Mean	Std. Dev.	Min	Max
Consumption growth	144	0.18	0.14	0.00	0.80
Rate of interest	144	6.83	6.28	0.18	74.70
Financial development	144	97.63	65.81	8.07	388.79
Gov. expenditure	144	0.55	0.17	0.00	1.02
Population	144	32.90	5.68	14.13	46.96
Remittances	144	2.03	2.73	0.00	13.32
Log of GDP per capita	144	3.84	0.47	2.70	4.87

Source: Authors' estimation.

The mean value of consumption growth is 0. 18 per cent point, while it deviates from 0.00 to 0.80 per cent point. The mean value of rate of interest is 6.83; however, it moves from 0.18 to 74.70 The mean values of government expenditures, remittances and log of GDP per capita are 0.55, 2.03, 3.84 per cent points, while, they deviate from 0.00 to 1.01, 0.00 to 13.32 and 2.70 to 4.86 respectively. In addition, the mean values of financial development and population are 97.63 and 32.90 per cent points; however, they deviate from 8.07 to 388.79 and 14.13 to 46.96, respectively.

[6] Four year average of the entire data set has been taken for estimation purpose because time length must be less than the length of cross sections in the panel for applying the two steps System Generalize Moment Method (GMM).

Table 2 shows the pair-wise correlation among all key variables (consumption growth, deposit rate of interest, financial development, Government expenditures, Population, remittances and log of GDP per capita). This table also shows the statistically significant association of consumption growth with financial development, government expenditures, population, remittances and log of GDP per capita at 5 per cent level of significance. Furthermore, it can also be observed from Table 2 that the remittances and log of GDP per capita are highly effective but negatively correlated with each other at 0.73 in non-inflation targeting countries.

Column (1) of Table 3 shows the impact of rate of interest on household consumption in 36 emerging economies during the period 2001 till 2016. However, the empirical findings of the sliced data into inflation targeting and non-inflation targeting

TABLE 2

Pair wise Correlation Matrix

Variables		Household Consumption growth	Rate of interest	Financial development	Gov. expenditures	Population	Remittances	Log of GDP per capita
Household Consumption growth	Overall	1						
	IT	1						
	Non-IT	1						
Rate of interest	Overall	0.095	1					
	IT	-0.007	1					
	Non-IT	0.202*	1					
Financial development	Overall	-0.164*	-0.287*	1				
	IT	0.135*	-0.195*	1				
	Non-IT	-0.279*	-0.502*	1				
Gov. expenditures	Overall	-0.650*	0.027	-0.027	1			
	IT	-0.444*	0.137*	-0.277*	1			
	Non-IT	-0.636*	0.017	-0.029	1			
Population	Overall	0.085	0.210*	-0.273*	0.298*	1		
	IT	-0.207*	0.147*	-0.151*	0.629*	1		
	Non-IT	0.158*	0.358*	-0.401*	0.284*	1		
Remittances	Overall	0.054	-0.047	-0.235*	0.215*	0.421*	1	
	IT	-0.370*	-0.169*	-0.193*	0.638*	0.434*	1	
	Non-IT	0.161*	0.110*	-0.304*	0.202*	0.492*	1	
Log of GDP per capita	Overall	-0.078	-0.152*	0.209*	-0.192*	-0.584*	-0.654*	1
	IT	0.641*	-0.104*	0.195*	-0.547*	-0.355*	-0.574*	1
	Non-IT	-0.154*	-0.266*	0.231*	-0.206*	-0.661*	-0.738*	1

Source: Authors' estimation.

countries have been given in columns (2) and column (3) of Table 3, respectively. The p-values of Sargan test and AR-test are found to be quite larger than 5 per cent level in all Columns (1 to 3), which show the acceptance of restriction of over-identified and hypothesis of zero correlation. Both specification test result support the validity of instruments and also confirm that the estimated coefficients are free from endogenity. In addition, the lag dependent variable is found to be significant and relatively high in all columns (1 to 3) at least at 10 per cent level of significance.

Similar to Blare (1978), the significant but negative coefficient of rate of interest in columns (1 and 2) reflects the effectiveness of monetary transmission in inflation targeting economies. This reveals that households are interested to save more at the cost of current

TABLE 3

Dynamic Panel Estimation of Household Consumption in Emerging Economies During 2001 to 2016

Variable	IT and Non-IT (1)	IT (2)	Non-IT (3)
Household Consumption(t-1)	0.909***	0.917***	0.631**
	(0.046)	(0.084)	(0.260)
Rate of interest	-0.00043***	-0.001**	-0.00011
	(0.000)	(0.000)	(0.001)
Financial development	-0.000032***	-0.00014**	0.0004**
	(0.000)	(0.000)	(0.000)
Gov. expenditure	0.028**	0.206**	0.295**
	(0.012)	(0.119)	(0.177)
Population	0.006***	0.004**	0.007***
	(0.002)	(0.002)	(0.002)
Remittances	0.001***	0.001	0.012***
	0.000	(0.003)	(0.003)
Log of GDP per capita	0.283***	0.478***	0.122**
	(0.020)	(0.083)	(0.063)
Observations	110	48	60
Countries	36	16	20
Sargan test (p-value)	(1.000)	(0.987)	(0.930)
AR (1) (p-value)	(0.025)	(0.034)	(0.079)
AR (2) (p-value)	(0.370)	(0.417)	(0.462)

Source: Authors' estimation.

consumption when rate of interest increases. The significant but negative coefficient of financial development in columns (1 and 2) also validates these outcomes. Following Funke (2002), these findings show that households are likely to save more due to the relatively developed financial sector of inflation targeting economies. The study also found a complementary relation between government expenditures and household consumption similar to Gali, et al. (2004) which shows that government spends more on welfare and transfer payments in inflation targeting economies. Following Arapova (2018), the study found a positive and significant coefficient of the population.[7] The insignificant coefficient of remittances in column (2) reflects that households prefer to utilize their remittances for saving due to the well development financial sector of inflation targeting economies. Following Rossi (1988), the coefficient of per capita in inflation targeting economies in columns (1 and 2) is found to be positive and significant.

Column (3) of Table 3 observed a negative but insignificant coefficient of rate of interest for the non-inflation targeting economies. However, the coefficient of financial development is found to be significant and positive similar to Mukherjee and Bhattacharya (2011) which reveals that households prefer to save less and maximize their current consumption. This might be possible in such countries where the interest elasticity of household consumption increases (becomes more negative) with the level of development of the domestic financial sector. In contrast of inflation targeting economies, the insignificant coefficient of remittances in column (3) reflects that households prefer to utilize their remittances for consumption purpose instead of saving.

IV. Concluding remarks and Policy Recommendations

This study empirically investigates the role of inflation targeting strategy in the process of monetary policy transmission mechanism by estimating the impact of rate of interest on household consumption in 36 emerging market economies (EMEs) from 2001 to 2016. The number of studies provided evidence of insignificance of interest rate channel in developing countries [Safia (2012) and Baig (2011)]. However, it has been observed through the literature[8] that this insignificance of interest rate channel can be the outcome of estimating the impact of interest rate on aggregate demand [Mukherjee and Bhattacharya (2011)]. Therefore, working on the components of aggregate demand, we estimate the structural equation for household consumption instead of looking at the overall output. The study works only for consumption as it is the major contributor of GDP among all components of aggregate demand. The study implies the Generalize Moment Method (GMM) for estimation purposes on annual data from 2001 to 2016. The Sargan test is applied to investigate the validity of instruments and the Autoregressive test is used to check the autocorrelation.

[7] This study excludes the working age population.

[8] See also Alam and Waheed (2006) and Ifeakachukwu and Olufemi (2012).

Table 3 reveals that the coefficient of household consumption growth is found to be significant and positive in all columns (1 to 3). The coefficient of rate of interest is found to be significant for inflation targeting countries [see column (2)] while insignificant [see column (3)] for non-inflation targeting economies. This outcome indicates that inflation targeting strategy may improve the effectiveness of monetary transmission. The negative sign of the coefficient of rate of interest throughout all columns (1 to 3) reflect the inter-temporal choices of consumer. Households increase their savings due to the high rate of return in order to maximize their future consumption. The coefficient of remittances is found to be insignificant for inflation targeting economies, while, the coefficient of financial development is significant but negative. It means households prefer to save instead of consuming their remittances due to the relatively developed financial sector of inflation targeting economies. Interestingly, the coefficients of remittances and financial development are found to be significant and positive in non-inflation targeting economies. These findings state that households prefer to consume their remittances and they are no more interested in saving. The positive sign of the coefficient of financial development shows the target saving behavior[9] [Guha and Guha (2008), and Samwick (1998)] of households in non-inflation targeting economies.

In contrast of many studies available in the literature, our results suggest that rate of interest significantly affects household consumption in emerging market economies. Moreover, the study suggests that adopting the inflation targeting may alter the outcomes of traditional Keynesian interest rate channel of monetary transmission mechanism. Our results suggest that non-inflation targeting countries should follow the inflation targeting economies at least in the area of monetary policy and its implementation. This study also suggests that non-inflation targeting emerging market economies may improve their existing monetary transmission process via adopting the inflation targeting strategy. The study recommends the policymakers to analyze components of aggregate demand instead of overall analysis of aggregate demand for proper econometric analysis.

[9] Target saving behavior states that prudence can achieve any future saving target with a smaller amount of current savings.

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APPENDIX

TABLE A-1

List of Countries

S.No.	EMEs	IT EMEs	Non-IT EMEs
1.	Argentina	Brazil	Argentina
2.	Bangladesh	Chile	Bangladesh
3.	Brazil	Colombia	Bulgaria
4.	Bulgaria	Czech Republic	China
5.	Chile	Hungary	Egypt, Arab Rep
6.	China	Indonesia	Greece
7.	Colombia	Israel	India
8.	Czech Republic	Korea, Rep	Iran, Islamic Rep
9.	Egypt, Arab Rep	Mexico	Malaysia
10.	Greece	Peru	Mauritius
11.	Hungary	Philippines	Nigeria
12.	India	Poland	Oman
13.	Indonesia	Romania	Pakistan
14.	Iran, Islamic Rep	South Africa	Qatar
15.	Israel	Thailand	Russian Federation
16.	Korea, Rep	Turkey	Slovenia
17.	Malaysia		Ukraine
18.	Mauritius		United Arab Emirates
19.	Mexico		Vietnam
20.	Nigeria		Venezuela, RB
21.	Oman		
22.	Pakistan		
23.	Peru		
24.	Philippines		
25.	Poland		
26.	Qatar		
27.	Romania		
28.	Russian Federation		
29.	Slovenia		
30.	South Africa		
31.	Thailand		
32.	Turkey		
33.	Ukraine		
34.	United Arab Emirates		
35.	Vietnam		
36.	Venezuela, RB		

Source: World Economic Outlook and IMF