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Financial innovation and monetary policy transmission mechanism in Pakistan

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Abstract

In the recent past there are remarkable financial innovations in Pakistan which have the implications for the monetary policy. In Pakistan there is no or little empirical evidence on the impact of financial innovation on monetary policy transmission mechanism. In this paper we fill this gap by analyzing the impact of financial innovation on monetary policy transmission mechanism by using the interest rate channel. We use the quarterly date covering the period, 1981Q1 to 2010Q4 for Pakistan and for estimation we use OLS. We found that the interest rate channel of monetary policy transmission mechanism dampens by the interest rate channel.

Keywords: Financial innovation, Output gap, Aggregate demand, Monetary policy transmission mechanism

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1. Introduction

Most of the economists are agreed that the economic activity can be affected by the monetary policy. As in these days financial sector is developing in many countries which lead the new financial instruments. These new financial instruments changed the impact of monetary policy on the economic activity. We found some theoretical Litrature that how the financial innovation can affect the monetary policy transmission mechanism but in the case of Pakistan there is no empirical evidence which shows the relationship of these variables. So this gap is fulfilled by our study by empirically analyzing the impact of financial innovation on monetary policy transmission, and for this purpose we use the interest rate channel.

There are two views about the impact of financial innovation on the monetary policy transmission mechanism by using the interest rate channel. Some authors' say that the financial innovation leads to increase the efficiency of financial system and due to easily available of financial assets to the investors, it is easy for the investors to take more risks in order to get the higher yields. Moreover, According to Jurgen, 2008; Mishra and Pradhah, 2008; Weber, 2008; "with increased menu of financial assets available to investors, it is easier to take risks in search of higher yields which enhances interest rate pass through since changes in risk premium is highly pro-cyclical. Moreover, with increased financial innovation, investors easily access products that allow hedging of interest rate risks which in turn encourages portfolio diversification amongst investors with positive implications on the pass-through effects of policy rates".

Other authors argue that there is decrease in the speed and magniyude of transmission policy to the financing cost due to the financial innovation. In addition due to financial innovation bubbles and imbalances may be emerged, if there is a difference between the expectations of investors and policy actions. So there is a need to investigate the impact of financial innovation on monetary policy transmission mechanism in Pakistan. So in this paper we investigate this issue empirically.

2. Literature review

Arturo (2001) used the IS equation for indentifying the effects of securitization on the monetary policy transmission mechanism. The author concluded that the housing investment and real output both have less sensitivity to the real interest rate because there is increase of asset securitization in 1980s and 1990s. This implies that interest rates are not directly related to the securitization largely affected channels. The impact of monetary policy on the housing prices is examined by AoKi et al. (2004) and concludes that the financial innovation like easy access to credit brings changes in the monetary transmission mechanism.

In addition Noyer (2007) points out that there is increase in the effectiveness of monetary policy due to the financial innovation through the interest rate channel. According to the author financial innovation leads to decrease the transaction cost with the result of increase in holding of financial asset and facilitate the funding and investment strategies. Firms have large access to securities markets due to the financial innovations which leads to decrease the information asymmetries.

According to Ho (2006) transmission mechanism can be affected by those financial developments which have the impact on the financial market conditions. The author found the three main channels that can affect the monetary policy which are the interest rate channel, asset channel and the channel of exchange rate. He further argues that the financial innovation leads to improve the economic agent's ability to lock in current interest rate for future funding needs.

Ignazio (2007) observed that due to the financial innovation economic agents have a large range of financing and investment opportunities. the strength and speed of monetary policy transmission mechanism is affected with the developments in the financial sector in the economy. These developments lead to more liquid and complete financial markets and the cost of investment financing and return on saving affects the whole economy.

3. Methodology

Different authors have used different approaches to explain the linkages between the transmission mechanism and the macroeconomic variables. Some authors have used the different channels like exchange rate channel, interest rate channel, and the credit money channel. But as the financial innovation is concerned this paper is focusing on the interest rate channel. The theoretical basis of our study is the traditional Keynesian theory which says that the real cost of borrowing is influenced by the monetary policy by using the nominal short term interest rate. By changing the nominal interest rate we expect that it has the influence on the real rate which ultimately affects the key components of output like the consumption and investment.

3.1. Model

As according to the Rudebush-Svensson (1999) the basic IS equation is

$$y_t = \beta_1 y_{t-1} - \beta_2 r_{t-1} + u_{ty}$$

where y_t is the output gap and r_t shows the real interest rate. We modify the above equation to test for the effects of financial innovation on the reaction to monetary policy moves as done by Arturo (2001).

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 (i_{t-1} - \pi_{t-1}) + \beta_3 Z_t + \beta_4 Z_t (i_{t-1} - \pi_{t-1}) + \eta_t$$

In the above equation two additional variables are used. The term Z_t shows the financial innovation and the second term $Z_t(i_{t-1} - \pi_{t-1})$ is the interaction term (interaction of financial innovation with the real interest rate).

3.2. Data and sources

In Present study we use the quarterly time series data for the time period 1981-Q1 to 2010-Q4 for Pakistan. All the data on different variables are available except the data of output gap. Output gap is calculated by using trend method.

3.3. Constriction of variables

We are using the quarterly based time series data. In order to use the time series data of some variables we make or construct the variables to use them in the specified form mentioned in the models.

3.3.1. Industrial production index

First of all for GDP we use the proxy of industrial productivity index, as the quarterly data of GDP is not available in Pakistan. As Arby and Kemal (2004) calculated the GDP data till the 2003[1] on quarterly basis, but in our analysis we are using the quarterly data till 2010. So we have to use manufacturing productivity index [2] because we are using the data till 2010. In
our analysis output gap is defined as:

$$y_t = \bar{y} - y_t^*$$

where $\bar{y}$ is de-seasonalised output, y_t^* is the potential output and we use the trend method to estimate it.

$$y_t^* = c + \omega_1 t + \omega_2 t^2$$

In the above equation the series has a quadratic trend if t^2 is significant otherwise series has a linear trend. The difference between y_t^* and $\bar{y}$ is the output gap.

3.3.2. Real interest rate

For real interest rate we use call money rate on quarterly based in our analysis. The real interest rate is made as:

$$r_t = i_t - \pi_t^e$$

where i_t is the nominal interest rate and π_t^e is expected rate of inflation.

3.3.3. Inflation

Inflation is calculated as percentage change in de-seasonalized series of CPI on year-on-year basis, i.e.,

[1] I have used the data given by Arby and Kemal (2004) in my M.Phil thesis
[2] As the manufacturing sector is a part of GDP but this sector leads to the large changes in GDP so we can use it as a proxy.

$$\pi_t = \frac{(P_t - P_{t-4})}{P_{t-4}} * 100$$

where P is seasonally adjusted series of consumer price index

3.3.4. Financial innovation

We use the variable of financial innovation in the AD equation. Usually this variable is used as the improvement in the payment system (No. of ATM machines, No. of credit cards or transactions through credit cards and ATMs) but due of the lack of complete data for our analysis we use the proxy for the financial innovation and that is the ratio of broad money to the narrow money.

3.4. Sources of data

To estimate the above equations, we collected quarterly data. Our sample period ranges from 1981Q1 to 2010Q4 for Pakistan. We collected short-term interest rates (call money rate), industrial production index, and consumer price index from the IMF's *International Financial Statistics* (IFS). As the data of output gap is not available so after having the quarterly IPI data, we found potential output through using the Hodrick-Prescott filter and then made the data of output gap by using the above mentioned formula.

4. Results and analysis

4.1. Unit root test

There are many unit root tests in literature but we are using only the augmented fuller test which is commonly used by many economists. According to this test the series is said to be stationary at level if we reject our null hypothesis that there is a unit root in a series. For the purpose to check the stationarity, we use the augmented Dickey-Fuller (ADF) test. The test shows that all the variables are stationary at level. The results are shown in table given below.

4.2. Regression analysis

The below table shows the results of estimated IS equations for the period of 1981Q1 to 2010Q4. The coefficients of baseline equation without the impact of financial innovation are given and t values are given for the respective equation. The coefficient on the real interest rate is negative and significant in the baseline equation and the coefficients have the almost same magnitude as Malik and Ahmad (2007). But the lag value of the output gap is positively and significantly related to the dependent variable. LM test shows the presence of the autocorrelation.

Table 1. Results of ADF Test

Variables	Intercept/Trend	ADF Stat	Critical Value 5 & 10 %	Stationary	DW-Stat
Interest rate	Intercept	-3.9734	-2.8860 -2.5799	Level	2.052
	Intercept & trend	-4.1384	-3.4483 -3.1493	Level	2.061
Inflation	Intercept	-3.9990	-2.887 -2.580	Level	1.906
	Intercept & trend	-4.0496	-3.456 -3.150	Level	1.907
Output Gap	Intercept	-3.45347	-2.8867 -2.574	Level	2.0616
	Intercept & trend	-4.8876	-3.448 -3.149	Level	2.073
Financial Innovation	Intercept	-10.97553	-2.885 -2.576	Level	1.997
	Intercept & trend	-10.996	-3.446 -3.149	Level	1.996

Table 2. Estimation Results of AD Equation

Variables	Coefficients	t-values
y_{t-1}	0.753937	33.90167
$(i_{t-1} - \pi_{t-1})$	-0.087300	-1.785165
R Squared	0.720745	
Serial Correlation LM Test	8.712646 (Prob. 0.048697)	

Now by including the terms of financial innovations in the regression analysis we have the following results.

Table 3. Estimation Results of AD Equation

Variables	Coefficients	t-values
C	-0.084370	-0.281243
y_{t-1}	0.955837	34.01857
$(i_{t-1} - \pi_{t-1})$	-0.064782	-1.838870
Z_t	0.050703	1.0942461
$Z_t(i_{t-1} - \pi_{t-1})$	0.022775	1.526257
R Squared	0.923170	
Serial Correlation LM Test	6.922301 (Prob. 0.0085)	

The above table shows the results of estimated IS equations for the period of 1981:Q1 to 2010:Q4. The coefficients of baseline equation with the impact of financial innovation are given in the second column where as in the third column the t values are given for the respective equation. The coefficient on the real interest rate is negative and significant in the equation. But the lag value of the output gap is positively and significantly related to the dependent variable. When both the financial innovation term and the interaction term are included in the model the results show that they are both significant at 10% level. The result of interaction term shows that the financial innovation increases the positive output gap because the financial innovation leads to increase the efficiency with which the money is transmitted in the economy. Due to this increase in efficiency the finances are easily access able to the institutions and households since interest rate is reduced with the minimized transactions costs and are therefore able to consume and invest more. LM test shows the presence of the autocorrelation.

5. Conclusion and policy implication

Financial innovation is not quantifiable and is difficult to measure. Different authors have used different proxies for the financial innovations like banking assets to GDP ratio and M2/M1 in an economic framework.

The significant results of financial innovation show that it has the implications for the output and monetary policy. When the financial innovation is interacted with the interest rate then negative relationship of interest rate with the output gap is reversed which implies that the central bank actions through the interest rate channel is dampened.

As in Pakistan there are advancements in payment technology which may pilot the consumption smoothing and leads to decrease the importance of interest rate channel in the transmission mechanism. So the central bank should revise the policy targeting frameworks and instruments and should use the mix tools.

References

Akhtar, M. (1983), "Financial Innovations and Implications for Monetary Policy: An International Perspective", *BIS Economic Papers*, Vol.9, pp. 1-64.

Aoki, K., Proudman, J. and Vlieghe, G. (2004), "House Prices, Consumption, and Monetary Policy: A Financial Accelerator Approach", *Journal of Financial Intermediation*, Vol.13, pp. 414-445

Arturo, E. (2002), "Securitization and the Efficacy of Monetary Policy", Federal Reserve Bank of New York, *Economic Policy Review*, Vol.9, pp. 243-255.

Arturo, E. (2001), "Financial Innovation and the Monetary Transmission Mechanism", Mimeo, *Federal Reserve Bank of New York*.

Arrau et al. (1995), "The Demand for Money in Developing Countries: Assessing the Role of Financial Innovation", *Journal of Development Economics*, Vol.46, No.2, pp. 317-340.

Arrau, P. and De Gregorio, J. (1991), "Financial Innovation and Money Demand: Theory and empirical Implementation", *Policy Research and External Affairs Working Papers*, WPS 585.

Bolt, W. and van Els, P.J.A. (2002), "Output gap and Inflation in the EU", *De Nederlandsche Bank Staff Papers.*

Ebson, U. and Ikhide, S. (2002), "Monetary Policy Transmission Mechanism in Namibia", *BON Working Paper*, Vol.2.

Era, D. and Holger, F. (2006), "Transmission Mechanisms of Monetary Policy in Armenia: Evidence from VAR Analysis", *IMF Working Paper*, WP/06/248.

Florin, C. and Twaddle, J. (2004), "The Output gap and its Role in Monetary Policy Decision Making", *Reserve Bank of New Zealand Bulletin*, Vol.66, No.1, pp.5-13.

Fuhrer, J. and Rudebusch, G. (2004), "Estimating the Euler Equation for Output", *Journal of Monetary Economics*, Vol.51, No.6, pp. 1133-1153.