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Asset Price Channel of Monetary Policy in Pakistan

Saleem Shah [*] | Irfan Hussain Khan [†] | Alamgir Khan [‡]

Abstract *This study has used Vector Auto-Regressive (VAR) model approach to analyze the Asset Price Channel of Monetary Transmission (APCMT) regarding Pakis an. Study use the date period of 34 years from 1980 to 2 14. Major findings of the study are; stock prices have bi-directional causality with industrial price index and money r te. Granger causality test was employed to check multi-directional causality between stock prices and industrial product index, money supply, money market rate, and consumer price index, whereas stock prices do not have significant causality with money supply and consumer price in ex. Descriptive statistics are used to check the normality of the data, and mean, median, standard deviation, Jerq-Berra, maximum and minimum values were calculated through descriptive statistics appro ch. For policy designing, this study has some important implications, and it gives emphasis on financial prices instead of credit to achieve the objective of the monetary policy of Pakistan.*

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Introduction

Effective monetary policy is considered a key tool for the stabilization of the economy both in developed and developing economies es. Central banks influence the quantity of money in circulation and interest rate through monetary policy. It is mostly the primary objective of every country to achieve stable prices and real economic growth. It has been identified by the currently available published literature that monetary policy is responsible for the change in real economic activities and the prices through the asset price channel.

The asset price channel is directly related to how the adjustment in monetary policy variables affect the real income (output) level and the prices (Hussain, 20 4). The monetary policy mechanism through this channel identifies the ways in which the monetary policy brings changes to the cumulative prices and demand by manipulating, consumption and investment levels of the domestic households, financial intermediaries, and other related organizations ns. Therefore, among the other channels of monetary policy, the asset price channel is

[*] PhD Scholar, Department of Economics, Clark University, MA, USA.
[†] PhD Scholar, Department of Economics, Government College University, Faisalabad, Punjab, Pakistan. Email: Irfansial007@hotmail.com
[‡] Lecturer, Department of Economics, Hazara University, Mansehra, KP, Pakistan.

considered a key factor. One other benefit of studying this channel is it is also used to identify the directions of the economy in real terms and to forecast future economic variables like prices as well (Jiménez & Ongena, 2012; Acharya, 20 2). Monetary policies may be transmitted in some other situations like the course of diverse channels that also affect macroeconomic variables and markets at different extent. The role or functions of asset price channels vary from country to country or region to region, and one of the reasons for this difference is the strength of the financial intermediaries, capital market, and structural economic conditions (Baig, 2011).

As discussed, the primary objective of monetary policy is to achieve the target rate of inflation and the required sustainable output level and sustainability in economic gro th. It is the policy interest rate that the chief bank mostly uses to attain the desired level of inflation. Changes in interest rate affect various kinds of economic activities, for example, the inflation and output level through the following five channels:

- Channel of Expectation's
- Channel of Interest rate
- Channel of Asset price
- Channel of Credit
- Channel of the exchange rate (EX)

All these channels are equally important, but there is one which deals with the expectations of both the consumers and the markets, that is, the channel of asset prices, and could not be igno ed. Therefore, this study focuses on asset price chan el. A comprehensive analysis of the asset price channel is important to identify two key components that channelize the flow of effects policy towards key economic variables.

The functioning of the sub-channels is based on the principles which have been underlined in Tobin's q theory, and changes in the wealth are given in the second sub-channel, which has been targeted by the decisions of the policymakers and influence the whole econ mine. If the notion of the q variable is clarified once, then it is possible to proceed to study the Tobin's concept within the mechanism of the monetary policy transmission on. Let put ourselves in a situation wherein circulation, the number of money, declines, which shows that that the rate of interest will move up to increase. This increase will cause to decrease in the spending level; this will include the spending in the capital market, this decrease will influence the negative prices of stocks, and demand will f ll. In the same situation, a higher interest rate may alter the ratio of profitability between bonds and stocks and will put extra pressure on stock prices. Similarly, a rise in the supply of money in circulation and its effect on the decrease in the rate of interest rate will positively influence the evolution of the assets because it facilitate the capacity of the firms for financing there routine expenditures need from the capital market, and on the other hand to make the expansion with the help of acquisition of the other firms or companies is extremely difficult because of the in its market value (Mishkin, 1995).

Problem Statement

The key objective of this reading is to test specific relationships of interest rate and net foreign assets of the banking system with macroeconomic variables under study, namely out ut. The question we put here is to analyze how the monetary policy is effective with the asset price channel.

Theoretical Background

The existing study adopts that monetary policy fluctuations lead to IR fluctuations, and IR fluctuations affect stock prices.

Changes in SP are passed on to changes in I, which in turn are passed on to industrial products. Moreover, monetary policy will lead to lower IR. Lowering interest rates reduces the required rate of return, and asset values are positively affected. An investor will try to modification his portfolio as IR decreases by adding more stocks and removing bonds from t em. As a result, SP are expected to rise (Hashemzadeh and Taylor, 19 8). A higher SP will go main to a higher Tobin's Q, which will cause to a higher I. Increased I will cause to greater industrial output (Mishkin, 1996).

↑ Money Supply →↓ IR →↑ SP→↑ I →↑Industrial Output

Method and Methodology

To study the role of the asset price channel, five variables were examined, namely interest rate, investment, output, stock prices, and money sup ly. For the analysis, quarterly data from 2000:1 to 2015:3 is u ed. Non-stationary properties of time series were checked by using unit root Augmented Dickey-Fuller (ADF) test along with asymmetric cointegration. After testing for non-stationarity, we choose the optimal lag length. The AIC and Schwartz Information Criterion SIC methods were used to determine the lag len th. According to (Enders 2008), the Engle & Granger approach is easy to implement, although it has some drawba ks. Usually, cointegration is observed in regression, and if we reverse the order, cointegration cannot be found. In particular, for multiple cointegration vectors, the method does not provide any procedu es. Another flaw of the EG method is that it consists of two st ps. Residuals are generated in the first step; regressions are estimated in the second step by using these residu ls. Therefore, errors in the first step are passed to the next step. In our study, if cointegration is detected, it means that there is a long-term relationship between the variables es. Study uses VECM to examine the short-term dynamics of this ser es. If there is no cointegration between variables, then we do not need to use VECM but use VAR Granger causality to assess causality between variables.

Empirical Study

The examination of this study mainly depends on vector autoregressive on. To examine the effects of monetary policy on the economy, we use the VAR model first used by (Sims & A, 19 0). (Agha et al. (2005) argue that there is little consensus on how monetary policy in Pakistan works.

Existing deploy VAR models also identify monetary policy (MP) & macroeconomic variables. Several papers have used VAR to examine the mechanism of MP in different countries. For example, (Morsink & Bayoumi, 2001), (Lovrinović & Benazić, 2004), (Agha et al., 2005), (Poddar, Khachatryan, & Sab, 2006), (Floerkemeier & Norris, 2006), (Mashat & Billmeier , 2008), (Bjornland & Leitemo, 2009), (Hussain, 2009), (L. Cheng & Jin, 2013), (Vinayagathasan, 2013), (Barakchian & Crowe, 2013) and (Mahdi Barakchian & Christopher Crowe, 2013) .

The variables are

Y explains GDP

P represent SP

M2 explains MS

MMR explains IR

I describe I

X_t describes matrix of all macro variables

X_t describes $[y_t\ p_t\ M2_t\ R_t\ I_t]$

X_{t-1} explains $[y_{t-1}\ p_{t-1}\ M2_{t-1}\ R_{t-1}\ I_{t-1}]$

The benchmark VAR equation is given as

$$Y_t = \beta_{10} - \beta_{11}p_t - \beta_{12}\mathbf{R_t} + \beta_{13}I_t - \beta_{14}M2_{t-i} + \Upsilon_{12}p_{t-1} + \Upsilon_{13}MMR_{t-1} + \Upsilon_{14}y_{t-1} + u_t^y$$

$$P_t = \beta_{20} - \beta_{21}M_{2t} - \beta_{22}I_t - \beta_{23}y_t - \beta_{24}\ MMR + y_{21}M2 + y_{22}p_{t-I} + \Upsilon_{33}MMR_{t-i} + \Upsilon_{23}y_{t-i} + \Upsilon_{35}I_{t-I} + UM2$$

$MMR_t = ß_{40} - ß_{41}M2_t - ß_{42}p_t + ß_{43}y_t - ß_{44}MMR_t + ϒ_{41}M2_{t-1} + ϒ_{42}p_{t-i} + ϒ_{43}MMR_{t-i} + ϒ_{44}y_{t-i} + ϒ_{45}I_{t-1} + U_t^{MMR}$

$I_t = ß_{50} - ß_{51}p_t - ß_{53}M2_t - ß_{54}y_t + ϒ_{51}M2_{t-i} + ϒ_{52}pt\text{-}i + ϒ_{53}Y_{t-i} + ϒ_{55}I_{t-i} + U_t^i$

Descriptive Statistics

In below table (1) LIPI represents log of industrial price index, lM2 represents log of money supply and, LSP represents log of stock prices and MMR represents money market r te. Initially almost all the variables are non-normal except Money market rate and all of them are non-stationary so have made them stationary through first difference.

Table 1. Descriptive Statistics

	LIPI	LIVET	LM2	LSP	MMR
Mean	1.920055	1.436336	6.033637	1.915729	8.629704
Median	1.948417	1.378851	6.079390	1.953539	8.750000
Maximum	2.182956	2.107481	6.951425	2.391160	20.03000
Minimum	1.542203	0.904716	5.099294	1.391288	0.740000
Std. Dev.	0.123422	0.309457	0.537015	0.223586	3.283056
Skewness	-0.712471	0.583230	-0.020382	-0.263361	0.114771
Kurtosis	2.986563	2.083114	1.809270	2.375296	3.212739
Jarque-Bera	31.47490	34.12030	22.00224	10.34921	1.518186
Probability	0.000000	0.000000	0.000017	0.005658	0.468091
Sum	714.2603	534.3171	2244.513	712.6511	3210.250
Sum Sq. Dev.	5.651439	35.52832	106.9907	18.54651	3998.808
Observations	372	372	372	372	372

Data source: State Bank of Pakistan, WDI.

Pairwise Causality test

Table 2. Pairwise Granger causality (GC)

Lags: 2			
Ho:	**Obs**	**F-Statistic**	**Prob.**
LIVET does not cause GC with LIPI	370	2.77520	0.0637
LIPI does not cause GC with LIVET		1.91988	0.1481
LM2 does not cause GC with LIPI	370	9.88617	7.E-05
LIPI does not cause GC with LM2		6.64389	0.0015
LSP does not cause GC with LIPI	370	4.99621	0.0072
LIPI does not cause GC with LSP		5.15809	0.0062
MMR does not cause GC with LIPI	370	4.93215	0.0077
LIPI does not GC with MMR		5.85594	0.0031
LM2 does not cause GC with LIVET	370	4.78102	0.0089
LIVET does not cause GC with LM2		0.40265	0.6688
LSP does not cause GC with LIVET	370	1.23563	0.2919
LIVET does not cause GC with LSP		0.64256	0.5265
MMR does not cause GC with LIVET	370	2.78724	0.0629
LIVET does not cause GC with MMR		1.98514	0.1388
LSP does not cause GC with LM2	370	1.83852	0.1605
LM2 does not cause GC with LSP		1.34183	0.2627
MMR does not cause GC with LM2	370	2.68028	0.0699
LM2 does not cause GC with MMR		3.02461	0.0498

Lags: 2			
Ho:	**Obs**	**F-Statistic**	**Prob.**
MMR does not cause GC with LSP	370	2.28454	0.1033
LSP does not cause GC with MMR		4.23817	0.0152

Pairwise Granger Causality

1. Investment does not granger cause industrial price in ex. Similarly industrial price index does not granger cause investm nt. A bidirectional causality do not occurs between I and industrial product index.
2. Money supply granger cause Industrial product index and at the same time industrial product also granger cause money sup ly. So we can say that bi-directional causality exists between the supply of money and industrial output.
3. Bidirectional causality exists between Stock prices and Industrial Prod t. At one side stock prices affects industrial output and at the other side, industrial output affects stock prices.
4. There is a Bidirectional causality exists between Money Market Rate and Industrial output. At one side money market affects industrial output and at the other side industrial output affects the money market.
5. Money supply granger cause investment But investment do not granger cause investment and thus unidirectional causality exist between the supply of money and investment i.e., supply of money to investment.

Vector autoregressive Granger causality Test

Table 3. VAR Granger Causality

VAR Granger Causality/Block Exogeneity Wald Tests			
Total observations: 370			
Dependent variable: LIPI			
Excluded	Chi-square	Dof	Prob.
LINVET	8.995727	2	0.0111
LM2	22.44805	2	0.0000
LSP	4.427257	2	0.1093
MMR	8.171758	2	0.0168
All	45.90015	8	0.0000
Dependent variable (DV): LINVET			
Excluded	Chi-square	Dof	Prob.
LIPI	0.628770	2	0.7302
LM2	6.267832	2	0.0435
LSP	3.567467	2	0.1680
MMR	5.443767	2	0.0658
All	21.82028	8	0.0053
Excluded	Chi-sq	Df	Prob.
LIPI	15.78550	2	0.0004
LINVET	6.728390	2	0.0346
LSP	2.643661	2	0.2666
MMR	8.902262	2	0.0117

VAR Granger Causality/Block Exogeneity Wald Tests			
All	29.18715	8	0.0003
Dependent variable (DV): LSP			
Excluded	Chi-sq	Df	Prob.
LIPI	7.464828	2	0.0239
LINVET	0.769144	2	0.6807
LM2	1.015450	2	0.6019
MMR	2.759279	2	0.2517
All	15.19642	8	0.0554
Dependent variable: MMR			
Excluded	Chi-sq	Df	Prob.
LIPI	10.67341	2	0.0048
LINVET	7.439312	2	0.0242
LM2	8.789523	2	0.0123
LSP	6.281803	2	0.0432
All	27.09391	8	0.0007

VAR GRANGER CAUSALITY/BLOCK EXOGONEITY WALD TEST

Dependent variable: Industrial Product Index

The P-values for investment, money supply, and Money market rate is less than 0.05, therefore there is any evidence of GC from I to Industrial product index in the short-run, and there is granger causality running from MS to I in the short-run, and there is also an evidence of Granger causality running from Money market rate to Industrial product index in the short- un. The P-value for Stock Prices is 0.1093 (more than 0.05), therefore no evidence of Granger causality exists from stock prices to Industrial Product Index in the short- un. The P-Value for (ALL) is 0.0000 (less than 0.05), therefore there is also an evidence of Granger causality from investment, Money supply, stock prices, and Money market rate to Industrial Product in the Long-Run.

Dependent Variable: Investment

The model shows that there is an evidence of Granger causality only between investment and money supply but no granger causality with other variables in the short run. While in the long run, as the value of P< 0.05, so we say that Granger causality exists between dependent and independent variables in long run.

Dependent Variable: Stock Price

Among this group, it is clear from the value of p that only Stock Prices and Industrial Product Index have granger causality, and SP do not have granger causality with other variables in the short un. Similarly, as overall P> 0.05, so we say that long-run Granger causality does not exist between SP and independent variables.

Dependent Variable: Money Market Rate

As for this group, the p-value is less than, so it shows that there exists granger causality between MMR and all the independent variables at both the short and long run.

Discussion

The AP channel can play a main role in the transmission mechanism of MP. The increase in money supply can increase the prices of assets by two ways; either making equity much more attractive to

bonds due to the fall of interest rate or due to the increase in the profitability of the firms because of the increase of the spending of the households (agha, 2005). By the same way, this study also shows that the increase in the prices of the stock results in the increase of industrial produ ts. Because with the increase if the asset price income of the households increases, this in turn increases the spending of the househo s. As a result, businesses have increased production due to increased household spend ng. SIMS (1992) discuss the same puzzling results, who argue that the tightening of MP has had a positive effect on pri es. Our findings suggest that output is accountable for changes in I and IR.

Conclusion

The study concluded that there is a bidirectional causal relationship between SP and industrial produ ts. Again, the model employed suggests that there is a one-way causal relationship between stock prices and money market interest ra es. Likewise, the results of the vector autoregressive model suggest that there is a multivariate causal relationship between stock prices and industrial product indies. The results further suggest a multivariate causal relationship between stock prices and money market interest ra es. Therefore, we can conclude that any changes in stock prices will affect industrial products and currency markets.

Recommendations

Based on the research objectives and findings, we recommend further research and recommendations for effective monetary policy that can help achieve economic goals. Governments should be cautious about changes in the money supply, as any change in the money supply brings changes in stock prices, which in turn affect industrial output and money market interest ra es. There is a long-term negative relationship between IR and I, so central banks should exercise caution in their monetary policy actions. Cointegration analysis shows that there is a long-run negative association between stock prices and investment and output, while MP tightening is generally expected to be associated with lower prices.

Reference

Agha, A. I., Ahmed, N., Mubarik, Y. A., & Shah, H. (2005). *Transmission Mechanism of Monetary Policy in Pakistan*. Karachi: SBP.

Bernanke, B. S., & Gertler, M. (1995). The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, *9*(4), 27–48. https://doi.org/10.1257/jep.9.4.27.

Bondt, G. d., & Mojon, B. (2005). *TERM STRUCTURE AND THE SLUGGISHNESS OF RETAIL BANK INTEREST RATE*. Paris: European Central Bank.

Canova, F., & Nicoló, G. D. (2002). Monetary disturbances matter for business fluctuations in the G-7. *Journal of Monetary Economics*, *49*(6), 1131–1159. https://doi.org/10.1016/s0304-3932(02)00145-9

Dumičić, K. (2010, December 22). *THE ANALYSIS OF MONETARY TRANSMISSION MECHANISM IN CROATIA USING COINTEGRATION APPROACH*. Croatian Operational Research Review. https://hrcak.srce.hr/94970.

Habibullah, M. S., Makmur, M. I., Azman-Saini, W. N. W., Radam, A., & Ong, H.-B. (2005). BANK EFFICIENCY AND THE EFFICIENT MARKET HYPOTHESIS: THE CASE FOR BANK STOCK PRICES IN KLSE. *Savings and Development*, *29*(4), 363–390. http://www.jstor.org/stable/25830907.

Kan. (2002). monetary transmission mechanisms in Pakistan.

Marijana, I. L. (n.d.). *MONETARY TRANSMISSION MECHANISM AND BEHAVIOUR OF ASSET PRICES: THE CASE OF CROATIA*. University of Zagreb, Croatia.

Sims, C. A. (1992). Money, Income, and Causality. The American Economic Review, 62,(4), 540-552.