Modeling Short and Long Run Relationships between Inflation and Returns in Indian Stock Markets

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Abstract

In this paper, we are motivated to inspect the presence of any association between stock market gains and price level changes. The paper considers NIFTY and CPI for January 1998 to June 2019 that includes 256 observations. To examine this relationship we have used ARDL model and casuality test for exploring the interim and enlongated term efects.

The study indicates that change in price level has a trivial bearing on the returns in the stock markets in India over a short tenure, however, over the long period, there may be a lagged effect. Price data is useful in predicting or framing policies and not stock returns. We establish that the publication of price level data may not indicate a direct visible association with the returns in stock markets, though it may be an input to the central bank for framing the economic policies.

I. Introduction

INFLATION IS AN incessant increase in the wide-ranging price levels of commodities in a financial system over tenure under scrutiny. With a hike in general prices, more money chases lesser commodities and services. This consequently results in a downside in spending strength of money, thereby adversely impacting the currency value. Inflation is conventionally measured using a rate that reflects a percentage change (annualized) in the price level, more commonly known as the Consumer Price Index. An economy witnesses constructive as well as the depressing effects of inflation. On an optimistic side, investments in non–monetary projects are encouraged and nominal interest rates are adjusted by the fiscal and monetary authority to mitigate recessionary risks. The purchasing power of money erosion is the most peculiar negative effect of inflation. Prospective investments and savings are discouraged in an event of uncertainty over future inflation.

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References

Acharya, D., S. Amanulla, and S. Joy, (2009), "Financial Development and Economic Growth in Indian States: An Examination", *International Research Journal of Finance and Economics"*, Vol. 1450, No. 24, pp. 117-130

Agrawalla, R.K. and S.K. Tuteja, (2007), "Causality between Stock Market Development and Economic Growth: A Case Study of India", *Journal of Management Research*, Vol. 7, pp.158-168

Ahmed S., and Cardinale, (2005), "Does inflation matter for equity returns", *Journal of Asset Management,* Vol. 6, No. 4, pp. 259- 273

Anari, A., and J. Kolari, (2001), "Stock prices and inflation", *The Journal of Financial Research*, Vol. 26, No. 4, pp. 587-602

Azar, S.A., (2013), "The Spurious Relation between Inflation Uncertainty and Stock Returns: Evidence from the U.S.", *Review of Economics and Finance*, Vol. 3, pp. 99–109

Bhattacharya, P.C., and M.N. Sivasubramanian, (2003), "Financial development and economic growth in India: 1970–1971 to 1998–1999", *Applied Financial Economics*, Vol. 13, No. 12, pp. 925–929

Boudoukh, J., M. Richardson and R.F. Whitelaw, (1994), "Industry returns and the Fishers Effect", *The Journal of Finance*, Vol. 49, pp. 1595-1615

Barnes, MP., J.H. Boyd and B.D. Smith, (1999). "Inflation and asset returns", *European Economic Review*, Vol. 43, pp. 737- 754

Bodie, Z., (1976), "Common stocks as a hedge against inflation", *Journal of Finance*, Vol. 31, pp. 459-470

Boucher, C., (2006), "Stock price inflation puzzle and the predictability of stock market returns", *Economic Letters*, Vol. 90, pp. 205

Chakraborty, I., (2008), "Does Financial Development Cause Economic Growth? The Case of India", *South Asia Economic Journal*, Vol. 9, No. 1, pp. 109-139

Chatrath, A., S. Ramchander and F. Song, (1997), "Stock prices, inflation and output: evidence from India", *Applied Financial Economics*, Vol. 7, No. 4, pp. 439-445

Choudhry, T., (2001), "Inflation and rates of returns on stocks: Evidence from high inflation countries", *Journal of International Financial Markets, Institutions and Money*, Vol. 11, pp. 75-96

Devi, M.M., and A. Hinduja, (2018), "Stock markets and Economic Growth of India - a study on impact of market capitalization on GDP", *International Research Journal of Social Sciences*, Vol. 7, No. 4, pp. 21–27

Deb, S.G., and J. Mukherjee, (2008), "Does Stock Market Development Cause Economic Growth? A Time Series Analysis for Indian Economy", *International Research Journal of Finance and Economics*, Vol. 21, pp. 142-149

Ely, D., and K.J., Richardson, (1997), "Are stock a hedge against inflation? International evidence using a long run approach", *Journal of International Money and Finance*, Vol. 16, No. 1, pp. 141-167

Engsted, T., and C. Tanggaard, (2002), "The relation between asset returns and inflation at short and long Horizons", *Journal of International Financial Markets, Institutions and Money,* Vol. 12, pp. 101-118

Fama, E.F., and G.W. Schwert, (1977), "Asset returns and inflation", *Journal of Financial Economics*, Vol. 5, pp. 115-146

Fama, E.F., (1981), "Stock returns, real activity, inflation and money", *American Economic Review,* Vol. 71, No. 4, pp. 545-565

Feldstein, M., (1980), "Inflation, tax rules and the stock market", *American Economics Review*, Vol. 70, No. 5, pp. 839-847

Fisher, R.A, (1930), "*The general theory of natural selection*", Oxford University Press

Flannery, M.J., and A.A. Protopapadakis, (2002), "Macroeconomic factors do influence aggregate stock returns", *The Review of Financial Studies*, Vol. 15, pp. 751-782

Fraser, P., and O. Oyefeso, (2005), "US, UK and European Stock Market Integration", *Journal of Business Finance and Accounting*, Vol. 32, No. 1-2, pp. 161–181

Lee, T.-H., and Y. Tse, (1996), "Cointegration tests with conditional heteroscedasticity", *Journal of Econometrics*, Vol. 73, No. 2, pp. 401–410

Geetha, C., R. Mohidin, V.V. Chandran and V. Chong, (2011), "The relationship between inflation and stock market: evidence from Malaysia, United States and China", *International Journal of Economics and Management Sciences,* Vol. 1, No. 2, pp. 1–16

Geske, R., and R. Roll, (1983), "The fiscal and monetary linkage between stock returns and inflation", *Journal of Finance*, Vol. 38, pp. 1-33

Graham, F.C., (1996), "Inflation, real stock returns and monetary policy", *Applied Financial Economics,* Vol. 6, pp. 29-35

Gultekin, N.B., (1983), "Stock market returns and inflation evidences from other countries", *The Journal of Finance*, Vol. 36, No. 1, pp. 49-65

Hardouvelis, G., (1987), "Macroeconomic information and stock prices", *Journal of Economics and Business*, Vol. 39, pp. 253-57

Jaffe, J. and G. Mandelker (1976), "The fisher effect for risky assets: an empirical investigation", *Journal of Finance*, Vol. 31, pp. 447-458

Jang, H., and W. Sul, (2002), "The Asian financial crisis and the co-movement of Asian stock markets", *Journal of Asian Economics*, Vol. 13, No. 1, pp. 94–104

Joyce, M.A.S., and V. Read, (2002), "Asset price reactions to RPI announcements", *Applied Financial Economics*, Vol. 12, pp. 253-276

Kamat, M.S., and M.M. Kamat, (2007), "*Does Financial Growth Lead Economic Performance in India? Causality-Cointegration Using Unrestricted Vector Error Correction Models*", SSRN Network

Kaul, G., (1987), "Stock returns and inflation: The role of the monetary sector", *Journal of Financial Economics*, Vol. 18, pp. 253-274

Kaul G., (1990), "Monetary regimes and the relation between stock returns and inflation expectation", *Journal of Financial and Quantitative Analysis*, Vol. 25, No. 3, pp. 307-321

Komijani, A., M. Sargolzaei, R. Ahmad, and M. Ahmadi, (2012), " Asymetric effects of monetary shocks on economic growth and inflation: case study in Iran", *International Journal of Business and Social Science*, Vol. 3, No. 9, pp. 224–230

Kwofie, C., and R.K. Ansah, (2018), "A Study of the Effect of Inflation and Exchange Rate on Stock Market Returns in Ghana", *International Journal of Mathematics and Mathematical Sciences*, pp. 1–8

Laopodis, N.T., (2006), "Dynamic interaction among the stock market, Federal Funds Rate, Inflation and Economic Activity", *The Financial Review, Eastern Finance Association*, Vo. 41, No. 4, pp. 515-545

Lee, K, and S. Ni., (1996), "Stock returns real activities and temporary and persistent inflation", *Applied Financial Economics*, Vol. 6, pp. 433-441

Lintner, J., (1975), "Inflation and Security Returns", *The Journal of Finance*, Vol. 30, No. 2, pp. 259

Luintel, K.B., and K. Paudyal, (2006), "Are common stock a hedge against inflation?", *Journal of Financial Research*, Vol. 29, pp. 1-19

Marshall, D.A., (1992), "Inflation and Asset Returns in a Monetary Economy", *The Journal of Finance*, Vol. 47, No.4, pp. 1315–1342

Modigliani, F., and R.A. Cohn, (1978), "Inflation rational valuation and the market", *Financing Analysts Journal,* Vol. 35, pp. 24-24

McQueen, G. and Roley, V.V., (1993), "Stock prices, news and business conditions", *Reviews onFinancial Studies*, Vol.3, pp.144-157

Nelson, C.R., (1976), "Inflation and rate of return on common stocks", *The journal of Finance*, Vol. 31, pp. 471-483

Özlen, ªSerife, (2012), "Macroeconomic Factors and Stock Returns (ARDL Approach)", *International Journal of Academic Research in Business and Social Sciences (IJ-ARBSS)*, Vol. 2, pp. 315-342

Ozurumba, B.A., (2012), "The impact of stock market return on foreign portfolio investment in Nigeria", *IOSR journal of Business and Management*, Vol. 2, No. 4, pp. 10-19

Padhan, P.C., (2007), "The nexus between stock market and economic activity: an empirical analysis for India", *International Journal of Social Economics*, Vol. 34, No. 10, pp. 741–753

Pan, L., and V. Mishra, (2018), "Stock market development and economic growth: Empirical evidence from China", *Economic Modelling*, Vol. 68, pp. 661–673

Paramati, S.R., and R. Gupta, (2013), "*An Empirical Analysis of Stock Market Performance and Economic Growth: Evidence from India*", SSRN Network

Pearce, D., and V.V. Roley, (1984), "Stock Prices and Economic News", *The Journal of Business,* Vol. 58, pp. 49-67

Peel, D., P. Pope, and K. Paudyal, (1990), "The policy anticipation hypothesis and the expected inflation hypothesis", *Economics Letters*, Vol. 34, No. 2, pp. 121–125

Ritter, J.R., and R.S. Warr, (2002), "The decline of inflation and the bull market of 1982-1999", *Journal of financial and Quantitative Analysis*, Vol. 37, No. 1, pp. 27-61

Sathyanarayana, S., and S. Gargesa, (2018), "An Analytical Study of the Effect of Inflation on Stock Market Returns", *IRA-International Journal of Management and Social Sciences,* Vol. 13, No. 2, pp. 48

Sayilgan, G., and C. Suslu, (n.d.), "The effect of macroeconomic factors on stock returns: A study of Turkey and emerging markets", *Journal of BRSA Banking and Financial Markets Banking Regulation and Supervision Agency,*Vol. *5,* No. 1, pp. 73–96

Schotman, P.C., and M. Schweitzer, (2000), "Horizon sensitivity of the inflation hedge of stocks", *Journal of Empirical Finance*, Vol. 7, pp. 301-315

Sharpe, W.F., (1994), "A simplified model for portfolio and analysis", *Journal of Management Science*, Vol. 29, pp. 277–293

Sharpe, S.A., (2002), "Re–examine stock valuation: The implications of analysis earnings forecast", *The Review of Economics and Statistics*, Vol. 84, No. 4, pp. 632-648

Siklos, and B. Kwok, (1999), "Stock returns and inflation: a new test of competing Hypothesis", *Applied Financial Economics*, Vol. 9, pp. 507-581

Sinha, D., and J. Macri, (2001)," Financial Development and Economic Growth: The case of Eight Asian Countries", *Economia-Internazionale,* Vol. 54, No. 2, pp. 219-234

Sohail, N., and Z. Hussain, (2009), "Long-run and Short-run relationship between macro-economic variables and stock prices in Pakistan -The case of Lahore stock exchange". *Pakistan Economic and Social Review*, Vol. 47, No. 2, pp. 183–198

Tessaromatis, J., (1990), "Money supply announcement and real interest rates: Evidence from the UK Index-linked bond market", *Journal of Banking and Finance*, Vol. 14

Upadhyaya, P., and S.G. Roy, (2017), "Analysis of macroeconomic factors causing non-performing loans in India", *International Journal of Business and Globalisation*, Vol. 18, No. 2, pp. 182

Uwubanmwen A, Eghosa IL. (2015), "Inflation rate and stock returns: evidence from the Nigerian stock market", *International Journal of Business and Social Sciences*, Vol. 6, No. 11, pp. 155-167

Vanderhoff, J. and M. Vanderhoff, (1986), "Inflation and stock returns: *an Industry Analysis, Journal of Economics and Business*", Vol. 38, pp. 341-352

Wasseja, M.M. and S.N. Mwenda, (2015), "Analysis of the Determinants of Foreign Direct Investment in Kenya", *Journal of Multidisciplinary Scientific Research*, Vol. 3, pp. 16-26

Wong, K. and H. Wu, (2003), "Testing fisher hypothesis in long horizons for G7 and Eight Asian Countries", *Applied Economics Letter*, Vol. 10, No. 14, pp. 917-923

Annexure

Table A1
Results of Breusch-Godfrey Serial Correlation LM Test
Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.569435	Prob. F(7,246)	0.7805
Obs*R-squared	4.081940	Prob. Chi-Square(7)	0.7703

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 09/17/19   Time: 21:01
Sample: 1998M02 2019M05
Included observations: 256
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RETURNS(-1)	-0.178434	0.382773	-0.466161	0.6415
CPI	-0.051800	0.497687	-0.104081	0.9172
C	0.197443	0.631476	0.312669	0.7548
RESID(-1)	0.185789	0.388071	0.478751	0.6325
RESID(-2)	0.038230	0.065064	0.587570	0.5574
RESID(-3)	-0.015787	0.063583	-0.248292	0.8041
RESID(-4)	-0.053378	0.063499	-0.840601	0.4014
RESID(-5)	-0.059819	0.063546	-0.941347	0.3475
RESID(-6)	0.083333	0.063820	1.305747	0.1929
RESID(-7)	-0.031478	0.063984	-0.491963	0.6232

R-squared	0.015945	Mean dependent var	-1.21E-16
Adjusted R-squared	-0.020057	S.D. dependent var	6.540685
S.E. of regression	6.605952	Akaike info criterion	6.652098
Sum squared resid	10735.10	Schwarz criterion	6.790582
Log likelihood	-841.4686	Hannan-Quinn criter.	6.707796
F-statistic	0.442894	Durbin-Watson stat	2.003189
Prob(F-statistic)	0.910748		

Note: * Observations
Source: Self Computed

Table A2
Results of Wald test

Equation: Untitled

Test Statistic	Value	Df	Probability
F-statistic	**17.60462**	(2, 232)	0.0000
Chi-square	35.20924	2	0.0000

Null Hypothesis: C(16)=C(17)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(16)	-1.052826	0.177806
C(17)	-0.405145	1.341081

Note: Restrictions are linear in coefficients.
Source: Self Computed

Table A3
Results of ARDL Error Correction Regression

ARDL Error Correction Regression
Dependent Variable: D(RETURNS)
Selected Model: ARDL(1, 0)
Case 3: Unrestricted Constant and No Trend
Date: 09/17/19   Time: 20:04
Sample: 1998M01 2019M05
Included observations: 256

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.391882	0.418437	3.326386	0.0010
CointEq(-1)*	-0.963172	0.061738	-15.60105	0.0000
R-squared	0.489337	Mean dependent var	0.057124	
Adjusted R-squared	0.487327	S.D. dependent var	9.152844	
S.E. of regression	6.553548	Akaike info criterion	6.605672	
Sum squared resid	10909.04	Schwarz criterion	6.633369	
Log likelihood	-843.5260	Hannan-Quinn criter.	6.616811	
F-statistic	243.3926	Durbin-Watson stat	1.987948	
Prob (F-statistic)	0.000000			

F-Bounds Test	Null Hypothesis: No levels relationship			
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	121.2172	10%	4.04	4.78
K s	1	5%	4.94	5.73
		2.5%	5.77	6.68
		1%	6.84	7.84

t-Bounds Test	Null Hypothesis: No levels relationship			
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-15.60105	10%	-2.57	-2.91
		5%	-2.86	-3.22
		2.5%	-3.13	-3.5
		1%	-3.43	-3.82

Note : * p-value incompatible with t-Bounds distribution.
Source: Self Computed