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Does the United States Bond Yield Affect Foreign Institutional Investor Inflows to India and Indian Stock Market?

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We investigate the extent to which the United States (US) bond yield affects foreign institutional investor (FII) inflows and the performance of the Indian stock market using monthly time-series data from 2002 to 2021. We use the vector autoregressive model and apply the Granger causality test to investigate this relationship. We find no short- and long-run relationships among the US bond yield, FII inflows, and India's stock market performance.

I. Introduction

In this paper, we examine how the United States (US) bond yield affects affects foreign institutional investor (FII) inflows to India and the performance of the Indian stock market. The impact of monetary policy in the US on international financial conditions, the resultant changes in capital flows, and the differences in spillovers between advanced and emerging economies have long been studied and debated in the literature (Fratzscher et al., 2018; Joyce et al., 2011; Krishnamurthy & Vissing-Jorgensen, 2011; Zhang et al., 2020). Our hypothesis is that the US 10-year government bond and variations in its yield influence the FII inflows into emerging markets in general and India and thereby influence changes in stock market performance. This hypothesis test is important because the performance of stock markets in the emerging economies depends largely on the investments by foreign institutions.

The literature has examined the relationship between quantitative easing (QE) and stock market performance. Anand and Chakraborty (2020) study the local and international consequences of a negative interest rate policy and how it varies from QE. They find that, while QE has no discernible effect on inflation, it has a negative effect on nominal gross domestic product growth in emerging Asian markets. Bhattarai et al. (2021) examine the international spillover effects of US QE on emerging market economies. They find that the US QE shock has a considerable impact on emerging market economies' financial variables.

Ziaei and Szulczyk (2021) examine the impact of the US monetary policy on assets, bonds, and exchange rates in a sample of East Asian nations. They find that the US monetary policy plays a substantial role in the East Asian financial markets.

A handful of studies (e.g., Bhatia & Kishor, 2013; Chandra, 2012; Choudhary et al., 2022; Marfatia, 2022; Pandey, 2020; Singhania & Saini, 2016) explore FII inflows and their impact on the Indian stock market. To our knowledge, there is no study investigating the causal relationship among US bond yield, FII inflows, and stock market performance in the Indian context. Our study attempts to fill this gap in the literature.

The remaining paper is organised as follows. Section II discusses the methodology. Section III discusses the results, while Section IV concludes the paper.

II. Research Design and Methodology

We use monthly time-series data ranging from 2002 to 2021. To test the interrelationship among US bond yield, FII inflows, and stock market performance, we use a vector autoregressive (VAR) model and the Granger causality test.

A. Data

We collect monthly historical data on the 10-year US bond yield from www.investing.com. The monthly FII inflows (net investment) data are collected from www.fpi.nsdl.co.in. The monthly historical data on the Nifty index are collected from www1.nseindia.com.

B. Econometric Model

We employ a VAR model and the Granger causality test to assess the impact of bond yield on FII inflows and stock market performance. The reason for this choice is that a VAR model is flexible and is of widespread use in time-series analysis. It is mainly used for forecasting financial and economic trends, and allows users to develop real-

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Table 1. Unit Root Test and Cointegration Test Results

Panel A: Unit root test						
	ADF Test Statistics	Critical Value 1%	Critical Value 5%	Critical Value 10%	Prob.	Result
D BONDY	-14.317	-3.996	-3.432	-3.132	0.0000	Stationary
D FII Equity	-9.209	-3.467	-2.881	-2.571	0.0000	Stationary
D_NSE	-15.320	-3.466	-2.881	-2.571	0.0000	Stationary
Panel B: Cointegration test results						
maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value	
0	12	-4019.1084	.	312.5347	29.68	
1	17	-3952.868	0.43506	180.054	15.41	
2	20	-3898.4677	0.37435	71.2534	3.76	
3	21	-3862.841	0.26444			
maximum rank	parms	LL	eigenvalue	max statistic	5% critical value	
0	12	4019.1084	.	132.4807	20.97	
1	17	-3952.868	0.43506	108.8006	14.07	
2	20	3898.4677	0.37435	71.2534	3.76	
3	21	-3862.841	0.26444			

This table presents Augmented Dickey-Fuller (ADF) unit root test and Johansen cointegration test results in Panels A and B, respectively. *NSE* represents the Indian stock market; *FII_EQ* refers to the FII inflows to equity market, and the *BONDY* refers to the US Bond Yield. *D* represents the first-order difference to the time series.

time equation modelling. The stationarity of the series is checked by applying the Augmented Dickey-Fuller unit root test.

III. Results

A. Augmented Dickey-Fuller Unit Root Test

Panel A of Table 1 reports the Augmented Dickey-Fuller unit root test results. It is clear that the series follow a stationary process at first difference. That is, we cannot accept the null hypothesis that series contain a unit root, Thus, the time series are considered to be integrated at the first difference. Following this, we conduct the cointegration and Granger causality tests between the variables, namely bond yield and FII inflows.

B. Cointegration Test

The results obtained from the Johansen cointegration test are reported in Panel B of Table 1. The trace statistics are greater than the 5% critical value, indicating no long-run cointegration between the variables. Since the variables are not cointegrated, we employ an unrestricted VAR model to estimate their relationship.

C. The VAR Model

Table 2 shows the appropriate lag lengths based on the Likelihood ratio (LR), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan–Quinn Information Criterion (HQ). The SIC suggests no lag, whereas the HQIC, AIC, and LR suggest, respectively, lags of two, six, and seven.

Our estimation uses the two lags suggested by the SIC. The results of this VAR estimation are provided in Table 3. The results show that the US bond yield does not affect the FII inflows and the Indian stock market performance. The robustness of the results is further checked using other lags, such as two, six, and seven lags. We find similar relationships.

D. Granger Causality Test

The Granger causality test is widely used to identify long-run relationships among variables in the literature. The results of the Granger causality test are provided in Table 4. Since the *p*-values under the Granger causality test are not significant, there is no long-run causality among the US bond yield, FII inflows, and Indian stock market performance.

IV. Conclusion and Discussion

We investigate the extent to which the US bond yield affects FII inflows to India and the performance of the Indian stock market using monthly data from 2002 to 2021. Using the VAR model and the Granger causality test, we find no short- and long-run relationships among the US bond yield and FII inflows to the Indian stock market and its performance. Therefore, the US monetary policy does not affect FII inflows to the Indian stock market and its performance. This is contrary to the popular belief that "when the US (Federal Reserve) sneezes, the world catches a cold". The role of factors such as domestic institutional investor participation and the changes in foreign exchange rate can be explored by future research.

Table 2. Lag Order Selection Statistics

lag	LL	LR	df	p	AIC	HQ	SIC
0	-3829.64				33.9171	33.9355	33.9625*
1	-3819.47	20.335	9	0.016	33.9068	33.9801	34.0884
2	-3782.77	73.387	9	0.000	33.6617	33.79*	33.9796
3	-3776.69	12.173	9	0.204	33.6875	33.8707	34.1416
4	-3773.22	6.9282	9	0.645	33.7365	33.9747	34.3268
5	-3756.4	33.648	9	0.000	33.6673	33.9604	34.3937
6	-3738.83	35.148	9	0.000	33.5914*	33.9395	34.4541
7	-3730.04	17.578*	9	0.040	33.5932	33.9964	34.5922
8	-3726.92	6.2271	9	0.717	33.6453	34.1034	34.7805

This table presents the lag order selection statistics based on the Likelihood (LR), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan–Quinn Information Criterion (HQ).

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Table 3. Vector Autoregression Model

		Lag 1		Lag 2		Lag 6		Lag 7	
		Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
					NSE				
	L1	-.001797	0.89	0.01	0.88	0.03	0.07	0.02	0.82
	L2			0	0.99	0.01	0.07	-0.02	0.82
	L3					0.04	0.08	0.02	0.76
NSE	L4					0.02	0.08	-0.03	0.68
	L5					-0.05	0.08	-0.1	0.2
	L6					0.05	0.08	0.02	0.76
	L7							0.05	0.58
	L1.	-.001797	0.83	0	0.84	0	0.01	0.01	0.63
	L2.			0	0.6	-0.01	0.01	0	0.69
	L3					0.01	0.01	0.02	0.17
FII_EQ	L4					-0.02	0.02	-0.01	0.7
	L5					0	0.02	0.02	0.28
	L6					-0.01	0.01	0.02	0.32
	L7							0.03	0.024**
	L1.	-113.347	0.28	-118.04	0.26	-162.98	110.04	-127.61	0.25
	L2.			52.03	0.62	117.63	110.57	127.99	0.24
	L3					-35.85	112.58	-15.52	0.89
BONDY	L4					171.66	112.24	161.35	0.15
	L5					-198.62	110.15	-182.59	0.1
	L6					24.07	107.92	22.09	0.84
	L7							104.49	0.33
	_cons	61.22579	0.02	62.22	0.02	61.24	28.59	65.48	0.02
					FII_EQ				
	L1.	-.148478	0.81	-0.18	0.74	0.37	0.52	0.4	0.44
	L2.			0.4	0.48	0.61	0.52	0.65	0.22
	L3					0.41	0.55	0.47	0.39
NSE	L4					-0.17	0.56	-0.04	0.94
	L5					-2.19	0.55	-2.05	0
	L6					1.7	0.57	1.76	0
	L7							-0.06	0.91
	L1.	-.23241	0	-0.27	0	-0.4	0.08	-0.41	0
	L2.			-0.56	0	-0.71	0.08	-0.74	0
	L3					-0.29	0.09	-0.32	0
FII_EQ.	L4					-0.35	0.11	-0.38	0
	L5					-0.22	0.12	-0.27	0.034**
	L6					-0.49	0.1	-0.55	0
	L7							-0.08	0.45
	L1.	-1104.17	0.23	-1168.23	0.16	-1551.1	772.87	-1681.9	0.034**
	L2.			-718.57	0.38	-215.04	776.59	-226.86	0.77
	L3					-452.48	790.7	-545.65	0.49
BONDY	L4					1185.03	788.31	1290.68	0.11
	L5					-1252.54	773.64	-1404.73	0.08
	L6					295.83	757.94	346.73	0.66
	L7							-615.48	0.42

		Lag 1		Lag 2		Lag 6		Lag 7	
		Coef.	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**
	_cons	-13.29315	0.95	-51.08	0.81	-1.43	200.79	25.96	0.9
					BONDY				
	L1.	.0000977	0.031**	0	0.038**	0	0	0	0.12
	L2.			0	0.16	0	0	0	0.08
	L3					0	0	0	0.93
NSE	L4					0	0	0	0.54
	L5					0	0	0	0.3
	L6					0	0	0	0.028**
	L7							0	0.61
	L1.	0	0.24	0	0.22	0	6.87e	0	0.78
	L2.			0	0.69	0	6.68e	0	0.64
	L3					0	7.90e	0	0.65
FII_EQ.	L4					0	9.34e	0	0.44
	L5					0	9.93e	0	0.23
	L6					0	8.55e	0	0.09
	L7							0	0.99
	L1.	0.0354344	0.59	0.04	0.54	0.05	0.07	0.03	0.62
	L2.			-0.16	0.011**	-0.19	0.07	-0.2	0.00***
	L3					0.13	0.07	0.13	0.06
BONDY	L4					-0.08	0.07	-0.08	0.23
	L5					-0.08	0.07	-0.08	0.24
	L6					-0.15	0.06	-0.15	0.019**
	L7							-0.07	0.3
	_cons	-0.020469	0.21	-0.03	0.08	0.04	0.02	0.04	0.03

This table presents results obtained from the VAR model. *NSE* represents the Indian stock market; *FII_EQ* refers to the FII inflows to equity market, and the *BONDY* refers to the US Bond Yield. *, **, and *** denotes statistical significance at 10%, 5%, and 1%, levels, respectively.

Table 4. Granger Causality Wald test

Equation	Excluded	chi2	df	Prob > hi2
		Lag 1		
NSE	*FII_EQ.*	0.04503	1	0.832
NSE	*BONDY*	1.1931	1	0.275
NSE	*All*	1.2312	2	0.54
FII_EQ	*NSE NSE*	0.05505	1	0.814
FII_EQ	*BONDY*	1.4392	1	0.23
FII_EQ	*All*	1.6313	2	0.442
BONDY	*NSE*	4.6796	1	0.031
BONDY	*FII_EQ.*	1.3623	1	0.243
BONDY	*All*	4.8385	2	0.089
		Lag 2		
NSE	*FII_EQ.*	0.30793	2	0.857
NSE	*BONDY*	1.4565	2	0.483
NSE	*All*	1.7166	4	0.788
FII_EQ.	*NSE NSE*	0.58577	2	0.746
FII_EQ.	*BONDY*	2.8966	2	0.235
FII_EQ.	*All*	3.2985	4	0.509
BONDY	*NSE*	6.439	2	0.04
BONDY	*FII_EQ.*	1.668	2	0.434
BONDY	*All*	8.0346	4	0.09
		Lag 6		
NSE	*FII_EQ.*	6.9146	6	0.329
NSE	*BONDY*	3.6851	6	0.719
NSE	*All*	10.165	12	0.601
FII_EQ.	*NSE NSE*	12.943	6	0.044
FII_EQ.	*BONDY*	7.6136	6	0.268
FII_EQ.	*All*	18.314	12	0.106
BONDY	*NSE*	29.554	6	0.000
BONDY	*FII_EQ.*	8.3529	6	0.213
BONDY	*All*	36.049	12	0.000
		Lag 7		
NSE	*FII_EQ.*	7.978	7	0.335
NSE	*BONDY*	7.8375	7	0.347
NSE	*All*	17.034	14	0.254
FII_EQ.	*NSE NSE*	11.845	7	0.106
FII_EQ.	*BONDY*	7.5955	7	0.370
FII_EQ.	*All*	18.685	14	0.177
BONDY	*NSE*	28.651	7	0.000
BONDY	*FII_EQ.*	9.0254	7	0.251
BONDY	*All*	36.597	14	0.001

This table presents the results obtained from the Granger Causality Wald test. *NSE* represents the Indian stock market; *FII_EQ.* refers to the FII inflows to equity market; and the *BONDY* refers to the US Bond Yield.

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