International Journal of Business and Economic Affairs (IJBEA)
9(2), 42-51 (2024)
DOI: 10.24088/IJBEA-2024-92004
ISSN: 2519-9986

Do Macroeconomic Factors are interlinked with Stock Markets in Asian Emerging Economies. A Panel Data Approach

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Abstract: The study of macroeconomic forces and the stock market is a dynamic field in finance because investors' interest changes due to their preference for high returns over lower returns and risk-averse investors are always desirous of mitigating risk across emerging economies are playing a pivotal role in the global investment communities. Therefore, this study focuses on various economic indicators that robust business growth. The primary purpose of this study is to evaluate macroeconomic forces' linkages with stock markets by applying a panel data analysis. Data was taken for the period 1999 to 2019 for Asian stock markets. Panel data econometric techniques have been used to analyze the data of the Asian equity market. Studies have taken stock market data from five emerging economies, i.e., Pakistan, China, India, Philippines, and Japan. Panel data results confirm that gross domestic product, interest rates, exchange rate, and money supply positively impact market return. However, correlation results reveal that market return strongly relates to foreign direct investment, interest rate, and money supply. The co-integration result also reveals the presence of a long-run relationship. Further results show that GDP has a leading behavior with market return, and market return has a leading behavior with GDP, CPI, ER, and IPI.

Keywords: Stock markets, Macroeconomic variables, Asian economies, Panel co-integration

Received: 20 March 2024 / Accepted: 29 April 2024 / Published: 15 May 2024

INTRODUCTION

Macroeconomic forces are generally the main driving forces for a dynamic economy. Generally, macroeconomic forces are those forces that lead the economy in various perspectives and are typically measured as Gross domestic product (GDP) as a proxy of economic growth or size of the economy, foreign direct investment (FDI), consumer price index (CPI), industrial price index (IPI), exchange rate (ER), Interest rate (IR) and money supply. At the same time, the stock market is a barometer that measures the scale of a business in an economy and reflects the present economic condition. A stock market is a secondary market where buyers and sellers of stock meet together to make transactions. It can be elaborated that the stock market provides a forum where you can quickly purchase or sell any stocks. The stock market significantly predicts the success of emerging economies in the long run. Macroeconomic variables highly influence investment decisions in a dynamic economy. The emphasis on macroeconomic influences on shifts in stock market indices quoted in Singapore's stock market, as well as (Kwon & Shin, 1999), who studied those ties in South Korea's stock market, analyzed such ties in South Korea's stock market. It examined the Malaysian stock exchange. The analysis focusing on Athens (Acikalin et al., 2008) or Cyprus (Tsoukalas, 2003) analyses the impact of macroeconomic factors on the country's stock price index in emerging stock markets. Such research is missing, particularly in less developed Eastern and Central European stock markets, including the Baltic ones (Palandri, 2009). This study is critical because of the changing dynamics of the region's economic and trade policies and the initiation of new infrastructure among these economies.

LITERATURE REVIEW

Kibria et al. (2014) used a dynamic insider trading model with sequential auctions, structured to look like sequential balance, to observe the informational content of prices, liquidity characteristics of a speculative market,

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and the importance of private information for an insider. Alam and Rashid (2015) studied the effect of bid-ask spread on asset pricing in this paper. Here, they analyzed the model with different holding periods expected by investors with trade assets with different relative spreads. The results revealed that a testable hypothesis will increase the market expected return with the concave function of the spread. Pal and Mittal (2011) analyzed the long-term connection between core macroeconomic factors and the Indian capital markets. They worked to inspect the response of the Indian stock market to various macroeconomic factors. As predictor variables and two populations, macroeconomic variables, such as interest rates, inflate.

Celebi and Honig (2019) have confirmed a substantial association between the stock price index and macroeconomic variables. They picked six macroeconomic variables for their study: inflation, exchange rate, factory production, currency availability, gold prices, and interest rate. Khan and Zaman (2011) reported a long-term balance relationship with the Thai stock exchange index and four selected macroeconomic variables that are money supply (M2), consumer price index, interest rate, and industrial performance index (as a proxy for gross domestic product)—using time series data over 20 years and using the Johansen co-integration test and vector error correlation mode.

Vanita and Khushboo (2015) investigated the long-term connection between the exchange rates of BIRCS countries and asset prices. They employed the Johansen co-integration test and recorded an inverse and essential connection between Russia's and South Africa's exchange rate and stock prices. With Aggarwal (1981), this outcome contradicts.

Hernowo (2020) evaluated three economies and analyzed the effects of macroeconomic factors and stock market returns. Their results confirmed that returns from the stock market favorably affect interest rates and inflation and have an insignificant impact on capital production in Singapore, Malaysia, and Indonesia, respectively.

Keswani and Wadhwa (2017) planned to inspect the impact of macroeconomic factors on securities exchange since macroeconomic factors demonstrate the abundance of any economy, and they chose the eventual fate of speculations. In any economy, value assurance measures are impacted by macroeconomic factors. Ndlovu et al. (2018) measured the macroeconomic indicator and South African stock exchange association by collecting quarterly data from 1981 to 2016 and using a vector error correction model, co-integration experiments, an impulse response function, a decomposition of variance, and findings for finding. The results showed that money supply, inflation, and interest rates in the long run.

Pervaiz et al. (2018) inspected the effect of chosen macroeconomic factors (inflation, conversion scale, loan fee) on Karachi securities exchange returns. Mohamed and Ahmed (2018) analyzed the connection between stock worth (KSE-100 file) and macroeconomic components. The primary objective of this examination was to check the since quite a while ago run and short-show association between macroeconomic factors and stock expense by utilizing various techniques and methodologies.

Chang et al. (2019) experimentally analyzed the short-run and quite a while ago run effects of macroeconomic factors, for example, modern creation, unfamiliar direct venture (FDI), exchange balance (TB), swapping scale, loan cost (IR) and buyer value file (CPI) on stock costs (SP) of KSE-100 file; and whether this relationship changes because of the monetary emergency. Jude (2019) investigated the easygoing nexus between stock return instability and chose macroeconomic factors in a developing securities exchange from 1981 to 2018. The investigation explicitly checked the impact of mechanical creation and conversion standards on stock to bring unpredictability back. Ahmad et al. (2019) examined new proof of the effect of macroeconomic variables on the Kuwaiti Stock Exchange. It experimentally analyzed the dynamic connection between the Kuwaiti Stock Exchange Index and the principal macroeconomic factors. These factors included M2, the three-month store financing cost, oil costs, the US Dollar versus Kuwaiti Dinar conversion standard, and the inflation rate.

Camilleri et al. (2019) examined the associations between stock costs and key macroeconomic pointers: expansion, mechanical creation, loan fees, cash flexibility, and select cooperation between the last gathering of factors. Such connections were assessed through vector auto relapses (VARs) on month-to-month information traversing 1999-2017 for Belgium, France, Germany, Netherlands, and Portugal. The study checked whether such relations were affirmed across various sub-periods and received a non-parametric methodology by utilizing a Pesaran-Timmermann test. Ali et al. (2020) observed the effect of macroeconomic variables on stock market return volatility in sub-Saharan markets. The research focused on three financial markets, Ghana, Nigeria, and South Africa, using the GARCH-X (1.1) monthly data model. Parab and Reddy (2020) examined the competitive stock

market and economic conditions empirically. The structural breaks were unforeseen changes in the time series data that could deteriorate performance.

DATA AND METHODOLOGY

The study used macrocosmic and equity market data from Pakistan, China, India, the Philippines, and Japan. Annual data for the period 1999 to 2019 for Asian stock markets was taken. Several econometric techniques, such as panel unit roots, panel co-integration, panel VECM, Correlation Matrix, Panel Least Square, and panel Granger Causality Tests, have analyzed data on emerging Asian economies. Moreover, the study aims to check the impact of Macroeconomic indicators on market returns of the sample counties. For this purpose, Market return is used as a dependent variable, while GDP, FDI, CPI, IR, ER, IPI, and MS are used as independent variables.

RESULTS AND DISCUSSION

Panel Unit Root Test

The majority of financial factors are often variable. As a result, it is critical to perform the stationarity test before summarizing any relationships. So, we are starting to look for unit roots using the Augmented Dickey-Fuller tests. Fuller and Dickey, 1976 (1976). The test reveals that all of the components are nonstationary. They were fixed after the primary effect because Granger and Newbold (1974) observed that the relapse results from Granger causality tests in VECM models using non-fixed components would be misleading. To avoid this, we will relapse with the fixed factors after differencing.

Unit root test in level, there are no variables stationary but close to it in every test such as (ADF, LLC, BREIT.) because the probabilities near zero, but the money supply is more stationary against the other variables in ADF and LLC.

The unit root test clarifies that either stationary or non-stationary is the state of the knowledge. The stationary level of SM, GDP, FDI, CPI, IR, ER, IPI, and MS using the ADF test, LLC test, and Breitung test is shown in the table below. The probability values of all other variables except MS are higher than the significance amount of 0.05 in the ADF test, which indicates that they have non-stationary activity in these markets.

Money supply has a 0.0038 likelihood value, essential at the significance stage of p<0.05. The LLC test also has MS as an essential variable, with an additional variable as a stationer, SM, with a probability value of 0.0771, which is meaningful at a significance level of 0.05. Compared to other non-stationary variables in the LLC test, SM and MS are stationary. On the other hand, the findings of the Breitung test clarify that only SM reports relevant results relative to all other variables that show negligible results. SM has a 0.0091 probability value that is significant at p<0.01 and implies that it is stationary.

Table 1: Unit Root Test at Level

Parameters	ADF Test		LLC Test		Breitung Test	
	t-stat	Prob.	*t*-stat	Prob.	*t*-stat	Prob.
S M	5.93985	0.8203	-1.42495	0.0771	-2.35956	0.0091
GDP	3.35599	0.9718	1.73535	0.9587	1.50883	0.9343
FDI	8.12176	0.6169	-0.46254	0.3218	-0.57245	0.2835
CPI	10.5428	0.3942	-1.04864	0.1472	-1.10563	0.1344
I R	15.7797	0.1061	-1.19739	0.1156	-1.18756	0.1175
E R	6.06546	0.8097	1.0435	0.8516	-0.76173	0.2231
IPI	4.96066	0.8938	2.44156	0.9927	3.19157	0.9993
M S	25.9806	0.0038	-3.79861	0.0001	0.49931	0.6912

Table 1 shows the results of the stationarity test in the first difference. The variable's results are more accurate and well stationary against the unit root at the level. All the variables are stationary in every test, such as ADF, LLC, and BREIT, but exchange rate results show non-stationarity in the Breitung test.

The findings of the Unit root test at the first discrepancy in Table 2 clarify that SM, GDP, FDI, IR, ER, IPI, and MS have a meaningful outcome at $p < 0.05$ significance level, suggesting that these variables at the ADF test are stationary. More variables display necessary and stationary conditions relative to the stage test. This suggests that

the first difference measure more adequately clarifies the stationary existence of testing data. At the same time, the LLC test shows that at $p < 0.01$, 0.05, and 0.10 significance stages, all variables are essential and stationary. The LLC test describes the most relevant findings in this model relative to the same model's ADF test. Finally, the Breitung test also clarifies stationary testing.

Table 2: Unit Root Test at first difference

Parameters	ADF Test		LLC Test		Breitung Test	
	t-stat	Prob.	*t*-stat	Prob.	*t*-stat	Prob.
S M	49.0027	0	-6.47685	0	-5.16816	0
GDP	21.2012	0.0197	-3.25237	0.0006	-1.61888	0.0527
FDI	25.9863	0.0038	-2.89849	0.0019	-3.96087	0
CPI	14.0023	0.1729	-1.41234	0.0789	-1.96008	0.025
I R	40.8598	0	-2.18834	0.0143	-1.43383	0.0758
E R	20.5738	0.0243	-3.91219	0	-1.01055	0.1561
IPI	24.9544	0.0054	-3.45216	0.0003	-1.39119	0.0821
M S	33.1366	0.0003	-4.00336	0	-2.71012	0.0034

Table 3 depicts the result of the unit root at the second difference. In the second difference, most variables are stationary in ADF, LLC, or the Breitung test. On the other hand, in the Breitung test, only the interest rate is not stationary, but other variables are more stationary.

Table 3: Unit Root Test at the second difference

Parameters	ADF Test		LLC Test		Breitung Test	
	t-stat	Prob.	*t*-stat	Prob.	*t*-stat	Prob.
S M	78.3136	0	-10.0465	0	-8.41092	0
GDP	47.8869	0	-4.12022	0	-2.66515	0.0038
FDI	54.3762	0	-5.76135	0	-3.57347	0.0002
CPI	44.4085	0	-6.56608	0	-2.38429	0.0086
I R	51.288	0	-1.06091	0.1444	0.18539	0.5735
E R	46.3966	0	-5.32376	0	-3.22734	0.0006
IPI	52.154	0	-4.22899	0	-3.96752	0
M S	52.4183	0	-4.94466	0	-4.03495	0

Panel Co-Integration

Suppose our factors are exposed to be co-integrated. In that case, there exists a direct, steady, and since quite a while ago run relationship among factors, with the end goal that the disequilibrium blunders would generally vacillate around zero means. Co-reconciliation tests, for example, Engle and Granger (1987), Johansen (1988), Johansen and Juselius (1990), Pesaran et al. (2001), and so on, are used in writing to confirm the presence of a previously run balanced connection between two factors. We used Johansen's method to calculate the co-integration conditions between factors. The results show that at the 5% level, the most excellent eigenvalue measurement suggests the presence of one co-integrating condition among the six factors. Co-integration test results indicate that the long-run relationship is exited in different variables. Some variables are more closely integrated or in a long-run relationship. GDP, CPI, and IR are co-integrated with long-run relationships, and these variables are more integrated with markets.

Table 4: Normalized co-integration coefficient

LN_MARKETS	LNGDP	LNFDI	LNCPI	LNIPI	LNE_R	LNI_R	LNM_S
1	-2.70322	0.715921	-4.23865	15.35671	0.984983	-0.56673	5.5892
	-0.53628	-0.30105	-1.52459	-3.58646	-0.36765	-0.29738	-1.37067

The Johansen-Fisher Panel Long-Run Equilibrium Relationship

The long-term affiliation between stock markets, GDP, FDI, inflation, industrial output, exchange rates, interest rates, and money supply is analyzed using the non-stationary series. The Johansen-Fisher panel co-integration test is used for this purpose. The findings are listed in Table 4.6. the results demonstrate that two factors have a robust long-run relationship between variables. This ensures that two factors are co-integrated in the long term and shift together. In other words, in selected countries such as Pakistan, China, India, the Philippines, and Japan, there is a long-term equilibrium between markets, GDP, FDI, inflation, industrial development, exchange and interest rates, and money supply.

Table 5: Johansen co-integration model

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.412317	184.0844	159.5297	0.0011
At most 1 *	0.355593	130.9277	125.6154	0.0228
At most 2	0.252366	86.98517	95.75366	0.1721
At most 3	0.216188	57.90094	69.81889	0.3054
At most 4	0.148387	33.54235	47.85613	0.527
At most 5	0.101404	17.48009	29.79707	0.6045
At most 6	0.06493	6.787882	15.49471	0.6024
At most 7	0.000744	0.074471	3.841466	0.7849

Significant at $p < 0.05$

Significant at $p < 0.01$

Suppose many factors are found to have at least one co-integrating vector. In that case, a reasonable assessment method is a VECM (Vector Error Correction Model), which acclimates to short-run changes in factors and deviations from balance. The general form of the VECM model used is:

$\Delta Yt = a_1 + a_2$ ec $t1 + a_3 \Delta Yt1 + a_4 \Delta Xt1 + \epsilon t$.....(1)

Table 6: VECM Adj R^2

Error Correction:	D(Ln(Market Returns))	D(Ln (GDP))	D(Ln (FDI))	D(Ln (CPI))	D(L (IR))	D(Ln (ER))	D(Ln (IPI))	D(Ln (MS))
CointEq1	[1.1391]	[3.85]	[-1.14]	[-1.78]	[1.23]	[-1.37]	[3.92]	[1.194]
D(Ln(Market Returns))(-1))	[-1.8023]	[1.74]	[3.02]	[2.32]	[0.43]	[-1.52]	[3.79]	[-0.955]
D(Ln(Market Returns (-2))	[-0.6061]	[-0.778]	[1.88]	[-0.69]	[0.10]	[0.747]	[0.28]	[0.393]
D(Ln (GDP(-1))	[-0.3384]	[-0.55]	[1.04]	[1.67]	[-1.41]	[0.152]	[-0.57]	[-0.878]
D(Ln (GDP(-2))	[-1.5254]	[-1.608]	[1.13]	[1.52]	[-1.32]	[1.03]	[-1.44]	[0.048]
D(Ln (FDI(-1))	[0.4789]	[1.191]	[-2.98]	[0.17]	[1.28]	[-0.88]	[0.13]	[1.951]
D(Ln (FDI(-2))	[-0.4741]	[0.963]	[-1.86]	[-0.72]	[0.49]	[-1.08]	[0.22]	[2.459]

Table 7: Cont...

Error Correction:	D(Ln(Market Returns))	D(Ln (GDP))	D(Ln (FDI))	D(Ln (CPI))	D(L (IR))	D(Ln (ER))	D(Ln (IPI))	D(Ln (MS))
D(Ln (CPI(-1))	[1.5681]	[1.174]	[-1.29]	[3.72]	[1.67]	[-0.05]	[3.28]	[-0.162]
D(Ln (CPI(-2))	[0.1941]	[0.48]	[-1.22]	[0.22]	[0.61]	[0.37]	[-1.32]	[0.814]
D(Ln (IR(-1))	[-0.3011]	[-0.244]	[-0.99]	[1.82]	[-4.36]	[-0.25]	[0.09]	[0.251]
D(Ln (IR(-2))	[0.5568]	[0.242]	[-0.72]	[0.26]	[-2.17]	[-0.53]	[1.00]	[0.361]
D(Ln (ER(-1))	[0.1848]	[-1.68]	[2.85]	[2.16]	[-2.23]	[1.72]	[-1.23]	[-1.108]
D(Ln (ER(-2))	[-2.013]	[-1.313]	[0.26]	[0.97]	[-1.09]	[0.709]	[-1.36]	[-1.023]
D(Ln (IPI(-1))	[-0.4299]	[-0.994]	[2.28]	[0.84]	[-0.71]	[0.82]	[-0.18]	[0.123]
D(Ln (IPI(-2))	[-0.5710]	[0.261]	[0.30]	[0.57]	[0.02]	[0.15]	[-0.32]	[-0.865]
D(Ln (MS(-1))	[1.5323]	[-0.973]	[1.11]	[1.14]	[-0.38]	[1.15]	[-0.70]	[-0.809]
D(Ln (MS(-2))	[-3.7168]	[-1.160]	[-0.58]	[3.72]	[-0.54]	[2.57]	[-1.97]	[-2.432]
C	[1.7822]	[4.085]	[-0.66]	[-1.36]	[0.92]	[-1.37]	[2.57]	[1.869]
Adj.Rsq	0.189	0.331	0.224	0.710	0.192	0.140	0.470	0.061

Market Return Descriptive

Table 8 offers panel descriptive statistics for selected nations, including standard deviation, skewness, kurtosis, and mean. The mean is positive for most variables in the panel, including stock returns from sample countries. The negative skewness means the fat-tailed or left-skewed is the frequency distribution of the actual value of these factors. However, the positive coefficient of skewness for inflation and interest rate shows that the frequency distribution is right-skewed.

The market return mean is 0.132582, the median is 0.0029, and the maximum is 1.304334. On the other hand, the market return minimum value is -0.6539.

Table 8: Market return descriptive

	Market Return	ΔGDP	ΔFDI	ΔCPI	ΔI_R	ΔE_R	ΔIPI	ΔM_S
Mean	0.1325	0.0027	0.004	0.0088	0.218	0.0036	0.003	0.003
Median	0.0736	0.0029	0.0051	0.0077	-0.05	0.003	0.003	0.003
Maximum	1.3043	0.0106	0.1475	0.0442	23.584	0.0459	0.021	0.056
Minimum	-0.653	-0.006	-0.06	-0.002	-6.15	-0.044	-0.01	-0.06
Std. Dev.	0.3378	0.003	0.0282	0.0081	2.6	0.0173	0.006	0.013
Skewness	0.6613	-0.134	1.19	1.231	7.261	0.2088	-0.02	-0.59
Kurtosis	4.2536	3.4097	9.2806	5.4935	67.05	3.0104	3.656	11.473
J. Bera	13.8385	1.0024	187.961	51.163	17973	0.7273	1.808	305.1
Probability	0.00098	0.6057	0	0	0	0.6951	0.404	0
Obs	100	100	100	100	100	100	100	100

Correlation Matrix

Correlation connotes the relationship between two variables to demonstrate whether or not they 'are closely related. The correlation findings are listed below, and they are derived from reviews of the association between dependent and independent variables (market return, GDP, FDI, CPI, IR, ER, IPI, and MS). The dependent variable, market return, positively correlates with all the study's independent variables. A weak relation is observed between market return and GDP. Similarly, a weak positive association is observed between market return and consumer price index, exchange rate, and industrial price index. The *r* value of .13 of FDI shows a strong positive relation between market return and FDI. It means that both variables move in the same direction. An increase in FDI will enhance the market return. Money supply and market return have a direct relation; a rise in the value of money supply leads to the increased value of market return.

Table 9: Correlation Matrix

	RETURN	GDP	FDI	CPI	I_R	E_R	IPI	M_S
Return	1							
GDP	0.0599	1						
FDI	0.1344	-0.0614	1					
CPI	0.0272	0.21955*	0.0045	1				
I_R	0.2998	-0.0508	0.1795	0.0448	1			
E_R	0.0018	-0.6645*	0.005	0.2946*	-0.0953	1		
IPI	0.0683	0.48117*	0.0079	0.3233*	0.0315	-0.2041*	1	
M_S	0.199628	-0.0961	0.23*	-0.10*	0.2445	-0.16*	0	1

Significant at $p < 0.05$

Panel Least Squares

The results in the table above explain that GDP growth, interest rate growth, growth in the exchange rate, and growth in money supply are predicting the market return. On the other hand, FDI growth, CPI growth, and IPI growth failed to explain the market return. A positive relation is observed between market return and growth in GDP. The relation is strong and highly important as the probability value is less than 0.05. The coefficient of growth in interest rate depicts that one unit change in interest rate growth will increase the market return by 0.04 units. Similarly, market return is positively associated with the growth in the exchange rate, and the beta coefficient shows that the relationship is solid and significant. Money supply is also positively associated with market return; the relationship is solid and significant.

Table 10: Panel least squares

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.ă
GROWTH_IN_GDP	42.9437	15.7991	2.718107	0.0078
GROWTH_IN_FDI	0.70048	1.1847	0.591235	0.5558
GROWTH_IN_CPI	-5.9634	5.2706	-1.1314	0.2608
GROWTH_IN_I_R	0.0393	0.0131	2.979207	0.0037
GROWTH_IN_E_R	7.3054	2.9963	2.438146	0.0167
GROWTH_IN_IPI	1.266	6.0953	0.207704	0.8359
GROWTH_IN_M_S	5.0758	2.4853	2.042297	0.044
R-squared	0.1519	Mean dependent var		0.1325
Adjusted *R-squared*	0.0972	S.D. dependent var		0.3378

Granger Causality Tests

The results of the Table depict that growth in GDP has a significant relationship with market returns by having a probability value of less than 0.05 significance level. This behavior explains that growth in GDP leads to market returns and clarifies that positive change in GDP will also cause positive change in market returns. Meanwhile, market returns also show leading behavior in GDP growth. Growth in FDI has an insignificant association with market returns with a p-value of 0.4207; this behavior of FDI explains that Growth in foreign direct investment has

a lagging relationship with market returns, while market returns also have a lagging relationship with growth in FDI. Growth in CPI has a lagging relationship with market returns because its p-value is 0.1270, which is insignificant. However, the market return shows leading behavior with the growth of the consumer price index. That behavior is an indication that an increase in returns will also become the cause of the increase in the consumer price index. Market returns 0.8746 indicate lagging behavior with growth in interest rates as well as with the probability value of interest rate, and its value 0.1438 is also a lagging behavior shown in this table. The exchange rate shows lagging behavior, and the value is 0.5887. Another aspect of the result is that market return shows leading behavior, and the industrial production index also shows lagging behavior. However, the market return behavior against IPI is leading.

Table 11: Pairwise granger causality tests

Null Hypothesis:	Obs	*F*-Statistic	Prob.ă
GROWTH_IN_GDP———-RETURN_M	90	3.25149	0.0436
RETURN_M———GROWTH_IN_GDP		6.57076	0.0022**
GROWTH_IN_FDI——-RETURN_M	90	0.87479	0.4207
RETURN_M ——— GROWTH_IN_FDI		2.15325	0.1224
GROWTH_IN_CPI———RETURN_M	90	2.11446	0.127
RETURN_M———- GROWTH_IN_CPI		4.89179	0.0098**
GROWTH_IN_I_R ——— RETURN_M	90	1.98395	0.1438
RETURN_M ———— GROWTH_IN_I_R		0.13424	0.8746
GROWTH_IN_E_R ————- RETURN_M	90	0.53321	0.5887
RETURN_M ——- GROWTH_IN_E_R		2.77892	0.0678***
GROWTH_IN_IPI ————— RETURN_M	90	1.94419	0.1494
RETURN_M ——— GROWTH_IN_IPI		8.96820	0.0003**
GROWTH_IN_FDI ——— GROWTH_IN_GDP	90	1.30858	0.2756
GROWTH_IN_GDP ——— GROWTH_IN_FDI		1.83847	0.1653
GROWTH_IN_CPI————-GROWTH_IN_GDP	90	0.73387	0.4831
GROWTH_IN_GDP————-GROWTH_IN_CPI		0.82313	0.4425
GROWTH_IN_I_R ——— GROWTH_IN_GDP	90	1.78080	0.1747
GROWTH_IN_GDP ——— GROWTH_IN_I_R		9.51031	0.0002**
GROWTH_IN_FDI ————-GROWTH_IN_GDP	90	1.30858	0.2756
GROWTH_IN_M_S————-GROWTH_IN_GDP	90	1.47475	0.2346
GROWTH_IN_GDP ————- GROWTH_IN_M_S		2.33202	0.1033
GROWTH_IN_CPI —— GROWTH_IN_FDI	90	0.36261	0.6969
GROWTH_IN_FDI ——— GROWTH_IN_CPI		0.34974	0.7059
GROWTH_IN_I_R ——— GROWTH_IN_FDI	90	0.88158	0.4179
GROWTH_IN_FDI ————— GROWTH_IN_I_R		0.31674	0.7294
GROWTH_IN_E_R ——— GROWTH_IN_FDI	90	2.83041	0.0646
GROWTH_IN_FDI ——— GROWTH_IN_E_R		0.32268	0.7251
GROWTH_IN_IPI ————- GROWTH_IN_FDI	90	1.06136	0.3505
GROWTH_IN_FDI ——— GROWTH_IN_IPI		0.15999	0.8524
GROWTH_IN_M_S ————- GROWTH_IN_FDI	90	0.39783	0.673
GROWTH_IN_FDI ——— GROWTH_IN_M_S		3.58590	0.032
GROWTH_IN_I_R ——— GROWTH_IN_CPI	90	3.61308	0.0312
GROWTH_IN_CPI ————- GROWTH_IN_I_R		0.66495	0.517
GROWTH_IN_E_R ——— GROWTH_IN_CPI	90	1.88830	0.1576
GROWTH_IN_CPI ——— GROWTH_IN_E_R		1.54918	0.2184
GROWTH_IN_IPI ——— GROWTH_IN_CPI	90	0.94578	0.3924
GROWTH_IN_CPI ——— GROWTH_IN_E_R		1.54918	0.2184
GROWTH_IN_IPI ——— GROWTH_IN_CPI	90	0.94578	0.3924
GROWTH_IN_CPI ————- GROWTH_IN_IPI		1.93101	0.1513

Table 12: Cont...

Null Hypothesis:	Obs	*F*-Statistic	Prob.ă
GROWTH_IN_M_S ——— GROWTH_IN_CPI	90	10.6698	0.0007**
GROWTH_IN_CPI ———— GROWTH_IN_M_S		0.01978	0.9804
GROWTH_IN_E_R ———— GROWTH_IN_I_R	90	1.83004	0.1667
GROWTH_IN_I_R ———— GROWTH_IN_E_R		0.11765	0.8891
GROWTH_IN_IPI ———— GROWTH_IN_I_R	90	0.84036	0.4351
GROWTH_IN_I_R ————- GROWTH_IN_IPI		2.54270	0.0846*
GROWTH_IN_M_S ———— GROWTH_IN_I_R	90	14.9402	0.0006**
GROWTH_IN_I_R ———— GROWTH_IN_M_S		0.81448	0.4463
GROWTH_IN_IPI ————- GROWTH_IN_E_R	90	1.01597	0.3664
GROWTH_IN_E_R ———- GROWTH_IN_IPI		2.13841	0.1241
GROWTH_IN_M_S ——— GROWTH_IN_E_R	90	1.37869	0.2575
GROWTH_IN_E_R ———— GROWTH_IN_M_S		2.04889	0.1352
GROWTH_IN_M_S ———- GROWTH_IN_IPI	90	0.71361	0.4928
GROWTH_IN_IPI ——— GROWTH_IN_M_S		1.53382	0.2216

CONCLUSION AND SUMMARY

This study tried to conduct the required analyses to address the research question of whether or not any of the macroeconomic variables found may affect stock prices. The macroeconomic variables undertaken in our analysis are the exchange rate, GDP, inflation rate, interest rate, industrial production index, and money supply. Yearly data over 20 years was used (from January 1999 to December 2019). We applied Granger causality and co-integration studies to analyze this short- and long-term interaction.

The study resolved to explore the connection between Macroeconomic variables and market returns in long-run and short-run periods. The study collected annual data from January 1999 to December 2019, almost 20 years to achieve this purpose. Data was collected from the stock markets of 5 Asian economies, namely KSE (Pakistan), SSE (China), BSE (India), PSEI (Philippines), and Nikkei (Japan). The total number of observations collected was 100. The study was significant as it estimated the connectedness among macroeconomic variables or financial market performance and the outcome of macroeconomic variables on financial market performance. Different methods were applied to calculate the results to achieve this purpose. First of all, descriptive statistics were applied, and the results showed that the annual returns of BSE are the highest among all other markets under observation. The highest risk level is in KSE, and the returns of SSE are the lowest among all the markets, so investing in the Chinese stock market is also very low.

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