Determinants of the Stock Return – Exchange Rate Dynamic Linkage in India and China

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Abstract

Purpose : The present study tried to identify the macroeconomic variables that determined the dynamic linkage between stock return and exchange rate in two prominent emerging economies: India and China. The determinants of the stock return–exchange rate linkage varied from country to country depending on the various economic policies of a particular economy.

Methodology : Dynamic conditional correlation (DCC) values representing the stock return–exchange rate linkage were derived by performing the DCC-GARCH model. Furthermore, the potential macroeconomic factors such as capital flows, trade balances, interest rate, money supply, output, inflation, oil price, and world stock market were regressed on the estimated DCC series to find the significant determinants.

Findings : A significant spillover between the stock returns and exchange rates was found in India and China. Further, we found capital flow, money supply, and oil price to be the significant determinants of India's stock return–exchange rate linkage. However, in China, the interest rate was the only significant determinant.

Practical Implications : The study was helpful for policy-makers in framing effective policies to stabilize and integrate the financial markets and for investors in framing diversification and hedging strategies while investing in emerging markets.

Originality/Value : Numerous researchers empirically studied the linkage between stock returns and exchange rates and examined the determinants of stock return movements and exchange rate fluctuations separately. However, the significant determinants of the stock return–exchange rate linkage were not investigated adequately, especially in emerging economies.

Keywords : **stock return, exchange rate, macroeconomic variables, dynamic conditional correlation**

JEL Classification Codes : C32, F31, F62, G15

Paper Submission Date : February 20, 2024 ; Paper sent back for Revision : August 26, 2024 ; Paper Acceptance Date : October 15, 2024 ; Paper Published Online : January 15, 2025

The favorable drifts in the two major segments of the financial markets, stock markets and the currency markets, are considered the basis for a country's sound financial system. During the Asian Crisis of 1997 and the Global Financial Crisis of 2008, the significance of the stock market–currency market linkage and the co-movement of stock returns and exchange rates became critically evident (Agrawal et al., 2010; Chkili & Nguyen, 2014). The reformation of the global financial system, international economic integration, and efforts to

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DOI : https://doi.org/10.17010/ijf/2025/v19i1/174696

diversify have added importance to the study of the relationship between these variables (Dahir et al., 2018). Also, the relationship might be more particular and evident in emerging countries like India and China due to substantial foreign portfolio investment flows, foreign trade flows, prudent monetary policy actions, volatile markets, etc. There exist theoretical models demonstrating possible linkages between the stock returns and the currency market, but they contradict each other.

As per the flow-oriented model postulated by Dornbusch and Fischer (1980), the current account of the country conduits the stock return–exchange rate relationship (Moore & Wang, 2014). As per the stock-oriented model postulated by Branson (1981) and Frankel (1983), the capital account of the country channels the relationship between stock return and exchange rate (Diamandis & Drakos, 2011; Lin, 2012). Further, as per monetary models of exchange rate determination, factors like demand and supply of money, prices, output, and interest rate determine the exchange rate, and the stock price may influence the exchange rates through these variables (Gavin, 1989). Caporale et al. (2014) considered the possibility of monetary policy's effect on the relationship. Likewise, various domestic macroeconomic variables can surround the relationship between stock return and exchange rate, though these variables may not directly and separately determine the stock returns and exchange rates (Bhanumurthy et al., 2019). Apart from the above-mentioned domestic variables, global factors may also channel the relationship between stock price and exchange rate due to increased trade, huge capital flows, and financialization of markets (Sui & Sun, 2016). For instance, oil prices and the US stock index can be determining factors that would capture the global shocks (Caporale et al., 2014; Chortareas et al., 2011).

The presence of various domestic and global factors determining the stock return–exchange rate relationship is explicit from the aforementioned theoretical models and previous studies. However, the macroeconomic variables that significantly influence the relationship between stock price and exchange rate may depend on the various economic policies of a particular economy. Therefore, the significant determining variables of the stock return–exchange rate linkage need to be investigated specifically for an economy rather than going with the assumptions of the theoretical models.

Though numerous studies have been conducted to analyze the relationship between stock returns and exchange rates and to examine factors determining stock return movements and exchange rate fluctuations separately, studies that focus on examining the determinants of the linkage between stock return and exchange rate have not been investigated adequately, especially in emerging economies. The current study aims to determine significant macroeconomic variables that conduit the relationship between stock return and exchange rates in two prominent emerging economies, India and China. The critical macroeconomic variables presumed to act as determining factors for the stock return–exchange rate relationship are capital flows, trade balances, interest rate, money supply, output and inflation, and global factors such as oil price and the US Stock Index. All these variables are construed from the existing theories and economic intuitions derived from previous studies.

Policymakers, financial regulators, international investors, and traders can make informed decisions if the macroeconomic factors that conduit the linkage between stock return and exchange rates in different economies are explored thoroughly. The nature of the relationship between stock returns and exchange rates can be better understood by determining the driving forces of the dynamic linkage. It would, therefore, be helpful to control these variables through various policies, especially during times of turbulence.

Literature Review

Only a few studies exist that empirically examine the determining factors that channel the stock return–exchange rate relationship. However, the causal relationship between the variables is extensively studied worldwide. Particularly in India, Agrawal et al. (2010) investigated the causal relationship between the exchange rate movement and Nifty returns volatility and found a unidirectional causality running from stock price to exchange

rate. Similarly, Dahir et al. (2018), Das and Megaravalli (2017), Reboredo et al. (2016), and Yadav (2016) arrived at the same result, wherein the relationship ran from the stock return to the exchange rate in India. On the contrary, Mikhaylov (2018) and Sakthivel and Kamaiah (2013) found a unidirectional relationship running from exchange rate to stock return. Further, Ashwani and Sheera (2018) observed that stock market volatility can be predicted by exchange rates along with other factors such as money supply and treasury bills. Lakshmanasamy (2021) found that exchange rate volatility and crude oil prices caused stock price volatility in India. A bidirectional causality was found in the studies of Fauziah et al. (2015), Kumar (2013), and Sui and Sun (2016). Conversely, no relationship was established in India between the variables in the studies of Akdogu and Birkan (2016) and Tudor and Popescu-Dutaa (2012).

In the context of China, Cuestas and Tang (2015) studied the spillover effect between stock returns and changes in exchange rates and found that the spillover had a lasting effect during the Asian and global crises. Lee and Zhao (2014) found long-run causality from the exchange rates toward stock prices in the Chinese stock market. Mikhaylov (2018) found a volatility spillover effect from the stock market to the currency market. Fauziah et al. (2015) found a bidirectional causal relationship between the variables in China. No relationship was established in China between the variables by Akdogu and Birkan (2016), Dash and Sahu (2018), Sui and Sun (2016), and Tudor and Popescu-Dutaa (2012).

Various studies sought to understand which macroeconomic variables determined the stock return movement and exchange rate fluctuation, but these are analyzed separately. For instance, Varughese and Mathew (2017) confirmed that foreign portfolio investments significantly influenced stock market volatility. Pathak (2018) established a causality running from repo rate and global capital flows to stock returns. Sunil et al. (2019) found that stock returns were influenced by foreign direct investment, foreign portfolio investment, the balance of payment, and the exchange rate, whereas only GDP and stock return influenced exchange rates. Nayak and Barodawala (2021) found that money supply, call money rate, foreign exchange reserve, foreign institutional investment, and inflation had a strong liaison with the Indian stock market. While considering the global factors, Savadatti (2018) observed that the US stock market volatility caused Indian stock market volatility, and Joseph and Rajeshwari (2023) confirmed that oil prices influenced stock returns. Analyzing the influence of macroeconomic variables on the stock market and currency market individually and separately will not serve the purpose of understanding how these markets are integrated.

The results of the studies on the linkage between the two variables contradict each other. We could narrow down the nature of dynamic linkage if we could find the determining factors that drive the relationship between stock return and exchange rate. However, a reasonable number of studies have not been undertaken to determine the factors that channel the stock return–exchange rate relationship to date. Diamandis and Drakos (2011) concluded that the US stock market acted as a channel for the stock return – exchange rate linkage in the four Latin American countries. Ülkü and Demirci (2012) also concluded that the developed stock market return had a significant role in explaining the stock return–exchange rate co-movement in eight emerging European countries.

Moore and Wang (2014) revealed the trade balance as the main source of the dynamic correlation for Asian countries and capital mobility as a contributory factor for Australia, Canada, and the United Kingdom. For Japan, neither of the variables proved to be the contributor. They suggested that countries with relatively low capital mobility supported the flow-oriented model and countries with high capital mobility supported the stock-oriented model. Aftab et al. (2021) found that trade balance and capital mobility influenced the dynamic linkage between stock return and exchange rate in China in the short run and only trade balance in the long run, supporting the flow-oriented model. Trade balance was found to influence the relationship between the variables in the Philippines and capital mobility in Singapore in the short run. No linear influence was found to exist in other emerging Asian countries, including India.

Though the dynamic linkage between stock returns and exchange rates has been empirically studied and established widely, an examination of the factors that determine the linkage between stock returns and exchange rates has been performed on a very limited scale, especially in the context of India and China.

Objective of the Study

To find out the significant determinants of the dynamic linkage between stock returns and exchange rates in India and China.

Data and Methodology

Data Required

The study is analytical in nature. The monthly data during the period commencing from January 2000 to December 2020 are considered for the study. The values of the benchmark stock index of countries, NSE Fifty (for India) and Shanghai Composite Index (for China), and that of the currency indices, real effective exchange rates (REER) based on the consumer price index (CPI), are chosen to provide a wider perspective to the variables.

The study uses appropriate proxies to represent the chosen macroeconomic variables. The balance of payment financial account balance is considered to represent the capital flow. Further, data on the net trade balance of goods represent the current account, call money represents interest rate, broad money (M3) represents money supply, industrial index of production (IIP) represents output, and consumer price index represents inflation. The global factors chosen for the study are S&P 500 index values representing the world stock market and the oil price represented by West Texas Intermediate (WTI) crude oil price. CPI is used to represent inflation. However, instead of considering inflation as a separate variable in the model, the other variables can be deflated to bring the effect of inflation (Abouwafia & Chambers, 2015; Bai & Koong, 2018; Tsen, 2017).

The capital flow data is available only on a quarterly basis for China. The quarterly data series are interpolated to monthly data using the "cubic spline interpolation technique," referring to the previous studies of Chittedi (2014) and Patro et al. (2002). Also, the data series are transformed into log return series or growth rates as the data set consists of varied magnitude.

Methodology

Significant determining variables are identified using a two-step estimation process adopted from the study of Aftab et al. (2021) and Moore and Wang (2014). In the first step, dynamic conditional correlation (DCC) values of the two series of data, stock returns and exchange rates, are derived by performing the DCC-GARCH model advanced by Engle (2002) using *R* programming software, and then spillover effects between the stock return and exchange rate are examined. The data series, including the DCC series, are tested for stationarity and structural break. In the second step, a linear regression model is performed in EViews 12 software, wherein the estimated DCC series is considered as the dependent variable and is regressed on the potential macroeconomic factors that may determine the linkages between the series. The regression model to be performed to find the significant determinants is finalized depending on the stationarity of the series. If all the series are found to be "stationary at level," the analysis is advanced with the ordinary least squares (OLS) regression model, and if all the series are stationary at different levels, the ARDL model is performed for the analysis.

Empirical Analysis and Results

The theoretical model proposed for determining the macroeconomic factors that influence the dynamic relationship between stock returns and exchange rates is as follows:

Dynamic Linkage between Stock Return and Exchange Rate = f (Growth rate of Capital flow, Growth rate of Net Trade, Growth rate of Call Money rate, Change in Money Supply, Change in Output, Change in Oil Price, US Stock Market Return) (1)

DCC-GARCH Estimation and Results

In the first step of the estimation process, the dynamic correlation values representing the relationship between stock return and exchange rate are derived using a bivariate GARCH model with dynamic conditional correlation specification (DCC (1, 1) model). The combined ARCH effect (dcca1) and combined GARCH effect (dccb1) results that indicate the long-term and short-term spillover effects between the two variables are presented in Table 1.

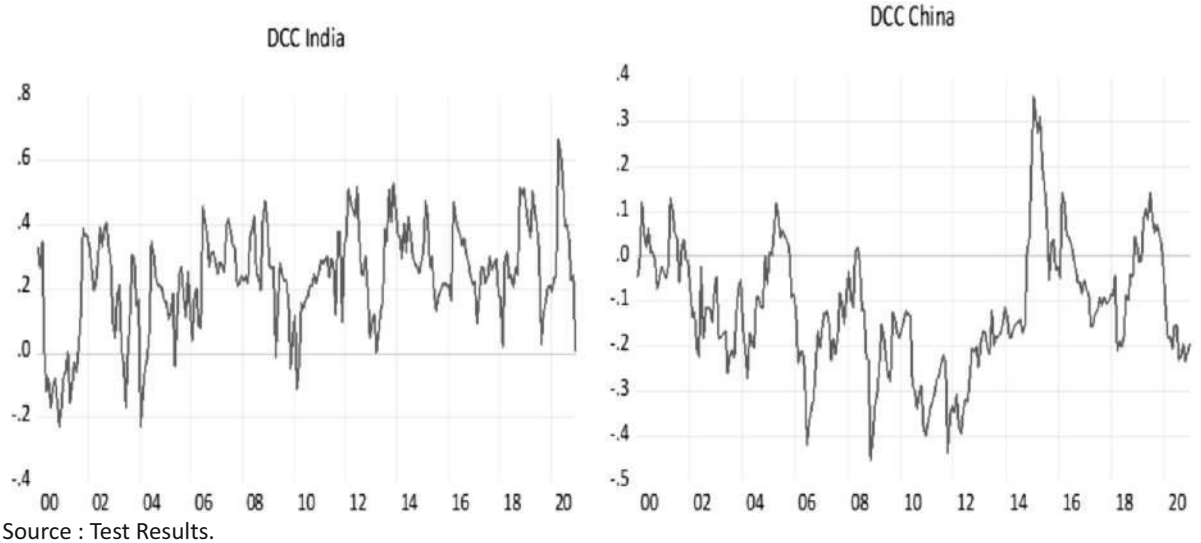
It is evident from the test results that a significant spillover between stock return and exchange rates exists in both India and China. In India, spillover is significant both in the long run and short run, whereas in China, it is significant in the long run. Figure 1 shows the graph of the DCC series.

Table 1. ***Estimates from the DCC-GARCH Model***

DCC Parameters	India	China
dcca1	0.12221**	0.06663
Std. error	*0.05985*	*0.04743*
dccb1	0.67736*	0.83792*
Std. error	*0.11744*	*0.14431*
Log Likelihood	1031.925	1091.596

Note. ** $p < 0.05$. & * $p < 0.01$.

Figure 1. ***Dynamic Conditional Correlation Between Stock Return and Exchange Rates***



Source : Test Results.

Table 2. ***ADF and PP Unit Root Test Statistics for DCC Series***

Variable	At Level			
	ADF Test		PP Test	
	Constant	Constant & Trend	Constant	Constant & Trend
DCC-India	–5.53*	–6.15*	–5.54*	–6.22*
DCC-China	–3.57*	–3.57**	–3.64*	–3.64**

Note. The rejection of the null hypothesis is based on MacKinnon's (1996) critical values. The critical values at the significant levels, 1%, 5%, and 10%, for the test with constant only are –3.46, –2.87, and –2.57, respectively, and for the test with constant and trend, are –4.00, –3.43, and –3.14, respectively.

* $p < 0.01$, indicating rejection of the null hypothesis of non-stationarity at a 1% significance level.

** $p < 0.05$, indicating rejection of the null hypothesis of non-stationarity at a 5% significance level.

The DCC values are highly volatile in both countries. In India, most values lie in the positive region, indicating a positive relationship. During the period of global crisis, from November 2008 to February 2010, a downward trend was recorded, indicating a decrease in the relationship. In 2012–2013, a downward movement was seen when India was experiencing an economic slowdown wherein foreign and domestic investments were declining, industrial production was affected badly, and a state of policy paralysis and anti-growth policies were also reported (Palit, 2012). In both these scenarios, the correlation value touched 0, which is a state of no relationship. A sharp decline is seen in 2019 and 2020 slowdowns. An abrupt upward trend was recorded after the decline in 2008–2010, 2012–2013, and 2019. On the contrary, in the early 2000s, when India was witnessing a booming period, the relationship was seen declining and reaching a weak but negative correlation and a sudden increase reaching positive and moderate correlation followed by an abrupt fall again to negative and weak relationship. These were the only periods where India recorded negative correlation values. A steep fall was recorded in April 2020, the pandemic outbreak.

In China, most values lie in negative regions, indicating a negative relationship. The negative relationship between the variables increases during exchange rate regime shift announcements (2005–2006). During the 2008 crisis, an all-time high negative correlation value was reached from zero. A positive relationship was recorded during 2014–2016, when China saw economic growth at the slowest pace in two decades and a stock market crash. A fall from positive relationship to zero and, thereafter, a slight increase in negative relationship was recorded towards the end of the 2019 pandemic outbreak in China.

A change in the movement of the values can be observed during the period of turmoil in both countries, but the changes are not similar. Further, in the presence of significant spillover, the analysis proceeds to the second stage by considering the DCC values derived in this stage as the dependent variable. The DCC series of India and China are found to be stationary at level. The results are presented in Table 2.

Linear Estimation and Results

In the second step of the estimation process, potential macroeconomic variables are regressed on the estimated DCC values to identify the major determinants of the stock return–exchange rate linkage. The linear regression model, based on the theoretical model presented in equation (1), which is used for satisfying the objective of identifying the major determinants of the dynamic linkage between stock return and exchange rate in the countries, can be presented in the following linear equation form:

$$DCC_t = \alpha + \beta_1 DCC_{t-1} + \beta_2 FA_t + \beta_3 NT_t + \beta_4 CM_t + \beta_5 M3_t + \beta_6 IIP_t + \beta_7 OIL_t + \beta_8 SP500_t + u_t \quad (2)$$

where,

DCC_t is the dynamic conditional correlation at time *t*. *FA* is the growth rate of the net financial account balance representing the capital flow growth rate of the country at time *t*, *NT* is the growth rate of the net trade balance of goods representing the current account growth rate, *CM* is the growth rate of call money rate, *M3* is the change in broad money supply, and *IIP* is the change in Industrial Production Index. *OIL* is the change in crude oil price, and *SP500* is the return of the US stock market, representing global factors. u_t is the error term.

The DCC series and all the macroeconomic variables of both the countries are found to be "stationary at level" as per the Augmented Dickey-Fuller (ADF) and Philips–Perron (PP) tests based on Schwarz Info Criterion, and no structural breaks are also found as per Bai–Perron multiple breakpoint test based on global information criteria. Since all the variables are stationary at level [*I*(0)], a simple OLS model is adopted for both countries. The results of the OLS model (equation (2)) and the corresponding diagnostic tests for India and China are presented in Tables 3a and 3b, respectively.

Tables 3a and 3b show that the *F*-statistics are significant, indicating the joint significance of all the variables in explaining the dependent variable, and the Durbin–Watson statistics indicate no autocorrelation as the values are almost equal to two. The diagnostic test results in the tables reveal no serial correlation, no ARCH effect, and no misspecification error as per the Breusch–Godfrey serial correlation LM test, ARCH test, and Ramsey RESET, respectively. However, the Breusch–Pagan–Godfrey test indicates the presence of heteroscedasticity; hence, the

Table 3(a). ***Estimates of OLS Model and Diagnostic Test Results for India***

Dependent Variable : DCC				
Regressors		**Coefficient**	**Std. Error**[a]	
C		0.059609*	0.012591	
DCC (–1)		0.771165*	0.038062	
FA		–0.000343**	0.000135	
NT		0.000115	0.001697	
CM		–0.122055	0.090263	
M3		–1.186078**	0.461723	
IIP		0.084368	0.093203	
OIL		–0.142991**	0.072399	
SP500		0.059911	0.179325	
Goodness of fit				
R-squared	0.620		*F*-statistic	49.33*
Adjusted *R*-squared	0.607		Durbin–Watson stat.	1.99
Model Diagnosis				
Diagnosis Test	***F*-Stat.**	**Prob.**	**H0**	**Result**
Breusch–Godfrey Serial Correlation LM	0.001	0.999	No Serial Correlation (2 lags)	Do not reject H0
Breusch–Pagan–Godfrey	2.29**	0.024	No Heteroscedasticity	Reject H0
ARCH Test	0.657	0.417	No ARCH effect	Do not reject H0
Ramsey RESET	0.535	0.465	No Misspecification	Do not reject H0

Note. [a] Heteroskedasticity consistent standard errors are reported to correct the problem of heteroskedasticity.

* $p < 0.01$ & ** $p < 0.05$.

robust standard error is reported to correct the regression in the case of India. However, for China, no heteroscedasticity exists either.

For India (Table 3a), significant coefficients are found for capital flow growth rate, change in money supply, and WTI crude oil price, suggesting that the dynamic relationship between stock return and exchange rates in India is influenced largely by these variables. The coefficients of all these variables are negative, implying that a decrease in capital flow, money supply, and oil price will increase the dynamic correlation between stock return and exchange rates. The significance of the capital flow variable indicates that the stock-oriented model is favored in India, where stock return influences the exchange rate through the capital account as per the theoretical framework. Further, as per the sticky price model by Dornbusch (1976), an increase in money supply makes domestic currency value decline, but the argument put forth by real activity theorists is that the same can improve the stock price, thus causing a negative correlation between stock returns and currency values. Oil price, as India is one of the biggest importers of oil, is expected to exert an influence on the country's macroeconomic variables, and the result shows the exposure of the Indian financial markets to global shocks.

For China (Table 3b), significant coefficients are found only for the call money growth rate, suggesting that the dynamic relationship between stock return and exchange rates in China is influenced largely by call money alone. The coefficient of this variable is positive, implying that an increase in the call money rate enhances the dynamic correlation between stock return and exchange rates in China. Both capital flow and net trade are found to be insignificant in China, indicating that both stock-oriented and flow-oriented models are not favored in China. The

Table 3(b). ***Estimates of OLS Model and Diagnostic Test Results for China***

Dependent Variable : DCC				
Regressors		**Coefficient**		**Std. Error**
C		–0.009871		0.005813
DCC (–1)		0.899484*		0.027357
FA		0.000031		0.000040
NT		0.001143		0.000837
CM		0.311473**		0.122461
M3		–0.240336		0.320762
IIP		0.107759		0.133056
OIL		–0.029851		0.039462
SP500		0.126347		0.087544
Goodness of fit				
R-squared	0.8233		*F*-statistic	140.41*
Adjusted *R*-squared	0.817		Durbin–Watson stat.	2.07
Model Diagnosis				
Diagnosis Test	***F*-Stat.**	**Prob.**	**H0**	**Result**
Breusch–Godfrey Serial Correlation LM	0.239	0.779	No Serial Correlation (2 lags)	Do not reject H0
Breusch–Pagan–Godfrey	0.837	0.563	No Heteroscedasticity	Do not reject H0
ARCH Test	0.205	0.649	No ARCH effect	Do not reject H0
Ramsey RESET	0.705	0.402	No Misspecification	Do not reject H0

Note. * $p < 0.01$ & ** $p < 0.05$.

two global factors are not significant in determining China's stock return–exchange rate relationship, showing Chinese financial markets' resistance to global shocks.

However, the US stock market, net trade, and output level are insignificant factors in both emerging countries. The lagged dependent values are also significant, implying strong persistence in the dynamic correlation between the variables in both countries.

Discussion

A significant spillover between stock return and exchange rates is found to exist in the Indian and Chinese economies. Domestic factors, such as money supply and capital flow, as well as oil price change, which is a global factor, are found to be negatively significant factors that determine the linkage between the stock return and the exchange rate in India. In China, only the call money rate, the proxy for interest rate, is found to be positively and significantly determining the linkage. Hence, the macroeconomic variables that conduit the stock return–exchange rate relationship differ from country to country depending on the macroeconomic framework.

India, being a liberalized economy with high foreign capital mobility — the significance of capital flow is justifiable and can be considered as a confirmation that the stock-oriented model is prevalent in India. That is, stock return influences India's exchange rate through capital accounts. Even though China is also a country with very high capital mobility and trade balance, only the call money rate is found to be a significant factor, not conforming to the stock-oriented and flow-oriented models. This may be because China continues to follow a rigid exchange rate regime[1], though a flexible system was officially adopted in 2006 by the Chinese Government. The same can be the reason for the Chinese financial market linkage not being significantly exposed to the global shock that can arise from the oil price change, whereas India, which follows a floating exchange rate regime, is exposed to the global shock.

Further, considering the influence of monetary policy proxies, call money rate (for China) and money supply (for India), a contractionary monetary policy, that is, reducing the money supply for India and raising the interest rate for China, can enhance the positive correlation between stock return and exchange rate in the economies.

Implications

Theoretical Implications

A study that specifically determines the conduiting factors of the stock return–exchange rate relationship by considering a wide variety of macroeconomic variables has not been undertaken extensively, especially in India and China. The present study addresses this gap in the literature. Also, the methodology used in the present study, the two-step estimation process of deriving DCC values to represent the dynamic linkage of the two variables and further considering the same as the dependent variable to determine the significant conduiting factors of the linkage, is less explored. The two main studies specifically in this line are Aftab et al. (2021) and Moore and Wang (2014), but only considered the trade balance and capital flows as the conduiting factors. The results of the study in India are in line with Moore and Wang (2014), where the stock-oriented model is found to be prevalent in economies with high capital mobility. However, the results of the study in China are not in line with Aftab et al. (2021) and Moore and Wang (2014).

[1] As per the Annual Report on Exchange Arrangements and Exchange Restrictions from 2005 to 2019 (AREAER) published by IMF, China follows a soft peg exchange rate regime, wherein direct market intervention by authorities is frequent and the exchange rates are allowed to move within a particular limit.

Policy Implications and Suggestions

We found that for both India and China, the proxies of the monetary policies significantly influence the stock return–exchange rate relationship, and therefore, it can be implied that the financial markets of emerging economies are sensitive towards monetary policies. As such, it can be suggested that in the emerging countries, India and China, the stock return–exchange rate relationship along with monetary policies need to be given particular attention to control the transmission of disturbances from one market to the other or to enhance the financial market integration at the time of tranquillity. A favorable foreign investment policy should also be given special attention in India. Further, while making investment decisions in India's financial markets, investors may consider the movement of oil prices as a decrease in oil prices enhances the positive correlation between stock return and exchange rate. An understanding of the set of determining factors can help the policy-makers in framing effective policies for stabilizing and integrating the financial markets as well as for the investors in framing diversification and hedging strategies of investment.

Limitations of the Study and Scope for Further Research

The study is limited to two emerging countries, India and China. Only the most prominent stock indices of the countries are considered for exploring the relationship with the exchange rate. The study uses monthly data as most of the macroeconomic variables chosen for the study are available on a monthly basis only. The capital flow data is available only on a quarterly basis for China, which is then transformed into monthly. The period of the study is limited to a span from 2000 to 2020. Some of the related research that can be explored further is that the study can be replicated in other emerging as well as developed countries. Also, the determinants specifically influencing the sector stock return–exchange rate relationship may be explored.

Authors' Contribution

Dr. Tomy Mathew formed the research idea. Dr. Abha Mohan elaborated the idea into a research problem through a literature review and developed a quantitative research design for the empirical study. Dr. Roy Sam Daniel verified the research design and contributed ideas to improve the research paper. Dr. Abha Mohan conducted the analysis using the software EViews 12, and she wrote the manuscript. Dr. Tomy Mathew and Dr. Roy Sam Daniel supervised and edited the manuscript.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Funding Acknowledgment

The authors received no financial support for the research, authorship, and/or for the publication of this article.

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