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THE INTEREST RATE - EXCHANGE RATE NEXUS IN CHINA: A DCCA CROSS-CORRELATION COEFFICIENT WITH SLIDING WINDOW APPROACH

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This study aims to investigate the dynamics of the interest rates and exchange rates during the pandemic-induced crisis in the Chinese economy. In the study, rolling window detrended cross-correlation analysis (DCCA) was used. The DCCA coefficient was extracted based on detrended fluctuation analysis (DFA). The data used in the study are the daily data of the period from 2/1/2019 to 7/5/2021. The results obtained in the study suggest the presence of positive cross-correlation between China's interest rate and exchange rate after the COVID-19 pandemic, and they also report the existence of weak positive cross-correlation during the initial days of the pandemic. However, the weak positive cross-correlation became stronger over time. Higher interest rates are associated with higher exchange rates after the COVID-19 pandemic. The results of the research study have policy implications in that conventional higher interest rates introduced to defend the exchange rate might fail during pandemic-induced crises.

Keywords: interest rate, exchange rate, DCCA, DFA, COVID-19

JEL Classification: E44, E52, C22

INTRODUCTION

Policymakers and research scholars across the globe have a keen interest in investigating the link among macroeconomic factors due to their effects on the real economy (Hussain, Bashir & Rehman, 2023). The link between the interest rate and the exchange rate cannot be ignored among such macroeconomic factors. Policymakers use uncovered interest-rate parity-based rationale to defend the domestic currency using active interest rates. The conventional monetary policy approach to defending the exchange rate implies using a tight monetary policy (increasing interest rates) to control exchange depreciation. This approach also mitigates inflationary pressure in the economy. The basic idea is that, in the short run, high interest rates increase the cost of speculation and selling domestic currency. Higher interest rates improve the balance of payment and the exchange rate as a consequence in the long run.

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However, such a monetary approach to controlling the exchange rate failed to explain the Asian financial crisis (AFC) of 1997 and the global financial crisis (GFC) of 2008. The higher interest rates worsened the depreciation of the exchange rate instead of improving it (Basurto & Ghosh, 2000; Bautista, 2003; Saraç & Karagöz, 2016). This unexpected outcome, where an increase in interest rates leads to a further decline in the exchange rate, is commonly called the "perverse effect" (Basurto & Ghosh, 2000; Saraç & Karagöz, 2016). It is important to note that the perverse effect is not exclusive to crises, as is evidenced by the fact that it occurs in normal economic conditions as well, as is exemplified by the case of the Philippines (Bautista, 2003).

Practically, the correlation between the interest rate and the exchange rate can go either way, being either positive or negative, and is difficult to predict. Therefore, it is essential to explore the topic under discussion so as to prescribe a successful monetary policy. It would enable us to answer whether a tight monetary policy (high interest rates) successfully defends exchange rates or not.

In China, which operates under a controlled exchange rate system, the response of the exchange rate to monetary policy interventions, such as changes in interest rates, differs from that in a flexible exchange rate system (Bashir, Khan, Jones & Hussain, 2021; Hussain, Bashir & Bilal, 2021). It is important to examine whether a tight monetary policy characterized by high interest rates is sufficient to defend the exchange rate in a controlled exchange rate system as the one existent in China. Accordingly, this research is focused on exploring the dynamics between interest rates and exchange rates in the context of pandemic-induced crises. While previous studies (Bashir, Yu, Hussain & Zebende, 2016; Hussain, Zebende, Bashir & Donghong, 2017) have mainly investigated the impact of conventional economic crises, such asthe Asian financial crisis and the global financial crisis, this study aims to address the gap in the literature by analyzing the effects of pandemic-induced crises on financial markets. Studying the effects of pandemic-induced crises on interest rates and exchange rates is crucial to the comprehension of their unique dynamics and implications in financial markets. This analysis provides valuable insights to policymakers, investors, and market participants. Pandemics bring about specific challenges and disruptions to economic activities, resulting in distinct impacts on interest rates and exchange rates compared to conventional crises (Hussain *et al*, 2023).

Based on the foregoing discussion, this study aims to investigate the cross-correlation between interest rates and exchange rates in the Chinese economy using the DCCA correlation coefficient. Three hypotheses were developed for the purpose of this research study.

H1: There is a positive correlation between interest rates and exchange rates in China in the observed period.

H2: The COVID-19 pandemic crisis leads to change in the strength of the correlation between interest rates and exchange rates in China.

H3: The causality pattern between the interest and exchange rates in China will change during a pandemic-induced crisis.

To achieve the research aim and test the proposed hypotheses, a different approach and a correct proxy were applied in order to explore the relationship between the interest rate and the exchange rate for China. The detrended cross-correlation analysis (DCCA) developed by G. F. Zebende (2011) was carried out. This approach has different strengths compared to the existing literature. First, most econometric series, such as the interest rate and the exchange rate, have a unit root. In the presence of unit root, cause-and-effect analysis, regression, vector auto-regression, and cointegration analysis would provide spurious results if the unit root problem was not properly dealt with (Hussain *et al*, 2017). Second, the DCCA approach can measure detrended cross-correlation on different time scales. The DCCA coefficient is a measure used to quantify the long-term correlation between two time series. It helps identify the presence of long-term dependencies and cross-correlations in the data. By conducting detrended cross-correlation analysis, the coefficient is calculated by removing short-term trends and examining the correlation at different time scales. Positive values indicate positive long-term correlation, whereas negative values indicate negative long-term correlation, and values close to zero suggest no significant long-term correlation at all. This coefficient is valuable in various fields for understanding persistence and interdependencies in time series data, being helpful in modeling, forecasting, and risk management (Zebende, 2011; Zebende, Da Silva & Machado Filho, 2013; Kristoufek, 2014; Saleem, Khalid & Nadeem, 2019).

The rest of the paper is structured into four sections. The second section contains a brief literature review, whereas in the third section, the methodology and the data are presented. The results and discussion are presented in Section four. The fifth section contains the conclusion of the paper.

LITERATURE REVIEW

Interest rate and exchange rate dynamics are of great importance as they have remarkable effects on the real economy and have been the point of interest of policymakers. These policy implications pertain to both the domestic economy and the rest of the world. Keeping in mind the practical implication of this relationship, monetary policy tools and the exchange rate have been under extensive investigation (Kim & Chen, 2022). However, these studies come across different econometric issues, as suggested by (Zettelmeyer, 2004). The problem with the existing literature is that they measure the relationship under discussion with regression, vector auto-regression, and the nominal proxy of the interest rate and regression analysis (Basurto & Ghosh, 2001). They argued that the nominal interest rate is not a good proxy for the monetary policy stance. Second, regression and vector auto-regression models are silent to explain the conjectured relationship due to the misidentification of exogenous shocks to the monetary policy (Christiano, Eichenbaum & Evans, 1999). In a fashion similar to the international literature, the Chinese monetary policy has also been studied either by testing (McCallum, 1988; Taylor, 1993) or through a hybrid rule. The most recent literature investigated such a context (Chang, Liu & Spiegel, 2015; Saleem, Tahir & Batool, 2021). However, these studies measure the response of the monetary policy to changes in inflation and the output growth.

The monetary policy transmission mechanism in the Chinese economy has been investigated by conducting various studies (Hussain *et al*, 2021). However, their main focus is on the monetary policy transmission through bank lending channels and risk-taking channels. Recent studies carried out by K. Rai and B. Garg (2022) and M. Hussain *et al* (2023) have investigated the exchange rate and the stock price volatility in BRICS markets. However, the analysis lacks in that it does not explore the link between the interest rate and the exchange rate in the Chinese economy. In a similar fashion, Z. Umar and M. Gubareva (2020) analyzed the exchange rate and the crypto market volatility lacking the analysis of the interest rate and the exchange rate. Moreover, H. O. Osazevbaru (2021) investigated the possible impact of the exchange and interest rate volatility on SMEs performance and found the significant evidence of long-term cointegration. In addition, the exchange rate fluctuations substantially affect exports and investment in Asian countries (Milenković, 2012).

It is worth mentioning that the existing literature on the discussed topic has been investigated using different models, such as linear regression analysis, vector autoregression (VAR), the impulse response, the vector error correction model, the Generalized Method of Movement, and instrumental regression analysis, which are all strong, but the same measure the response of variables in two dimensions, namely in the long-term and in the short-term dimensions. The goal of this study is slightly different, implying the checking of the co-movement of the interest rate and the exchange rate over different time scales. Such a model will not prove to be useful if there is a wish to check the co-movements of the interest rate and the exchange rate on different time scales. For the reason of that fact, detrended cross-correlation analysis (DCCA) was applied.

The approach used in this research study offers distinct advantages compared to the existing literature. Firstly, it addresses the issue of the unit root present in many econometric series, such as the interest rate and the exchange rate. Failure to properly deal with the unit root problem may lead to spurious results in causal and regression analyses, vector auto-regression, and co-integration analysis (Hussain *et al*, 2017). Secondly, conventional methods, such as regression, auto-regression, and co-integration analysis, only consider the long- and short-term dimensions of the relationship studied, often overlooking the co-movements of variables across different time scales. In contrast, the approach based on DCCA applied in this study allows for the measurement of detrended cross-correlation at various time scales (Zebende, 2011; Zebende *et al*, 2013; Kristoufek, 2014).

Moreover, this research study is focused on analyzing the dynamics between interest rates and exchange rates during the pandemic-induced crises, which is quite a novel contribution. Previous studies primarily examined the effects of conventional economic crises, such as the Asian financial crisis and the global financial crisis. In a similar way, the impact of the pandemic-induced crisis on the cross-correlation between the interest rate and the exchange rate were investigated in this research study. The effect of pandemic-induced crises on these financial markets will fill the research gap in the continuously expanding literature. Being knowledgeable of how pandemic-induced crises affect financial markets is crucial in gaining comprehensive insights into their unique characteristics and implications for the global economy.

METHODOLOGY AND DATA

The detrended cross-correlation analysis (DCCA) coefficient was used so as to quantify the co-movements of the interest rate and the exchange rate. The DCCA coefficient is a powerful method to investigate the cross-correlation between nonstationary series compared to traditional correlation analysis (Kristoufek, 2014). The DCCA coefficient is a combination of DCCA (Podobnik & Stanley, 2008) and detrended fluctuation analysis (DFA) (Peng, Buldyrev, Goldberger, Havlin, Simons & Stanley, 1993; Kantelhardt, Zschiegner, Koscielny-Bunde, Havlin, Bunde & Stanley, 2002).

According to G. F. Zebende (2011), the DCCA coefficient can be defined as a ratio between the detrended covariance of two series and the detrended variance of the series of interest. Here, the DCCA coefficient can be obtained by dividing the detrended covariance of the interest rate and the exchange rate over the detrended variance of the interest rate and the exchange rate. It can be expressed as follows:

$$\rho DCCA^{(n)} = \frac{F^2 DCCA^{(n)}}{F_{DFA\{Y1\}(\mathrm{n})} F_{DFA\{Y2\}(\mathrm{n})}} \tag{1}$$

The $\rho DCCA^{(n)}$ coefficient value can range between -1 and 1 (including borderline values). The zero value implies no correlation at all. This coefficient is robust and has been applied in finance (Reboredo, Rivera-Castro & Zebende, 2014; Hussain *et al*, 2017).

It was also hypothesized that the correlation before and after the pandemic crisis (COVID-19) between the interest rate and the exchange rate may change as well. The dependence and contagion of the interest rates and the exchange rates before and after the pandemic crisis was tested (Gençay, Selçuk & Whitcher, 2002). To do so, the data had been divided into subsamples, those before and those after COVID-19, from which it follows that there are $\rho DCCA^{(n)^{Before}}$ and $\rho DCCA^{(n)^{After}}$ COVID-19. Hypothetically, it can be written as is given in Equation 2. In order to set the hypothesis and empirically test it, the method applied in the similar studies (Gençay *et al*, 2002; Gallegati, 2012; Reboredo *et al*, 2014) was used.

$$\text{Ho: } \rho DCCA^{(n)^{After}} = \rho DCCA^{(n)^{Before}} \tag{2}$$

Furthermore, research was also done in the pre- and post-COVID-19 Granger causality pattern. The hypothesis reads that the causality pattern between the interest rate and the exchange rate might change during pandemic-induced crises. The hypothesis was tested using the Granger casualty test (Granger, 1988), which implies using the following equations 3 and 4.

Two models can be defined for two variables, X and Y, namely:

$$Y = \alpha + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \varepsilon_t \quad (3)$$

$$Y = \gamma + \delta_1 Y_{t-1} + \beta_2 X_{t-1} + \varepsilon_t \quad (4)$$

In Model 3, the variable Y is regressed on its own lagged values (Y_{t-1}) and the lagged values of X (X_{t-1}). The term ε_t represents the error or the residual component. In Model 4, the variable Y is solely regressed on its lagged values (Y_{t-1}), without considering the influence of X. The term ε_t represents the error or the residual component. To assess the presence of Granger causality, the statistical significance of the coefficients β_2 in Model 3 was examined. If β_2 is found to be statistically significant, it indicates that X has a Granger causal effect on Y, suggesting a causal relationship between the variables. The significance of the coefficients is typically evaluated using the hypothesis testing methods. For instance, the F-test determines whether the coefficients significantly deviate from zero or not.

The daily data of the period from January 2, 2019 to May 7, 2021 were used. The One-week Shanghai Interbank Offer Rate (SHIBOR) is used as a proxy for the interest rate in China (Zhang & Zheng, 2020). The variable, measure, description, and data source are given in Table 1. The Chinese yuan per dollar was applied as a proxy for the exchange rate. The whole period was subjected to analysis, and the data were also divided into two halves (Figure 1). The coronavirus was first identified in December 2019 in Wuhan, China. The World Health Organization declared Public Health Emergency of International Concern on January 30, 2020 (the first vertical line). Later, it declared a pandemic on March 11, 2020 (the second vertical line). The two subsamples consist of the data of the period from 02/01/2019 to 11/03/2020 and 11/03/2020 to 07/05/2021. As shown in Figure 1, both the exchange rate and the interest responded to the COVID-19 shock and declined. However, a greater decline in SHIBOR compared to the exchange rate is obvious.

Table 1 The variable, measure, and data sources

Variable Name	Measure	Data Sources
Interest Rate	Shanghai Interbank Offered Rate (SHIBOR). One-week Shanghai Interbank Offer Rate (SHIBOR) is used as a proxy for the interest rate in China	Wind database (https://www.wind.com.cn/)
Exchange Rate	Exchange Rate Chinese Yuan Per Dollar	Investing database (www.Investing.com)

Source: Authors

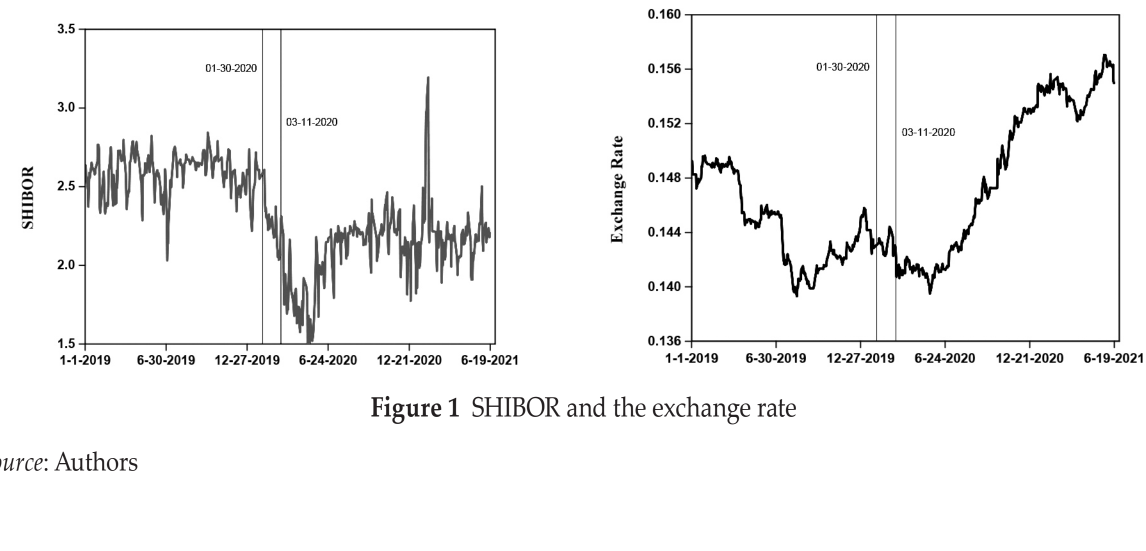

Figure 1 SHIBOR and the exchange rate

Source: Authors

RESULTS AND DISCUSSION

One of the concerns is that macroeconomic series (the exchange rate and the interest rate) contain unit root problems, and cross-correlation among such series is very difficult to estimate. The stationarity of the data was also checked through the augmented Dicky-Fuller test (ADF) (Harris, 1992; Paparoditis & Politis, 2018), the results of which are reported in Table 2. As can be seen, the null hypothesis (Ho: The exchange rate has a unit root) cannot be rejected in the case of the exchange rate. The same is also true for SHIBOR. Both hypotheses suggest that the exchange rate and SHIBOR are not stationary. Fortunately, DCCA can tackle unit root problems (Hussain *et al*, 2017).

Table 2 The augmented Dicky-Fuller test (ADF)

Hypothesis	ADF-Statistics	Probability
Ho: The exchange rate has a unit root.	-0.256653	0.9284
Ho: SHIBOR has a unit root.	-0.667346	0.1804

Source: Authors

Table 3 accounts for the descriptive statistics for the whole sample reported, before and after COVID-19, in the panels A, B, and C, respectively. Panel B of Table 3 shows that the observation that both SHIBOR and the exchange rate exhibit low values compared to their standard deviations indicates that these series do not display significant trends. In other words, these variables have limited variability or fluctuation over time, which implies that the interest rate and the exchange rate remain relatively stable without exhibiting pronounced upward or downward movements. Such stability can have implications for market participants as it suggests a relatively predictable environment regarding borrowing costs and currency valuations. However, it is important to note that the other factors apart from the trend analysis, such as market conditions, economic indicators, and policy interventions, should also be considered when assessing the overall dynamics of SHIBOR and the exchange rate. The same is true for Panel C as well. Panel A, however, suggests that the average and standard deviation mean is big compared to the standard deviation. SHIBOR volatility was observed to be less than the exchange rate after COVID-19, which suggests that the risk exchange market was bigger compared to SHIBOR (see the panels B and C). The exchange rate series is negatively skewed in both subsamples (before COVID-19 and after COVID-19). In a similar fashion, the higher values of Kurtosis observed in both subsamples suggest fatter tail returns. The Jarque-Bera test strongly rejected the null hypothesis of normal distribution in the panels A, B, and C, which suggests the data are not normally distributed.

Table 3 The descriptive statistics

Panel A: The whole sample (02/01/2019-07/05/2021)		
	SHIBOR	Exchange Rate
Mean	2.322240	0.146615
Median	2.283000	0.145281
Maximum	3.194000	0.157050
Minimum	1.481000	0.139303
Std. Dev.	0.299941	0.005006
Skewness	-0.344350	0.489325
Kurtosis	2.701979	1.900693
Jarque-Bera	14.38313	55.32916
Probability	0.000753	0.000000
Sum	1423.533	89.87486
Sum Sq. Dev.	55.05846	0.015335
Observations	613	613
Panel B: Before COVID-19 (02/01/2019 -11/03/2020)		
Mean	0.144258	2.522763
Median	0.143784	2.591000
Maximum	0.149651	2.843000
Minimum	0.139303	1.693000
Std. Dev.	0.002891	0.212569
Skewness	0.392847	-1.576334
Kurtosis	2.008869	5.671992
Jarque-Bera	20.72890	221.3135
Probability	0.000032	0.000000
Sum	44.86414	784.5792
Sum Sq. Dev.	0.002591	14.00747
Observations	311	311

Panel C: After COVID-19 (11/03/2020- 07/05/2021)		
Mean	0.145168	2.066229
Median	0.144009	2.150000
Maximum	0.153151	2.464000
Minimum	0.139507	1.481000
Std. Dev.	0.004021	0.228428
Skewness	0.535982	-0.947338
Kurtosis	1.943360	2.959023
Jarque-Bera	16.51996	26.18787
Probability	0.000259	0.000002
Sum	25.40440	361.5900
Sum Sq. Dev.	0.002813	9.079173
Observations	175	175

Notes: SHIBOR is the proxy for the interest rate in China. The exchange rate reported is the directly quoted RMB/USD rate.

Source: Authors

Table 4 contains the results of the Granger causality test. Granger causality was tested for the whole sample reported in Panel A. Panels B and C contain the Granger causality test results before COVID-19 and after COVID-19, respectively. Using the Granger causality test, the result shows that there is no evidence of causality for the whole sample (see Panel A of Table 4). In a similar fashion, the same result can be found in the subsample before COVID-19 (see Panel B of Table 4). However, it is very interesting to note that causality changed after COVID-19 (see Panel C of Table 4). SHIBOR became an important factor in explaining the Yuan/USD rate. Causality runs from SHIBOR to the exchange rate.

Table 4 The Granger causality test

Panel A: The whole sample (02/01/2019-07/05/2021)			
Null Hypothesis:	Observation	F-Statistic	Prob.
SHIBOR does not Granger-cause the exchange rate.	611	0.80528	0.4474
The exchange rate does not Granger-cause SHIBOR.		0.35580	0.7008
Panel B: Before COVID-19 (02/01/2019 -11/03/2020)			
SHIBOR does not Granger-cause the exchange rate.	309	0.02814	0.9723
The exchange rate does not Granger-cause SHIBOR.		0.44962	0.6383
Panel C: After COVID-19 (11/03/2020- 07/05/2021)			
SHIBOR does not Granger-cause the exchange rate.	173	2.94060	0.0033
The exchange rate does not Granger-cause SHIBOR.		1.65948	0.2387

Source: Authors

The DCCA detrended cross-correlation coefficient was also estimated in order to capture the cross-correlation between SHIBOR and the exchange rate. The results of the DCCA coefficient for the whole sample period are given in Figure 2. The DCCA coefficient reveals the existence of a weak negative cross-correlation between SHIBOR and the exchange rate over 10 to 15 days, beyond which period, however, cross-correlation is becoming positive and is steadily increasing, only to eventually reach its highest value of 0.333, which implies that, in the short term, changes in SHIBOR and the exchange rate tend to move in the opposite directions but, as time passes, they align and exhibit a positive relationship.

In Figure 3, the DFA coefficient was estimated for the entire study period spanning from February 2, 2019 to July 5, 2021. Both the SHIBOR and the exchange rate showed positive DFA coefficients, with the magnitudes 1.07 and 1.49, respectively, which suggests that both variables demonstrate a long-range dependence or persistence in their dynamics.

Figure 4 shows the DFA and DCCA coefficients between SHIBOR and the exchange rate for the two subsamples (before and after COVID-19). The DFA pre- and post-COVID-19 coefficient is accounted for in Table 5. The DFA coefficient before COVID-19 was 0.89, which increased to 0.96. In a similar fashion, a significant increase in the DFA coefficient for the exchange rate can be noticed as well. The magnitude of the DFA coefficient for the exchange rate was 1.44 and reached 1.47 after COVID-19. The alpha values after COVID-19 are greater than the alpha values before COVID-19, which indicates greater persistence.

Table 5 The DFA pre- and post-COVID-19 coefficient

Variable	$\alpha_{\text{DFA Before COVID-19}}$	$\alpha_{\text{DFA After COVID-19}}$
SHIBOR	0.89	0.96
Exchange Rate	1.44	1.47

Source: Authors

The DCCA coefficient reported in Figure 4 (before COVID-19) shows that there was a weak negative cross-correlation for the initial 10 to 15 days, which faded away in the long run. However, the results reported (after COVID-19) are interesting. The cross-correlation was weak and negative in the initial 10 days. However, this correlation became positive and reached the highest magnitude of 0.666. This positive cross-correlation between SHIBOR and the exchange rate suggests that increases in the SHIBOR rate are associated with the higher exchange rate, which might oppose the conventional approach and best fit the "pervasive effect". The "pervasive effect" is the phenomenon implying that monetary authorities implement higher interest rates in order to control the exchange rate depreciation. However, such a higher interest rate further deteriorates the exchange rate instead of improving it.

From the point of view of the policy, these results have important implications. The positive DFA coefficients suggest that both SHIBOR and the exchange rate demonstrate persistent dynamics, thus indicating the presence of memory or long-term patterns in their behavior, which on its part is implicative of the fact that policymakers should consider the prior behavior and trends of these variables when formulating monetary and exchange rate policies. The findings of the DCCA coefficient highlight the existence of a time-varying relationship between SHIBOR and the exchange rate. In the short run, negative cross-correlation suggests a potential hedging effect, where fluctuations in one variable may offset the impact of the other. However, in the medium to long run, positive cross-correlation indicates synchronization between SHIBOR and the exchange rate, implying that changes in one variable tend to coincide with changes in the other. This information may guide policymakers in their understanding the interplay between the interest rate (SHIBOR) and the exchange rate, and it may help them design more effective policies to manage these variables. For instance, when

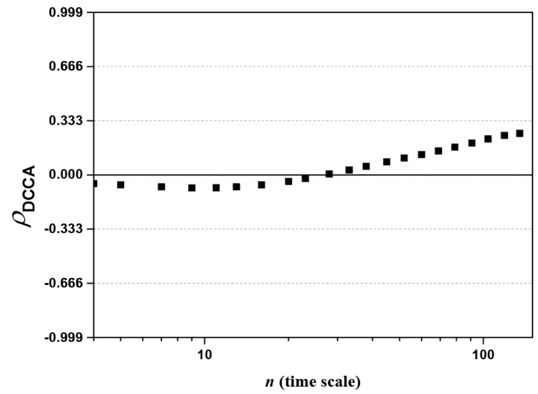

Figure 2 The DCCA coefficient for the whole sample (02/01/2019-07/05/2021)

Source: Authors

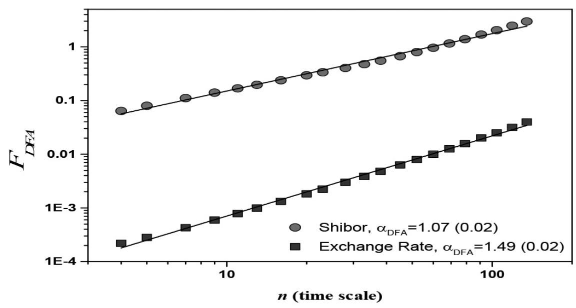

Figure 3 The DFA coefficient for the whole sample (02/01/2019-07/05/2021)

Source: Authors

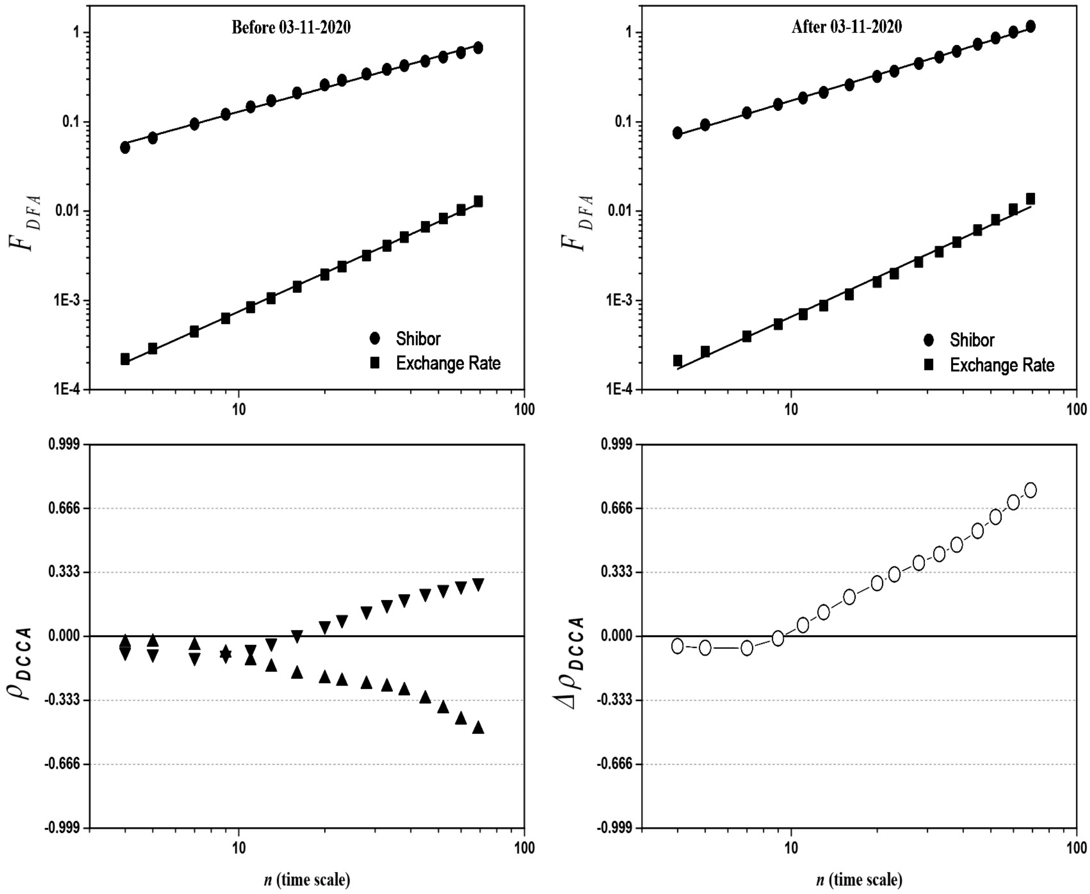

Figure 4 The DFA and DCCA pre- and post-COVID-19 coefficients

Source: Authors

considering measures to stabilize the exchange rate, policymakers should consider a potential impact of changes in the interest rate, given the fact that the two variables are becoming positively correlated over time. It is worth mentioning that the study has but one limitation, which is the fact that both the interest rate dynamics and the exchange rate dynamics can be affected by the other factors as well, for which reason this analysis is recommended as a future research question: how might the interest rate dynamics and the exchange rate dynamics change if the other factors are taken into account (e.g. the effects of the foreign trade flow, capital flows and so on).

CONCLUSION

The study findings suggest the presence of a weak correlation between SHIBOR and the exchange rate. However, a noteworthy change is observed when the data are classified into two periods, the period before and the period after the outbreak of COVID-19. Following the onset of COVID-19, the correlation between SHIBOR and the exchange rate becomes positive, indicating a stronger association between the two variables. Thus, the first hypothesis of this research study, which says that there is a positive correlation between the interest rate and the exchange rate in China, is accepted. In a similar fashion, the second hypothesis, which says the correlation pattern between the interest rate and the exchange rate might change during COVID-19, is also accepted. Moreover, the casualty pattern also changed during COVID-19. Several reasons might justify such behavior, for example, monetary intervention to reduce higher inflation during COVID-19 by applying higher interest rates. In a similar way, the investor seeks safe haven currencies during COVID-19 that build downward pressure on domestic currencies and might cause downward pressure on the Chinese currency (depreciating the Chinese Yuan). The COVID-19 pandemic has introduced a considerable level of instability and unpredictability in financial markets, causing investors to reevaluate their risk preferences (Hussain *et al*, 2023). Consequently, the capital flows that determine exchange rates have become more uncertain and challenging to anticipate. In certain instances, investors may prioritize the stability and reliability of a currency over its interest rate, which can strengthen the correlation between interest rates and exchange rates. These circumstances highlight the intricate nature of the relationship between these factors, particularly during the times of crisis, such as the ongoing pandemic (Hussain *et al*, 2023). These findings have significant implications for policymakers, particularly during the times of crisis, such as the COVID-19 pandemic. Policymakers should closely consider the relationship between SHIBOR and the exchange rate when formulating effective strategies. Positive correlation implies that adjustments in SHIBOR are more likely to coincide with movements in the exchange rate during COVID-19 crisis periods. To optimize policy effectiveness, policymakers could coordinate the interest rate adjustments (SHIBOR) to stabilize the exchange rate during economic turmoil. By synchronizing these actions, potential adverse effects can be mitigated, which may contribute to a more stable financial environment.

Moreover, strengthening the correlation over time in the early stages of the COVID-19 period emphasizes the importance of timely and adaptable policy responses. Policymakers should closely monitor and reassess the evolving relationship between SHIBOR and the exchange rate as the crisis unfolds, which enables them to promptly adjust policy measures, thus ensuring better alignment between monetary policies and the exchange rate dynamics. Understanding the dynamic relationship between SHIBOR and the exchange rate, particularly during crises, can enhance policymakers' ability to develop effective monetary policies. By acknowledging positive correlation and its evolution, policymakers can make well-informed decisions to foster stability in both financial markets and the exchange rate movements.

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