

# Will the US Dollar Hegemony as the World Reserve Currency Be Replaced? An Exploratory Study

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## Abstract

The understanding of the behavioral economics of how the US\$ has been performing as an international reserve currency since 1945 seems to face a serious threat posed by the BRICS coalition nowadays. The study aimed to assess the long-term stability of the US dollar as an international reserve currency in light of the emerging challenge from the BRICS coalition. The research used ARDL and ECM analysis to address two main questions. First, the study confirmed that the US dollar's long-term equilibrium as a reserve currency is stable. Second, it found that the US economic and monetary infrastructure appeared more resilient than that of the BRICS countries. This suggests that a shift away from the US dollar as a world reserve currency is not likely in the near future. The study also raised the need to consider designing a better monetary system for the modern world.

*Keywords:* US Dollar hegemony, BRICS, ARDL and ECM analysis, world reserve currency, economic and monetary infrastructure

## Introduction

After the dominance of the United Kingdom's pound sterling (£) in 1931, the preparation of the US dollar (USD) as a reserve currency since the Bretton Woods conference in 1944 does seem to dominate the world central banks' international reserves and the international foreign exchange (forex) market. A reserve currency is held by a country's central bank and its banking system in large quantities to make international payments and reinforce the value of its currency. Martins (2014) summarized the dominance of the international monetary system's reserve currency from the British £ (1810-1931) to the USD since 1945. The year 1931 was marked by the United Kingdom's abandonment of the gold standard system, as well as the effect of the great depression during the 1930s when the international trade markets began to look at buying US treasury securities with the USD. This was the first time USD was regarded as an anchor currency (Williamson, 1985). However, since the Russian annexation in 2014 and invasion of Ukraine in 2022, particularly with the US and

European Union's sanctions on Russia, the USD as the world reserve currency is under threat. Linney et al. (2023) specified these sanctions as comprised of the US Treasury Office of Foreign Assets Control (OFAC) restrictions:

1. Conducting business in Ukraine
2. Restrictions: Import from Russia, maritime transport, consultant working in Russian metal and mining products, finance and banking services in Russia,
3. Ban on service exports (accounting, trust, consultancy, quantum services, etc.) and specially designated national (SDN), including that of oligarchs and Russian elites.

This study tested the stability of the US dollar (USD) in comparison to the British Pound (£), Euro (€), and Chinese yuan (CNY) against the challenges presented by the BRICS coalition. Since 1875, the monetary system has transitioned from the gold standard to the floating exchange rate system after the collapse of the Bretton Woods regime, which had a fixed exchange rate

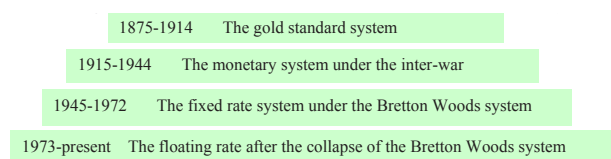
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system pegged to the value of gold. This transition occurred in the 1970s when US President Richard Nixon suspended the convertibility of the US dollar to gold.

The floating exchange rate system has existed from that time until the present. Figure 1 presents a summary of the history of the world’s monetary system. The gold standard was abandoned because of its propensity for exchange rate volatility. The collapse of the Bretton Woods regime was mainly caused by the need of some European countries to convert their reserves into more gold, which motivated President Richard Nixon to suspend the gold convertibility in 1971 (Ghizoni, 1971).

**Figure 1**

*The Stages of the International Monetary System (1875 – present time)*



**Progress of the USD Dominance**

As mentioned earlier, the USD practically became the reserve currency since the Bretton Woods system took place in 1944, which led to more investment in US Treasury securities, regarded as safe investments. This dominance was mainly motivated by the US-Saudi Arabia’s petrodollar agreement when the world international trades used the USD as a reserve currency.

**Table 1**

*Growth of Global Forex Turnover and International Reserves in Billion US\$*

Reserve Currency	Global Forex Turnover			Global International Reserve		
	2022	2013	Growth*	2020	1920	Growth*
American USD	88.5	87.0	0.2%	62.0	27.9	0.8%
Eurozone €	30.5	33.4	-1.0%	21.2	n/a	n/a
United Kingdom £	12.9	11.8	1.0%	4.7	68.9	-2.6%
Chinese CNY	2.0	7.0	-12.1%	2.2	n/a	n/a

Source: *International Monetary Fund*. \*CAGR % (compounded annual growth rate)

This was shown by the 87.0% and 88.5% global foreign exchange (forex) turnover in 2013 and 2022, respectively, as well as the global international reserves domination of 62.0% in 2020. The £/USD and €/USD have traditionally and consistently shown as active over-the-counter foreign exchange currencies, despite what happened to the € and USD, which are currently under pressure by the BRICS coalition due to the Russia annexation (2014) and the Russian-Ukraine war (2022). The CNY over-the-counter trading turnovers seemed to decline from 7.0% (2013) to 2.0% (2022) in Shenzhen, Suzhou, and Chengdu, with a 2.2% international reserve holding in 2020 (Bansal & Singh, 2021). Will the findings on this US\$ dominance still indicate the USD hegemony as a reserve currency despite the emergence of the BRICS coalition to de-dollarize?

**Historical Shift from British £ to US\$ as a Reserve Currency**

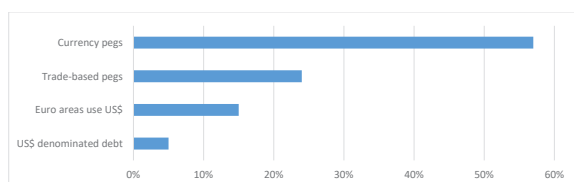
With the deficits and less gold holding, the US treasury printed more paper money, leading to further USD circulation worldwide. With this more USD circulation, Eagle (2021) described the evolvement of reserve currency from the £ to USD during the period 1920-2020. First, regarding the global central banks’ holding, a shift from £ 68.9% in 1920 to the mentioned USD 62.0% in 2020 occurred. The European € began to pick up in its global reserve and recorded a 21.2% share in 2020, while the Chinese CNY struggled and ended up only 2.2% in 2020. Second, in terms of global foreign exchange turnovers, the USD had indicated a convincing share of 87.0% in 2013 to 88.5% in 2022, which grew at a compounded annual growth rate of

0.2% per year, while the Chinese CNY tremendously declined from 7.0% in 2013 to only 2.2% in 2022 (see Table 1).

Even amid the 2020 coronavirus pandemic, the landscape of the world forex trading indicated the USD as the majority mover with USD 5,824 billion turnovers per day, followed by the € with some USD 2,129 billion per day (16.1%), as well as the liquidity swap transactions of USD 3,008 billion and USD 1,168 billion dominated by the USD and €, respectively, according to the US Federal Reserve Bank. Arslanalp et al. (2022) further observed that the USD had become the world currency peg (56%), followed by trade shares (24%), Euro areas international trades (15%), and debt shares (5%), which they mentioned as a strong foundation, also shared earlier by Costigan et al. (2017). Refer to Figure 2.

**Figure 2**

*Chart of the Percentage Weight of USD Function*



Weiss (2022) and Kaltenbrunner, et al. (2017) were not even convinced that the US\$ hegemonic power would fade soon. They discovered that even with a reduced USD-trade invoicing and debt denomination by the large bloc of countries less geopolitically attached to the US, they would unlikely use the USD as their reserve currency.

### **Emergence of the CNY as USD Contender**

Other than the BRICS' 5-R currencies (Brazilian real, Russian ruble, Indian rupee, Chinese renminbi, and South African rand), China seemed to strive hard to promote its renminbi or its principal unit, Chinese yuan

(CNY), to be internalized as the USD contender currency. First, the countries involved in international trade had been accumulating Chinese CNY in their international reserves.

In the early 2020s, the African countries with CNY total reserves equivalent to USD 47.6 billion, with Angola and Kenya, keeping the largest amount of USD 13.8 billion and USD 8.3 billion, respectively, was proof of their confidence in CNY. The other confident countries were Tanzania, Botswana, Mozambique, Uganda, Namibia, Rwanda, Zambia, Lesotho, Malawi, Eswatini, Burundi, and Zimbabwe. Second, Stein & Uddhammar (2021) confirmed that China had become Africa's biggest bilateral trading partner, lender, and foreign investor, with a certain degree of influence. Third, even Russia had been increasing the CNY reserve as well, which, as of the end of 2021, was estimated at an equivalent of USD 88.7 billion. Fourth, Hooijmaaijers (2021) commented that Chinese outward foreign direct investments were said to be one of the primary movers of the economic cooperation among Brazil, Russia, India, China, and South Africa or BRICS, exactly as commented by Qiu and Zhao (2019) earlier. Fifth, Said & Kalin (2022) reported that with the rising oil prices, oil-exporting countries, including Saudi Arabia, had considered accepting CNY for their oil sales to China since 2014. Those are some of the countries that are currently looking at the CNY.

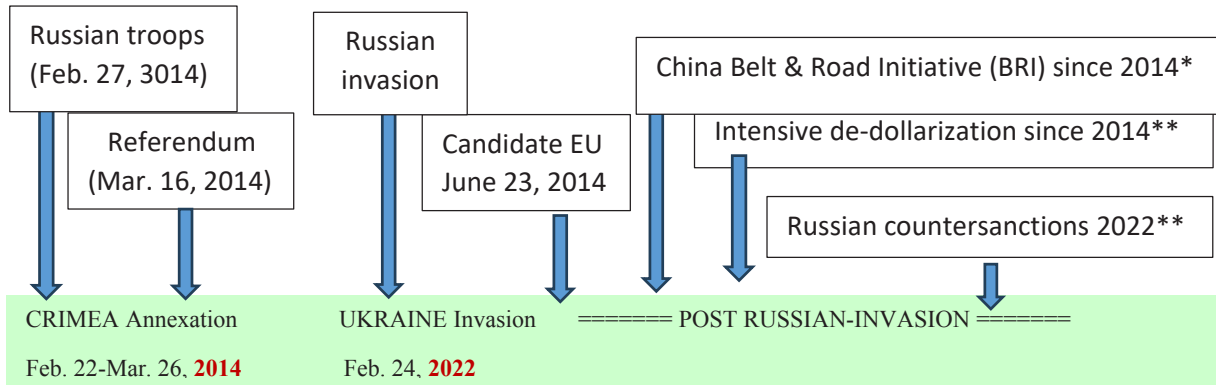
### **BRICS' Strategies to De-Dollarize**

The amalgamation of China's BRI and Russia's countersanction in de-dollarization seems to be a good coincidence for the BRICS coalition. Hill (2023) interpreted the BRI projects as an enhancement of the de-dollarization effort besides China's original geopolitical and economic objectives to boost its advanced economic system, more especially with the joining of the BRICS' six new members— Argentina, Ethiopia, Egypt, Iran, Saudi Arabia, and United Arab Emirates (UAE). Through these Arab countries, among others, the

BRICS coalition will be able to expand access to the Greater Arab Free Trade Area (GAFTA) and African markets.

**Figure 3**

*Map of the BRICS-Coalition's De-Dollarization Efforts Post Russian-Invasion*



\*Post-invasion indirect effect to compete with the US \*\*Post-invasion direct effect

Aiming at a high-technology economic system, China has been developing this Belt & Road Initiative (BRI), which is comprised of two infrastructure projects, the Silk Road Economic Belt and Marco Polo Silk Road connecting China with Southeast Asia, Africa and Europe, through railroad, shipping and energy ventures. Refer to Figure 4.

1. New Silk Road connecting Xiam to Rotterdam and Venice.
2. Maritime Silk Road connecting Fuzhou to KL/Jakarta to Kolkata, Mombasa, and back to Venice.
3. China Pakistan Corridor through Kashgar, Islamabad, Gwadar

**Figure 4**

*China Sphere of Regional Influence of the Belt & Road Initiative (BRI)*

Despite the loyalty doubt of China's partnership in the BRICS-coalition as well as in the BRI projects, Jie & Wallace (2021) argued that China is still not certain about the loyalty



of its partnership with its trading partners even the BRICS-coalition, i.e., Russia and the other Eurasia partners like Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyzstan, as they belonged to the former Soviet Union, as well as the partnership with Pakistan, which is the old adversary of India (BRICS member) and as the corridor runs near the disputed Kashmir region.

Stemming from the same loyalty doubt, McNamara (2023) has a certain degree of reservation and pessimism due to the perceived fragmentation of the members' structure of their economic performance, as China's share dominates more than seventy percent in terms of the BRICS' national outputs (USD 17.7 trillion out of the total BRICS' USD 24.7 trillion), as well as pessimism on how the centrally-planned economies might successfully transform into well-functioning market economies (Calvo & Frenkel, 1991). The latter cited some of the reasons, like the anticipatory dynamics, monetary pressure, budgetary priority for the system first, and underdeveloped credit markets, in addition to what McBride et al. (2023) said as China's staggering attempt to trap borrowing countries under a debt trap.

Nevertheless, Lisovolik (2023) reported a more convincing picture of the BRICS' intra-trades, which they expected to continually increase soon in the quest for de-dollarization, especially amid the request of nineteen countries to join recently (Vecchiato, 2023). Nelson & Sutter (2021) set forth the steps of China and Russia's de-dollarization efforts as those to include the following: First, China has established CNY trading centers in Hong Kong, Singapore, and Europe; cross-border stock exchange connection programs, and even requested the International Monetary Fund (IMF) to include CNY in the benchmark basket of international currencies in 2016. Second, Russia began reducing USD holdings and shifting to other currencies like €, £ or Yen despite the discouragement of the G-7, including that of reducing USD in its international trades, as confirmed by Garver (2022), creating a new international

payment system called the STFM (System for Transfer of Financial Messages) to replace the SWIFT (Society for World Interbank Financial Telecommunications) established by the US. Refer to Figure 3 to understand the history of Russia's annexation and invasion.

### **Statement of Problem and Research Questions**

With the current weakening of US economic conditions, there are growing concerns about the dominance of the USD as the world reserve currency, especially in the aftermath of the Russian invasion. Will another currency replace the USD as the world reserve currency? Based on this problem statement, the study aims to address the following research questions:

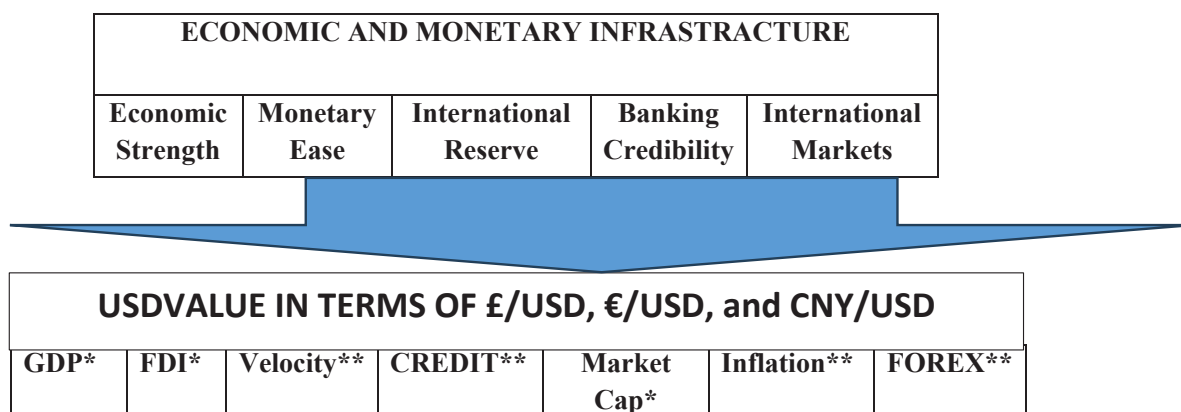
1. Does the value of the USD as a reserve currency in the European markets (in terms of €/USD and £/USD) and in the Chinese markets (in terms of CNY/USD) during the period 1990-2022 indicate long-term stability?
2. How does the economic and monetary infrastructure resilience of BRICS compare to that of the US in supporting a reserve currency?

### **Reserve Currency Theoretical Framework**

The theoretical framework of the study is based on the IMF's concept of how the economic and monetary infrastructure had facilitated the resilience of the USD as the world reserve currency post-Bretton Woods Conference in July 1944 (Boughton, 2002), which had originated the international monetary theory. Dimand (2013) has magnified the theory of quantity of money of Irving Fisher and David Hume, which involves the economic function of national output coined as the gross domestic product (GDP) and the mechanism of investment, which has given high importance to foreign direct investment (FDI) and value of the firm in terms of market capitalization or stock value in the firm's equity investment. Refer to Figure 5.

**Figure 5**

*Theoretical & Conceptual Framework of World Reserve Currency*



*\*Economic infrastructure (based on John Maynard Keynes and Robert A. Mundell theories)*

*\*\*Monetary infrastructure (Keynes' reserve currency theory and Irving Fisher's quantity theory of money)*

Considering the economic strength of the US and its allies, Dunn (2022) commented that a relatively resilient economic and monetary infrastructure should be required to protect the successful function of a reserve currency.

**Economic Infrastructure for An International Currency**

Siripurapu and Berman (2023) argue that the strongest economic infrastructure that supports the US\$ are the IMF and World Bank. The result of the Bretton Woods conference resolution in 1944 was in line with Keynesian economics, not to mention the other strong US and its allies' financial institutions, including that of the huge eurocurrency market. On the other hand, the economic infrastructure, based on Robert A. Mundell's theory on "optimal currency area" or OCA, has highlighted the essential importance of the GDP in purchasing power parity (ppp,  $\beta_{21}GDP_{t-1}$  in the main equation), foreign direct investment or FDI ( $\beta_{4i}FDI_{t-1}$  in the main equation), and market cap (capitalization,  $\beta_{7i}CAP_{t-1}$  in the main equation) in a certain currency area. An example is the European Union, the US ally, with its € currency, which has performed optimally as the second strongest reserve currency after the USD. First, Brueckner (2021) pointed out the need for the international currency to play an important

role in strengthening international trade for a better GDP per capita. He implied that GDP per capita could be a vehicle for an international currency's further development and more robust infrastructure, as Stobierski (2022) supported. Second, Ozeki & Tavlas (1992) explained the reasonableness of the international currencies' fundamental economic functions as a medium of exchange, store of value, and unit of account as theorized by the Mundell theory. Third, despite a limited number of relevant variables (only GDP, total reserves % of GDP, and consumer price index), Bartik and Karabulut (2023) evaluated China's economic infrastructure to become a potential strong currency in the future.

**Monetary Infrastructure for An International Currency**

Based on John Maynard Keynes' theory of reserve currency, Iancu et al. (2017) argue that the resilience of the USD as the global reserve currency is an instrument of US hegemonic power. This Keynesian economic theory further leads to the reinforced monetary infrastructure resilience that umbrellas the USD hegemonic power as a global currency. It is exactly what the BRICS coalition is putting the best effort into, which is expanding the membership of the coalition to add weight to the BRICS coalition's chosen currency. Loeff & Monissen (1999)

brought forward Irving Fisher's quantity theory of money, ultimately leading to the argumentation of strong money as an international currency. And strong money leads to an internationally reputable currency. Fisherian Monetary Model is expressed in the following natural-logarithms-based equation:  $m v = p t$ , where  $m$  = money supply at home,  $v$  = velocity in terms of a country's total output,  $p$  = price of goods at home, and  $t$  = trade or actual output production. The underlying thought for a monetary infrastructure development lies in the monetary policy reform called open market policy, which is the central bank's buying or selling of government securities in the open market. It further leads to the development of an internationally reputable currency.

### Methodology

The study aimed to explore whether the USD, as the world's reserve currency, would be replaced by the currency chosen by the BRICS coalition. It focused on assessing the stability of the USD as a reserve currency in relation to the euro (€/USD in the Eurozone), the British pound (£/USD in the London market), and the Chinese yuan (CNY/USD in the Chinese markets).

### Method of Research

The study was fundamentally quantitative and exploratory to answer whether the USD hegemonic power would be replaced by a currency to be created by the BRICS coalition.

**Quantitative Method.** To analyze the level of cointegration of the USD exchange rate value in terms of €, £, and CNY, we tested the autoregressive distributed lag (ARDL) model coupled with the error correction model (ECM). Bhatta & Shrestha (2018) confirm that unless the order of integration does not have any unit root (zero-unit root) or is expressed as  $I(0)$ , the method of vector autoregressive or VAR should not be used in the cointegration, as confirmed by Johansen (2020).

**Exploratory Method.** To explore the

hegemonic power of US and BRICS coalition's reserve currency, the economic and monetary capacities of both powers must be evaluated in terms of resilience of their economic and monetary infrastructure.

### Research Analysis

**First Research Question.** To answer the first research question, the distributed lags of an autoregression were simply used as an ordinary least square or OLS of the model with mixed order of integration or a mixture of  $I(0)$ ,  $I(1)$ , or even  $I(2)$  and above, which were revealed from the unit root analysis. The first order, or  $I(0)$ , indicated a time series with no unit roots. Based on the mixture, the ECM was designed to designate that the previous year's error would be corrected at a certain speed,

where,

$\Delta y_t$  (€, £, CNY) per USD = the change of the marginal utility of the reserve currency (*in the markets of the respective countries where the currencies come from*), i.e.,  $\Delta\text{€}/\text{US\$}$  (from one period to the other).

$a_0$  = Alpha or the constant

$\beta_{1i} \Delta y_{t-1}$  (short-run equilibrium) = Coefficient of  $y$  or €, £, and CNY per US\$, value in period  $t$  and before  $t$ . The same with those for  $\beta_{2i} \text{GDP}_{t-1}$ ,  $\beta_{3i} \text{CURR}_{t-1}$  (current accounts balance),  $\beta_{4i} \text{FDI}_{t-1}$  (foreign direct investments),  $\beta_{5i} V_{t-1}$  (velocity of broad money),  $\beta_{6i} \text{CRE}_{t-1}$  (credits),  $\beta_{7i} \text{CAP}_{t-1}$  (market capitalization),  $\beta_{8i} \text{INF}_{t-1}$  (inflation index), and  $\beta_{9i} \text{FORX}_{t-1}$  (foreign exchange transactions).

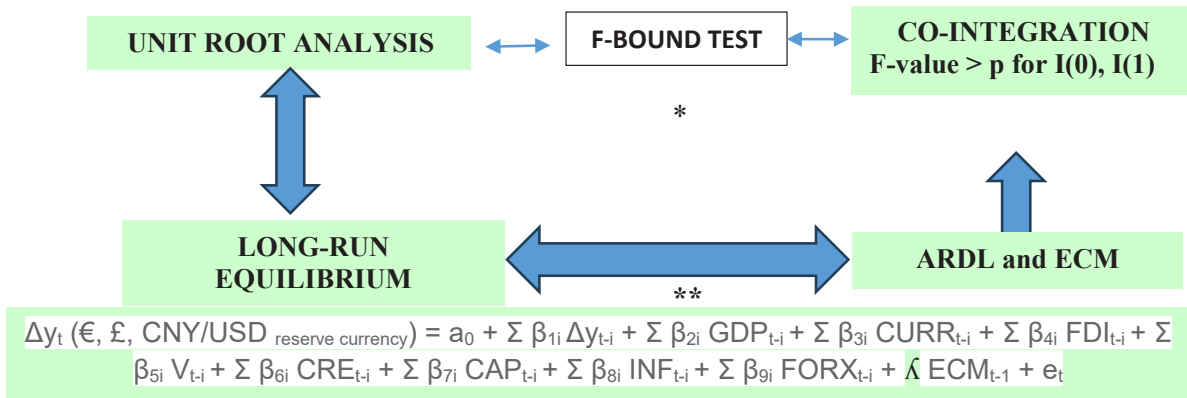
$\lambda \text{ECM}_{t-1}$  (long-run equilibrium) = The  $\lambda$  of the error correction model generates the values that determine the long-run equilibrium posed by the ECM

$et$  = vector of error terms

The cointegration analysis framework was based on a diagnostic stability, adopting the ARDL coupled with the ECM, as shown in

**Figure 6**

*Conceptual Framework of the A Long-run Equilibrium USD Reserve Currency.*



*\*Unit root and F-Bound test to answer the first research question. \*\*ECM to answer the second research question.*

**Second Research Question.** The second research question was exploratorily evaluated using an International Monetary Fund (IMF) reserve currency rubric analysis to assess the USD and BRICS’ currency resilience as the world reserve currency in terms of the related infrastructure that supported the currency. The assessment was made by perceiving the resilience of the economic and monetary infrastructure to support the currency using the 8-scale rating (1-not resilient at all, to 8-extremely resilient). Based on the Bank International Settlements 2022 statistics, the infrastructure components of the rubric were comprised of the following: First, economic strength; second, ease of monetary conditions; third, international reserve adequacy; fourth, banking system credibility; fifth, international financial market.

**Results and Discussion**

The resulting co-integration analysis of the USD exchange rate movement in terms of €/USD, £/USD, and CNY/USD, as well as the resilience of the economic and monetary infrastructure to support a reserve currency, are presented.

**First Question – Diagnostic Stability of the**

**USD**

To answer the first question, the presence of the unit roots and order of integration were tested first to explore the diagnostic stability utilizing an F-Bound test, ARDL & ECM, and Granger-causality test from 1990 through 2022.

**Unit Root Analysis**

Using the unit root hypothesis test, “*there were no unit roots in the time series of the USD values,*” the first research question sought to determine the pattern of the co-integration. The analysis revealed a mixture of the I(0) and I(1) order of integration with most p values of lesser than 0.05 significance level, which complied with the stationarity rule.

The foreign exchange transactions as a % of GDP (ppp) indicated a strong order of integration in the Eurozone, UK, and China’s markets. The €/USD, £/USD, and CNY/USD revealed an F-value = -5.294, p = 0.000; F-value = -4.396, p = 0.002; and F-value = 11.456, p = 0.000, respectively, with the latter (CNY/USD) as the strongest in the level order of integration or I(0) or an order with no unit roots at the highest F-value (Refer to Table 2).



**Table 2**

*Unit Roots Analysis (Levels, 1<sup>st</sup>. and 2<sup>nd</sup> Differences) of All Currencies in Home Markets*

Variable	€/USD		£/USD		CNY/USD	
	ADF	<i>p</i>	ADF	<i>p</i>	ADF	<i>p</i>
Exchange rate*	-4.390	0.002	-4.533	0.001	-5.460	0.000
GDP	-3.871	0.006	-5.209	0	-7.145	0.000
CURR	-4.643	0	-4.283	0.003	-5.102	0.000
FDI	-5.380	0	-3.683*	0.009*	-4.281	0.002
V	-4.910	0	-4.096	0.004	-5.588	0.000
CRE	-4.698	0	-3	0.047	-4.808	0.000
CAP	-5.379	0	-5.281	0	-5.973	0.000
INF*	-5.323	0	-4.239	0.003	-3.053	0.042
FOREX*	-5.294	0	-4.396	0.002	-11.456	0.000
<b>Average ADF</b> <i>t</i> -value	-4.937		-4.273		-5.926	

NOTE: Using E-View software, the unit roots and lag optimality are determined. \*Stationary at level or I(0) order

**F-Bounds (upper and lower) Test**

With the asymptotic  $n = 1000$ , the period under observation (1990-2022), or 32 years, indicated a critical *t*-value of 2.110 and 3.150 for the order of integration of I(0) and I(1), respectively. The related F-values of the USD exchange

rate movement in the three currencies' home markets were compared to the above I(1) of the first differences or I(0) for stationarity level.

**Table 3**

*F-bound Test Result and Short-run Equations of USD Exchange Rate Movement*

*F-bound Test Result and Short-run Equations of USD Exchange Rate Movement*

Transaction	F-value*	<i>t</i> -gdp**	<i>t</i> -curr**	<i>t</i> -fdi**	<i>t</i> -forx**
Home market:					
Euro (€)	6.632	-5.994	n/a	n/a	4.313
Pound (£)	3.964	n/a	n/a	1.371	n/a
CNY	9.927	2.767	3.839	n/a	n/a

\*The *p* values of I(0) = 2.110 (lower bound) and I(1) = 3.150 (higher bound) denote the limit of the F-bounds, i.e., F-value of £/USD (3.964) is > than *p* (2.110) of the order integration, the H0 (there is no level integration) is rejected, and vice versa.

\*\* The *t*-value result > 1.96 (+ and – for both tails) indicates a significant difference, implying that the result is likely not due to chance.

All F-values in the three home money markets for the USD seemed to indicate a strong co-integration because they were all larger than the critical *t*-values of the above-mentioned order

integration. The more significant USD exchange rate movement in CNY/USD recorded an F-value of 9.927, followed by the €/USD and £/USD at F-value = 6.632 and F-value 3.964, respectively. Refer to Table 3. It typically interprets that a co-integration at a certain order of integration statistically exists even though its diagnostic stability must be tested first. It is expressed through the cumulative sum or CUSUM of the deviations from a target. A structural break occurs if the CUSUM goes beyond the upper or lower

bound. The t-values larger than 1.96 designated significant differences, implying that the results were likely not due to any sampling error. The greater the F-value than that of the t-value in the F-bound test led to the finding of co-integration in the time series, i.e., € (F-value = 6.632 > all t-values), £ (F-value = 3.964 > 1.371 t-value), and CNY (F-value = 9.927 > all t-values).

**ARDL and ECM**

The ARDL model was used for the short-run equilibrium, and the ECM for the long-run equilibrium determination, due to the mixture of the available order integration of I(0) and I(1). These two cycles were adopted to pinpoint the related variables that affected the USD exchange rate movement.

Using the Breusch-Godfrey serial correlation, the three-movement values of the USD trading in terms of €, £, and CNY indicated that no serial correlation caused estimated variances of the regression coefficients to be biased or resorting to unreliable H0 testing. With this finding, the equation formulation for the short and long-run equilibrium of the USD exchange rate movement in the Eurozone, UK, and China for the period 1990-2020 were derived

as follows:

$$\begin{aligned} \text{€/US\$ in European markets: } \Delta y_t (\text{€/USD}) = & 0.030 - 0.008 (-1) - 13.886 (-1) - 0.796 (-1) + \\ & 0.014 (-1) - 0.544 (-1) - 0.002 (-1) - 0.000 (-1) - \\ & 0.017 (-1) + 0.878 (-1) - 1.353 + e_t \end{aligned}$$

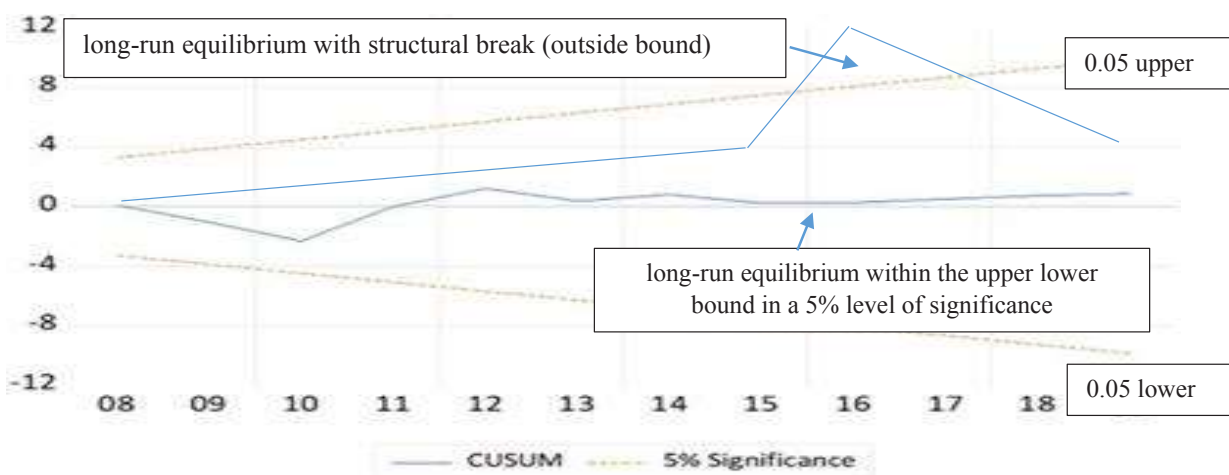
$$\begin{aligned} \text{£/US\$ in UK markets: } \Delta y_t (\text{€/USD}) = & 0.002 \\ & + 0.107 (-1) - 4.560 (-1) + 0.028 (-1) + 0.000 (-1) \\ & + 0.004 (-1) - 0.003 (-1) + 0.001 (-1) + 0.001 (-1) \\ & - 0.035 - 2.761 (-1) - 1.119 + e_t \end{aligned}$$

$$\begin{aligned} \text{CNY/US\$ in Chinese markets: } \Delta y_t (\text{CNY/} \\ \text{USD}) = & 0.052 - 0.167 (-1) + 3.552 (-1) - 0.048 \\ & (-1) - 0.020 (-1) + 0.213 (-1) + 0.093 (-1) - 0.069 \\ & (-1) + 0.019 (-1) + 18.268 (-1) - 0.958 + e_t \end{aligned}$$

In terms of stability, the cumulative sums (CUSUM) of the above three USD values in terms of the contender currencies at their home markets significantly depicted long-run equilibrium within the 0.05 (upper) and -0.05 (lower) level of significance, with no deviations or structural breaks at all. This is proof that US\$ diagnostic stability is long-term. Refer to Figure 7.

**Figure 7**

*Cumulative Sum of Control Chart Applied in the Long-run Equilibrium Equations*



### Granger-causality Relationship

The Granger-causality relationship of the USD exchange rate movement values in terms of €, £, and CNY in the home market led to the long-run equilibrium, which changed the USD value. In the study of financial economics, Ferreira (2022) used a statistical concept of a two-way vector causality for prediction based on linear regression modeling. It was developed in the 1960s and widely applied in economics.

The main finding of the Granger-causality analysis in Table 4 revealed that the USD exchange rate movement values in all contender currencies' respective home money markets seemed to indicate strong evidence of causality. The home markets' current accounts deficits as a % of GDP or CURR had Granger caused the €/USD (F-value = 5.354, p = 0.029) and CNY (F-value = 4.883, p = 0.036) values. On the contrary, the £/US\$ Granger caused the home market's current accounts as a % of GDP (F-value = 5.232, p = 0.030). Refer to Table 4.

**Table 4**

*Granger-causalities of the US\$ Exchange Rate Movement and the Related Variables*

Transaction	Model	F-value	P	Granger-causality Vector
Home market:				
Euro (€)	110 <sup>6</sup> 1	5.354	0.029	CURR causes €/S
Pound (£)	10 <sup>2</sup> 10 <sup>5</sup>	5.232	0.030	£/\$ causes CURR
CNY	1110 <sup>6</sup>	4.883	0.036	CURR causes CNY/\$
			0.001	INF causes CNY/\$

that of the US, particularly on the US negative current account balance as a percentage of GDP of -3.6%, relatively high external debt as a percentage of gross national income of 126.4% more than that of BRICS' 28.6%. The US' other economic and monetary infrastructure seemed to be on the same footing as the BRICS'. Please refer to Appendix A for the statistical details.

### Second Question – Resilience of the USD as a Reserve Currency

Even though we are not yet aware of the BRICS' adopted currency, the IMF reserve currency rubric evaluation revealed that the USD would seem more resiliently supported by its economic and monetary infrastructure than that of the BRICS on an overall basis. The US international market performance and the banking system credibility seemed to be perceived higher than that of the BRICS; i.e., market capitalization of USD 45.0 trillion compared to the BRICS' USD 13.7 trillion, over-the-counter (OTC) foreign exchange deals of USD 6.6 trillion with a 10.5% CAGR compared to a relatively small turnover of USD 0.8 trillion with a 3.8% CAGR, as well as the US over-the-counter derivatives transactions of USD 3.8 trillion compared to a relatively small transactions of USD 0.4 trillion. The US banking system, with total assets of USD30.2 trillion compared to BRICS' USD 5.3 trillion, also demonstrated a much better performance with a low non-performing loan rate of 0.8% compared to the BRICS' 4.6%.

In fairness, the BRICS' economic strength slightly demonstrated more resilience than

### Conclusion and Recommendations

The study found that the value of the US dollar in relation to the Euro, Pound, and Chinese yuan in their respective markets had a strong long-term relationship with the order of integration of I(0) and I(1). This shows that the stability of its long-term equilibrium can be controlled within the upper and lower 0.05 level of significance. Additionally, despite

concerns about the US dollar's hegemony as the world's reserve currency, analysis of the IMF reserve currency framework revealed that the US dollar is still backed by a resilient economic and monetary infrastructure on an overall basis. However, it's important for the US and its allies not to underestimate the potential impact of the BRICS coalition on reducing the dominance of the US dollar.

The implication is that despite the much-needed improvement of the BRICS coalition's economic and monetary infrastructure, the US and its allies must not underestimate the former's power to reduce reliance on the dollar. Both parties need to closely cooperate with the single markets like the European Union or EU members (the US' current allies), the Gulf Cooperation Council or GCC (the entire BRICS coalition might be interested in), the Caribbean Community or CARICOM (Brazil might be interested in), and the Eurasian Economic Union or EEU (Russia might be interested in). Additionally, world foreign exchange transactions must be diversified, and the USD has shown significant performance compared to the modest performance of the British nations. Besides, capital-market-based regions must be fully developed, which the BRICS coalition has to catch up with in the future. Also, outward foreign direct investments of the US and its close allies have shown a significant presence in Asia, Africa, Australia, North America, and Europe, which the BRICS coalition also has to catch up with. With the hopeful success of China's Belt & Road initiative, this vision might be carried forward and benefit the BRICS coalition.

As a result, this study concludes that the analysis has established the USD as the dominant world reserve currency with convincing diagnostic stability, at least for the foreseeable future. However, despite the BRICS coalition's significant power, a concern arises regarding whether the future currency chosen by the BRICS coalition will replace the US dollar or reduce its dominance.

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## Appendix A

## An IMF-Reserve Currency Rubric Evaluation Between the US and BRICS Countries

COMPONENT	INDICATORS		RESILIENCE SCALE		NET*
	US	BRICS	US	BRICS	US less BRICS
<b>Economic strength</b>					
GDP in ppp (USD-T)	23.5	24.7	7	8	-1
CAGR% of GDP in ppp	4.0%	6.2%	6	8	-2
(Ex + Imp)/GDP (%)	38.8%	46.1%	6	8	-2
External debt/GNI (%)	126.4%	28.6%	2	6	-4
Current accounts/GDP (%)	-3.6%	1.9%	3	8	-5
<b>Ease of monetary</b>					
GDP/M3 multiplier (x)	0.904	0.901	8	8	0
CPI %	4.7%	4.8%	6	6	0
Total labor force %	50.0%	46.0%	8	7	1
Interest rate (%)	3.3%	11.6%	7	4	3
<b>Int'l reserve adequacy</b>					
Int'l reserve/GDP (%)	3.1%	22.2%	2	6	-4
Int'l reserve in days	11	81	2	6	-4
Gold weight (%)	66%	45%	8	6	2
<b>Banking credibility</b>					
Loan-deposit ratio (LDR)	62%	83%	6	7	-1
Capital adequacy (CAR)	8.6%	8.4%	8	7	1
Non-performing loan (%)	0.8%	4.6%	8	4	4
Assets in trillion USD	30.2	5.3	8	3	5
CAGR% of banking assets	7.9%	4.7%	8	5	3
<b>Int'l financial markets</b>					
Market cap (USD-T)	45.0	13.7	8	3	5
OTC forex deals (USD-T)	6.6	0.8	8	3	5
CAGR% (OTC deals)	10.5%	-3.8%	6	1	5
OTC derivatives (USD-T)	3.8	0.4	8	3	5

\*NET RATING (US' less BRICS' = +39 - 23) = 16, with two 0s (GDP/M3 multiplier and CPI)

Source: Bank of International Settlements (BIS) estimates for the year 2022