

UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

**DEDOLLARIZATION OF INTERNATIONAL TRADE IN THE
CONTEXT OF THE RISE OF THE BRICS GROUP**

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	WORLD RESERVE CURRENCY	3
2.1	Theory of the World Reserve Currency	3
2.2	How and Why Did the US Dollar Become the World Reserve Currency?	6
2.3	“The Triffin dilemma”	9
2.4	Dominant Currency Pricing	12
2.5	Benefits of Dollar Dominance for the U.S.....	13
2.6	Weaknesses of Dollar Dominance for the US	14
3	THE DEDOLLARIZATION PROCESS AND INITIATIVES BY THE BRICS GROUP	14
3.1	Reasons for dedollarization.....	14
3.2	The BRICS group’s dedollarization initiatives and strategies	15
3.2.1	The New Development Bank (NDB).....	16
3.2.2	Oil and gas trade denominated in Chinese yuan	17
3.2.3	Alternative payment systems	18
3.2.4	Reducing the reliance on the US dollar in global capital markets and as a vehicle currency	19
3.3	Challenges in the BRICS dedollarization process	20
4	A NEW BRICS CURRENCY OR YUAN DOMINANCE?	23
4.1	Introduction of a New Common BRICS Currency	23
4.1.1	Optimal Currency Area.....	23
4.1.2	Experiences with the common currency introduction	25
4.1.3	Challenges in Introducing a BRICS Common Currency.....	26
4.2	Internationalization of the yuan	31
4.2.1	Medium of exchange	32
4.2.2	Store of value	33
4.2.3	Unit of account.....	34
4.2.4	Barriers to greater international use of the yuan.....	34
4.2.5	Evaluating the prospects of the two strategies.....	35

5 EMPIRICAL ANALYSIS OF THE FACTORS OF THE DEDOLLARIZATION PROCESS.....	36
5.1 Data and research setting.....	36
5.2 Empirical model specifications and methodological issues.....	45
5.2.1 Regression model specifications and variable definition	45
5.2.2 Methodology.....	47
5.2.3 Descriptive statistics	47
5.3 Empirical results.....	51
5.3.1 Results for foreign exchange reserves allocated in USD	51
5.3.2 Results for foreign exchange reserves allocated in yuan.....	54
5.3.3 Interpretations of empirical results	55
6 CONCLUSION	56
7 LIST OF REFERENCES.....	58

LIST OF FIGURES

Figure 1: Share of allocated foreign exchange reserves by currency in the third quarter of 2023	5
Figure 2: Total reserves in 2022 (millions current US\$)	6
Figure 3: Foreign exchange market turnover by currency and currency pairs, expressed as a percentage of total turnover in April 2019 and April 2022	8
Figure 4: The international role of the US dollar (left) and the US dollar share of official foreign exchange reserves (right) both in percent	9
Figure 5: US total public debt as a % of GDP 1973-2023	10
Figure 6: Average annual inflation rate in the United States using CPI data.....	11
Figure 7: Trade as a share of GDP in 2022 (in percent)	27
Figure 8: Standard deviation of Trade as a share of GDP in 2022.....	27
Figure 9: Annual inflation rate (CPI) in 2022 (in percent)	28
Figure 10: Standard deviation of the annual inflation rate in 2022.....	28
Figure 11: Global Economic Diversification Index	29
Figure 12: Standard deviation of the Global Economic Diversification Index.....	29
Figure 13: Labour Market Mobility Index	30
Figure 14: Standard deviation of the Labour Market Mobility Index.....	30
Figure 15: Progress check on the internationalization of the Chinese yuan	32
Figure 16: Russia's total trade with China settlement by currency in percent 2013-2022 .	33
Figure 17: Central banks' foreign exchange reserves allocated in US dollars as a share of total reserves in % for selected countries in a 2011-2022 period.....	37

Figure 18: Central bank's foreign exchange reserves allocated in Chinese yuan as a share of total reserves in % for selected countries in a 2011-2022 period	38
Figure 19: Exports to USA as a share of total exports in % for selected countries in a 2011-2022 period	39
Figure 20: Imports from USA as a share of total imports in % for selected countries in a 2011-2022 period	40
Figure 21: Exports to China as a share of total exports in % for selected countries in a 2011-2022 period	41
Figure 22: Imports from China as a share of total imports in % for selected countries in a 2011-2022 period	42
Figure 23: Inwards FDI stock from USA in millions of US dollars for selected countries in a 2011-2022 period	43
Figure 24: Inwards FDI stock from China in millions of US dollars for selected countries in a 2011-2022 period	44
Figure 25: GDP per capita for selected countries in a 2011-2022 period	45

LIST OF TABLES

Table 1: Summary statistics.....	48
Table 2: Correlation matrix	50
Table 3: Annual fixed effects of foreign exchange reserves allocated in USD.....	51
Table 4: Fixed effects regression results for foreign exchange reserves allocated in USD	52
Table 5: Fixed effects regression results for foreign exchange reserves allocated in yuan.	54

LIST OF ABBREVIATIONS

ASEAN – Association of Southeast Asian Nations

BIS – Bank for International Settlements

BRICS – Brazil, Russia, India, China, and South Africa

BSA – Bilateral swap agreement

CIPS – Cross-Border Interbank Payment System

CRA – Contingent Reserve Arrangement

DCP – Dominant Currency Pricing

EU – European Union

EMU –Economic and Monetary Union

FDI – Foreign direct investment

GCC – Gulf Cooperation Council

GDP – Gross domestic product

IMF – International Monetary Fund

NDB – New Development Bank

OCA – Optimum Currency Area

SDR – Special Drawing Rights

SPFS – System for Transfer of Financial Messages

SWIFT – Society for Worldwide Interbank Financial Telecommunication

USD – United States Dollar

1 INTRODUCTION

In the last two decades, and particularly in the recent years, there has been a significant increase in interest in reducing dependence on the US dollar as the primary currency for international transactions. This is especially notable among countries in the BRICS¹ group and other emerging markets, particularly those experiencing growing trade and political relations with China. As early as the first BRIC² summit in 2009, the leaders of Brazil, Russia, India, and China committed to the long-term goal of reforming the global financial system and monetary diversification in the context of international trade (BRIC, 2009).

A major recent milestone was the 2020 BRICS summit, during which member states pledged to expedite the processes of dedollarization through the publication of the document "Strategy for BRICS Economic Partnership 2025." In this document, they emphasize the need for reforming the institutional framework of the so-called Bretton Woods system. The document prioritizes promoting the use of local currencies in both mutual trade and trade with other countries (BRICS, 2020).

Initiatives for dedollarization by BRICS countries also encompass a broader institutional framework, including proposals for expanding interbank payment systems as an alternative to SWIFT, utilizing their development bank NDB (New Development Bank), and the financial institution responsible for macroeconomic stability and liquidity CRA (Contingent Reserve Arrangement), as an alternative to the World Bank and the International Monetary Fund. Additionally, there are proposals for the creation of a new common BRICS currency, among other measures (Liu & Papa, 2022).

Recent financial sanctions imposed on Russia by the Western world as a consequence of its ongoing invasion of Ukraine in 2022 have accelerated the process of bringing BRICS countries and their partners closer together. This has highlighted the urgent task of dedollarization not only in international trade but also in the international monetary system.

The role of the currency used in international trade is closely connected to the reserve currencies held by central banks. In the year 2022, the U.S. dollar constituted a substantial 59% of all reserves held by central banks worldwide. This percentage has fluctuated between 50% and 70% over the past three decades (BIS, 2022a).

Nevertheless, there have been recent events of accelerated abandonment of the use of the dollar and its replacement with local currencies, especially the Chinese yuan, in mutual trade among BRICS members and some of their trading partners. This is particularly notable with the five countries that joined BRICS as new full members on January 1, 2024. These

¹ Brazil, Russia, India, China, South Africa.

² At that time, without South Africa, which joined the BRIC group in 2010, leading to the renaming of the group to BRICS.

countries are Egypt, Ethiopia, Iran and the United Arab Emirates, with Saudi Arabia still considering the invitation (Reuters, 2023a). The most recent addition to the BRICS group is Indonesia which joined the group as a full member in January 2025 (Reuters, 2025).

There was a substantial (percentagewise) increase in the use of the Chinese yuan in international trade and foreign exchange markets between 2011 and 2021. This suggests that the yuan's role as a medium of exchange is strengthening, although the same cannot be asserted to the same extent for the other two of the three main functions of money. In the case of the yuan, the store of value function has only slightly increased, as the yuan represented a slightly larger portion of the reserves of global central banks in 2021. Furthermore, the proportion of debt issued in yuan during the mentioned period has not significantly increased. The unit of account function remains very limited for the yuan in the global spectrum, as the denomination of capital markets in yuan outside of China is restricted to the Hong Kong Stock Exchange (Goldman Sachs, 2023).

The shortcomings of the Chinese yuan can be attributed to the advantages of the U.S. dollar and its role as the international reserve currency, remaining dominant in global trade. China's strong control over capital flows and the absence of capital markets denominated in yuan stand in stark contrast to the situation with the dollar. The U.S. capital markets, especially the market for U.S. Treasury bonds, are exceptionally deep and liquid (Peccatiello, 2023). Together with the dollar itself, they provide a secure haven against volatility and macroeconomic risks. The possibility of creating a new common currency within the BRICS group, taking a leading role in trade and financing, has also been expressed by BRICS countries. This prospect will be one of the main focal points of the research in the master's thesis, particularly in the context of the Theory of Optimal Currency Area.

The purpose of the master's thesis is to contribute to understanding of the dedollarization of the international trade and the implications and reasons behind BRICS initiatives for dedollarization. The key aims of the thesis are:

- a) Investigate why the dominant role of the U.S. dollar in international trade has persisted from the post-World War II era to the present day.
- b) Examine whether recent efforts by BRICS countries and some of their trading partners to abandon the U.S. dollar as the main currency in international trade could seriously jeopardize the role of the U.S. dollar.
- c) Examine whether a potential new leading currency among BRICS nations, in the spirit of dedollarization, could be the Chinese yuan or a new common BRICS currency.
- d) Conduct an empirical analysis examining how trade and investment ties with the United States and China influence the allocation of selected BRICS and non-BRICS countries' central banks' foreign exchange reserves, with an emphasis on the share of the US dollar reserves and the Chinese yuan reserves.

Considering the objectives of the empirical analysis, I have formulated the following main hypothesis:

H1: The dedollarization efforts of BRICS member countries are significantly linked to their closer economic ties with China.

The empirical analysis will be carried out as a panel data regression analysis conducted in STATA. The dependent variables, each for its own regression, are the central banks' foreign exchange reserves allocated in US dollars and the central banks' foreign exchange reserves allocated Chinese yuan, both as a share of total reserves. Independent variables include trade partner shares of imports and exports with the USA and China, inwards FDI stock from these two countries, and GDP per capita.

In Chapter 2 I will present some key features of the present global monetary and financial system in context of the Theory of the World Reserve Currency. This chapter will include the explanation how the US dollar became the global dominant currency, and the benefits and challenges that this status of the currency brings to the country that is its issuer, the USA, using The Triffin dilemma theory.

Chapter 3 moves towards the recent dedollarization initiatives led by the BRICS group. Apart from presenting the motivations for moving towards the dedollarization, this chapter will also show some of the BRICS group's main initiatives regarding the dedollarization process, from the New Development Bank (NDB) and alternative cross-border payment systems, to countering the US dollar dominant position as a vehicle currency in international trade. This chapter will also compare the "reform-the-status-quo" and the "go-it-alone" strategies striving for dedollarization and the related challenges in achieving the end goal.

Chapter 4 approaches the questions regarding the potential formation of a new common BRICS currency and the rising dominance of China and its currency the yuan. In the first part of this chapter, the Optimal Currency Area Theory will be used to help understand if a BRICS common currency is feasible. The second part will assess the progress of the internationalization of the yuan and its challenges explained through the three main functions of money: medium of exchange, store of value and unit of account.

In Chapter 5 I will present the results of the empirical analysis which aims to test how economic ties between selected BRICS and non-BRICS countries and the USA and China influence the recent dedollarization trend.

2 WORLD RESERVE CURRENCY

2.1 Theory of the World Reserve Currency

A reserve currency is a currency held by a central bank or treasury as part of a country's official foreign exchange reserves. Countries maintain reserves to withstand economic shocks, cover import costs, repay debts, and stabilize their currency value. Several countries

are unable to borrow or make payments for foreign goods in their local currencies due to the prevalence of the dollar in international trade. As a result, they must maintain reserves to guarantee a continuous flow of imports during emergencies and demonstrate to lenders that they can fulfil debt obligations in foreign currency (Siripurapu & Berman, 2023).

A central bank can impact the value of its country's currency by trading currencies on the open market, aiming to maintain stability and bolster investor confidence. For example, if a currency depreciates during an economic downturn, the Central Bank can intervene by utilizing its foreign reserves to increase its value. Countries can intervene also to prevent their currencies from increasing in value, which would result in cheaper exports (Siripurapu & Berman, 2023).

Countries prefer to keep their reserves in a currency that is backed by large and transparent financial markets to ensure easy access during emergencies. Central banks frequently maintain currency reserves in the form of government bonds, such as US treasuries. The US treasury market is the largest and most liquid bond market globally, making it easy to buy and sell bonds (Siripurapu & Berman, 2023).

According to the literature review conducted by the International Monetary Fund (IMF) (2020) there are four key principles in determining reserve currency status:

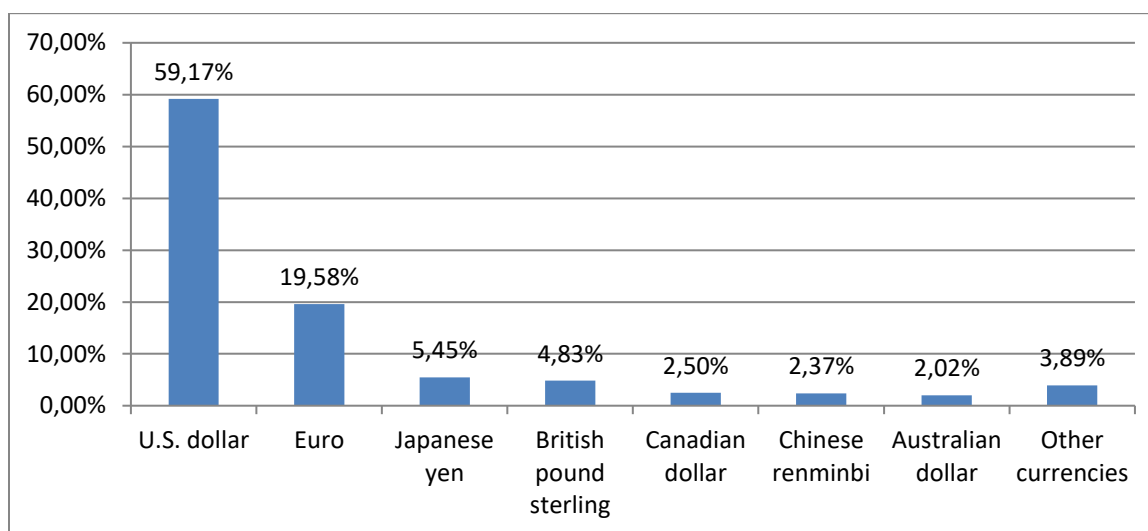
- The economic size/dominance of reserve currency issuer: A country's currency is more likely to be used in international transactions and as a reserve asset if its economy is larger and plays a significant role in global trade and financial networks.
- The transactional demand of reserve holders: Central banks' reserve portfolio decisions are likely to be influenced by the intended uses of reserves, particularly for trade and finance related payments or foreign exchange market intervention. The dominant reserve currency is thus commonly used as the preferred currency for international trade and invoicing. The use of a single currency in trade transactions simplifies pricing, reduces exchange rate risks, and lowers transaction costs for businesses engaged in cross-border trade.
- Inertia: Inertia is caused by the tendency of reserve currency status to change very slowly. There is a significant inertial bias towards using the currency that has previously been used as the reserve currency by other countries resulting in a classic effect of network externalities that worsen this resistance to change and establishes a strong reliance on current practices.
- The credibility of reserve issuers: Reserve assets are expected to provide a consistent value over time and be commonly utilized and exchanged, highlighting the significance of the credibility of reserve issuers' policies and the depth and liquidity of their financial markets.

The last principle “The credibility of reserve issuers” can be further divided into two elements:

- **Safe Haven Status:** A key factor contributing to the reserve status of a currency is its perceived safety and stability. Countries and investors often prefer to hold assets denominated in a reserve currency during times of economic uncertainty or financial turmoil. The ability of a currency to act as a safe haven enhances its appeal as a reserve currency.
- **Liquidity and Depth of Financial Markets:** Reserve currencies tend to be associated with deep and liquid financial markets, which facilitate smooth and efficient international transactions. The availability of a wide range of financial instruments denominated in the reserve currency, such as bonds and commodities, further strengthens its status as a global medium of exchange.

The IMF acknowledges eight primary reserve currencies: Australian dollar, British pound sterling, Canadian dollar, Chinese yuan³, Euro, Japanese yen, Swiss franc, and US dollar (IMF, 2020). As shown in Figure 1 the US dollar constitutes 59.17% of global foreign exchange reserves in the first quarter of 2023, making it the most widely held currency by central banks, followed by the Euro with 19.58% and with the Chinese yuan as the only BRICS currency a distant sixth with 2.37%.

Figure 1: Share of allocated foreign exchange reserves by currency in the third quarter of 2023

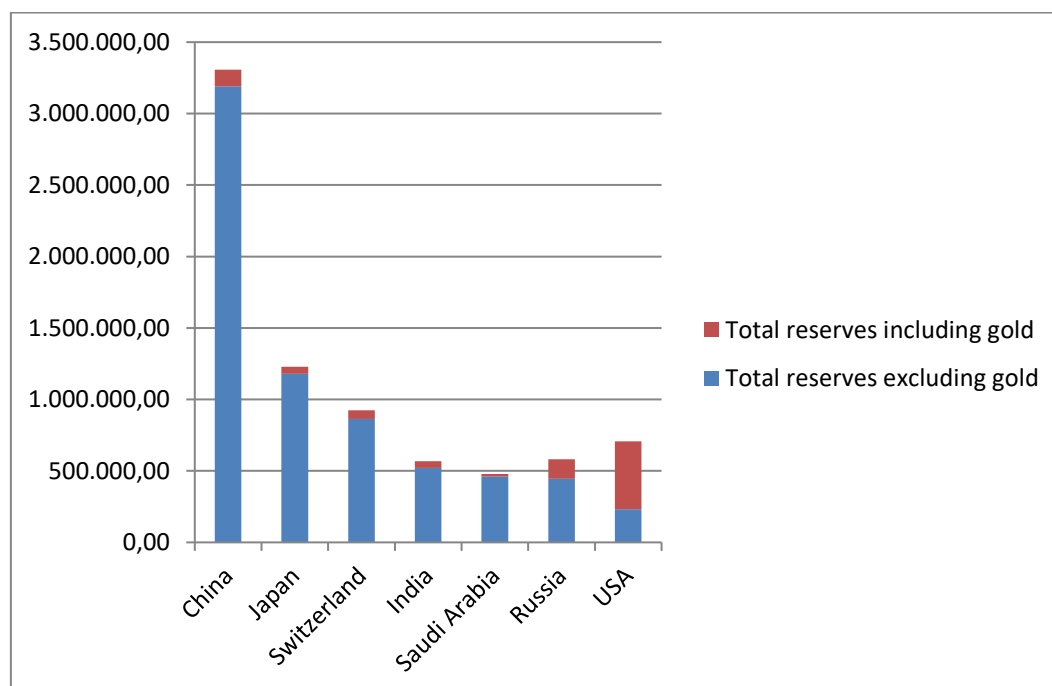


Source: Own work based on International Monetary Fund (n.d.).

³ The terms Chinese renminbi and Chinese yuan and its abbreviations RMB and CNY respectively are used interchangeably for China’s currency

As seen in Figure 2, China currently holds the largest reported foreign exchange reserves by a large margin, exceeding \$3 trillion as of 2022. Among the top 7 countries in terms of total reserves, both including and excluding gold reserves, there are three BRICS member countries (China, Russia, India) and one candidate country (Saudi Arabia). The fact that the BRICS group includes countries with some of the largest reserves in the world implies that changing their reserves composition could impact the global monetary and financial system and international trade.

Figure 2: Total reserves in 2022 (millions current US\$)



Source: Own work based on World Bank (2022).

2.2 How and Why Did the US Dollar Become the World Reserve Currency?

The dollar became the global reserve currency after World War II as a result of the 1944 Bretton Woods Conference, where forty-four countries established the IMF and the World Bank and laid the foundation of the post-war global monetary and financial system. A system of capital controls and fixed exchange rates was established at Bretton Woods where each country pegged the value of its currency to the US dollar, which could be exchanged for gold at a rate of \$35 per ounce. This was created to ensure stability and prevent the competitive devaluation of currencies known as "beggar-thy-neighbor" policies during the 1930s Great Depression, when countries abandoned the gold standard to gain an economic edge (Baldwin & Evenett, 2012).

In the 1960s, the United States faced a situation where it did not possess enough gold to back the dollars circulating internationally, causing concerns about a potential depletion of US gold reserves due to a run on the currency. US President Richard Nixon halted the dollar's convertibility to gold in August 1971 after attempts to rescue the system were unsuccessful, leading to the start of the decline of the Bretton Woods fixed exchange rate system and loosening of capital controls. The Smithsonian Agreement, established shortly after by ten major developed countries, aimed to rescue the system by reducing the value of the dollar and permitting greater exchange rate fluctuations, but it was brief. The system of predominantly floating exchange rates was established by 1973. Several countries still control their exchange rates by either limiting fluctuations within a specific range or pegging their currency's value to another currency, like the US dollar (Siripurapu in Berman, 2023).

For several decades, the US dollar has maintained its prominent status, despite notable changes in the global monetary and financial system which included the creation of the Special Drawing Rights (SDR)⁴ in 1969, the collapse of the Bretton Woods system in the 1970s, Japan's emergence as a global creditor in the 1980s, the introduction of the Euro in 1999, the deindustrialization in the west, increased reserve diversification after the Global Financial Crisis, and China's recent efforts to enhance the internationalization of the renminbi and its constant trade and consequently current account surpluses leading to a large-scale accumulation of dollar denominated assets as international reserves (Vernengo, 2021).

The dollar's portion of global reserves has stayed above 50%, and its share of global foreign exchange turnover has remained stable at around 45% since 1989. Although other currencies, such as the renminbi, have been gaining traction in trade invoicing, the use of the dollar for financial asset denomination, especially in EMDEs⁵ debt, has been increasing (Iancu et al., 2023).

The US dollar's dominance in global foreign exchange reserves is closely related to its dominance in global foreign exchange markets which is a result of mainly three interconnected factors. First, it is utilized as the dominant vehicle currency for foreign exchange transactions, where non-US dollar currency pairs are not exchanged directly but through the dollar. Some estimates suggest that nearly 40% of the turnover in foreign exchange markets is driven by the role of the US dollar. The US dollar was, as shown in Figure 3, on one side of 88% of all foreign exchange trades in April 2022 while the Chinese yuan experienced the largest growth in market share since the 2019 triennial survey, representing 7% of all trades in April 2022, up from 4% in 2019. The renminbi has risen to the fifth position in currency trading, up from eighth place three years ago (BIS, 2022a).

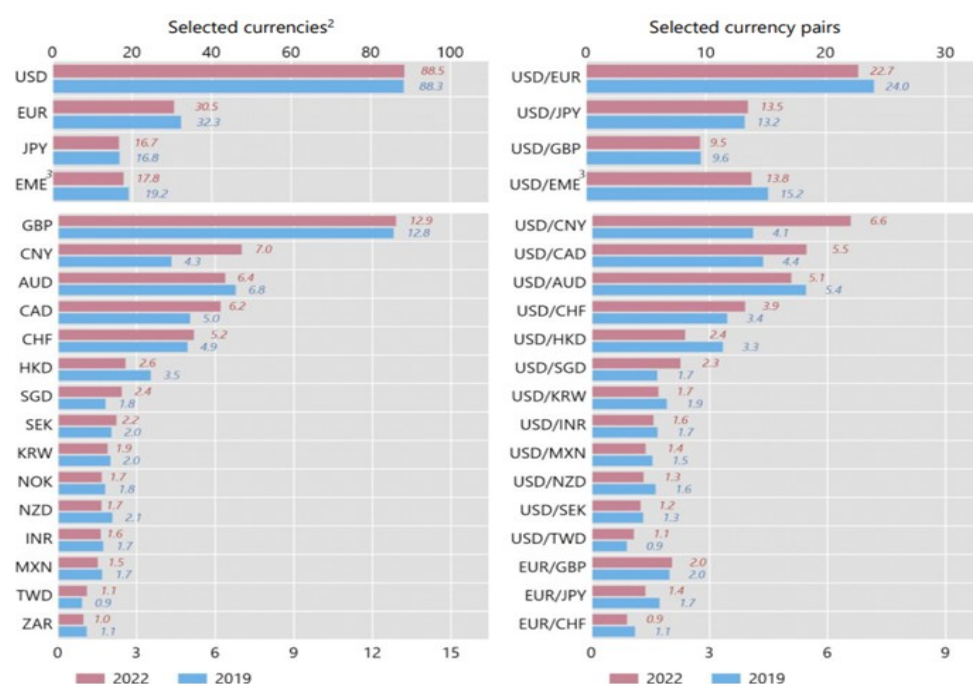
⁴ The SDR functions as a global reserve asset. The SDR is not a currency itself, but its value is currently determined by a basket of five currencies: the US dollar, the Euro, the Chinese renminbi, the Japanese yen, and the British pound sterling. It can be exchanged for other currencies by its holders when necessary and functions as the standard unit of currency for the IMF and various other international organizations.

⁵ Emerging Market and Developing Economy

The second factor is the dollar's impact on offshore funding markets, where financial market participants borrow money or secure loans in a foreign currency. As seen in Figure 4 approximately 50% of all global debt securities and cross-border loans issued in these foreign funding markets in 2022 were denominated in US dollar, of which approximately 88% of debt securities and 65% of cross-border loans were held by non-US residents (BIS, 2022b).

The third factor is the US dollar's dominance of international trade and invoices. Around 50% of international trade transactions are denominated in US dollars, with significant variation in different geographical areas (BIS, 2022b).

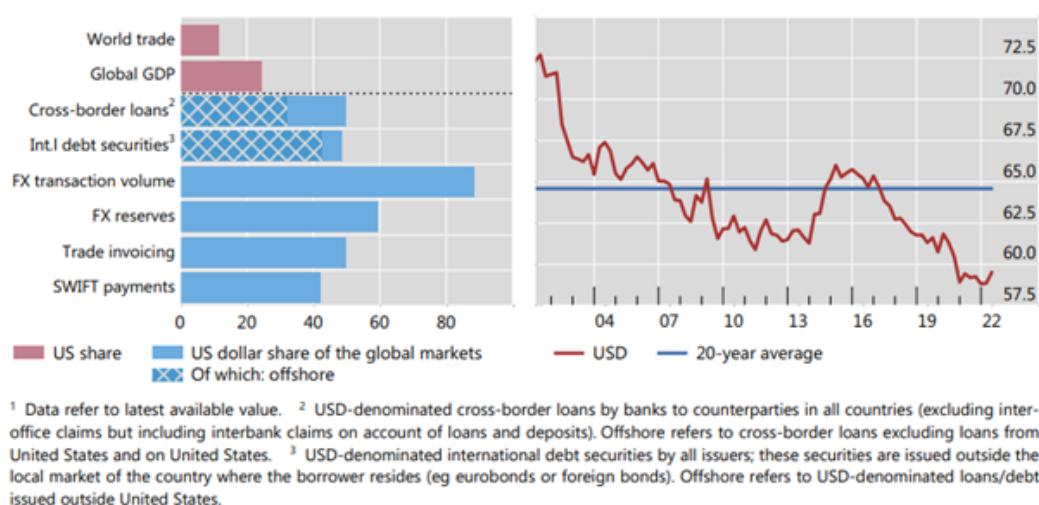
Figure 3: Foreign exchange market turnover by currency and currency pairs, expressed as a percentage of total turnover in April 2019 and April 2022



¹ Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis. ² As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200%. ³ Emerging market economy currencies excluding the Chinese renminbi and Russian rouble: AED, ARS, BGN, BHD, BRL, CLP, COP, CZK, HKD, HUF, IDR, ILS, INR, KRW, MXN, MYR, PEN, PHP, PLN, RON, SAR, SGD, THB, TRY, TWD and ZAR.

Source: BIS (2022a).

Figure 4: The international role of the US dollar (left) and the US dollar share of official foreign exchange reserves (right) both in percent



Source: BIS (2022b).

2.3 “The Triffin dilemma”

The asymmetry in adjustment between the reserve currency country, the United States, and the rest of the world was particularly noteworthy during the Bretton Woods period. In the 1950s, the ongoing deficit in the US balance of payments was used to meet the global demand for international liquidity. Nevertheless, as highlighted by economist Robert Triffin in 1960, the attempt to address the issue of a global shortage of dollars through a consistent balance of payments deficit in the United States cannot serve as a long-term solution.

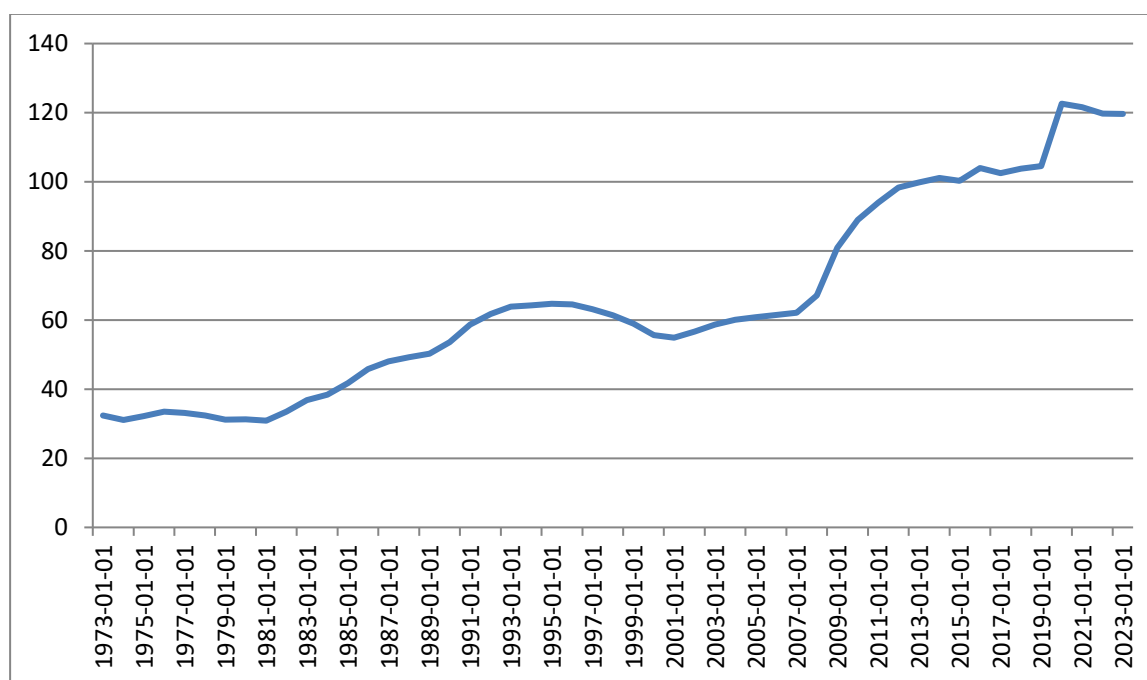
The US had to increase the amount of dollars in circulation to meet the global demand for international liquidity. However, this increase was happening at a faster pace than the growth of US gold reserves. As a result, it became increasingly challenging to maintain the fixed exchange rate between the dollar and gold without causing deflation worldwide. Triffin's argument was centred on the challenge of upholding a stable exchange rate between the dollar and gold. In the end, there would be either a significant decrease in the amount of international money available, or a loss of trust in the worth of the dollar leading to a sudden rush to sell the currency. This phenomenon came to be recognized as the "Triffin dilemma" (Chen & Lai, 2010).

Triffin's analysis demonstrated remarkable foresight. US policy makers, faced with increasing dollar liabilities that exceeded the amount of gold reserves, encountered a run on the dollar, meaning that many investors wanted to exchange their dollars for gold. Eventually the US had no choice but to end the convertibility between the dollar and gold. The Triffin's dilemma was, however, put to the test as the US dollar's dominance has actually grown since

the Bretton Woods system fell apart, despite the end of the dollar-gold parity. Despite the consensus that the Triffin's dilemma was flawed in the prediction of the dismantling of the dollar's dominance, many economists agree with its basic argument that the financial vulnerabilities that are inherent in a monetary system dominated by one currency have not vanished and claim that the Triffin dilemma persists, but in an updated form adjusted to the current floating exchange rate system (Gourinchas et al., 2019).

Some economists describe this updated Triffin's dilemma as the fiscal variation of the dilemma. Since international reserves consist mainly of US government debt, and the US's portion of the global economy is decreasing, the US is gradually losing its ability to meet the rest of the world's need for international liquidity. Therefore, there is a conflict between the goal of meeting the worldwide demand for dollars, which necessitates a continuing rise in the proportion of US government debt to US GDP, and the goal of ensuring the fiscal safety of US government debt, which requires stabilizing the debt to GDP ratio. However, it is worth noting that the potential occurrence of a dollar shortage is primarily attributed to a rise in global demand for foreign exchange reserves relative to global GDP, rather than being caused by a decrease in the supply of US debt securities since the US debt is constantly rising as seen in Figure 5 (Jeanne, 2012).

Figure 5: US total public debt as a % of GDP 1973-2023



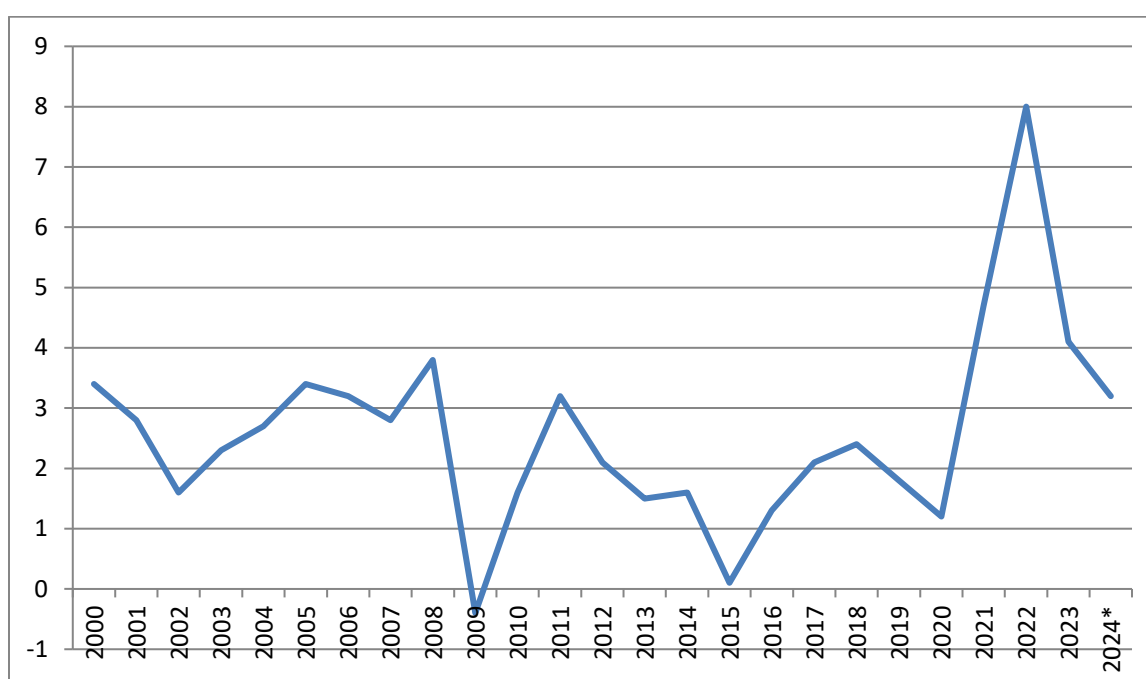
Source: Own work based on FRED (n.d.)

Another issue is the potential decline in the quality of the US Treasury debt securities and its classification as a safe asset, similar to what has already happened with some euro area government debts in the aftermath of the European debt crisis. Nevertheless, it is uncertain whether the US should prepare itself to confront such a scenario as seen in the EU. An important takeaway from the euro crisis is the significant impact of having a central bank

that is responsible for providing monetary support to a government during a debt rollover crisis, thereby preventing a default. As long as market participants anticipate that the US Federal Reserve will prevent a default of the US Treasury in the event of a rollover crisis and that a US fiscal adjustment will happen at some point, the debt of the US will continue to be considered a safe asset, in terms of both default risk and inflation risk (Jeanne, 2012).

However, it is exactly the inflation risk problem that has revived some doubts in the US Treasuries' designation as safe assets. As seen in Figure 6 the US have experienced a brief spike in the annual inflation rate which reached an annual average of 8% in 2022 which was the highest inflation level in the US since the 1980s (United States Bureau of Labor Statistics, n.d.).

Figure 6: Average annual inflation rate in the United States using CPI data



** The data for 2024 is based on the January and February reports only*

Source: United States Bureau of Labor Statistics (n.d.)

Some economists presented a possible solution to the fiscal Triffin dilemma in the form of a multipolar global monetary and financial system without a single dominant currency. In this scenario multiple currencies of the largest economies would step up to this role. Seghezza (2019) identifies bilateral swap agreements (BSA) as a step towards establishing a multipolar monetary system.

During the 2007-08 Global financial crisis and in its aftermath, the use of BSAs became widespread. These arrangements were considered the most significant innovation in addressing the shortage of dollars and other reserve currencies at that time. A BSA involves a mutual agreement in which the two state parties trade currencies based on predetermined terms and either a fixed or unlimited quantity, using the current market exchange rate.

Typically, these BSAs entail a borrower, which refers to the country seeking financial support, and a creditor, which denotes the country fulfilling the request. BSAs have facilitated central banks in providing liquidity in major currencies to domestic commercial banks experiencing currency mismatch and unable to secure financing from the global market. BSAs, due to their abundant availability, enable a substantial enhancement in the flexibility of international liquidity supply. Although in theory limitless, the BSAs amount of provided liquidity has its limits in the risk inclination of the creditor country towards the risk of insolvency of the borrower country (Seghezza, 2019).

The main benefit of the recent surge in BSAs is the tendency to deepen regional monetary arrangements, such as both the stipulation of local BSAs and agreements to pool currency reserves and to facilitate trade. A further widespread use of BSAs could result in the substitution of the US dollar as a dominant global currency especially its role as a vehicle currency and trade invoice settlement currency with a system of multiple reserve currencies (Seghezza, 2019).

2.4 Dominant Currency Pricing

The Dominant Currency Pricing (DCP) theory refers to the common practice of countries, especially EMDEs, to invoice the sales of their products destined for export in the dominant currencies used in international trade, mainly the US dollar, and their impact on the relationship between exchange rate fluctuations, firms' pricing strategies and trade flows (Gourinchas et al., 2019)

The price transmission effect or “pass-through” of the dollar exchange rate into export and import prices is substantial, irrespective of the goods' destination or origin. Movements in the dollar exchange rate affect local consumer prices through import prices and quantities but have a limited impact on the United States itself. A notable implication of DCP is that an appreciation of the dominant currency compared to other major currencies can have a detrimental short-term effect on global trade. As stated in Gourinchas et al. (2019) a 1% increase in the value of the US dollar compared to other major currencies is associated with a 0.6% to 0.8% decrease in global trade volume in a year. This is due to the fact that the depreciation of other countries' currencies against the US dollar results in increased domestic prices for their imports, leading to reduced demand for them (Adler et al., 2020).

The widespread use of the US dollar is also a characteristic of corporate financing, again mostly in EMDEs. This variation of the DCP is called in some literature the Dominant Currency Financing and refers to the impact of exchange rate fluctuations on companies' balance sheets. If a company has loans or debt securities mostly denominated in dollars and a large part of its revenues are generated locally in the local currency, the depreciation of the local currency relative to the dollar raises a company's liabilities compared to its revenues,

weakens its balance sheet and makes it harder to obtain new financing, as the company's ability to repay debt worsens. This effect is dependent on the currency in which revenues are generated, specifically whether revenues are mostly in foreign currency or in local currency. Export-heavy companies that utilize the US dollar or another dominant currency like the euro for both invoicing and financing are considered "naturally hedged" because their liabilities and revenues are synchronized when exchange rates change. On the contrary import-heavy companies often have mismatched revenues and liabilities, which are affected by exchange rate fluctuations, leading to balance sheet effects that limit financing and import levels. Using a dominant currency for financing can intensify the impact of a country's currency devaluation on its imports. The widespread use of the US dollar in corporate financing can lead to global contractionary effects when the dollar strengthens, affecting importing companies' balance sheets (Adler et al., 2020).

2.5 Benefits of Dollar Dominance for the U.S.

A country that can issue government bonds in its own currency and can actively utilize its central bank to finance and manage public debt can stimulate demand, productivity and economic growth. The key benefit of the dollar dominance for the United States is its capacity to borrow extensively at low interest rates enabling it to significantly increase the public debt at a low cost with close to no risk of default. The benefit involves also local US companies which have a home currency advantage when conducting international trade (Vernengo, 2021).

Because the majority of investors are willing to keep dollars, even small US companies can easily borrow from foreign sources. This demonstrates the liquidity and depth of US dollar asset markets, which is enhanced by its role as a vehicle currency. It also represents a part of the *exorbitant privilege* first described by former French Finance Minister Valéry Giscard d'Estaing in the 1960s (Gourinchas et al., 2019).

The dollar's dominance in the global payment system also contributes to the influence of US financial sanctions. Most trade conducted in US dollars, including trade between other nations, may be affected by US sanctions due to being processed through correspondent banks with accounts at the Federal Reserve. The United States may limit the ability of blacklisted individuals and companies to conduct business by restricting their access to dollar transactions. In 2022, following the Russian invasion of Ukraine, the United States imposed unprecedented sanctions that disconnected Russia from the dollar, resulting in the freezing of \$300 billion in Russian central bank assets and causing a default on part of its foreign currency denominated sovereign debt (Siripurapu & Berman, 2023).

Some literature considers this financial benefit to be modest, highlighting that other developed nations can also borrow at comparably low rates. The United States' diminishing

portion of the global economy and the emergence of other currencies like the euro and yen in the last few decades have posed some threat on the benefits of the dollar dominance, but the *exorbitant privilege* is yet to be undermined.

The latest threat to the dollar dominance is represented by the BRICS effort to move away from the dollar in international trade, to diversify foreign exchange reserves and to reform the institutional infrastructure of the US dominated international monetary and financial system which will be discussed in the following chapters.

2.6 Weaknesses of Dollar Dominance for the US

A strong dollar reduces the cost of US imports and increases the price of exports, potentially harming domestic industries that rely on exports and causing job cuts. In times of financial instability or high interest rates, investors tend to seek the stability and the returns respectively of the dollar, which can exacerbate this imbalance. Some literature suggests that the United States should voluntarily decrease the dollar's dominance due to the high costs it imposes on manufacturing and export-heavy regions like the Rust Belt. Other literature presents a different opinion, stating that a robust dollar will inevitably result in both winners and losers. The experts argue that losses experienced by exporters are balanced out by gains for importers, possibly resulting in an overall net benefit to the US economy (Siripurapu & Berman, 2023).

Another weakness for the US is the exposure to currency manipulation which occurs when a country deliberately devalues its currency to raise the competitiveness of local exports in order to sustain a significant trade surplus resulting in the decrease of competitiveness of US exports as they become more expensive in relation to the aforementioned country (Siripurapu & Berman, 2023). A typical example of this type of a country is China which has been designated as a Currency Manipulator by the US Department of the Treasury (2019).

3 THE DEDOLLARIZATION PROCESS AND INITIATIVES BY THE BRICS GROUP

3.1 Reasons for dedollarization

Dedollarization, the gradual shift away from the US dollar as the dominant settlement currency in international trade and financial transactions, is influenced by various factors within the BRICS Group and other emerging economies. One of the key driving forces is the relative historical volatility of the US dollar as a reserve currency and its susceptibility

to fluctuations in response to changes in US monetary policies. Countries seek to reduce their exposure to such risks and uncertainties by promoting dedollarization efforts. Additionally, geopolitical considerations play a crucial role in shaping dedollarization trends. Countries may wish to reduce vulnerability to potential sanctions or geopolitical pressures by promoting the use of local currencies in international transactions (McDowell, 2020).

Moreover, dedollarization serves as a means of diversifying trade balances for countries with significant trade relations with multiple partners. By using local currencies in trade settlements, transaction costs can be reduced, and intra-regional trade can be facilitated, fostering closer economic integration within regional blocs like BRICS. The availability and convertibility of local currencies also influence dedollarization efforts. Countries need to ensure that their currencies are widely accepted and easily convertible in international markets to promote their use in trade settlements effectively (Liu & Papa, 2022).

Furthermore, the establishment of robust financial infrastructures, including payment systems and clearing mechanisms, supporting the use of local currencies in international trade, is essential for successful dedollarization. Strong leadership and policy commitment from governments and central banks are critical in driving these efforts. The commitment to dedollarization creates an environment conducive to the adoption of local currencies in international transactions. Changes in global economic dynamics, such as the rise of emerging economies and the growing influence of regional trade blocs, contribute to the motivation for dedollarization (Singh, 2023).

3.2 The BRICS group's dedollarization initiatives and strategies

Liu & Papa (2022) outline two sets of strategies that emerging economic and political powers can implement concurrently to decrease their increasing vulnerability to the influence of the US dollar: the "go-it-alone" strategy, also called the strategy of independence and the "reform-the-status-quo" strategy. "Go-it-alone" de-dollarization strategies involve the creation and regulation of new institutions and/or market mechanisms that are not dependent on the US dollar. These measures allow members to mitigate currency risks and ensure continued access to the global financial system in the event of US economic sanctions. The proliferation of these initiatives may result in the establishment of an alternative or parallel system that operates autonomously from the US dollar and regulations imposed by dominant Western nations which is the end goal of this strategy.

On the other hand, "reform-the-status-quo" initiatives refer to collaborative initiatives aimed at re-evaluating and modifying the regulations of the current system and its balance of powers. These initiatives require negotiating with existing authorities to reduce the influence of the US dollar. If these reform-oriented initiatives are successful, they will expand the

range of widely used currencies in the current financial and monetary system, thereby increasing its diversity (Liu & Papa, 2022).

BRICS members have clearly shown a unanimous agreement and a firm dedication to encouraging the use of domestic currencies in global transactions and establishing a non-dollar alternative for the worldwide financial system. They have concurrently pursued both independent and status-quo reform initiatives. As an illustration, BRICS has created the New Development Bank (NDB), which will be presented in more detail in chapter 3.2.1, with the aim of reducing the reliance on the US dollar in financing development projects. The Agreement on the New Development Bank, states that the NDB has the option to offer financial support in the currency of the country where the operation is being carried out (NDB, 2014).

Simultaneously, BRICS has collectively implemented reformist strategies, including the establishment of the dollar-based Contingent Reserve Arrangement (CRA) which establishes the basis for safeguarding BRICS national economies from financial market crises. The pooled dollar reserves of USD100 billion are accessible to offer liquidity assistance to members during a moderate-sized balance of payment crisis (BRICS, 2014). However, the CRA does not act as a lender of last resort; instead, it offers its members initial protection before they need to turn to the IMF for conditional assistance. Furthermore, BRICS has advocated for the reform of the IMF Special Drawing Rights, and creating a BRICS stock exchanges alliance within the current system. These initiatives indicate that BRICS has made efforts to reform the current system in order to better include its interests. Additionally, BRICS has established a developing infrastructure for regional de-dollarization, with the aim of promoting global de-dollarization in the future (Han & Papa, 2024).

The BRICS countries are thus confronted with a contradiction. They desire to replace the US dollar as the primary currency with domestic currencies, but the depreciation of the dollar would diminish the worth of their substantial holdings of assets denominated in dollars. Therefore, it is necessary for them to find a middle ground between their aspiration for increased global influence and financial independence, while considering the tangible expenses associated with diminishing the US dollar's prevailing status as the dominant currency (Liu & Papa, 2022).

3.2.1 The New Development Bank (NDB)

The NDB assists BRICS member countries in reducing their dependence on dollar financing by providing loans in their respective local currencies and by borrowing from global financial markets at a significantly reduced interest rate. This is possible because the NDB has achieved a higher credit rating compared to most of the BRICS members. Since 2014,

when the NDB was created, the credit ratings of government bonds of Brazil, Russia, and South Africa were downgraded multiple times, even reaching the ‘junk’ category. Subsequently, their worsened credit ratings led to higher borrowing expenses in the global capital markets. While India did not undergo a downgrade during this period, its lowest investment-grade rating was still suboptimal, leaving China the only country of the group with constant solid credit ratings. (Liu & Papa, 2022).

Consequently, all five members were dedicated to achieving a superior credit rating for the NDB, and they accomplished their goal: the NDB was awarded a credit rating of AA+ by S&P and Fitch, surpassing the credit ratings of any individual BRICS member, including China (NDB, n.d.). The higher credit rating of the NDB enables multiple BRICS members to access global capital markets at more affordable interest rates compared to if they were to borrow individually. In addition to facilitating domestic currency lending, the NDB has also sanctioned loans denominated in alternative currencies like the euro and the Swiss franc in 2019. This move aims to broaden the NDB's funding sources and reduce its reliance on the US dollar (Liu & Papa, 2022).

Thanks to its AAA credit rating given by Chinese credit rating agencies (NDB, n.d.), the NDB can efficiently access the Chinese capital market and issue so called Panda bonds. Panda bonds are yuan denominated bonds sold in China by foreign issuers. The NDB has consequently emerged as the most prolific issuer of Panda bonds in the public sector.

The NDB's local currency financing function gives it a resemblance to a smaller version of the World Bank but owned by the BRICS countries. Nevertheless, the NDB offers more advantages to BRICS members compared to the World Bank. NDB loans come with fewer conditions, and the provision of loans in local currency enables borrowers to avoid accumulating additional external debt in US dollars. In addition, the group has been strategizing the implementation of a shared payment framework that can be seamlessly incorporated with a BRICS digital currency, with the aim of reducing the reliance on the US dollar in the global financial infrastructure (Verma & Papa, 2021).

3.2.2 Oil and gas trade denominated in Chinese yuan

The dominant position of the US dollar in the global financial system discussed in Chapter 2 is also based on its exclusive role as the currency used for funding and pricing in the global commodity trade, especially oil trade. The primary crude oil pricing benchmarks in the world, specifically the West Texas Intermediate (WTI) and Brent, are denominated in US dollars. Some academics believe that the global commodity market, particularly the USD 2 trillion oil market, is one of the primary battlegrounds where the fate of the dollar will be determined (Foster, 2018).

The process of reducing the use of the US dollar in bilateral trade between BRICS countries has advanced most rapidly in the case of energy trade between Russia and China. This phenomenon has been accelerated by the growing utilization of domestic currencies in Russia's trade with China, particularly following the decision of prominent Russian energy corporations to cease using the US dollar for their energy exports. In late 2023, two of the largest Russian energy companies Gazprom Neft and Rosneft declared that they switched to yuan and rubles settlement in almost all of their exports to China (TASS, 2023a). This represents a gradual shift, at first from the US dollar to euros after the 2018 round of US sanctions against Russia, and finally from euros to yuan and rubles after the latest unprecedented scale of sanctions following the Russian invasion of Ukraine in 2022.

Apart from slowly reducing dollar denominated energy trade with its BRICS partners, China, who is the largest importer of crude oil (OEC, n.d., a) and the second largest importer of liquefied natural gas (LNG) globally (OEC, n.d., b), presented a plan in 2022 for yuan settlements of imports of oil and LNG from the Gulf Cooperation Council (GCC)⁶ countries which are among the world's largest exporters of oil and gas (S&P Global, 2022). While China is increasing the import of crude oil and LNG from these partner countries, highlighted by the agreement with Saudi Arabia it is not yet clear when and how large of a share in trade will be settled in yuan (Zhou & Xu, 2023). Since Saudi Arabia and China signed a currency swap agreement worth 50 billion yuan in November 2023 it is likely that the yuan settlement of trade between the two countries is gaining ground and will probably be followed by other partners soon (Cash, 2023).

Meanwhile China has recently already started settling LNG imports in yuan, highlighted by the state-owned China National Offshore Oil Corporation's yuan settled purchase of LNG from a French company Engie in October 2023 (Reuters, 2023b). At the same time in October 2023, China made another step forward in the yuan denominated energy trade as state-owned PetroChina executed the first cross-border crude oil purchase settled in digital yuan (Business Insider, 2023). This represents a milestone in the use of digital yuan which is China's official Central Bank Digital Currency (CBDC) and is currently the most used CBDC in the world (Atlantic Council, 2024).

3.2.3 Alternative payment systems

Except for South Africa, each BRICS country has established its own autonomous national retail bank payment system. China and Russia have taken the lead in developing their own national payment systems: the Russian System for Transfer of Financial Messages (SPFS) and the Chinese Cross-Border Interbank Payment System (CIPS). The fast advancement in the financial technology (fintech) industry of BRICS countries has led to the development

⁶ GCC member countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, the latter officially joined BRICS in 2024.

of the BRICS Pay system that was launched in 2018 with the aim of facilitating financial transactions between member states. These national and supranational BRICS payment systems act as substitutes for the US-dominated Society for Worldwide Interbank Financial Telecommunication (SWIFT) network (Liu & Papa, 2022).

An independent retail bank payment network is a system of payment channels that define rules and processes for carrying out retail payments and sharing relevant information between banks for the ultimate settlement through wholesale payment networks. One clear advantage of having an autonomous retail bank payment network, as opposed to depending on prominent American card network providers like Visa or Mastercard, is to circumvent the fees imposed by these service providers. Moreover, it is crucial to note that if a nation lacks its own payment infrastructure and instead depends on the payment systems of Visa or Mastercard, as Russia did before 2014 and China did before 2002, and as South Africa currently does, these payment systems could be unilaterally terminated as a result of US sanctions. This withdrawal deprives domestic consumers of the capacity to carry out fundamental retail transactions using bank cards. By integrating these domestic payment networks with an alternative international payment system, it is possible to complete the entire payment process without relying on the global payment system dominated by the US and the dollar (Liu & Papa, 2022).

3.2.4 Reducing the reliance on the US dollar in global capital markets and as a vehicle currency

In order to facilitate the use of local currencies in bilateral trade and thus avoid the need for the US dollar as a vehicle currency, the BRICS members strengthened their agreements by implementing a series of bilateral currency swaps, particularly between China and other BRICS members. The China-Brazil bilateral swap agreement, established in as early as 2013, enabled the two countries to conduct trade using their respective local currencies, up to a value of USD30 billion per year. This amount represented half of the total bilateral trade between China and Brazil in 2012 (Flak & Lopes, 2013).

In 2014, Russia and China entered into a three-year currency swap agreement valued at RMB 150 billion (USD 24.5 billion) (Reuters, 2014). In 2017, the duration of this was prolonged for an additional three years (Simes, 2020). In 2015, South Africa and China entered into a three-year bilateral swap agreement valued at 57 billion rand (USD4.75 billion) (Reuters, 2015). In addition to this 2015 agreement, the majority of BRICS' bilateral currency swaps have primarily been conducted in Chinese yuan. It is not surprising because the yuan is the most globally integrated among all the national currencies of the BRICS countries (Liu & Papa, 2022).

Another key factor in abandoning the need for the dollar is the BRICS exchanges alliance which enables domestic investors from BRICS countries to engage in offshore trading of some stocks, bonds, indexes, futures and options for each exchange using their own currency, without being subject to capital controls or currency risk. Investors from countries outside of the BRICS alliance can conveniently access significant equity and index derivatives of the BRICS markets like BlackRock's iShares BIC 50 UCITS Exchange Traded Fund (ETF) (BlackRock, 2024). This provides global investors with the chance to diversify their investment portfolios and gain exposure to the equity markets of the BRICS countries.

Increased domestic and international participation in cross-listed financial products enhances the reputation of the exchanges and promotes the use of BRICS currencies in global equity markets, redirecting capital flow away from financial assets denominated in dollars. Furthermore, for investors who already possess investments in BRICS economies, futures contracts are indispensable for mitigating risk and managing potential losses. This is crucial for establishing a resilient financial ecosystem in BRICS nations (Liu & Papa, 2022).

Furthermore, some companies in the BRICS member states have begun to issue bonds denominated in yuan, highlighted by Rosneft's two yuan bond placements in Russia in 2022 and 2023 (Rosneft, 2023).

3.3 Challenges in the BRICS dedollarization process

Pushing towards dedollarization presents several challenges for the BRICS countries and other emerging economies. Despite the growing trend of using local currencies in international trade, the US dollar's entrenched position as the dominant global reserve currency and its extensive use in the foreign exchange market and invoice settlement poses significant hurdles as presented in Chapter 2. Transitioning away from the dollar as the primary settlement currency requires fundamental changes in established trade practices, which can be intricate and time-consuming. Moreover, the liquidity and market depth of the US capital markets, especially the US Treasuries market, are unparalleled, making it a preferred choice for investors and businesses globally to invest their US dollar reserves. As will be discussed in Chapter 4, BRICS countries' capital markets denominated in local currencies do not possess the same level of depth and liquidity, especially during periods of market volatility, which can hinder the currencies' broader adoption in trade settlements because of a lack of safe-haven assets to invest the reserves in.

Furthermore, many countries hold significant US dollar-denominated debt, including government bonds and corporate bonds and loans. Transitioning away from the US dollar may impact the cost of servicing these debts and necessitate careful debt management to avoid potential financial risks. Moreover, the level of dedollarization within BRICS

countries can be influenced by their external economic dependencies, as trade and financial relations with countries outside the bloc may require continued use of the US dollar in certain transactions. The BRICS countries could also experience higher expenses for cross-border transactions, more costly capital raising in the globally dominant dollar-based markets, and diminished competitiveness of their companies in foreign markets due to a scarcity of dollar funding (Liu & Papa, 2022).

Establishing robust financial infrastructures, including payment systems and clearing mechanisms, to support the use of local currencies in cross-border transactions requires substantial investments and effective coordination among countries. Convincing market participants to switch to alternative currencies also requires building trust and demonstrating the stability of local currencies, especially when the US dollar is perceived as a safe-haven currency (Greene, 2023).

Already in 2009, the BRICS countries had more differences than similarities, and recent events and the BRICS expansion have further increased the differences between them, limiting their potential for success. These disparities transform the concept into a highly ambitious project. China possesses significantly greater economic prowess than the other members of the group, making its participation crucial for the group's long-term viability (Greene, 2023).

There are some strategic differences between member countries, for example Russia, Brazil, and South Africa are significant exporters of commodities, whereas China plays a crucial role as a major importer of commodities. More specifically while Brazil, Russia and the newly joined UAE, Iran and the potential member Saudi Arabia reap the rewards of soaring energy prices, India and China as significant energy consumers, experience negative consequences of expensive energy (Jordaan, 2021).

From a political and cultural perspective, the BRICS members clearly exhibit diversity. China and Russia are permanent members of the UN Security Council and are nuclear powers along with India and potentially Iran since it is allegedly developing nuclear weapons. The majority of members are characterized as authoritarian states, with only Brazil, India, and South Africa formally recognized as democratic states. Regardless, most of the BRICS countries are stable, with varying degrees of internal tensions, except for Ethiopia which stands out with its permanent state of civil war. On the cultural side BRICS lacks the strong cultural connection that characterizes the EU since BRICS member countries are very different in terms of values, traditions, languages due to their geographical dispersion (Jordaan, 2021).

The biggest factor influencing the BRICS group's internal dynamics and threatening its deepening cooperation is the ongoing border conflict between China and India and their competition across multiple domains since gaining independence, particularly in their pursuit of influence in the developing world. When the two countries engaged in a border

conflict in the 1960s, it laid the foundation for hostile relations between the two countries with their relations being strained ever since (Jordaan, 2021).

Aside from territorial conflicts, the two nations have also engaged in confrontations in vying for power and strategic positioning in South Asia, East Asia, and the Indian Ocean. China's long-standing strategic partnership with Pakistan has posed a persistent challenge for India. India perceives China's utilization of Pakistan as a means to keep India involved in South Asian affairs, hinder India's capacity to counter China's ambitions of becoming the dominant power in the Asia-Pacific region and impede India's emergence as a global power. India's main concern is the China-Pakistan Economic Corridor, which is the flagship project of the Belt and Road Initiative (BRI). This corridor passes through the disputed territory of Kashmir and infringes upon India's territorial sovereignty according to India (Han & Papa, 2024).

Although Sino-Indian relations got generally warmer due to their cooperation in BRICS, the bilateral relations between them experienced a significant setback in 2017 due to a 73-day standoff between the two countries' troops in Doklam, located at the tri-border area between China, Bhutan, and India. The standoff resulted in heightened tensions with the possibility of escalating into an armed conflict, however, both India and China eventually agreed to remove their troops from the region. Nevertheless, the incident exacerbated the lack of trust between the two nations and undermined their diplomatic relations (Verma & Papa, 2021).

In 2018, the leaders of the two countries Narendra Modi and Xi Jinping had an informal meeting in Wuhan, China to repair the strained bilateral relations. During the Wuhan Summit, the two countries reached a consensus to enhance communication and reinforce the current confidence-building measures. There was a widespread agreement that the regular political involvement, particularly between Modi and Xi at BRICS annual meetings, annual RIC⁷ meetings and other meetings, enhanced their bilateral relations (Verma & Papa, 2021).

In 2020 and 2021, there was yet another series of confrontations between Indian and Chinese troops at the Galwan River valley and along the Line of Actual Control (LAC) disputed border area. The Galwan River valley clash has again led to anti-China sentiments in India. As a result of the clash, there have been demands for economic decoupling from China. The Indian government has implemented measures to decrease its economic reliance on China. In addition, India has imposed restrictions on Chinese companies' investments in Indian projects and has prohibited over two hundred Chinese mobile applications, such as Tik Tok and WeChat, citing concerns regarding national security (Verma & Papa, 2021).

These repeated border skirmishes and constant tension between India and China led India to align itself more closely with the United States. India and the US have bolstered their political, diplomatic, strategic, and defense relations in the new millennium. The United

⁷ RIC stands for Russia-India-China and is a trilateral platform for dialogue and cooperation (Panda, 2023).

States views India as a crucial element of its Indo-Pacific strategy and seeks India to serve as a counterweight to China in the region.

Such example of close ties between India and the US is the Quadrilateral Security Dialogue (QUAD) composed of India, US, Japan and Australia that China sees as an “anti-China alliance” since its goal is to counterweight China’s primarily military and secondarily political and economic influence in the Indo-Pacific region.

However, India is not the only BRICS member with close ties with the US. The UAE also has military ties to the United States and hosts the US Air Force at the Al Dhafra Air Base, the potential candidate Saudi Arabia also hosts US troops and military bases while Brazil no longer hosts US bases but had close political ties to the US under the previous government led by Jair Bolsonaro which makes Brazil’s democratic process of government changes a liability in China’s view (Verma & Papa, 2021).

4 A NEW BRICS CURRENCY OR YUAN DOMINANCE?

This chapter explores how the BRICS countries are challenging the dominance of the US dollar by considering two main strategies: creating a common BRICS currency or promoting the Chinese yuan on the global stage. In the following subchapters, the theoretical basis for each strategy will be presented, as well as the opportunities and challenges of each approach. Ultimately, it will be examined whether these efforts can truly reshape the global financial system or if the US dollar’s position remains unchallenged.

4.1 Introduction of a New Common BRICS Currency

4.1.1 Optimal Currency Area

The Optimum Currency Area (OCA) Theory is a key theoretical framework in international economics that examines the conditions under which a group of countries would benefit from adopting a common currency for international transactions and as a medium of exchange. The theory was first developed by economists Robert Mundell, Ronald McKinnon and Peter Kenen in the 1960s and has since become instrumental in understanding the advantages and challenges of monetary unions and currency arrangements.

Mongelli (2008) lists the main principles of the OCA Theory as following:

- Trade integration and the degree of economic openness: OCA theory suggests that countries with high levels of trade integration and strong economic ties are more likely to benefit from a common currency. By using the same currency, transaction costs,

exchange rate risks, and currency conversion expenses are eliminated, fostering smoother and more efficient trade flows within the currency union. The integration process also allows companies in the common currency area to increase their competitiveness internationally by setting up cross-border production structures. The main requirement is, as proposed by McKinnon (1963), a high degree of economic openness, meaning that the share of “tradable” goods and services in the economy is high which indicates an inclination to exports and imports of these goods and services.

- Labour mobility: it is a critical factor in Mundell’s (1963) principle of the mobility of factors of production. When labor can move freely across borders within the currency union, it helps to alleviate regional disparities in employment and wages. Labour mobility facilitates the adjustment process to asymmetric shocks, allowing resources to shift more easily from areas experiencing economic downturns to regions with better employment prospects.
- Price and wage flexibility: Flexible prices and wages are essential in OCA theory to accommodate changes in demand and supply conditions. When prices and wages can adjust swiftly in response to economic shocks, it reduces the need for discretionary monetary policies and mitigates the risk of diverging economic cycles among member countries.
- Fiscal integration and transfer mechanisms: Fiscal integration and transfer mechanisms play a crucial role in smoothing economic disparities within the currency union. These mechanisms help redistribute resources from economically stronger regions to weaker ones, thereby promoting stability and cohesion within the currency area. These principles require advanced political integration among the involved countries
- Symmetry of shocks: OCA theory suggests that countries within a currency union should be exposed to similar economic shocks. If member countries experience asymmetric shocks, the lack of an independent monetary policy may limit their ability to respond effectively to those shocks. Some of the main principles include Kenen’s (1969) product diversification principle and the principle of similarities in inflation rates presented by Fleming (1971). The diversification of production and consumption is important since it decreases the severity of shocks because any affected sector represents a small portion of the total economy, while similar inflation rates result in more balanced current accounts and thus more compatible trade patterns.

In the context of dedollarization and the rise of BRICS Group countries, OCA theory offers relevant insights. As these countries pursue dedollarization initiatives and consider the use of local currencies in mutual trade, OCA theory highlights the importance of considering the prerequisites for successful currency arrangements. It highlights the significance of trade integration, labour mobility, price and wage flexibility, and fiscal mechanisms in supporting the adoption of a common currency for trade within the region. Moreover, OCA theory warns that countries within a dedollarization movement must be mindful of the potential asymmetry of economic shocks (Horvath, 2003).

Placed in the context of dedollarization, OCA theory suggests that the success of a possible BRICS common currency depends on achieving a sufficient degree of economic integration, cooperation, and harmonization of policies among the BRICS member countries. Therefore, addressing economic divergences and promoting economic convergence could represent an essential goal for the BRICS group.

4.1.2 Experiences with the common currency introduction

The main benefits of a common currency per Baldwin & Wyplosz (2022) are: reduced transaction costs; improved price transparency; eliminated exchange rate risk and uncertainty; facilitated trade and greater monetary policy magnitude and quality. The euro represents the main example of implementation of a common currency with the EU being an example of the deepest economic integration yet achieved. The Economic and Monetary Union (EMU) was established on 1 January 1999 with an initial participation of 11 member nations of the European Union.

Curiously, after the adoption of the euro, the extra-EU trade has experienced stable annual growth rates, while intra-EU trade remained unchanged. Subsequently, the trade conducted between members of the Eurozone narrowed the disparity with trade outside the Eurozone following a period of adaptation and then grew at an accelerated pace. Following the establishment of the EMU, exports from the Eurozone initially increased their presence in foreign markets. However, over the next decade, EU's global price competitiveness gradually decreased and settled at lower levels. In general, the implementation of a shared currency has improved the overall growth of productivity (Singh, 2023).

On the other hand, the primary example of a common currency proposal that never materialized is the much-discussed potential common currency of the Association of Southeast Asian Nations (ASEAN). The Asian financial crisis of 1997 initially presented two potential scenarios for addressing the exchange rate issue: a flexible exchange rate system or a fixed exchange rate system with the concept of implementing a common currency within the ASEAN region gaining traction in the aftermath of the crisis (Madhur, 2002).

The proposal of a common currency has been discussed periodically over the years, but it has faced significant challenges and has not materialized due to various factors including differing economic structures, levels of development, and monetary policies among ASEAN countries. While the idea has not been entirely abandoned, it has not been actively pursued in recent years. ASEAN member states have instead focused on other aspects of economic cooperation, such as trade liberalization, investment promotion, and infrastructure development. Additionally, the global economic landscape and geopolitical considerations

have also influenced discussions around a common currency within ASEAN (Eswaran, 2022).

At the time of the Asian Financial crisis and the aforementioned EMU getting closer to implementation in the EU, ASEAN exhibited more favourable labour and capital mobility compared to the EU. Additionally, ASEAN ranked highly in terms of wage and price flexibility. Several ASEAN nations also exhibited higher trade-to-GDP ratios and trade-intensity ratios compared to Western Europe. The intra-regional trade in ASEAN was significantly higher at 25 percent compared to other existing currency unions, excluded the EU with the Eurozone, such as the Western Africa Economic and Monetary Union, the Central African Economic and Monetary Community and the Eastern Caribbean Currency Union (Madhur, 2002).

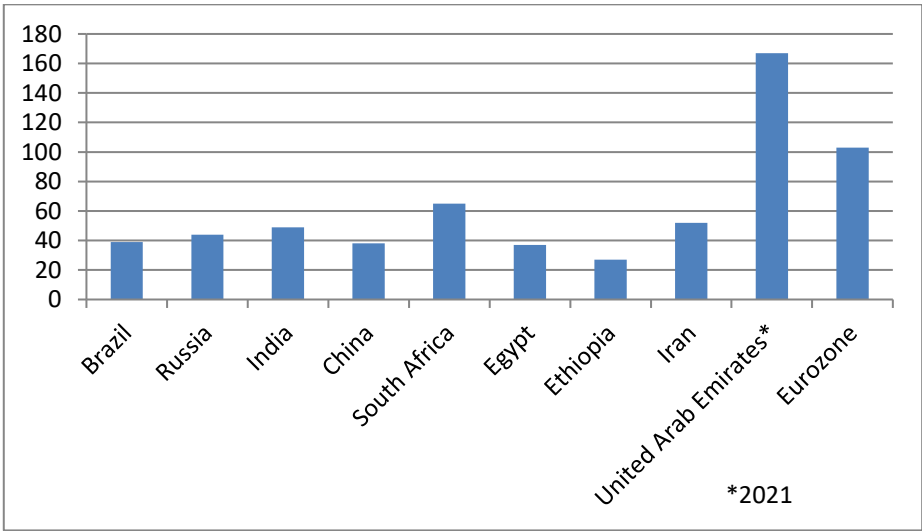
However, it is necessary to consider both cases when discussing the concept of a common currency. In the context of the EU, the establishment of a common currency was the outcome of mutual comprehension and integration. However, ASEAN countries have been collaborating without the use of a shared currency. Thus, while not necessarily indispensable, a shared currency can serve as a viable and efficient means to foster increased economic collaboration. In addition, if BRICS could establish such a monetary framework, the global response would be threefold. Initially, some countries could perceive such advancement as a threat to the existing monetary and financial system and would probably resist it. This is the case of the US and its allies like the EU, Japan, South Korea, Australia, Canada etc. Furthermore, countries within the geographical region which would stand to gain advantages from adopting the common currency, with existing economic and political ties to at least some BRICS member countries, mainly China, would probably choose to participate. With the movement gaining traction if successful it would attract even more new members. Ultimately, certain nations would probably adopt a neutral stance regarding the matter. Within a social framework, the alliance would possess the characteristics of a non-western power bloc. Within an economic framework, the utilization of a shared currency and a shared central bank could be able to facilitate outcomes that resemble those observed in the Eurozone. Within a political framework, the alliance would have the capacity to offset the influence of the West by offering an alternative to the current monetary and financial system (Liu & Papa, 2022).

4.1.3 Challenges in Introducing a BRICS Common Currency

When applying some of the main principles of the OCA theory to the BRICS group and then comparing it to the Eurozone which represents a case of successful implementation of a common currency, there are some interesting findings. The indicator of Trade as a share of GDP in 2022 was used as a proxy for economic openness and although some of the BRICS members like China are major players in global trade, their total trade, except for the UAE,

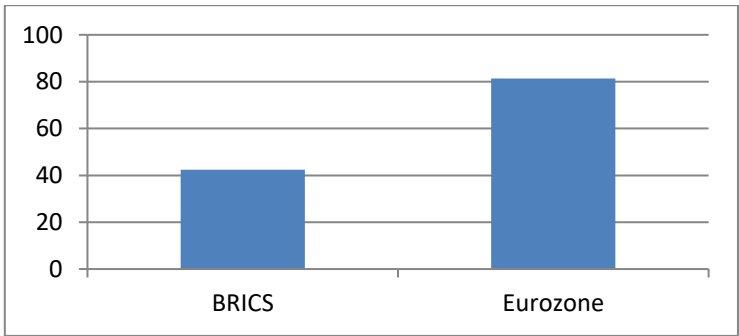
represents a much smaller share of their GDP compared to the Eurozone, as seen in Figure 7, indicating a lesser degree of economic openness. Interestingly the standard deviation of the two groups is reversed as seen in Figure 8. The BRICS group has a lower standard deviation of Trade as a share of GDP in 2022 as compared to the Eurozone group, meaning that while their degree of economic openness is lower, they are surprisingly more homogeneous in this aspect than the Eurozone.

Figure 7: Trade as a share of GDP in 2022 (in percent)



Source: Own work based on World Bank (2024).

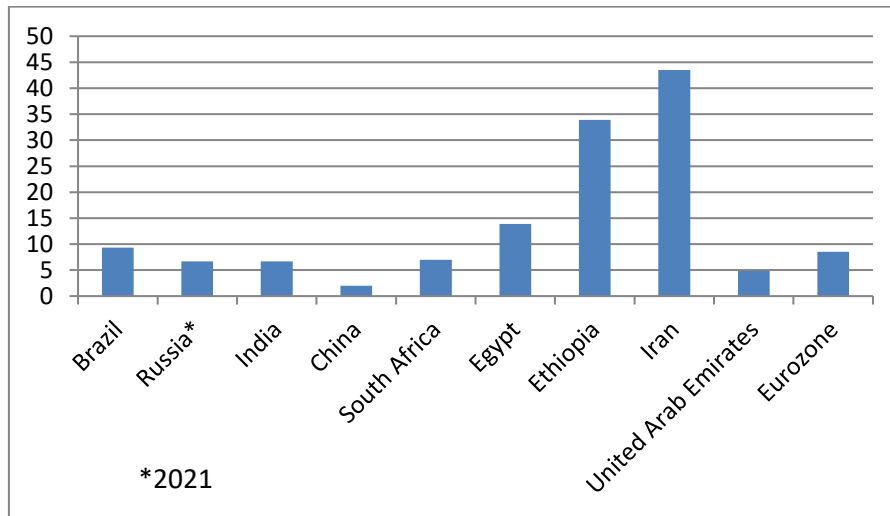
Figure 8: Standard deviation of Trade as a share of GDP in 2022



Source: Own work based on World Bank (2024).

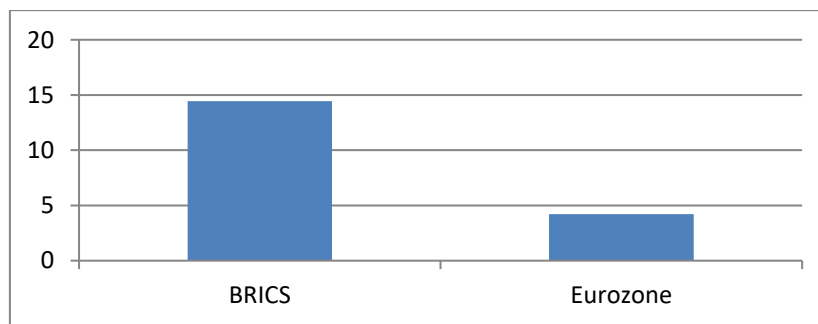
The next indicator, presented in Figure 9, is the annual inflation rate in 2022. Here the biggest surprise is China as it seems largely untouched by the recent global surge in inflation. On the other hand, Egypt and especially Ethiopia and Iran experienced severely elevated inflation rates in 2022. This gap in the BRICS group is well illustrated by a high standard deviation in the inflation rates between its member countries compared to the standard deviation of the Eurozone member countries shown in Figure 10.

Figure 9: Annual inflation rate (CPI) in 2022 (in percent)



Source: Own work based on World Bank (2024).

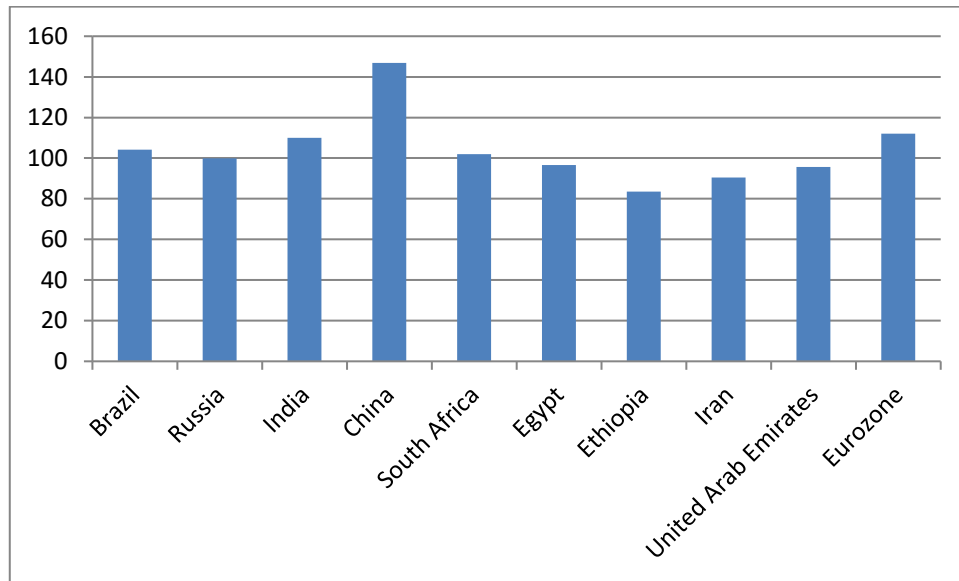
Figure 10: Standard deviation of the annual inflation rate in 2022



Source: Own work based on World Bank (2024).

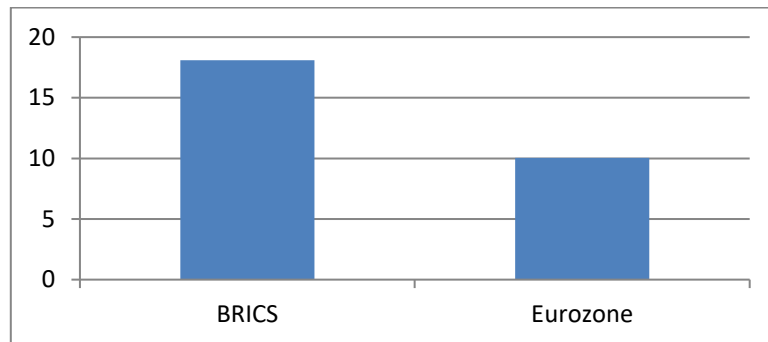
The next criterion is the diversification of production which will be represented by the Global Economic Diversification Index (Prasad et al., 2024), as seen in Figure 11. The index uses a wide range of economic indicators to provide a classification of a country's economic diversification through different sectors in a way that the higher the value of the index, the more diversified an economy is and the value of 100 is the average. China is as expected by far the most economically diverse country of the BRICS group, while the new member countries clearly lag behind the original five members. Even though the difference among the BRICS members doesn't seem large, the standard deviation of the BRICS group is significantly greater to the standard deviation of the Eurozone group as shown in Figure 12.

Figure 11: Global Economic Diversification Index



Source: Own work based on Prasad (2024).

Figure 12: Standard deviation of the Global Economic Diversification Index



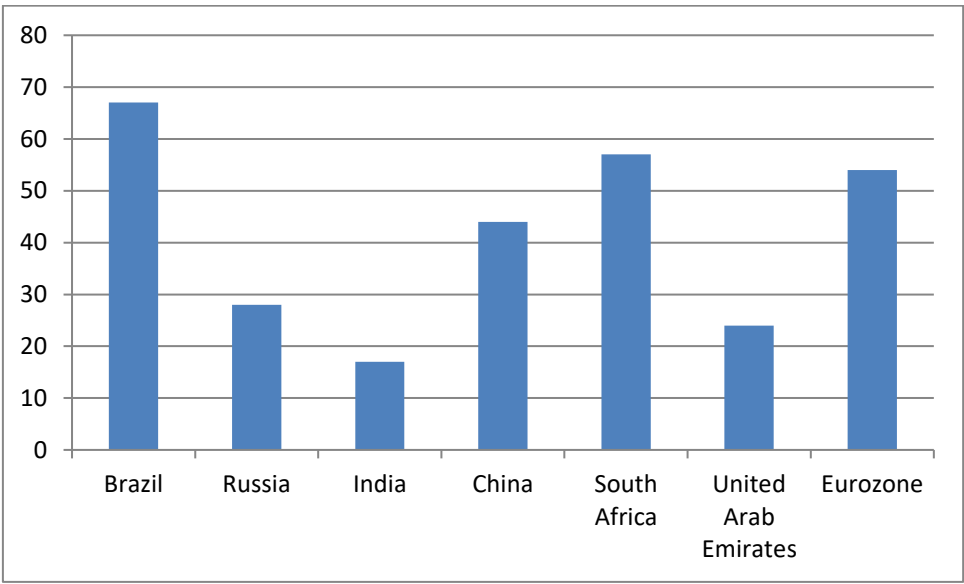
Source: Own work based on Prasad (2024).

The last index is the Labour Market Mobility Index which is part of the Migrant Integration Policy Index (Solano & Huddleston, 2020). The index is based on the access to the domestic labour market for foreign labourers and their integration in the domestic labour market. This index thus represents just the domestic part of the labour mobility principle but is a valuable indicator, nevertheless. Egypt, Ethiopia and Iran were not included in this index.

Figure 13 shows us that the index's score varies a lot for the BRICS countries with Brazil and South Africa having a higher score than even the Eurozone average but on the other hand India, UAE and Russia scoring poorly. The most surprising finding is that although the BRICS member countries' scores vary a lot, they have a slightly smaller standard deviation than the Eurozone member countries, as seen in Figure 14, although their scores are on average higher than the BRICS countries' scores. The free movement of workers is one of

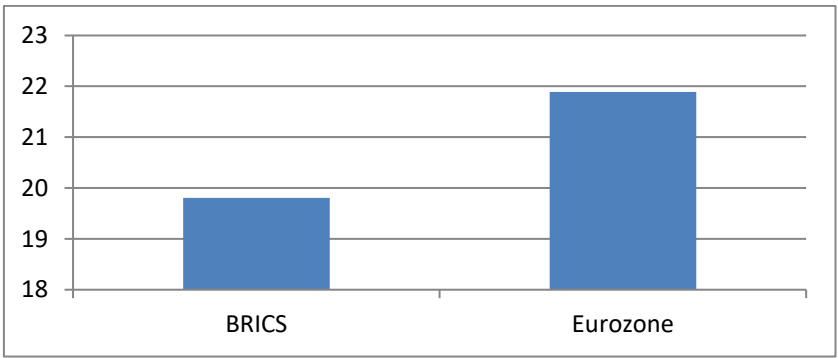
the key areas of the BRICS group recently, so we can expect some level of improvement of labour mobility in the near future, at least among member countries (Agarwal, 2023).

Figure 13: Labour Market Mobility Index



Source: Own work based on Solano & Huddleston (2020).

Figure 14: Standard deviation of the Labour Market Mobility Index



Source: Own work based on Solano & Huddleston (2020).

Adopting a common currency framework for the BRICS would present challenges not only in terms of OCA prerequisites, but also in terms of social, economic, and political aspects. BRICS member states exhibit distinct strategies in their foreign policy, internal affairs, and economic policies. Thus, it is imperative for them to establish and organize various political and economic meeting points and compromises that are essential for the proper functioning of a common currency.

When applying the OCA principles to the BRICS countries it is clear that there are some obstacles to creating a common currency. The first obstacle is the lack of economic openness, characterized by a low percentage of trade as a share of GDP common to all

BRICS members except for the UAE. The second obstacle is a high variation in inflation rates among the members which is also related to the varying degree of their macroeconomic stability with China as a stable giant on one side and Egypt and especially Ethiopia and Iran as highly unstable countries on the other side. The third obstacle is low diversification of the economy of some members, especially the recently joined ones. The fourth and final presented obstacle is low labour market mobility of most of its member countries.

With all these obstacles and internal differences in mind it is necessary to highlight the fact that the discussed common BRICS currency was never meant to substitute the existing national currencies but merely complement them with the goal of facilitating mutual trade while distancing from the US dollar. While it is obvious that the adoption of a common BRICS currency that would substitute the national currencies like the Eurozone part of the EU did with the introduction of the Euro is not economically feasible, the introduction of a complementary common currency is not as farfetched as it seems, especially if it was backed by gold like it's much discussed in the context of significant increases in gold reserves by some BRICS members like China and Russia (Liu & Papa, 2022).

4.2 Internationalization of the yuan

The functions of an internationally used currency are diverse and mainly encompass the three fundamental functions of money (Gourinchas et al., 2019):

- medium of exchange
- store of value
- unit of account

These characteristics include being an international currency that accounts for a significant portion of central banks' international reserves, being a currency commonly used in foreign transactions, being a currency that is predominantly used in international trade and being a dominant currency in global financial markets (Auboin, 2012).

When examining the internationalization of the yuan in the context of the above-mentioned roles of money we find out that as seen in Figure 3 it has successfully increased its market share and demonstrated progress in its role as a global medium of exchange. However, it has been slower in establishing itself as a reliable store of value and especially unit of account. The reason for this is likely due to China's growing significance in global trade, services, and financial sectors. However, the presence of capital controls in China and the limited convertibility of the yuan hinder its progress as a reliable store of value and unit of account (Goldman Sachs, 2023).

Figure 15: Progress check on the internationalization of the Chinese yuan

Roles of money	Relevant indicators	2011	2016	2021
Medium of Exchange	RMB share in international payments (%)	0.3	1.9	2.2
	RMB share in global FX turnover (%)*	0.9	4.0	7.0
Store of Value	RMB denominated assets in global reserve allocation (%)	0.0	1.0	3.0
	RMB denominated debt share in international debt market (%)	0.2	0.5	0.4
Unit of Account	RMB quoted prices in international markets	Dual currency counter in HK Stock Exchange (2023)		
	Anchor for pegging currency	SGD NEER, IMF SDR (since 2015)		

Source: Goldman Sachs (2023).

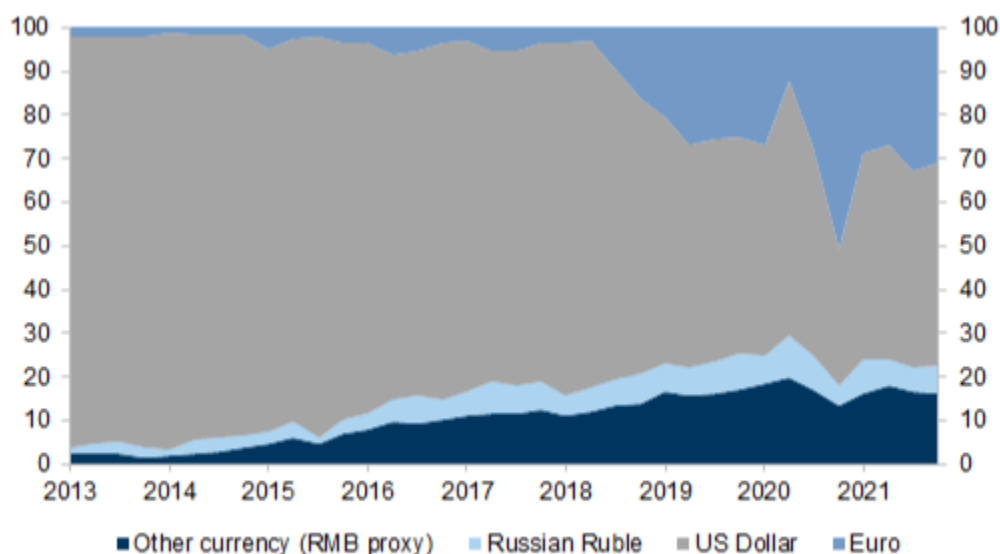
4.2.1 Medium of exchange

According to data from SWIFT collected by De Mott (2023) the Chinese yuan reached a new peak in its share of global payments and is now the fourth most utilized currency. The yuan's share of transactions increased to 4.61% in November 2023, up from 3.60% in October 2023, surpassing the Japanese yen's share, which declined to 3.41% from 3.91%. At the same time, the world's other leading currencies experienced a slight decrease in their market share. The share of the dollar has decreased from 47.25% to 47.08%, the euro has dropped from 23.36% to 22.95%, and the pound's share has slightly decreased from 7.33% to 7.15%. When comparing the latest figures to those from November 2022, it is evident that the yuan's global share has almost doubled, increasing from 2.37% to its current level. The consistent increase in value is a result of ongoing attempts to challenge the dominant position of the US dollar worldwide as China is actively promoting the international use of the yuan as a strong alternative to mainstream currencies.

Although the yuan's share in global payments still remains relatively low its share in China's cross-border payments has advanced rapidly. According to Goldman Sachs (2023) the yuan overtook the US dollar in March 2023 and established itself as the prevailing currency in China's cross-border payments. The yuan's share of China's cross-border payments reached 30% in November 2023 as reported by Soni (2023).

The increased utilization of the yuan in China's cross-border trade payments appears to be widespread and extends beyond the growing use of the yuan by Russia. Since 2014, when the United States imposed severe sanctions on Russia following its occupation of Crimea, Russia's utilization of the yuan in its trade with China has experienced a substantial increase. Although the central bank of Russia does not provide specific data on settlements in yuan, Goldman Sachs (2023) assumes that the category of "other currency" primarily includes yuan as presented in Figure 4.

Figure 16: Russia's total trade with China settlement by currency in percent 2013-2022



Source: Goldman Sachs (2023).

The yuan's share in Russia's trade with China settlement by currency has surged rapidly since the Russian invasion of Ukraine and the extensive financial sanctions that followed. According to Russia's state-run news agency TASS (2023b) as of September 2023 Russia and China almost completely eliminated foreign currencies in the settlement of trade between them as the share of the Chinese yuan and the Russian ruble supposedly reached 90% with the rouble reaching 20% and the yuan 70%.

4.2.2 Store of value

While the RMB has made significant strides in its role as a medium of exchange in global markets, it is still not widely utilized as a store of value. According to data from the BIS presented by Goldman Sachs (2023), the proportion of debt securities denominated in Chinese yuan in international debt markets in 2023 was approximately 0.7%, compared to 0.4% a decade ago. Based on the data I collected from the World Bank database (n.d.) the proportion of yuan denominated global reserves in the third quarter of 2023 was 2.37% which is still relatively low.

4.2.3 Unit of account

Internationally the Chinese yuan is linked to only one currency and one non-currency international reserve asset. The yuan acts as one of the anchors for the Singaporean dollar whose exchange rate is pegged to a basket of currencies of Singapore's main trading partners. The weight of each currency in the Singaporean dollar peg is not disclosed but Goldman Sachs (2023) estimates a 16% weight for the yuan in the basket in 2023. The yuan was formally incorporated into the IMF's SDR basket in 2016. The allocation of the yuan in the SDR in 2022 was 12.28% (IMF, n.d.).

Although China's capital controls restrict foreign investor's access to local assets there is a offshore market for yuan denominated assets on the Hong Kong Exchange which is open to international investors but is not substantial in comparison to some other international financial markets. There is a wide range of financial instruments such as dim-sum bonds (bonds denominated in yuan issued in Hong Kong), yuan-denominated investment funds, commodity-linked instruments, exchange traded funds (ETFs), real estate investment trusts (REITs), equities, and insurance products (Goldman Sachs, 2023).

In June 2023, the Hong Kong Exchange launched the HKD-RMB Dual Counter Model in the secondary securities market for the purposes of trading and settlement. This model allows Chinese securities to be traded on two different counters one denominated in Hong Kong dollars and the other in Chinese yuan (Hong Kong Exchange, 2023).

4.2.4 Barriers to greater international use of the yuan

The main obstacles to the yuan internationalization progress are China's capital controls which limit the access to onshore financial markets and the relatively small offshore market for yuan denominated assets. The primary aim of capital controls is to keep the volatility of the yuan low since sudden changes in capital inflows or outflows can cause sharp fluctuations in the value of the currency. More specifically the aim is to prevent sudden large capital inflows which would cause a rapid appreciation of the yuan and thus a decrease in the competitiveness of China's massive exports (S&P Global, 2023).

Although China is slowly easing its capital controls policies in the last few years, like expanding the list of manufacturing sectors open to foreign investment in late 2022 (UNCTAD, 2022) and launching a campaign promoting and facilitating foreign investment in the export oriented city of Guangzhou in early 2023 (UNCTAD, 2023) the Chinese yuan still lacks a key principle discussed in chapter 2 that helps the US dollar maintain the dominant position in global foreign exchange transactions and global trades and payments invoices: inertia.

When a country exports in US dollars more than it spends on imports in US dollars it accumulates US dollar reserves that enter the domestic banking system. In order to keep these newly acquired US dollar reserves safe and liquid, the country's Central bank usually invests these dollars in a dollar denominated market that is safe, deep and liquid thus eliminating currency risk, minimizing credit risk and enabling simple and fast turnover when necessary. The largest such market is the US Treasury market with its estimated size exceeding 20 trillion US dollars (Peccatiello, 2023).

The existing vast supply of debt securities by the US mainly in the form of US Treasuries financed by huge fiscal deficits combined with a sizeable offshore US dollar denominated debt market with an estimated size of over 12 trillion US dollars make it hard for other countries and their currencies, in this case the yuan and China, to emerge in an international role even if the country developed such deep and liquid markets as mentioned before. The main issue is that the increased use of yuan instead of US dollars in global trade would decrease the ability of companies and countries to finance and repay the existing US dollar denominated debt as the inflow of US dollars drops. This makes a large-scale deleveraging of the existent offshore US dollar denominated debt system improbable (Peccatiello, 2023).

4.2.5 Evaluating the prospects of the two strategies

This chapter has examined the two main possible strategies by the BRICS group in their efforts to challenge the global dominance of the US dollar: the introduction of a new common BRICS currency and the growing internationalization of the Chinese yuan. Both strategies present unique challenges that reflect the distinct economic, political, and structural differences within the BRICS countries.

From the analysis based on Optimum Currency Area (OCA) theory, the introduction of a BRICS common currency faces substantial obstacles. Low levels of economic openness, high variations in inflation rates, and limited labor mobility within the BRICS nations reduce the likelihood of establishing a functional common currency comparable to the Euro. Additionally, significant political and economic coordination would be necessary to overcome these disparities. While a complementary common currency aimed at facilitating trade within the BRICS and reducing dependency on the US dollar is possible, it remains a distant prospect due to the internal economic divergences.

In contrast, the strategy of yuan internationalization has made tangible progress, particularly as a medium of exchange in cross-border trade. China's economic influence and its growing trade partnerships, have increased the yuan's role in global transactions. However, the yuan still struggles to establish itself as a reliable store of value and unit of account due to China's capital controls and limited currency convertibility. Although the internationalization of the yuan is more feasible in the short term, it is constrained by the deep-rooted inertia of the US

dollar in global financial markets and the lack of large, liquid, and safe yuan-denominated assets.

5 EMPIRICAL ANALYSIS OF THE FACTORS OF THE DEDOLLARIZATION PROCESS

5.1 Data and research setting

This analysis aims to examine how economic ties with the United States and China influence the allocation of central banks' foreign exchange reserves among selected BRICS and non-BRICS countries and will consist of several panel data regression analyses conducted in STATA.

The selected countries are eight. Four BRICS members: Russia, Brazil, South Africa, Egypt and four non-BRICS countries: Chile, Australia, Norway and Bangladesh. The choice of countries is based on the availability of data; especially the data of central banks' foreign exchange reserves which is regarded as confidential and just few countries decide to publish the data, usually in their central bank's reports. The geographic differences between the BRICS countries were also taken in consideration when choosing the non-BRICS countries in order to maintain those differences in the group.

The time series of the regression is the range from 2011 to 2022. Again, the choice of the time series was based on the availability of data of all variables, although there are some missing values. The data for each separate variable will be presented in the following figures with BRICS countries represented by solid lines and non-BRICS countries represented by dotted lines. Each country has its line in a different colour than others. Missing values in the graphs indicate that the correspondent data was not available.

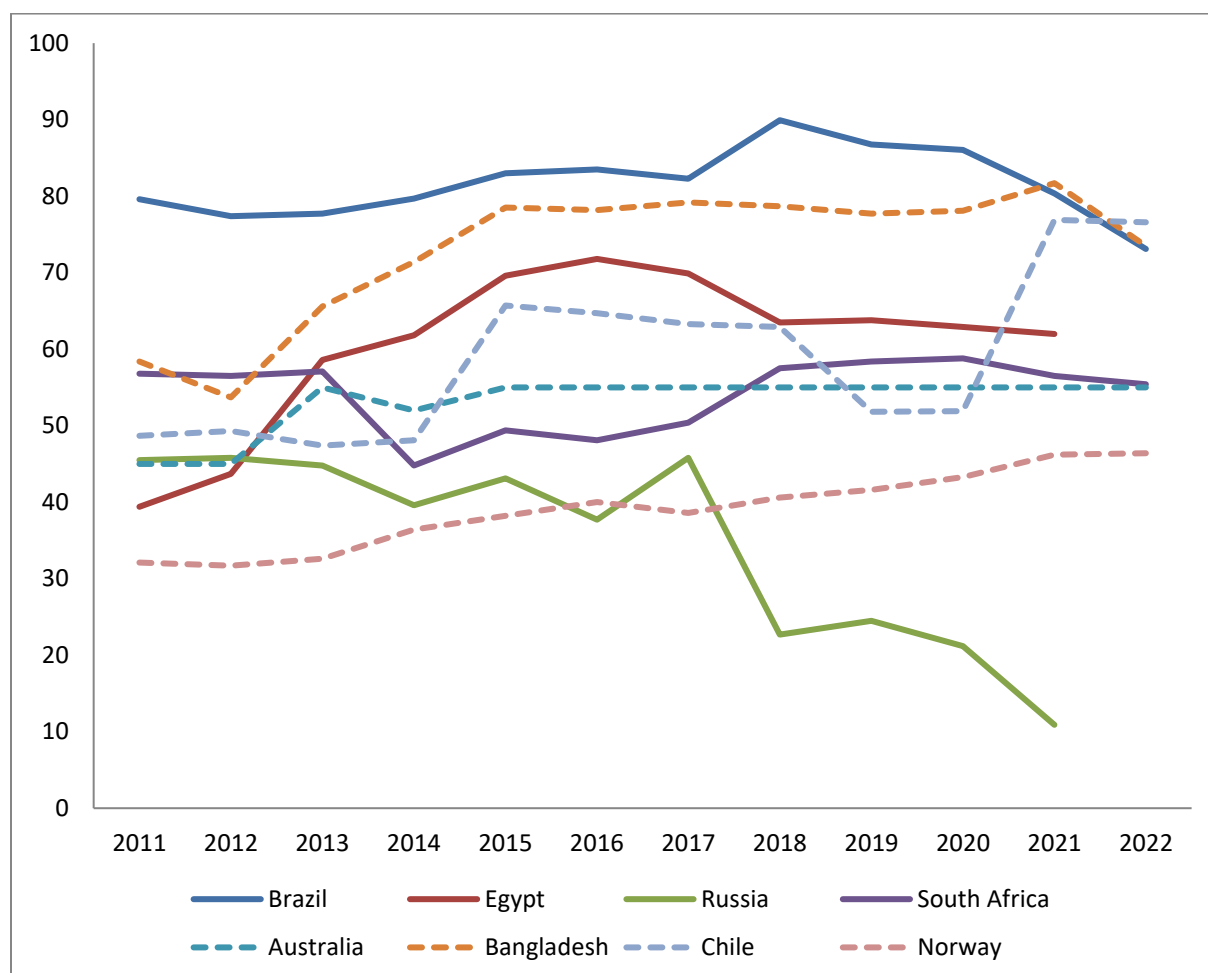
Figure 17 illustrates the allocation of foreign exchange reserves in US dollars as a percentage of total reserves across selected countries, distinguishing between BRICS and non-BRICS nations. While Brazil consistently maintains a high allocation, with over 70% of its reserves in US dollars throughout the time series, it has experienced a drop from the peak of around 90% in 2018 to just above 70% in 2022. This reflects the fact that Brazil's strong reliance on the US dollar for stability in its foreign reserves is being challenged in the last few years due to stronger ties with its BRICS partners. Russia, however, holds the lowest proportion of foreign exchange reserves allocated in US dollars, starting with a modest allocation somewhat above 40%, it further reduces its share after 2016, reflecting a strategic shift driven by geopolitical factors and increasing economic sanctions, resulting in a move towards diversifying away from the US dollar. South Africa shows a stable allocation just

above 50%, indicating a balanced approach between reliance on the US dollar and reserves diversification.

Non-BRICS countries display varying strategies. Chile and Bangladesh significantly increased their US dollar allocation from around 50 and 60% in 2011, respectively, to around 80% in 2022, suggesting its growing dependence on the dollar. Australia maintains steady allocations around 60%, reflecting mostly consistent reserve management strategies. Norway, starting from a lower dollar share, gradually increased its allocation, indicating a slight shift towards the dollar over time.

Based on Figure 17 there is a clear difference in trends between the selected BRICS and non-BRICS countries. The BRICS group has experienced a drop with varying degrees in the share of US dollar reserves, especially since 2017-2018. On the contrary, the non-BRICS group has mostly increased the US dollar share of reserves throughout the time series.

Figure 17: Central banks' foreign exchange reserves allocated in US dollars as a share of total reserves in % for selected countries in a 2011-2022 period



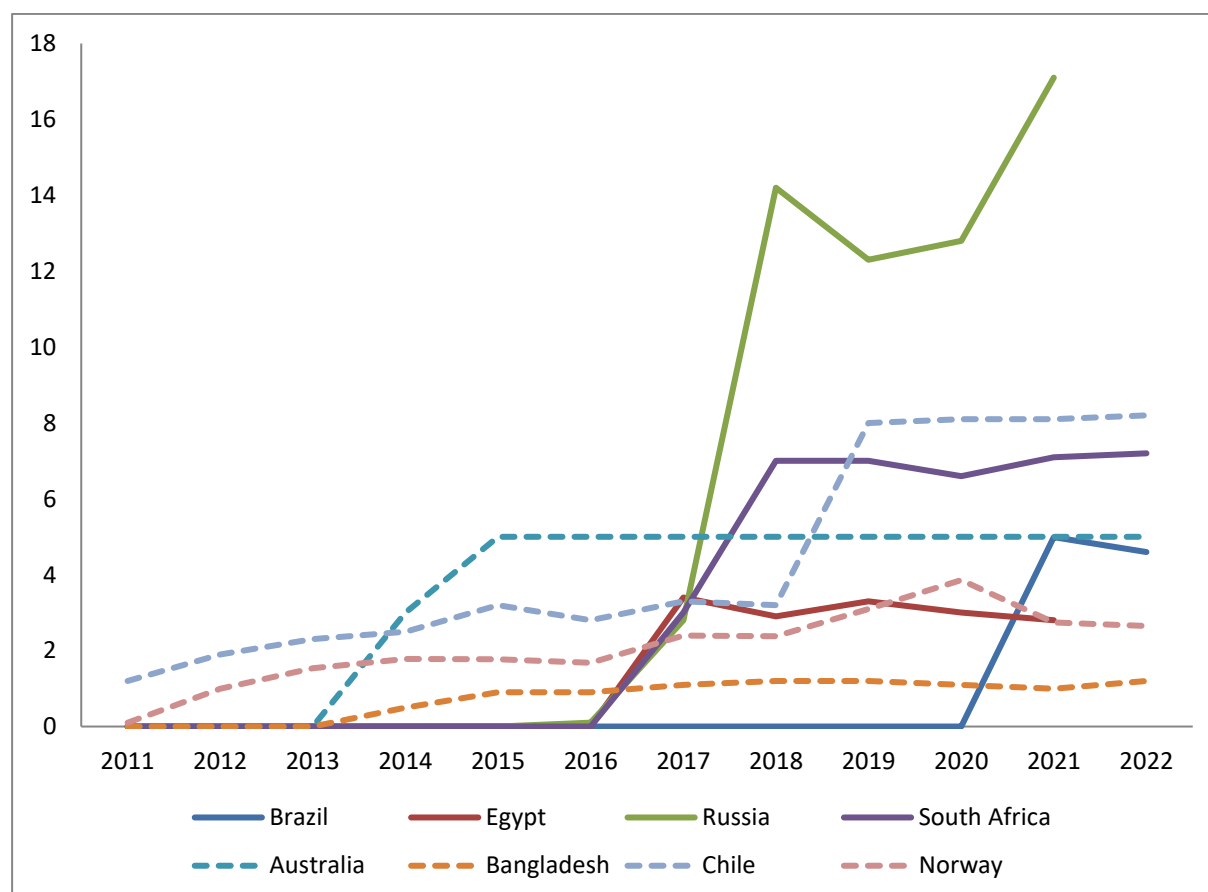
Source: Own work

Figure 18 highlights the growing importance of the Chinese yuan as a reserve currency, not only among BRICS countries. Russia shows a dramatic increase in its yuan allocation, from 0% in 2016 to about 17% in 2022, indicating a significant shift towards diversifying away from the US dollar and possibly aligning more closely with China economically. South Africa also shows an increasing trend, albeit more modest, with its yuan reserves growing from 0% to 7.2% by 2022.

Among non-BRICS countries, Australia leads with a stable allocation of 5% starting from 2015, indicating an early adoption of the yuan as part of its reserve diversification strategy. Chile and Norway also show a gradual increase in their yuan holdings, with Chile reaching about 8% and Norway around 3% by 2022.

These trends suggest a growing acceptance of the yuan as a reliable reserve currency and the lack of a clear difference in yuan reserves holdings between the selected BRICS and non-BRICS countries except for Russia with its disproportionate increase of yuan reserves compared to others.

Figure 18: Central bank's foreign exchange reserves allocated in Chinese yuan as a share of total reserves in % for selected countries in a 2011-2022 period



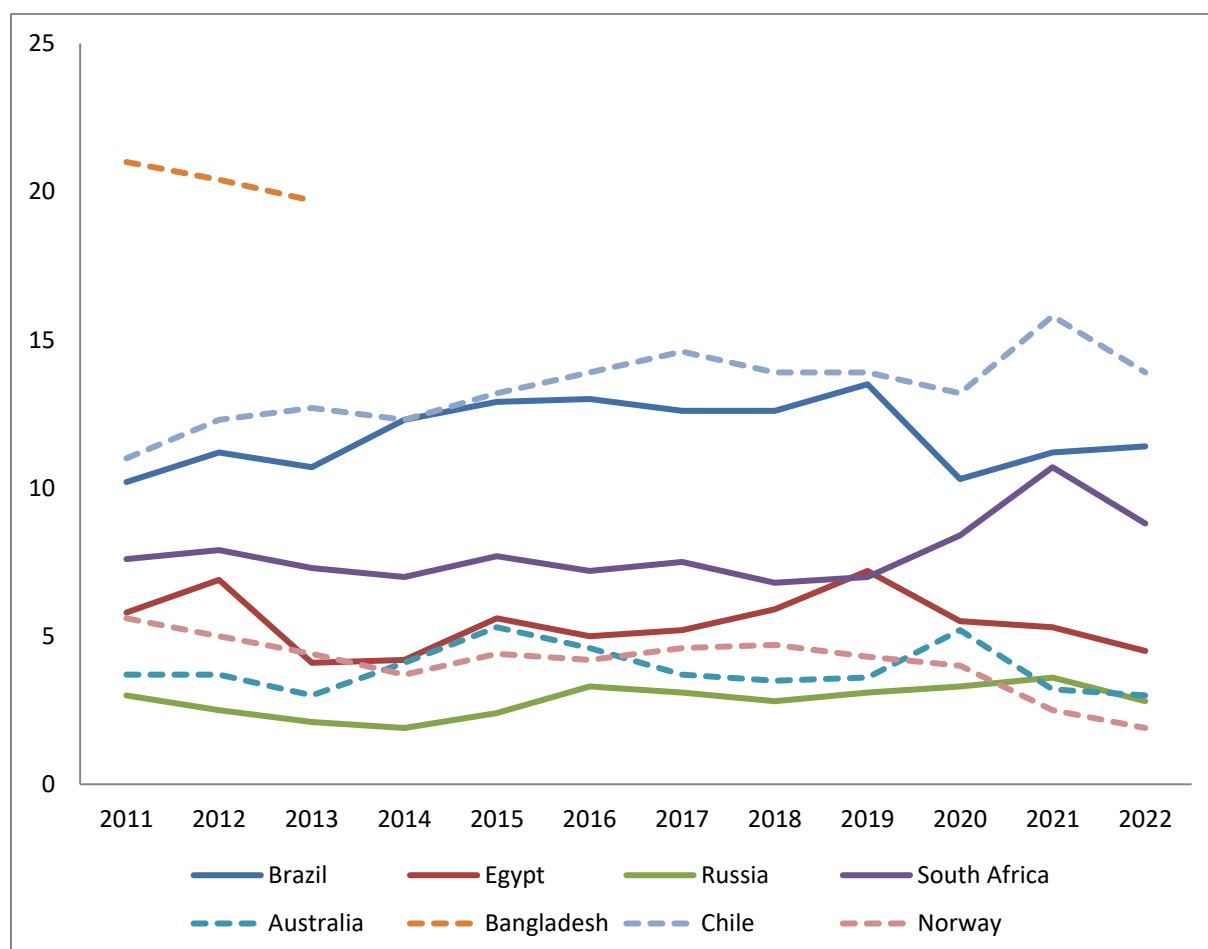
Source: Own work

Figure 19 depicts the trade relationships the selected countries have with the USA, as indicated by the share of their exports directed at the US market. Brazil and Chile consistently maintain a sizable portion of their exports to the USA, hovering around 10-15% throughout the period, showing a stable and important trade link marked by the historic economic ties between Latin America and the USA.

In contrast, Russia's export share to the USA remains low, at about 2-3% which reflects the impact of economic sanctions and deteriorating relations between the two countries. Interestingly Australia and Norway have similar shares of their exports headed towards the US as Russia.

There are varying levels of trade interconnectedness between each of the selected countries and the USA. As expected, among the selected BRICS countries, Brazil has the highest share of exports to USA and Russia has the lowest. The difference between the individual countries of the BRICS group, although substantial, is still smaller than the difference among the selected non-BRICS countries.

Figure 19: Exports to USA as a share of total exports in % for selected countries in a 2011-2022 period

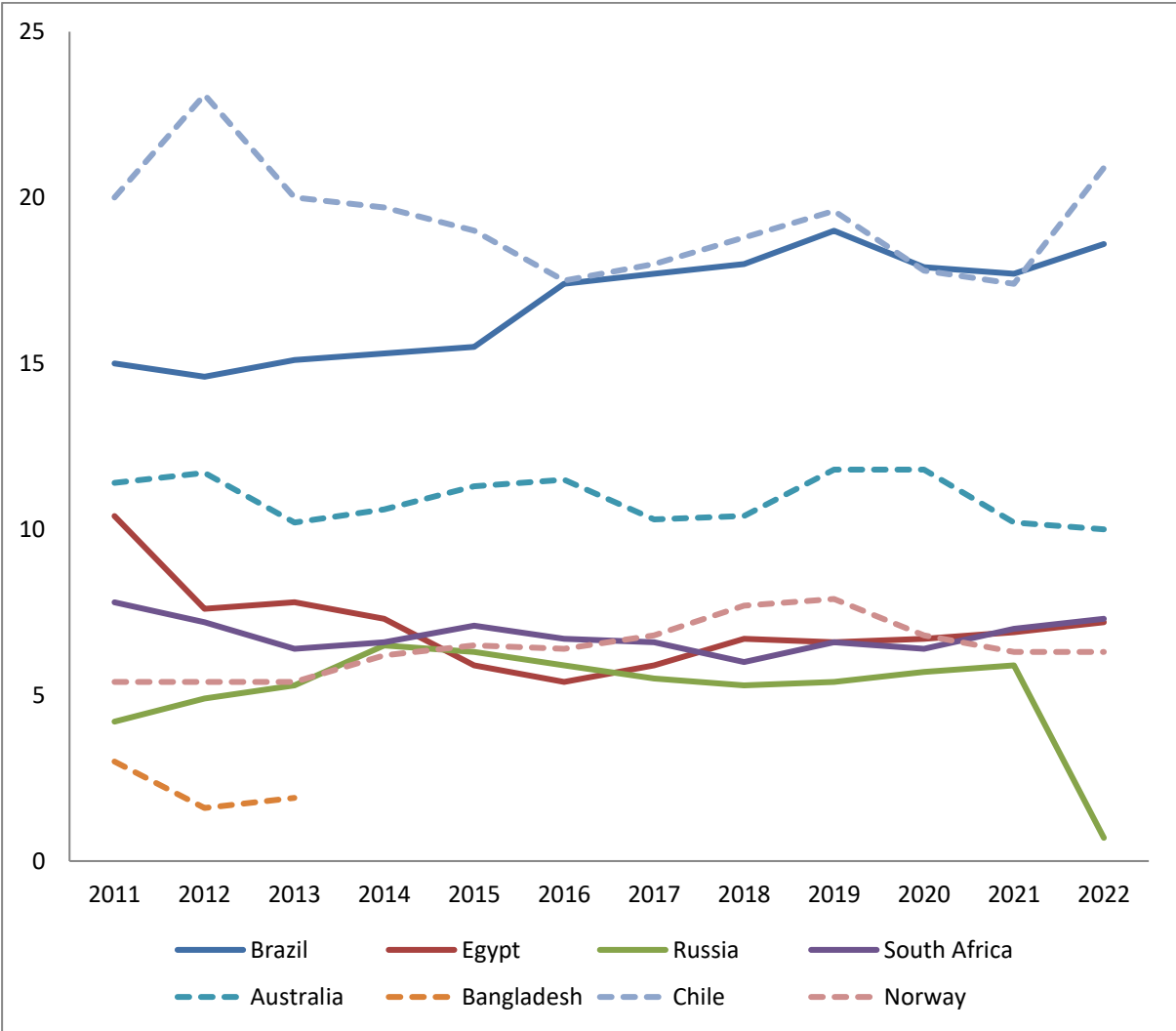


Source: Own work

Figure 20 confirms the reliance of the two selected Latin American countries Brazil and Chile on trade with the USA as both countries have the highest share of imports originating from the USA. Russia’s import share from the USA expectedly decreased significantly in 2022, dropping to about 1% reflecting the impact of geopolitical tensions and sanctions.

The rest of the countries have consistent shares of imports from the USA except for Bangladesh which is in an opposite position than in Figure 19, with its imports from USA as a share of total imports being the lowest, except for Russia.

Figure 20: Imports from USA as a share of total imports in % for selected countries in a 2011-2022 period



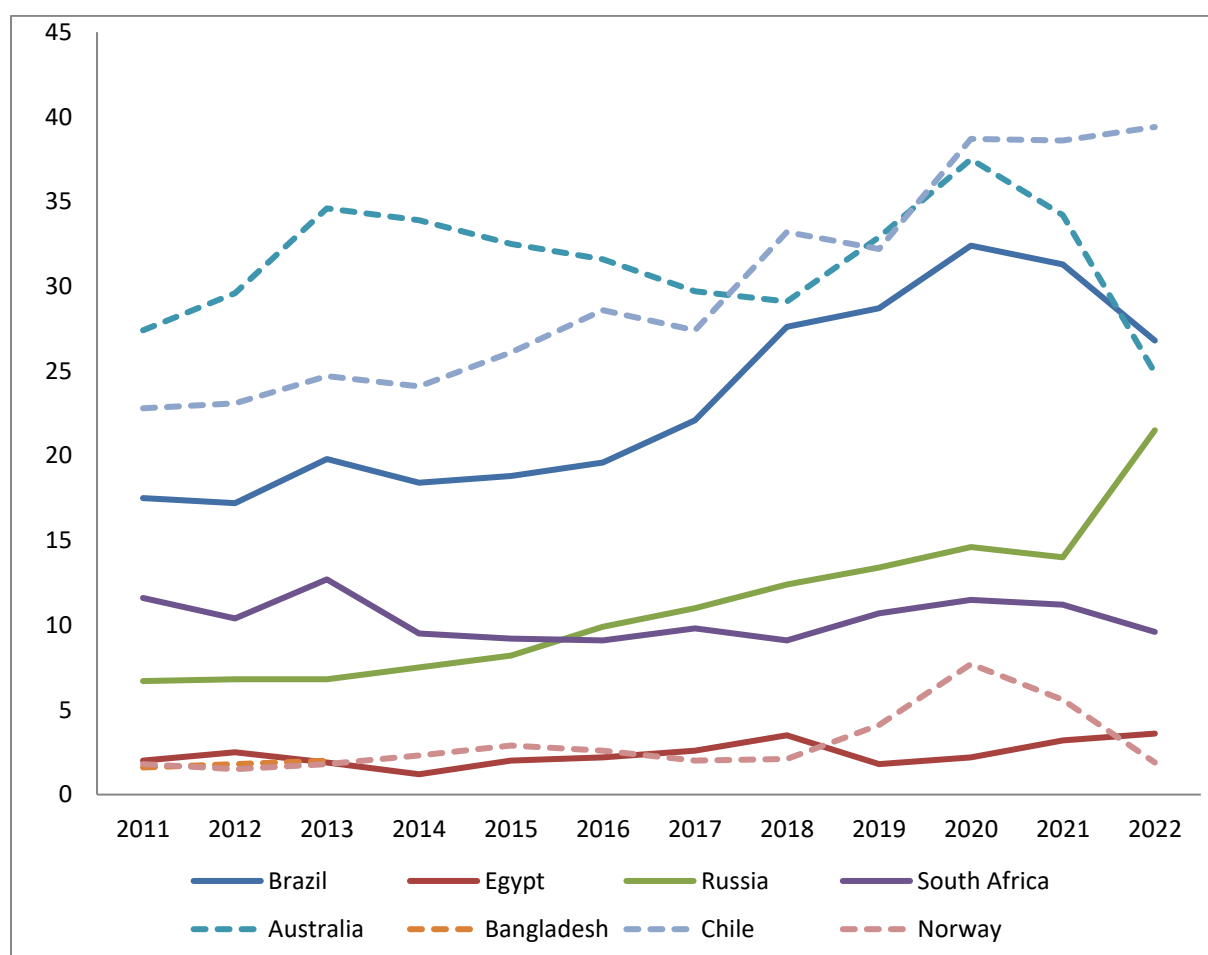
Source: Own work

Figure 21 illustrates the increasing importance of China as an export destination in addition to its major global exporter role, again, for both BRICS and non-BRICS countries. Brazil’s

exports to China rose significantly before the COVID-19 pandemic from about 17% to above 30%, highlighting the deepening economic ties between the two countries before experiencing a noticeable fall to about 27% in the last few years. While Russia shows a sharp increase, particularly from 2017 onwards, exceeding 20% in 2022, reflecting its pivot towards China amidst strained relations with the West.

For non-BRICS countries, Australia stands out with a significant share of exports to China, peaking at close to 40% in 2020, before declining to about 25% in 2022. Chile similarly shows a high export share to China, consistently above 20%, peaking at 40% in 2022, making China a crucial trading partner. Norway, in contrast, has a much lower share of exports to China. Trade patterns have changed recently as a consequence of the Russian invasion of Ukraine which precipitated the departure from past trends in trade ties globally which is also noticeable among the selected BRICS and non-BRICS countries.

Figure 21: Exports to China as a share of total exports in % for selected countries in a 2011-2022 period



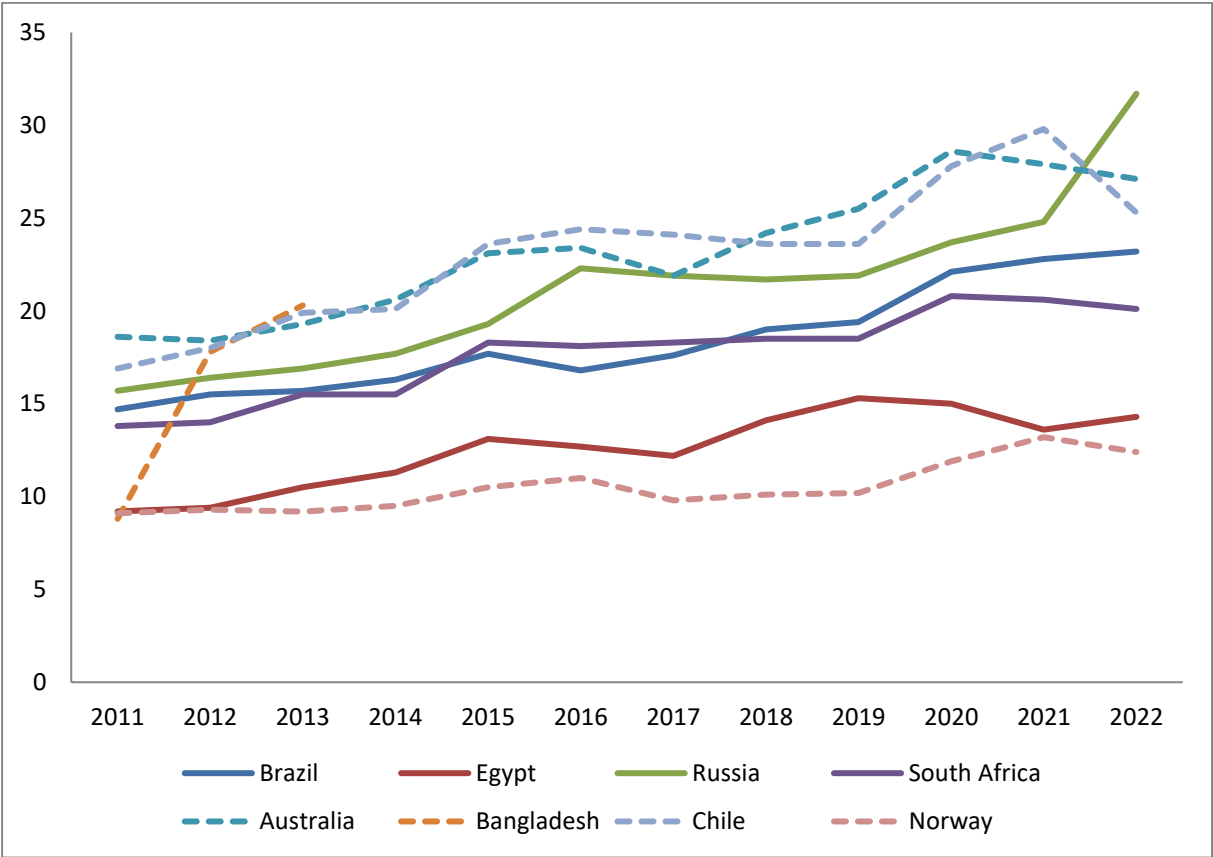
Source: Own work

Figure 22 perfectly depicts China's rising role as a major global exporter as all the selected countries have a predominantly rising trend of imports from China as a share of total imports. Russia's imports from China grew steadily, peaking at over 30% in 2022, highlighting the

strengthening economic ties between the two nations. Brazil and South Africa also show increasing trends, with their import shares from China rising from around 15% to around 20%.

Among non-BRICS countries, Australia and Chile have consistently high and growing import shares from China, with both reaching the vicinity of 25% by 2022, reflecting China’s key role in their import structure.

Figure 22: Imports from China as a share of total imports in % for selected countries in a 2011-2022 period



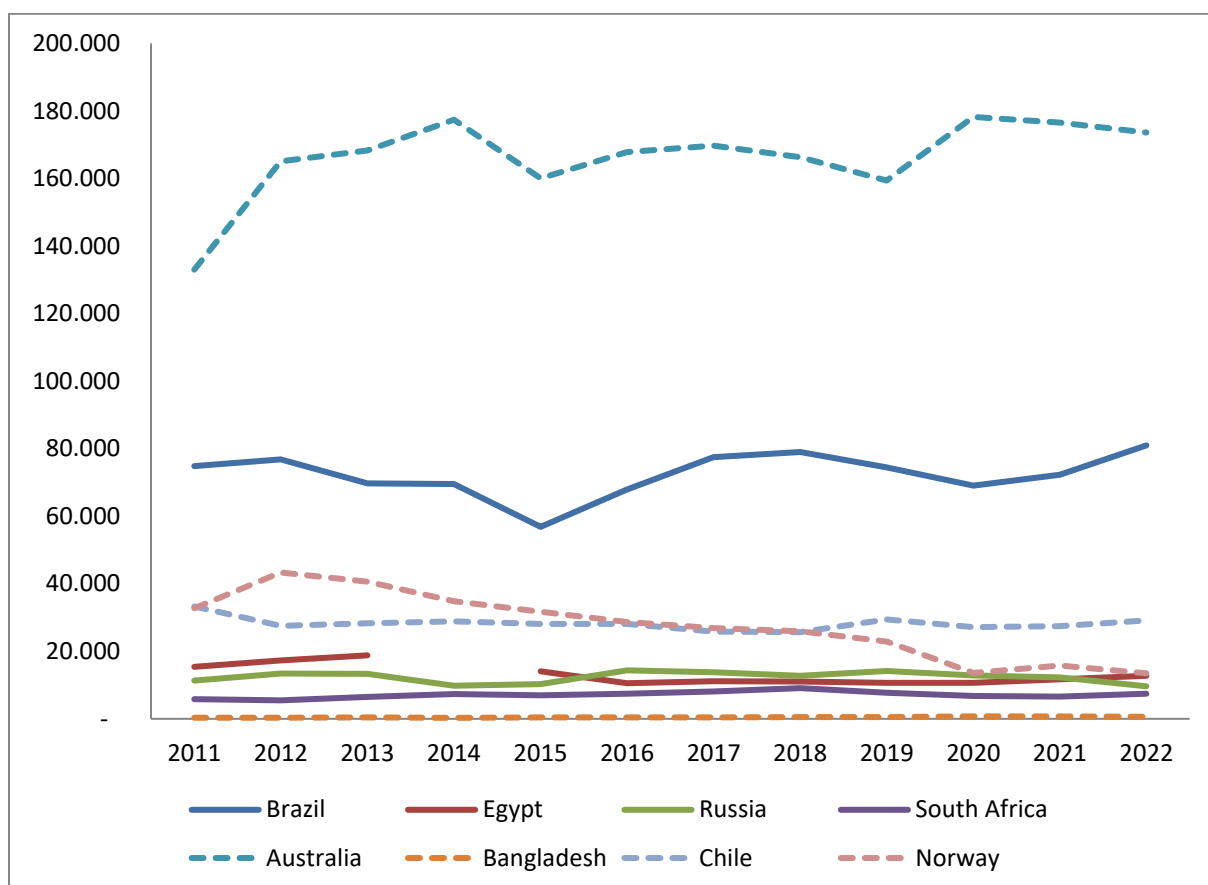
Source: Own work

Figure 23 shows that except for Brazil, the selected non-BRICS countries have mostly a higher value of inwards FDI stock from USA than BRICS countries. Brazil attracts significant FDI from the USA, with its FDI stock in Brazil peaking at around \$80 billion in 2022, indicating its importance as a destination for American investments. Russia’s inward USA FDI stock shows a surprisingly steady trend but an overall low amount of FDI stock as expected.

Among non-BRICS countries, Australia receives substantial investments form the USA being the largest recipient of inwards USA FDI stock of the selected countries. Chile is also a major USA FDI destination among the selected countries being in third place behind its

Latin American BRICS counterpart Brazil in second place, again showing the major role of the USA in Latin American economies.

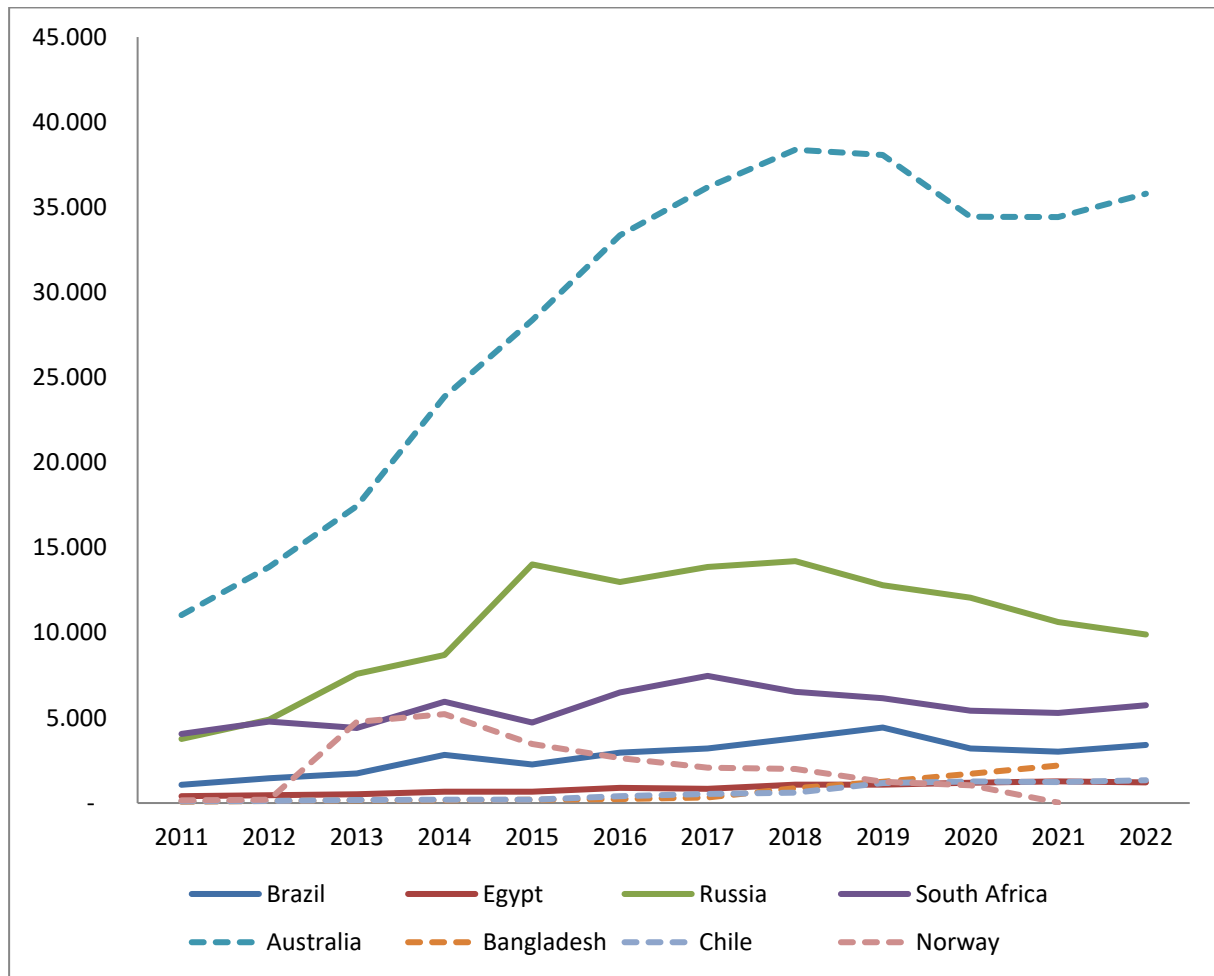
Figure 23: Inwards FDI stock from USA in millions of US dollars for selected countries in a 2011-2022 period



Source: Own work

Figure 24 shows the growing role of China as a source of FDI, especially in BRICS countries except for Australia which has a disproportionately higher value of inwards FDI stock from China than all other selected countries. Russia's, South Africa's and Brazil's FDI stock from China increased slightly in this time period. Chinese investments in the rest of the selected countries are more modest but consistent, illustrating China's growing global economic footprint.

Figure 24: Inwards FDI stock from China in millions of US dollars for selected countries in a 2011-2022 period

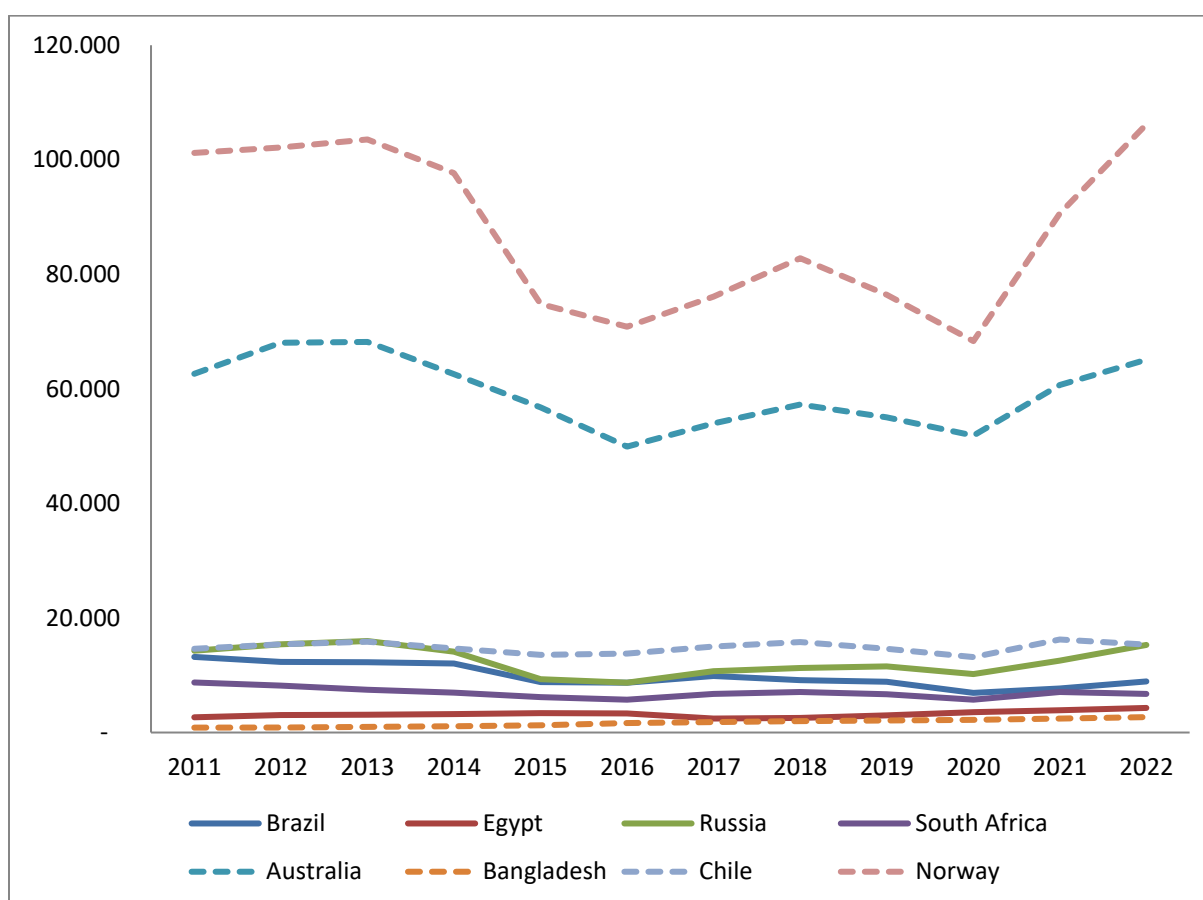


Source: Own work

Figure 25 shows the GDP per capita across the selected countries, showing some disparities in their economic prosperity. Norway consistently has the highest GDP per capita, exceeding \$100,000 multiple times, although with some volatility, reflecting its wealth and high standard of living. Australia also shows a high and rather stable GDP per capita, around \$60,000-\$70,000, indicating its status as a developed economy.

Among BRICS countries, Russia has the highest GDP per capita, though it remains significantly lower than the above-mentioned non-BRICS countries including Chile, showing a slight recovery after a decline in the mid-2010s, heading towards \$20,000 in 2022. South Africa's and Brazil's GDP per capita figures remain stable but lower, indicating persistent economic challenges in both countries. Bangladesh and Egypt, have much lower GDP per capita figures, reflecting their developing economy status.

Figure 25: GDP per capita for selected countries in a 2011-2022 period



Source: Own work

5.2 Empirical model specifications and methodological issues

5.2.1 Regression model specifications and variable definition

To analyse the factors determining the selected countries' central banks' allocation of foreign exchange reserves in US dollars and Chinese yuan, I conducted a series of panel data regression models.

The two dependent variables, each for its own regressions, are the central banks' foreign exchange reserves allocated in US dollars (ShareUSD) as a share of total reserves and the same for reserves allocated in Chinese yuan (ShareYUAN). Independent variables include:

- the share of imports from USA (Im_USA) as a percentage of total imports and the share of imports from China (Im_China) as a percentage of total imports
- the share of exports to USA (Ex_USA) as a percentage of total exports and the share of exports to China (Ex_China) as a percentage of total exports

- inwards FDI stock from USA (FDI_USA) in millions of US dollars and inwards FDI stock from China (FDI_China) in millions of US dollars
- the natural logarithm of GDP per capita (lnGDP)

Equation (1) serves as a baseline model where the share of USD in total foreign exchange reserves is regressed on a dummy variable indicating whether the country is a BRICS member, annual dummy variables to capture the general trend in the reserve share of USD, and the interaction between BRICS membership and the annual dummies. The interaction term explains how the trend in USD reserves differs for BRICS countries compared to non-BRICS countries over time.

$$ShareUSD_{it} = \alpha_0 + \beta_1 BRICS_i + \sum \beta_{2,t} Year_t + \beta_3 BRICS \# i.Year + \mu_{it} \quad (1)$$

Equation (2) introduces trade-related independent variables, specifically the lagged shares of imports from USA and China, alongside the time dummies. The lagged variables help capture the delayed impact of trade relationships on the allocation of reserves in USD and partially control for potential endogeneity. Further, the equation is augmented with the lagged inward FDI stock from the USA and China, as well as the lagged natural logarithm of GDP per capita. This specification allows for a more comprehensive analysis of the economic factors influencing the share of reserves held in USD.

$$ShareUSD_{it} = \alpha_0 + \beta_1 Im_USA_{it-1} + \beta_2 Im_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 lnGDP_pc_{it-1} + \sum \beta_{6,t} Year_t + \mu_{it} \quad (2)$$

Equations (3) and (4) add interaction terms to see if the connection between the share of USD reserves and imports from China or inwards FDI stock from China changes for BRICS countries. These interactions help us understand how being a BRICS member might affect the way trade and investment ties with China impact the allocation of USD reserves.

$$ShareUSD_{it} = \alpha_0 + \beta_1 Im_USA_{it-1} + \beta_2 Im_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 GDP_pc_{it-1} + \beta_6 BRICS + \beta_7 BRICS \# Im_China_{it-1} + \sum \beta_{8,t} Year_t + \mu_{it} \quad (3)$$

$$ShareUSD_{it} = \alpha_0 + \beta_1 Im_USA_{it-1} + \beta_2 Im_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 GDP_pc_{it-1} + \beta_6 BRICS + \beta_7 BRICS \# FDI_China_{it-1} + \sum \beta_{8,t} Year_t + \mu_{it} \quad (4)$$

Equations (5) through (7) mirror the structure of Equations (2) through (4) but replace import shares with export shares. The aim is to determine whether export relationships with the USA and China influence the allocation of USD reserves and how this influence might differ for BRICS countries.

$$ShareUSD_{it} = \alpha_0 + \beta_1 Ex_USA_{it-1} + \beta_2 Ex_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 GDP_pc_{it-1} + \sum \beta_{6,t} Year_t + \mu_{it} \quad (5)$$

$$ShareUSD_{it} = \alpha_0 + \beta_1 Ex_USA_{it-1} + \beta_2 Ex_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 GDP_pc_{it-1} + \beta_6 BRICS + \beta_7 BRICS\#Ex_China_{it-1} + \sum \beta_{8,t} Year_t + \mu_{it} \quad (6)$$

$$ShareUSD_{it} = \alpha_0 + \beta_1 Ex_USA_{it-1} + \beta_2 Ex_China_{it-1} + \beta_3 FDI_USA_{it-1} + \beta_4 FDI_China_{it-1} + \beta_5 GDP_pc_{it-1} + \beta_6 BRICS + \beta_7 BRICS\#FDI_China_{it-1} + \sum \beta_{8,t} Year_t + \mu_{it} \quad (7)$$

The regression model specifications from (1) to (7) are repeated, but this time with the dependent variable switched to the share of reserves held in Chinese yuan, focusing on the same set of independent variables and interactions to explore the determinants of yuan reserve holdings. These specifications will help illustrate the increasing importance of the Chinese yuan as an alternative to the US dollar in global central banks' reserves, particularly in the context of BRICS countries and the broader dedollarization movement.

5.2.2 Methodology

The empirical analysis was conducted using a series of panel data regressions in STATA based on regression model specifications presented in Chapter 5.2.1. Following the Hausman test, the fixed-effects model was chosen for the panel data regressions because it is particularly effective in panel data settings, where the aim is to examine the influence of variables that change over time, such as GDP or trade statistics, while accounting for country-specific factors that remain constant, such as geography or political and cultural aspects.

By using fixed effects, the model assumes that these country-specific factors may be correlated with the explanatory variables, allowing for more accurate estimation of the impact of the time-varying variables. Consequently, this approach ensures that any potential bias arising from omitted time-invariant variables is mitigated, providing more reliable results. There is a potential endogeneity issue, as several of the explanatory variables may be endogenous due to reverse causality, particularly the trade and FDI variables. In the static model specifications, it is not possible to fully address this endogeneity; therefore, I use the lagged values of the observed regressors to at least partially account for it.

5.2.3 Descriptive statistics

Table 1 presents the summary statistics for the analysed variables. The mean, standard deviation, median, skewness, kurtosis, minimum, maximum, and number of observations (N) are provided for each variable. Notably, the mean share of foreign exchange reserves allocated in US dollars was 57.07%, with a standard deviation of 16.68%. The skewness and

kurtosis indicate a slightly left-skewed distribution with heavier tails than a normal distribution. The median value is 55.00%, suggesting a moderate degree of central tendency.

Foreign exchange reserves allocated in Chinese yuan exhibit a much lower mean share of 2.68%, accompanied by a lower standard deviation of 3.42%. This variable displays positive skewness (1.86) and high kurtosis (6.93), indicating a non-normal distribution with a long tail on the right side. The median value is notably lower at 1.61%.

Regarding trade, exports to the USA as a share of total exports have a mean value of 7.64%, whereas exports to China are substantially higher with a mean of 15.31%. Imports from the USA and China also show a noticeable disparity, with mean values of 9.98% and 18.04%, respectively. The distributions of these variables exhibit positive skewness and moderate to high kurtosis, suggesting non-normal distributions with heavy tails. In terms of inward FDI stock as share of GDP, the mean value from the USA is considerably larger at 5% compared to 1% from China. Both variables demonstrate positive skewness and high kurtosis, indicating non-normal distributions with long right tails.

The natural logarithm of GDP per capita has a mean value of 9.35, with a standard deviation of 1.29. This variable also exhibits positive skewness and high kurtosis which is indicative of a non-normal distribution with a long right tail. The natural logarithm of GDP per capita is used instead of the raw GDP per capita values because clearer, smaller numbers are easier to work with in statistical software like Stata, facilitating more accurate and interpretable regression analysis

Table 1: Summary statistics

	Mean	SD	Median	Skewness	Kurtosis	Min	Max	N
FX reserves allocated in US dollars	57.07	16.68	55.00	-.1	2.6	10.9	89.93	94
FX reserves allocated in Chinese yuan	2.68	3.42	1.61	1.86	6.93	0	17.1	94
Exports to USA as a share of total exports	7.64	4.75	5.70	.92	3.05	1.9	21	88
Exports to China as a share of total exports	15.31	12.09	11.35	.44	1.78	1.2	39.4	88
Imports from USA as a share of total imports	9.98	5.51	7.25	.68	2.22	.7	23.1	88
Imports from China as a share of total imports	18.04	5.51	18.20	.15	2.35	8.8	31.7	88
Inwards FDI stock from USA as share of GDP	.05	.04	0.03	.6	1.98	0	.14	95
Inwards FDI stock from China as share of GDP	.01	.01	0.00	1.41	4.06	0	.03	94
GDP per capita (ln)	9.35	1.29	9.31	.08	2.22	6.75	11.57	96

Source: Own work

Table 2 displays the correlation matrix between the dependent variables and the independent variables. The foreign exchange reserves allocated in US dollars showed a significant positive correlation with exports to the USA ($r = 0.5789$, $p < 0.01$) and imports from the USA ($r = 0.4881$, $p < 0.01$). However, a negative correlation was observed between reserves

allocated in US dollars and logged GDP per capita ($r = -0.4722$, $p < 0.01$), indicating that countries with higher GDP per capita tend to allocate fewer reserves in US dollars. On the other hand, foreign exchange reserves allocated in Chinese yuan exhibited a significant negative correlation with reserves allocated in US dollars ($r = -0.3654$, $p < 0.01$), suggesting a potential diversification strategy by central banks. Additionally, reserves in Chinese yuan showed a positive correlation with exports to China ($r = 0.2670$, $p < 0.05$) and imports from China ($r = 0.5277$, $p < 0.01$), indicating closer economic ties with China.

Exports to China showed a significant positive correlation with both imports from China ($r = 0.7693$, $p < 0.01$) and inwards FDI stock from China ($r = 0.2909$, $p < 0.01$), reflecting the interconnectedness of trade and investment between the selected countries and China. Inwards FDI stock from the USA displayed a significant positive correlation with exports to China ($r = 0.6302$, $p < 0.01$), suggesting the role of foreign investment in driving export activities.

Table 2: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) FX reserves allocated in US dollars	1.00								
(2) FX reserves allocated in Chinese yuan	-0.3654*** (0.0003)	1.00							
(3) Exports to USA as a share of total exports	0.5789*** (0.0000)	-0.12 (0.2913)	1.00						
(4) Exports to China as a share of total exports	0.3339*** (0.0017)	0.2670** (0.0129)	0.2381** (0.0255)	1.00					
(5) Imports from USA as a share of total imports	0.4881*** (0.0000)	0.02 (0.8521)	0.4637*** (0.0000)	0.7452*** (0.0000)	1.00				
(6) Imports from China as a share of total imports	0.17 (0.1072)	0.5277*** (0.0000)	0.1850* (0.0845)	0.7693*** (0.0000)	0.3605*** (0.0006)	1.00			
(7) Inwards FDI stock from USA as share of GDP	-0.13 (0.2101)	0.13 (0.2310)	-0.00 (0.9799)	0.6302*** (0.0000)	0.5587*** (0.0000)	0.2625** (0.0140)	1.00		
(8) Inwards FDI stock from China as share of GDP	-0.2464** (0.0179)	0.3055*** (0.0031)	-0.3990*** (0.0001)	0.2909*** (0.0063)	-0.1806* (0.0942)	0.3738*** (0.0004)	0.3332*** (0.0011)	1.00	
(9) GDP per capita (ln)	-0.4722*** (0.0000)	0.17 (0.1084)	-0.4888*** (0.0000)	0.3082*** (0.0035)	0.14 (0.1992)	0.04 (0.7049)	0.6154*** (0.0000)	0.3740*** (0.0002)	1.00

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Own work

5.3 Empirical results

5.3.1 Results for foreign exchange reserves allocated in USD

Table 3 shows empirical results of the specification (1) from 2015 to 2022. BRICS dummy variable is omitted from the result due to perfect collinearity with country fixed effects. There was a statistically significant increase in the share of foreign exchange reserves allocated in USD, particularly in 2021 and 2022, indicating a reinforced reliance on the dollar during these years. However, BRICS countries displayed a significant shift away from the USD in 2021 and 2022, likely as part of a dedollarization strategy. This model explains a moderate portion of the variance in USD reserve allocation, highlighting the influence of both global economic conditions and strategic decisions by BRICS nations. In the last two years of the time series the divergence in USD reserves between BRICS and non-BRICS countries is very noticeable and statistically significant.

Table 3: Annual fixed effects of foreign exchange reserves allocated in USD

	nonBRICS	Interaction term i.Year#BRICS
year=2012	-1.1250 (0.833)	1.6500 (0.827)
year=2013	4.1000 (0.443)	0.1250 (0.987)
year=2014	5.9250 (0.269)	-4.7750 (0.527)
year=2015	13.3000** (0.015)	-7.3500 (0.332)
year=2016	13.4250** (0.014)	-8.4750 (0.264)
year=2017	12.9750** (0.017)	-6.2000 (0.412)
year=2018	13.2500** (0.015)	-10.1675 (0.181)
year=2019	10.4750* (0.053)	-7.4325 (0.326)
year=2020	11.0250** (0.042)	-9.1175 (0.229)
year=2021	18.9000*** (0.001)	-21.7900*** (0.005)
year=2022	16.8250*** (0.002)	-18.1720** (0.036)
Constant	50.8074*** (0.000)	
Observations	94	
R-squared	0.3709	

Source: Own work

Table 4 presents the results of empirical specifications (2-7) for the share of USD in reserves. The results in column (1) did not produce many statistically significant results. Most of the variables, including imports from the USA, imports from China, inward FDI from the USA and China, and GDP per capita, did not show significant effects on USD reserve allocations. However, a few year-specific effects, particularly for the years 2015, 2016, and 2017, were marginally significant, indicating some increase in USD reserve allocations during these years. The model explains a modest portion of the variance in USD reserve allocations, suggesting that the key variables in this regression do not strongly influence reserve currency composition.

Table 4: Fixed effects regression results for foreign exchange reserves allocated in USD

	(1)	(2)	(3)	(4)	(5)	(6)
L.im_usa	-0.7158 (0.481)	-0.8483 (0.354)	-0.8348 (0.395)			
L.im_china	0.3770 (0.604)	0.6221 (0.344)	0.5616 (0.426)			
BRICS=1 # L.im_china		-2.4864*** (0.000)				
L.ex_usa				-0.2138 (0.835)	-0.7439 (0.452)	-0.4756 (0.637)
L.ex_china				0.3272 (0.404)	0.9995** (0.026)	0.2468 (0.520)
BRICS=1 # L.ex_china					-1.6488*** (0.007)	
L.infdi_usa_percent	-0.4333 (0.704)	0.2406 (0.817)	-0.8192 (0.462)	-0.6064 (0.587)	0.6033 (0.595)	-0.8705 (0.427)
L.infdi_china_percent	-2.2985 (0.530)	-5.6842* (0.099)	-0.9095 (0.799)	-1.0601 (0.772)	-4.6816 (0.206)	0.2203 (0.951)
BRICS=1 # L.infdi_china_percent			-14.5101** (0.026)			-13.1949** (0.046)
L.lngdp_pc	15.4705 (0.107)	6.3682 (0.473)	6.9363 (0.483)	20.8361** (0.019)	13.3168 (0.124)	13.9156 (0.129)
Constant	-93.7900 (0.336)	6.8190 (0.940)	-8.6315 (0.932)	-149.7812* (0.085)	-79.0138 (0.353)	-76.7908 (0.400)
Annual fixed effects	yes	yes	yes	yes	yes	yes
Observations	78	78	78	78	78	78
R-squared	0.2813	0.4308	0.3447	0.2764	0.3698	0.3282

Source: Own work

As evident in column (2) in Table 4, this regression highlights a significant difference for BRICS countries. The interaction between BRICS status and imports from China is highly significant, showing that an increase in imports from China by 1 unit leads to a substantial reduction in the share of reserves held in USD by about 2.49 units in BRICS member states. Additionally, inward FDI from China also weakly significantly reduces USD reserve allocations. These results suggest that BRICS countries are actively reducing their reliance on the US dollar, particularly in response to increased economic ties with China. The model

explains a moderate portion of the variance in USD reserve allocations, underscoring to some extent the impact of BRICS countries' strategic reserve management decisions.

Column (3) shows that the regression results indicate that BRICS countries significantly reduce their share of USD reserves when there is an increase in inward FDI from China. This suggests that BRICS countries are strategically aligning their reserve holdings with their growing economic ties to China, moving away from the US dollar. Other variables, such as imports from the USA and China, did not show significant effects, and the model explains a moderate portion of the variance in USD reserve allocations.

Columns (4-6) in Table 4 further support the findings based on the export explanatory variables. Results in column (4) reveal that an increase in the previous year's GDP per capita is significantly associated with an increase in the allocation of foreign exchange reserves in USD. This suggests that wealthier countries tend to hold more of their reserves in USD. Other variables, including exports to the USA and China and FDI, did not show significant effects. Several year-specific effects, particularly from 2015 to 2018, also indicate increased USD reserve allocations. The model explains a moderate portion of the variance in USD reserve allocations, emphasizing the influence of economic performance on reserve management decisions.

Column (5) in Table 4 shows that while an increase in exports to China generally leads to a significant increase in the share of foreign exchange reserves allocated in USD (with a coefficient of 0.9995) for BRICS non-members, the opposite is true for BRICS countries. For BRICS members, an increase in share of exports to China by 1 unit leads to a reduction of the share of USD reserves by about 1.65 units, with this effect being highly significant. This indicates that BRICS countries are likely shifting away from the US dollar in favour of other currencies as their trade with China increases. Several year-specific effects, particularly from 2015 to 2022, also indicate increased USD reserve allocations. The model explains a moderate portion of the variance in USD reserve allocations, highlighting the interaction between trade relations and reserve management, especially within the BRICS bloc.

Column (6) in Table 4 indicates that for BRICS countries, an increase in the share of inward FDI from China in GDP by one 1 unit leads to a significant reduction in the share of USD reserves by 13 units. This relationship is statistically significant, suggesting a strong strategic shift away from the USD as BRICS nations deepen their economic ties with China. Other variables, such as exports to the USA and China, did not show significant effects, while several year-specific effects from 2015 to 2022 indicate increased USD reserve allocations. The model explains a moderate portion of the variance in USD reserve allocations, highlighting the important role of Chinese FDI in influencing reserve currency decisions within the BRICS countries.

5.3.2 Results for foreign exchange reserves allocated in yuan

Column (1) in Table 5 shows that none of the independent variables showed statistically significant effects on the share of reserves allocated in yuan. However, several year-specific interaction terms, particularly from 2018 to 2022, were significant, indicating an increase in yuan reserve allocations during these years. The model explains a considerable portion of the variance in yuan reserve allocations, but the key predictors outside of the yearly effects did not significantly influence the outcomes in this regression.

Table 5: Fixed effects regression results for foreign exchange reserves allocated in yuan

	(1)	(2)	(3)	(4)	(5)	(6)
L.im_usa	-0.5436 (0.103)	-0.5032* (0.098)	-0.5029 (0.116)			
L.im_china	0.1003 (0.670)	0.0257 (0.905)	0.0371 (0.870)			
BRICS=1 # L.im_china		0.7565*** (0.001)				
L.ex_usa				0.0417 (0.902)	0.1132 (0.743)	0.1582 (0.624)
L.ex_china				0.1384 (0.287)	0.0477 (0.756)	0.1741 (0.158)
BRICS=1 # L.ex_china					0.2222 (0.281)	
L.infdi_usa_percent	0.5591 (0.134)	0.3541 (0.304)	0.6912* (0.058)	0.4157 (0.261)	0.2526 (0.525)	0.5331 (0.131)
L.infdi_china_percent	0.0095 (0.994)	1.0396 (0.356)	-0.4657 (0.687)	0.6591 (0.585)	1.1472 (0.374)	0.0896 (0.938)
BRICS=1 # L.infdi_china_percent			4.9645** (0.019)			5.8684*** (0.006)
L.lngdp_pc	-0.8054 (0.793)	1.9640 (0.502)	2.1145 (0.508)	2.2271 (0.436)	3.2405 (0.282)	5.3050* (0.071)
Constant	9.3367 (0.767)	-21.2740 (0.480)	-19.7996 (0.543)	-25.6303 (0.368)	-35.1681 (0.239)	-58.0927** (0.050)
Annual fixed effects	yes	yes	yes	yes	yes	yes
Observations	78	78	78	78	78	78
R-squared	0.5824	0.6588	0.6233	0.5648	0.5741	0.6213

Source: Own work

Column (2) in Table 5 indicates that for BRICS countries, an increase in imports from China significantly raises the share of reserves allocated in Chinese yuan, with a positive effect of about 0.76 units per unit increase in imports, with this relationship being highly statistically significant. Contrarily, imports from the USA are associated with a significant reduction in yuan reserves, with a negative coefficient of -0.5032. These results suggest a strategic reallocation of reserves by BRICS countries in favour of the yuan, reflecting their growing economic ties with China. The model explains a substantial portion of the variance in yuan

reserve allocations, highlighting the influence of trade relations on reserve currency decisions within the BRICS bloc.

Column (3) in Table 5 reveals that for BRICS countries, an increase in inward FDI from China significantly boosts the share of reserves allocated in Chinese yuan, with a positive and statistically significant effect of about 4.97 units per unit increase in FDI. Surprisingly, inward FDI from the USA also leads to an increase in yuan reserves, with a positive but moderately significant coefficient of 0.6912. This suggests that both Chinese and US FDI influence BRICS countries to allocate more reserves in yuan, possibly as part of a broader strategy to diversify reserves. The model explains a substantial portion of the variance in yuan reserve allocations, emphasizing the importance of FDI in shaping reserve currency decisions within the BRICS bloc.

Columns (4) and (5) in Table 5 shows that none of the independent variables showed statistically significant effects on the share of reserves allocated in Chinese yuan. However, several year-specific interaction terms, particularly from 2018 to 2022, were significant, indicating increased yuan reserve allocations during these years. The model explains a considerable portion of the variance in yuan reserve allocations, but the key predictors outside of the yearly effects did not significantly influence the outcomes in this analysis.

Column (6) in Table 5 shows that for BRICS countries, an increase in inward FDI from China significantly raises the share of reserves allocated in Chinese yuan, with a positive and highly statistically significant effect of about 5.87 units per unit increase in FDI.

Additionally, an increase in GDP per capita is associated with a marginally significant increase in yuan reserves, suggesting that wealthier countries may allocate more reserves in yuan. This can be surprising at first since Column (4) in Table 4 showed that wealthier countries tend to allocate a larger share of their reserves in US dollars. However, currency reserves allocation is not a zero-sum game between the US dollar and the Chinese yuan, meaning that countries with higher GDP per capita are increasing the shares of both currencies in their reserve allocation portfolios, reflecting the immense economic weight of USA and China, probably at the expense of other currencies like Swiss francs, Great British Pounds, Australian and Canadian dollars etc.

5.3.3 Interpretations of empirical results

Some results may seem surprising at first since there is no strong connection between US dollar reserves and closer economic ties with the US, but it confirms what has already been determined throughout this thesis. The widespread use of US dollars has a systemic nature and is not necessarily strongly related to economic ties to the US since the dollar dominates the invoicing of trade transactions and the foreign exchange turnover, partially because of its role as a vehicle currency. In practice when two non-US countries conduct trade, they are

likely to either invoice the transaction in US dollars or use the US dollar as a vehicle currency in the foreign exchange market to exchange non-US dollar currency pairs through the dollar and not directly.

The main finding of the empirical analysis is the statistically significant interconnectedness between BRICS member countries' closer economic ties with China and their simultaneous decrease in US dollar reserves and the increase in Chinese yuan reserves. For non-BRICS countries there is no such statistically significant result. This divergence indicates that the BRICS group has already started with its dedollarization efforts, and the results are clearly showing.

Based on the empirical results, the null hypothesis (H_{1_0} : BRICS member countries' dedollarization efforts are not clearly connected to their closer economic ties with China) can be rejected and the alternative hypothesis (H_{1_a} : BRICS member countries' dedollarization efforts are significantly connected to their closer economic ties with China) can be accepted.

6 CONCLUSION

The recently enlarged BRICS group has made unprecedented moves toward the dedollarization of trade within the group and with other close trade partners. However, the magnitude of these steps is still small, especially when compared to the global financial and monetary system still dominated by the US dollar.

Initially I have presented the reasons behind the ongoing dominance of the US dollar and its role as the World reserve currency. The reasons can be summed up as following: the economic and political size and dominance of the reserve currency issuer, i.e. the US; the interconnectedness of high transactional demand for the reserve currency and the inertia of the well-established role of the currency in international trade and finance; the credibility of the currency issuer and the interrelated safe haven status and the liquidity and depth of financial markets of the issuer. However, this dominant position of the US dollar does not come without challenges and doubts as described by the Triffin dilemma and its modern interpretations.

I followed by the presentations of the BRICS group's dedollarization initiatives and the underlying motivations for achieving it. The economic motivation of the dedollarization of trade is to reduce the transactional costs and currency exchange rate fluctuations risks by using local currencies instead of the US dollar both as the invoice currency and as the vehicle currency. However, this logic is somewhat challenged by the fact that the US dollar remains one of the most stable currencies globally accompanied by the safest market for government bonds, the US Treasury market, which is the main destination for surplus dollars destined to be used as Central bank's foreign exchange reserves by most countries. The main reason for

decreasing the use of US dollars by the BRICS group is purely political as dedollarizing results in a lower exposure to potential US sanctions and other economic influences by the US. This has been emphasized by Russia's near complete abandonment of the US dollar since it has been hit with unprecedented economic sanctions as a result of its invasion of Ukraine in 2022. Nevertheless, Russia experienced various earlier rounds of economic sanctions starting in 2014 after its unilateral annexation of the Crimean Peninsula which started Russia's move towards diminishing its use and reliance on the US dollar.

Apart from abandoning the US dollar in mutual trade, the main institutional backbone of the dedollarization project is the NDB which provides BRICS countries with financing for development projects in local currencies. Compared to its global counterpart the World Bank, the NDB loans have fewer conditions and influence on the borrower countries. The other key BRICS institution is the CRA which provides liquidity in times of financial crisis and similarly to the NDB, it operates with fewer conditions than its global counterpart, in this case the IMF.

When debating the possibilities of the creation of a new BRICS currency using the OCA theory, I have come to the conclusion that the BRICS countries lack the necessary framework for establishing a common currency. Their internal differences regarding the main factors necessary for the creation of a common currency: trade integration; labour mobility; price and wage flexibility; fiscal integration and transfer mechanisms; symmetry of shocks, are too significant and resemble the differences between the ASEAN countries during their failed attempt to create a common currency in the late 1990s and early 2000s.

However, a common currency is far from necessary for deepening the dedollarization process since the Chinese yuan has taken a lead role among the currencies of the BRICS countries. The progress of the internationalization of the yuan is notable, yet far from prominent as the yuan's share in international payments and share in global foreign exchange turnover remain relatively low. The main issues holding back broader internationalization of the yuan are China's capital controls and the lack of liquid, deep and transparent bond markets in China.

The results of the panel data regressions confirm that the extensive use of US dollars is not strictly related to economic ties with the US but is a consequence of the dominant role the US dollar has in the global economy, being used as the main transactions invoice currency in global trade and as a vehicle currency. The explanation of the increasing role of the Chinese yuan as a reserve currency partially lays in deepening economic ties with China but it is also a politically motivated project within the BRICS group.

Although the BRICS group does not have clearly set goals regarding its dedollarization process it is evident that the dedollarization is not to be understood as an attempt to eliminate the US dollar dominance, replacing it with a new hegemonic currency but as an attempt to gradually decrease their use of to the dollar and consequently their exposure to economic

sanctions and other influences, counterbalancing it with an increased use of their local currencies highlighted by the Chinese yuan.

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APPENDICES

Appendix 1: Summary in Slovene language

Magistrska naloga se poglobi v proces dedolarizacije mednarodne trgovine, ki ga vodi skupina BRICS z namenom zmanjšanja globalne odvisnosti od ameriškega dolarja kot glavne rezervne valute in sredstva za poravnavo mednarodnih transakcij. V magistrski nalogi so predstavljeni razlogi za dedolarizacijo, pobude na področju dedolarizacije, ki jih izvajajo države BRICS ter empirična analiza učinka gospodarskih povezav izbranih držav članic BRICS in držav, ki niso članice te skupine z ZDA in Kitajsko na sestavo njihovih deviznih rezerv.

V uvodnem delu se naloga osredotoča na zgodovinsko ozadje prevlade ameriškega dolarja. Po drugi svetovni vojni se je dolar uveljavil kot svetovna rezervna valuta, predvsem zaradi vzpostavitve Brettonwoodskega sistema leta 1944, ki je določil fiksne devizne tečaje med nacionalnimi valutami in ameriškim dolarjem, podprtim z zlatom. Po razpadu sistema v sedemdesetih letih je dolar kljub temu ohranil globalno prevlado zaradi likvidnosti in globine ameriških finančnih trgov, predvsem trga ameriških državnih obveznic. V tem kontekstu je predstavljena teorija "Triffinove dileme", ki opozarja na strukturne probleme globalne dominacije ene same valute. Po tej teoriji naraščajoče globalno povpraševanje po ameriškem dolarju sili ZDA v kronični primanjkljaj plačilne bilance, kar dolgoročno ogroža stabilnost svetovnega finančnega sistema.

V nadaljevanju so v nalogi raziskani ključni razlogi, zaradi katerih države BRICS zasledujejo strategijo dedolarizacije. Med glavnimi motivi so zaščita pred volatilnostjo dolarja in vplivom monetarne politike ZDA, zmanjšanje izpostavljenosti ekonomskim sankcijam s strani ZDA ter zmanjšanje transakcijskih stroškov v medsebojni trgovini v kateri se ameriški dolar pogosto uporablja kot posredniška valuta. Poleg tega dedolarizacija omogoča krepitev regionalnih finančnih institucij, kot je Nova razvojna banka (NDB), in spodbuja uporabo lokalnih valut pri financiranju projektov. Pomemben del procesa predstavlja tudi politična želja po večji finančni neodvisnosti in prerazporeditvi moči v globalnem finančnem sistemu.

Sledi predstavitev glavnih strateških iniciativ skupine BRICS, ki so usmerjene v zmanjšanje odvisnosti od dolarja. Med njimi so vzpostavitev Nove razvojne banke (NDB), ki omogoča financiranje projektov v lokalnih valutah, širitev uporabe kitajskega juana v bilateralni trgovini, še posebej v energetske sektorju, ter razvoj alternativnih plačilnih sistemov, kot sta ruski SPFS in kitajski CIPS. Ti sistemi predstavljajo alternativo zahodnemu SWIFT-u in omogočajo izvajanje čezmejnih plačil brez posredovanja zahodnih bank in dolarja kot posredniške valute. Poseben poudarek je namenjen strategijama "go-it-alone" in "reform-the-status-quo". Prva se osredotoča na gradnjo vzporednih finančnih institucij, ki so neodvisne od zahoda, medtem ko druga stremi k reformam znotraj obstoječega mednarodnega finančnega sistema.

Naslednje poglavje razpravlja o možnosti uvedbe skupne valute BRICS. Uporabljena je teorija optimalnega valutnega območja (OCA) na kateri je osnovana analiza katere cilj je

ugotoviti ali bi države BRICS lahko ustvarile gospodarsko in finančno dovolj stabilno okolje za skupno valuto. Glavna ugotovitev v tem poglavju je, da trenutno ni izpolnjenih dovolj pogojev za optimalno valutno območje, saj so države BRICS preveč heterogene glede gospodarske odprtosti, inflacijskih stopenj in mobilnosti delovne sile. Predstavljena je možnost uvedbe komplementarne skupne valute, ki bi bila namenjena izključno olajšanju medsebojne trgovine znotraj BRICS in ne bi nadomestila obstoječih nacionalnih valut. Predlagana valuta bi lahko bila podprta z zlatimi rezervami, kar bi zmanjšalo zunanjo ranljivost držav BRICS.

Alternativa tej možnosti je nadaljnja internacionalizacija kitajskega juana. Ta proces je omejen zaradi kitajskih kapitalskih kontrol in pomanjkljivosti kitajskih finančnih trgov, sploh trga kitajskih državnih obveznic. Kljub temu Kitajska postopoma povečuje uporabo juana v mednarodnih transakcijah, zlasti v energetskih sektorjih in preko dvostranskih sporazumov o valutnih zamenjavah z drugimi državami BRICS in ostalimi trgovinskimi partnerji.

Empirični del sestavlja analiza podatkov o deviznih rezervah izbranih držav BRICS in držav, ki niso članice te skupine. Uporabljen je regresijski model panelnih podatkov, s katerim sem preverjal vpliv BDP na prebivalca ter deleža izvoza in uvoza in neposrednih tujih naložb iz ZDA in Kitajske na sestavo deviznih rezerv izbranih držav. Rezultati analize so pokazali, da države z močnimi trgovinskimi in investicijskimi povezavami s Kitajsko povečujejo delež juana v svojih deviznih rezervah, medtem ko države s tesnejšimi gospodarskimi vezmi z ZDA ohranjajo prevladujoč delež dolarja. Ti izsledki podpirajo hipotezo, da so iniciative skupine BRICS za dedolarizacijo tesno povezane s hitro rastočim gospodarskim vplivom Kitajske.

V zaključku naloge poudarjam, da se države BRICS, čeprav uspešno napredujejo pri zmanjševanju odvisnosti od ameriškega dolarja, soočajo z notranjimi in zunanjimi izzivi. Notranje razlike med članicami, kot so politični konflikt med Kitajsko in Indijo ter preveč heterogene gospodarske strukture, otežujejo doseganje enotnosti. Poleg tega dominantna globalna vloga ZDA in njena močna finančna infrastruktura ostajata trdovratni oviri pri doseganju dedolarizacije. Kljub temu trdim, da kombinacija lokalnih pobud, in prizadevanja za reformo mednarodnega finančnega sistema ponuja realno možnost za dolgoročni uspeh držav BRICS pri zmanjšanju odvisnosti od ameriškega dolarja in prerazporeditvi moči v mednarodnem finančnem sistemu in mednarodni trgovini, ne pa nujno pri nadomestitvi ameriškega dolarja kot dominantne globalne rezervne valute.

Appendix 2: Panel data regression results in STATA

Friday February 7 12:58:58 2025 Page 1



```

name: <unnamed>
log: C:\Users\jm5926\Downloads\BRICS.smcl
log type: smcl
opened on: 7 Feb 2025, 12:13:35

1 . import excel "C:\Users\jm5926\Downloads\BRICSdata.xlsx", sheet("Sheet1") firstrow
2 . encode country, generate(country_id)
3 . xtset country_id year
    panel variable:  country_id (strongly balanced)
    time variable:   year, 2011 to 2022
                   delta: 1 unit
4 . foreach var in shareUSD ShareYUAN ex_USA im_USA ex_China im_China inFDI_USAGDP inFDI
   > _ChinaGDP lnGDPpc BRICS {
    2.   destring `var', ignore("/") replace
    3.   *generate l_`var' = ln(`var')
5 . }
shareUSD: character / removed; replaced as double
(2 missing values generated)
ShareYUAN: character / removed; replaced as double
(2 missing values generated)
ex_USA: character / removed; replaced as double
(8 missing values generated)
im_USA: character / removed; replaced as double
(8 missing values generated)
ex_China: character / removed; replaced as double
(8 missing values generated)
im_China: character / removed; replaced as double
(8 missing values generated)
inFDI_USAGDP: character / removed; replaced as double
(1 missing value generated)
inFDI_ChinaGDP: character / removed; replaced as double
(2 missing values generated)
lnGDPpc already numeric; no replace
BRICS already numeric; no replace
6 . describe

Contains data
    obs:      96
    vars:     13
    size:     8,736

variable name    storage    display    value    variable label
                 type      format     label
year             int       %10.0g
country          str12     %12s
shareUSD         double    %10.0g
ShareYUAN        double    %10.0g
ex_USA           double    %10.0g
im_USA           double    %10.0g
ex_China         double    %10.0g
im_China         double    %10.0g
inFDI_USAGDP     double    %10.0g
inFDI_ChinaGDP   double    %10.0g
lnGDPpc          double    %10.0g
BRICS            byte      %10.0g
country_id       long      %12.0g    country_id
country          country

Sorted by: country_id year
Note: Dataset has changed since last saved.

```

```

7 . foreach var in shareUSD ShareYUAN ex_USA im_USA ex_China im_China inFDI_USAGDP inFDI
>   ChinaGDP lnGDPpc_BRICS {
2.     summarize `var', detail
3. }

```

shareUSD

	Percentiles	Smallest		
1%	10.9	10.9		
5%	31.7	21.2		
10%	38.2	22.7	Obs	94
25%	45.5	24.5	Sum of Wgt.	94
50%	55		Mean	57.06777
		Largest	Std. Dev.	16.68467
75%	71.4	83.5		
90%	79.6	86.03	Variance	278.3782
95%	83	86.77	Skewness	-.1037739
99%	89.93	89.93	Kurtosis	2.599843

ShareYUAN

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	94
25%	0	0	Sum of Wgt.	94
50%	1.61		Mean	2.681809
		Largest	Std. Dev.	3.419398
75%	3.86	12.3		
90%	7.1	12.8	Variance	11.69228
95%	8.2	14.2	Skewness	1.860725
99%	17.1	17.1	Kurtosis	6.932526

ex_USA

	Percentiles	Smallest		
1%	1.9	1.9		
5%	2.5	1.9		
10%	3	2.1	Obs	88
25%	3.7	2.4	Sum of Wgt.	88
50%	5.7		Mean	7.635227
		Largest	Std. Dev.	4.747366
75%	11.3	19.3		
90%	13.9	19.7	Variance	22.53748
95%	15.8	20.4	Skewness	.9233171
99%	21	21	Kurtosis	3.049434

im_USA

	Percentiles	Smallest		
1%	.7	.7		
5%	3	1.6		
10%	5.3	1.9	Obs	88
25%	6.25	2	Sum of Wgt.	88
50%	7.25		Mean	9.978409
		Largest	Std. Dev.	5.508853
75%	15.05	20		
90%	18.8	20	Variance	30.34746
95%	19.7	20.9	Skewness	.6790015
99%	23.1	23.1	Kurtosis	2.215709

ex_China					
	Percentiles	Smallest			
1%	1.2	1.2			
5%	1.8	1.5			
10%	1.9	1.6	Obs		88
25%	3.05	1.8	Sum of Wgt.		88
50%	11.35		Mean		15.30568
75%	27.1	Largest	Std. Dev.		12.08827
90%	32.9	37.5			
95%	34.6	38.6	Variance		146.1263
99%	39.4	38.7	Skewness		.4379628
		39.4	Kurtosis		1.778536
im_China					
	Percentiles	Smallest			
1%	8.8	8.8			
5%	9.3	9.1			
10%	10.1	9.2	Obs		88
25%	13.9	9.2	Sum of Wgt.		88
50%	18.2		Mean		18.04318
75%	22	Largest	Std. Dev.		5.505124
90%	24.8	27.9			
95%	27.8	28.6	Variance		30.30639
99%	31.7	29.8	Skewness		.1469698
		31.7	Kurtosis		2.352211
inFDI_USA/GDP					
	Percentiles	Smallest			
1%	.0012495	.0012495			
5%	.001612	.0015591			
10%	.0025342	.0015659	Obs		95
25%	.0112164	.0015931	Sum of Wgt.		95
50%	.0335132		Mean		.0485484
75%	.0867302	Largest	Std. Dev.		.0419199
90%	.1131744	.1276308			
95%	.1206939	.1323295	Variance		.0017573
99%	.1386702	.1340023	Skewness		.6034248
		.1386702	Kurtosis		1.979284
inFDI_China/GDP					
	Percentiles	Smallest			
1%	.0000536	.0000536			
5%	.0004092	.0003323			
10%	.000702	.0003666	Obs		94
25%	.0016461	.0003898	Sum of Wgt.		94
50%	.0034805		Mean		.0068359
75%	.0101406	Largest	Std. Dev.		.0073752
90%	.0195832	.0268392			
95%	.0258947	.027203	Variance		.0000544
99%	.027562	.0273885	Skewness		1.410758
		.027562	Kurtosis		4.057613
lnGDPpc					
	Percentiles	Smallest			
1%	6.75227	6.75227			
5%	7.119636	6.776507			
10%	7.711101	6.881411	Obs		96
25%	8.509775	7.011214	Sum of Wgt.		96

50%	9.305637		Mean	9.34857
		Largest	Std. Dev.	1.287147
75%	10.25673	11.52507		
90%	11.22271	11.53445	Variance	1.656748
95%	11.48932	11.54785	Skewness	.0833355
99%	11.57286	11.57286	Kurtosis	2.224493

BRICS

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	96
25%	0	0	Sum of Wgt.	96
50%	.5		Mean	.5
		Largest	Std. Dev.	.5026247
75%	1	1		
90%	1	1	Variance	.2526316
95%	1	1	Skewness	0
99%	1	1	Kurtosis	1

8 . pwcorr
(country ignored because string variable)

	year	shareUSD	ShareY~N	ex_USA	im_USA	ex_China	im_China
year	1.0000						
shareUSD	0.1702	1.0000					
ShareYUAN	0.5890	-0.3654	1.0000				
ex_USA	-0.1011	0.5789	-0.1151	1.0000			
im_USA	0.0648	0.4881	0.0204	0.4637	1.0000		
ex_China	0.2350	0.3339	0.2670	0.2381	0.7452	1.0000	
im_China	0.4752	0.1749	0.5277	0.1850	0.3605	0.7693	1.0000
inFDI_USAGDP	-0.0797	-0.1312	0.1254	-0.0027	0.5587	0.6302	0.2625
inFDI_Chin~P	0.2140	-0.2464	0.3055	-0.3990	-0.1806	0.2909	0.3738
lnGDPpc	0.0099	-0.4722	0.1666	-0.4888	0.1382	0.3082	0.0409
BRICS	0.0000	0.0674	-0.0073	-0.1527	-0.2061	-0.3201	-0.1191
country_id	0.0000	-0.5029	0.1633	-0.3090	-0.4597	-0.5905	-0.3078
	inF~AGDP	inF~aGDP	lnGDPpc	BRICS	country~d		
inFDI_USAGDP	1.0000						
inFDI_Chin~P	0.3332	1.0000					
lnGDPpc	0.6154	0.3740	1.0000				
BRICS	-0.5399	-0.0856	-0.3722	1.0000			
country_id	-0.4255	-0.0389	0.0068	0.5455	1.0000		

9 . xtreg shareUSD i.year##BRICS, fe
note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression	Number of obs	=	94
Group variable: country_id	Number of groups	=	8
R-sq:	Obs per group:		
within = 0.3709	min =		11
between = 0.0058	avg =		11.8
overall = 0.0309	max =		12
	F(22, 64)	=	1.71
corr(u_i, Xb) = -0.2033	Prob > F	=	0.0493

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
year						
2012	-1.125	5.312731	-0.21	0.833	-11.7384	9.488401
2013	4.1	5.312731	0.77	0.443	-6.513401	14.7134
2014	5.925	5.312731	1.12	0.269	-4.688401	16.5384
2015	13.3	5.312731	2.50	0.015	2.686599	23.9134
2016	13.425	5.312731	2.53	0.014	2.811599	24.0384
2017	12.975	5.312731	2.44	0.017	2.361599	23.5884
2018	13.25	5.312731	2.49	0.015	2.636599	23.8634
2019	10.475	5.312731	1.97	0.053	-.138401	21.0884
2020	11.025	5.312731	2.08	0.042	.411599	21.6384
2021	18.9	5.312731	3.56	0.001	8.286599	29.5134
2022	16.825	5.312731	3.17	0.002	6.211599	27.4384
1.BRICS	0	(omitted)				
year#BRICS						
2012 1	1.65	7.513337	0.22	0.827	-13.35962	16.65962
2013 1	.125	7.513337	0.02	0.987	-14.88462	15.13462
2014 1	-4.775	7.513337	-0.64	0.527	-19.78462	10.23462
2015 1	-7.35	7.513337	-0.98	0.332	-22.35962	7.659616
2016 1	-8.475	7.513337	-1.13	0.264	-23.48462	6.534616
2017 1	-6.2	7.513337	-0.83	0.412	-21.20962	8.809616
2018 1	-10.1675	7.513337	-1.35	0.181	-25.17712	4.842116
2019 1	-7.4325	7.513337	-0.99	0.326	-22.44212	7.577116
2020 1	-9.1175	7.513337	-1.21	0.229	-24.12712	5.892116
2021 1	-21.79	7.513337	-2.90	0.005	-36.79962	-6.780384
2022 1	-18.17205	8.476187	-2.14	0.036	-35.10518	-1.238915
_cons	50.80738	2.657076	19.12	0.000	45.49926	56.1155
sigma_u	16.476823					
sigma_e	7.5133367					
rho	.82786201					(fraction of variance due to u_i)

F test that all u_i=0: F(7, 64) = 51.00 Prob > F = 0.0000

10. xtreg shareUSD L1.im_USA L1.im_China i.year, fe

Fixed-effects (within) regression
 Group variable: **country_id**

Number of obs = 79
 Number of groups = 8

R-sq:
 within = 0.2152
 between = 0.2128
 overall = 0.1714

Obs per group:
 min = 4
 avg = 9.9
 max = 11

corr(u_i, Xb) = -0.7685
 F(12,59) = 1.35
 Prob > F = 0.2171

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-1.716886	.8767823	-1.96	0.055	-3.471323	.0375516
im_China L1.	.1801848	.68927	0.26	0.795	-1.199041	1.559411
year						
2013	3.956151	3.911048	1.01	0.316	-3.869839	11.78214
2014	2.281262	4.137581	0.55	0.583	-5.998019	10.56054
2015	7.977123	4.33709	1.84	0.071	-.7013737	16.65562
2016	7.807221	5.066188	1.54	0.129	-2.330198	17.94464
2017	7.36385	5.271985	1.40	0.168	-3.185368	17.91307
2018	5.557069	5.088867	1.09	0.279	-4.625729	15.73987
2019	4.467421	5.476007	0.82	0.418	-6.490044	15.42489
2020	4.9747	5.810862	0.86	0.395	-6.652808	16.60221
2021	4.887981	6.885816	0.71	0.481	-8.890505	18.66647
2022	7.330462	7.587311	0.97	0.338	-7.851712	22.51264

_cons	64.9136	14.96548	4.34	0.000	34.96774	94.85946
sigma_u	21.260189					
sigma_e	7.5600828					
rho	.88774468	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 59) = 30.32 Prob > F = 0.0000

11. xtreg shareUSD c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGDPp
> c i.year, fe

Fixed-effects (within) regression
Group variable: **country_id**

Number of obs = 78
Number of groups = 8

R-sq:
within = 0.2813
between = 0.3601
overall = 0.2034

Obs per group:
min = 4
avg = 9.8
max = 11

corr(u_i, Xb) = -0.8864

F(15, 55) = 1.44
Prob > F = 0.1642

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.715757	1.009668	-0.71	0.481	-2.739176	1.307662
im_China L1.	.3769722	.7224654	0.52	0.604	-1.070881	1.824825
inFDI_USAGDP L1.	-43.33313	113.3852	-0.38	0.704	-270.5621	183.8958
inFDI_China~P L1.	-229.8523	363.8041	-0.63	0.530	-958.9321	499.2275
lnGDPp L1.	15.47045	9.427967	1.64	0.107	-3.423614	34.36452
year						
2013	3.435043	3.864809	0.89	0.378	-4.310207	11.18029
2014	2.202182	4.12786	0.53	0.596	-6.070234	10.4746
2015	7.935122	4.633133	1.71	0.092	-1.349885	17.22013
2016	10.4204	5.47828	1.90	0.062	-.5583145	21.39912
2017	12.18805	6.139325	1.99	0.052	-.1154307	24.49153
2018	9.22034	5.885756	1.57	0.123	-2.574978	21.01566
2019	6.860633	6.248998	1.10	0.277	-5.662639	19.38391
2020	6.895056	6.575874	1.05	0.299	-6.28329	20.0734
2021	8.301213	7.910531	1.05	0.299	-7.551847	24.15427
2022	7.942821	8.444049	0.94	0.351	-8.979431	24.86507
_cons	-93.79003	96.58764	-0.97	0.336	-287.356	99.77593
sigma_u	31.836877					
sigma_e	7.4478208					
rho	.94811311	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 55) = 18.71 Prob > F = 0.0000

```
12. xtreg shareUSD c.L1.im_USA c.L1.im_China##BRICS L1.inFDI_USAGDP L1.inFDI_ChinaGDP L
> .lnGDPpc i.year, fe
note: 1.BRICS omitted because of collinearity
```

```
Fixed-effects (within) regression      Number of obs   =      78
Group variable: country_id             Number of groups =       8

R-sq:                                  Obs per group:
      within = 0.4308                  min =         4
      between = 0.0528                  avg  =        9.8
      overall = 0.0358                  max  =        11

corr(u_i, Xb) = -0.8910                F(16,54)         =      2.55
                                      Prob > F           =      0.0053
```

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.8483417	.9074719	-0.93	0.354	-2.667713	.9710299
im_China L1.	.6221429	.6521074	0.95	0.344	-.6852537	1.929539
1.BRICS	0	(omitted)				
BRICS# cL.im_China L1	-2.486397	.6601035	-3.77	0.000	-3.809824	-1.162969
inFDI_USAGDP L1.	24.06335	103.392	0.23	0.817	-183.2251	231.3518
inFDI_China~P L1.	-568.4194	338.8731	-1.68	0.099	-1247.819	110.9802
lnGDPpc L1.	6.368186	8.8054	0.72	0.473	-11.28558	24.02195
year						
2013	4.088549	3.475343	1.18	0.245	-2.879094	11.05619
2014	4.229858	3.746138	1.13	0.264	-3.280696	11.74041
2015	11.09466	4.244752	2.61	0.012	2.58444	19.60487
2016	14.05273	5.013693	2.80	0.007	4.000886	24.10458
2017	16.41056	5.626572	2.92	0.005	5.129959	27.69115
2018	14.28556	5.454403	2.62	0.011	3.350141	25.22098
2019	13.3489	5.870663	2.27	0.027	1.578927	25.11887
2020	13.82858	6.186054	2.24	0.030	1.426291	26.23087
2021	16.05011	7.396356	2.17	0.034	1.221313	30.87892
2022	15.55981	7.848639	1.98	0.053	-.1757599	31.29539
_cons	6.819052	90.76512	0.08	0.940	-175.1541	188.7922
sigma_u	33.386469					
sigma_e	6.688936					
rho	.9614094	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 23.38 Prob > F = 0.0000

```
13. xtreg shareUSD c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS L1
> .lnGDPpc i.year, fe
note: 1.BRICS omitted because of collinearity
```

```
Fixed-effects (within) regression      Number of obs   =      78
Group variable: country_id             Number of groups =       8

R-sq:                                  Obs per group:
      within = 0.3447                  min =         4
      between = 0.2191                  avg  =        9.8
      overall = 0.0697                  max  =        11
```

corr(u_i, Xb) = -0.7262 F(16,54) = 1.78
 Prob > F = 0.0598

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.8347563	.9743759	-0.86	0.395	-2.788262	1.11875
im_China L1.	.5616333	.7008877	0.80	0.426	-.8435619	1.966828
inFDI_USAGDP L1.	-81.92388	110.5621	-0.74	0.462	-303.5876	139.7398
inFDI_China~P L1.	-90.95034	355.8134	-0.26	0.799	-804.3132	622.4125
1.BRICS	0	(omitted)				
BRICS# cL. inFDI_China~P 1	-1451.014	634.7645	-2.29	0.026	-2723.64	-178.3875
lnGDPpc L1.	6.936314	9.82258	0.71	0.483	-12.75677	26.6294
year						
2013	3.824648	3.72829	1.03	0.310	-3.650124	11.29942
2014	2.434127	3.97918	0.61	0.543	-5.543649	10.4119
2015	8.863752	4.483246	1.98	0.053	-.1246136	17.85212
2016	10.34779	5.279339	1.96	0.055	-.2366424	20.93223
2017	12.76286	5.921612	2.16	0.036	.8907398	24.63498
2018	10.02449	5.682813	1.76	0.083	-1.368867	21.41784
2019	7.25929	6.024484	1.20	0.233	-4.819074	19.33765
2020	6.864238	6.336973	1.08	0.284	-5.840629	19.56911
2021	7.109983	7.640917	0.93	0.356	-8.209133	22.4291
2022	6.292314	8.169231	0.77	0.445	-10.08601	22.67063
_cons	-8.631467	100.2568	-0.09	0.932	-209.6343	192.3714
sigma_u	22.083111					
sigma_e	7.1772263					
rho	.90446062	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 14.01 Prob > F = 0.0000

14. xtreg shareUSD c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGDPpc
 > c i.year, fe

Fixed-effects (within) regression Number of obs = 78
 Group variable: country_id Number of groups = 8

R-sq: Obs per group:

within = 0.2764	min = 4
between = 0.2069	avg = 9.8
overall = 0.1063	max = 11

corr(u_i, Xb) = -0.9135 F(15,55) = 1.40
 Prob > F = 0.1799

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA L1.	- .2137984	1.022436	-0.21	0.835	-2.262805	1.835208
ex_China L1.	.3271518	.3894016	0.84	0.404	-.4532263	1.10753
inFDI_USAGDP L1.	-60.64295	110.9514	-0.55	0.587	-282.9944	161.7085
inFDI_Chin~P L1.	-106.0145	363.8207	-0.29	0.772	-835.1274	623.0984
lnGDPpcc L1.	20.83608	8.589634	2.43	0.019	3.622068	38.05009
year						
2013	3.86122	3.758736	1.03	0.309	-3.671455	11.39389
2014	2.496466	3.963448	0.63	0.531	-5.446462	10.43939
2015	8.402212	4.389369	1.91	0.061	-.3942806	17.1987
2016	12.44326	4.272287	2.91	0.005	3.881403	21.00511
2017	14.50099	4.999893	2.90	0.005	4.480981	24.521
2018	10.98557	4.941186	2.22	0.030	1.083213	20.88793
2019	7.89616	5.099579	1.55	0.127	-2.323624	18.11594
2020	7.528457	5.244334	1.44	0.157	-2.981424	18.03834
2021	9.604647	5.925443	1.62	0.111	-2.270206	21.4795
2022	9.419873	5.992166	1.57	0.122	-2.588695	21.42844
_cons	-149.7812	85.5219	-1.75	0.085	-321.1709	21.6085
sigma_u	41.092004					
sigma_e	7.4728384					
rho	.96798702	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 55) = 18.68 Prob > F = 0.0000

15. xtreg shareUSD c.L1.ex_USA c.L1.ex_China##BRICS L1.inFDI_USAGDP L1. inFDI_ChinaGDP L
> 1.lnGDPpcc i.year, fe
note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression
Group variable: country_id

Number of obs = 78
Number of groups = 8

R-sq:
within = 0.3698
between = 0.1658
overall = 0.0778

Obs per group:
min = 4
avg = 9.8
max = 11

F(16,54) = 1.98
Prob > F = 0.0319

corr(u_i, Xb) = -0.9252

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA L1.	-.7439414	.9810251	-0.76	0.452	-2.710778	1.222895
ex_China L1.	.9995321	.4370267	2.29	0.026	.1233464	1.875718
1.BRICS	0	(omitted)				
BRICS# cL.ex_China 1	-1.648774	.5827984	-2.83	0.007	-2.817214	-.4803333
inFDI_USAGDP L1.	60.33472	112.9085	0.53	0.595	-166.0332	286.7027
inFDI_Chin~P						

L1.	-468.1571	365.7871	-1.28	0.206	-1201.516	265.2018
lnGDPpc						
L1.	13.31677	8.515406	1.56	0.124	-3.755595	30.38913
year						
2013	4.08396	3.540969	1.15	0.254	-3.015254	11.18317
2014	2.982299	3.736845	0.80	0.428	-4.509625	10.47422
2015	8.928362	4.138224	2.16	0.035	.6317222	17.225
2016	12.3226	4.023997	3.06	0.003	4.254973	20.39023
2017	14.44499	4.709094	3.07	0.003	5.00382	23.88615
2018	12.79288	4.697404	2.72	0.009	3.375155	22.21061
2019	10.62542	4.89887	2.17	0.035	.803774	20.44706
2020	10.09486	5.02189	2.01	0.049	.0265782	20.16314
2021	10.64495	5.592866	1.90	0.062	-.5680756	21.85797
2022	11.55209	5.693709	2.03	0.047	.1368865	22.96729
_cons	-79.01381	84.34196	-0.94	0.353	-248.1093	90.08165
sigma_u	42.710531					
sigma_e	7.0381493					
rNo	.97356306	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 17.50 Prob > F = 0.0000

16. xtreg shareUSD c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS L1
> .lnGDPpc i.year, fe
note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression	Number of obs	=	78
Group variable: country_id	Number of groups	=	8
R-sq:	Obs per group:		
within = 0.3282	min =		4
between = 0.1641	avg =		9.8
overall = 0.0628	max =		11
corr(u_i, Xb) = -0.8625	F(16,54)	=	1.65
	Prob > F	=	0.0872

shareUSD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA						
L1.	-.4756226	1.002492	-0.47	0.637	-2.485499	1.534254
ex_China						
L1.	.2468212	.3807064	0.65	0.520	-.5164493	1.010092
inFDI_USAGDP						
L1.	-87.05498	108.666	-0.80	0.427	-304.9173	130.8073
inFDI_Chin~P						
L1.	22.03392	359.3127	0.06	0.951	-698.3447	742.4125
1.BRICS	0	(omitted)				
BRICS#						
cL.						
inFDI_Chin~P						
1	-1319.491	646.6955	-2.04	0.046	-2616.038	-22.94482
lnGDPpc						
L1.	13.9156	9.015188	1.54	0.129	-4.158763	31.98997
year						
2013	4.533868	3.669939	1.24	0.222	-2.823917	11.89165
2014	3.172352	3.868379	0.82	0.416	-4.583282	10.92799
2015	9.75408	4.319466	2.26	0.028	1.094073	18.41409
2016	13.56124	4.190472	3.24	0.002	5.159854	21.96263
2017	16.39234	4.949615	3.31	0.002	6.468963	26.31573
2018	13.02084	4.907398	2.65	0.010	3.182095	22.85958

2019	9.762894	5.042667	1.94	0.058	-.3470455	19.87283
2020	9.193939	5.164654	1.78	0.081	-1.160568	19.54845
2021	10.8553	5.794581	1.87	0.066	-.7621338	22.47274
2022	10.49854	5.850886	1.79	0.078	-1.231781	22.22886
_cons	-76.79079	90.5316	-0.85	0.400	-258.2957	104.7141
sigma_u	32.956282					
sigma_e	7.2668013					
rho	.95363479	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 18.52 Prob > F = 0.0000

17. xtreg ShareYUAN c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGDP
> pc i.year, fe

Fixed-effects (within) regression Number of obs = 78
Group variable: country_id Number of groups = 8

R-sq: within = 0.5824 between = 0.0088 overall = 0.3300
Obs per group: min = 4 avg = 9.8 max = 11

corr(u_i, Xb) = -0.4672 F(15,55) = 5.11
Prob > F = 0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.5435819	.3276814	-1.66	0.103	-1.20027	.1131062
im_China L1.	.1003212	.2344717	0.43	0.670	-.3695705	.570213
inFDI_USAGDP L1.	55.91292	36.79845	1.52	0.134	-17.83282	129.6587
inFDI_ChinaGDP L1.	.9500015	118.0704	0.01	0.994	-235.6683	237.5683
lnGDPpc L1.	-.805358	3.059788	-0.26	0.793	-6.937311	5.326595
year						
2013	-.092447	1.2543	-0.07	0.942	-2.60612	2.421226
2014	.0635486	1.339671	0.05	0.962	-2.621213	2.74831
2015	.5270187	1.503655	0.35	0.727	-2.486373	3.54041
2016	-.0012689	1.777942	-0.00	0.999	-3.564344	3.561806
2017	1.17645	1.99248	0.59	0.557	-2.816569	5.169469
2018	3.635349	1.910186	1.90	0.062	-.1927489	7.463446
2019	4.524419	2.028074	2.23	0.030	.4600685	8.58877
2020	4.850651	2.134159	2.27	0.027	.5737006	9.127602
2021	5.448374	2.567314	2.12	0.038	.3033617	10.59339
2022	4.694955	2.740464	1.71	0.092	-.7970577	10.18697
_cons	9.336709	31.34692	0.30	0.767	-53.48393	72.15734
sigma_u	2.7450914					
sigma_e	2.4171442					
rho	.56327278	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 55) = 2.39 Prob > F = 0.0327

18. xtreg ShareYUAN c.L1.im_USA c.L1.im_China##BRICS L1.inFDI_USAGDP L1.inFDI_ChinaGDP L
 > 1.lnGDPpc i.year, fe
 note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression Number of obs = 78
 Group variable: **country_id** Number of groups = 8

R-sq: Obs per group:

within = 0.6588	min = 4
between = 0.1620	avg = 9.8
overall = 0.1450	max = 11

corr(u_i, Xb) = -0.8827 F(16, 54) = 6.52
 Prob > F = 0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.5032425	.2991641	-1.68	0.098	-1.10303	.0965454
im_China L1.	.025727	.2149787	0.12	0.905	-.4052792	.4567333
1.BRICS	0	(omitted)				
BRICS# c.L.im_China 1	.7564965	.2176147	3.48	0.001	.3202052	1.192788
inFDI_USAGDP L1.	35.40727	34.08498	1.04	0.304	-32.92901	103.7435
inFDI_Chin~P L1.	103.9604	111.7155	0.93	0.356	-120.0156	327.9365
lnGDPpc L1.	1.964044	2.902855	0.68	0.502	-3.85583	7.783918
year						
2013	-.291279	1.145708	-0.25	0.800	-2.588285	2.005727
2014	-.5533802	1.23498	-0.45	0.656	-3.029366	1.922606
2015	-.4342824	1.399357	-0.31	0.757	-3.239825	2.37126
2016	-1.10642	1.652852	-0.67	0.506	-4.420189	2.207348
2017	-.1082642	1.854898	-0.06	0.954	-3.827112	3.610583
2018	2.094234	1.79814	1.16	0.249	-1.510819	5.699288
2019	2.550338	1.935367	1.32	0.193	-1.32984	6.430516
2020	2.741097	2.039342	1.34	0.185	-1.347537	6.829731
2021	3.090738	2.438339	1.27	0.210	-1.797837	7.979314
2022	2.377453	2.587442	0.92	0.362	-2.810056	7.564962
_cons	-21.27402	29.92232	-0.71	0.480	-81.26466	38.71662
sigma_u	6.4901812					
sigma_e	2.2051255					
rho	.89650792	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 3.67 Prob > F = 0.0026

19. xtreg ShareYUAN c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS L
 > 1.lnGDPpc i.year, fe
 note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression Number of obs = 78
 Group variable: **country_id** Number of groups = 8

R-sq: Obs per group:

within = 0.6233	min = 4
between = 0.3219	avg = 9.8
overall = 0.2892	max = 11

corr(u_i, Xb) = -0.7912 F(16,54) = 5.59
 Prob > F = 0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	-.5028674	.3145189	-1.60	0.116	-1.13344	.127705
im_China L1.	.0371411	.2262396	0.16	0.870	-.416442	.4907241
inFDI_USAGDP L1.	69.11642	35.68836	1.94	0.058	-2.434431	140.6673
inFDI_Chin~P L1.	-46.57412	114.853	-0.41	0.687	-276.8405	183.6923
1.BRICS	0	(omitted)				
BRICS# cL. inFDI_Chin~P 1	496.4518	204.8957	2.42	0.019	85.66071	907.2429
lnGDPpc L1.	2.114524	3.170631	0.67	0.508	-4.242209	8.471257
year						
2013	-.225747	1.203455	-0.19	0.852	-2.638529	2.187035
2014	-.0158095	1.28444	-0.01	0.990	-2.590956	2.559337
2015	.2092957	1.447147	0.14	0.886	-2.69206	3.110651
2016	.0235739	1.704118	0.01	0.989	-3.392977	3.440125
2017	.9797854	1.911438	0.51	0.610	-2.852416	4.811987
2018	3.360217	1.834356	1.83	0.072	-.3174447	7.037878
2019	4.388022	1.944644	2.26	0.028	.4892464	8.286798
2020	4.861195	2.045512	2.38	0.021	.7601906	8.9622
2021	5.855943	2.466412	2.37	0.021	.9110846	10.8008
2022	5.259662	2.636946	1.99	0.051	-.0270977	10.54642
_cons	-19.79956	32.36191	-0.61	0.543	-84.68127	45.08216
sigma_u	4.1869062					
sigma_e	2.3167373					
rho	.76559527					(fraction of variance due to u_i)

F test that all u_i=0: F(7, 54) = 1.80 Prob > F = 0.1069

20. xtreg ShareYUAN c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGDP
 > pc i.year, fe

Fixed-effects (within) regression
 Group variable: country_id

Number of obs = 78
 Number of groups = 8

R-sq:

within = 0.5648
 between = 0.2240
 overall = 0.1693

Obs per group:

min = 4
 avg = 9.8
 max = 11

corr(u_i, Xb) = -0.8688

F(15,55) = 4.76
 Prob > F = 0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA Ll.	.0417325	.3376165	0.12	0.902	-.6348661	.7183311
ex_China Ll.	.1383516	.1285835	1.08	0.287	-.1193356	.3960387
inFDI_USAGDP Ll.	41.56771	36.63704	1.13	0.261	-31.85455	114.99
inFDI_Chin~P Ll.	65.9093	120.1365	0.55	0.585	-174.8497	306.6683
lnGDPpc Ll.	2.22708	2.836367	0.79	0.436	-3.457125	7.911286
year						
2013	-.030113	1.241165	-0.02	0.981	-2.517463	2.457237
2014	.1923829	1.308763	0.15	0.884	-2.430436	2.815202
2015	.640959	1.449405	0.44	0.660	-2.263714	3.545632
2016	.6698997	1.410744	0.47	0.637	-2.157294	3.497093
2017	2.033629	1.651005	1.23	0.223	-1.275058	5.342317
2018	4.210761	1.631619	2.58	0.013	.9409224	7.480599
2019	4.647975	1.683922	2.76	0.008	1.27332	8.022631
2020	4.607006	1.731722	2.66	0.010	1.136558	8.077453
2021	5.611647	1.956629	2.87	0.006	1.690475	9.532819
2022	4.780101	1.978662	2.42	0.019	.8147751	8.745428
_cons	-25.63029	28.24002	-0.91	0.368	-82.22456	30.96398
sigma_u	5.8153502					
sigma_e	2.4675916					
rNo	.84742121					
		(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 55) = 4.52 Prob > F = 0.0005

21. xtreg ShareYUAN c.Ll.ex_USA c.Ll.ex_China##BRICS Ll.inFDI_USAGDP Ll.inFDI_ChinaGDP L
> 1.lnGDPpc i.year, fe
note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression	Number of obs	=	78
Group variable: country_id	Number of groups	=	8
R-sq:	Obs per group:		
within = 0.5741	min =		4
between = 0.1840	avg =		9.8
overall = 0.1511	max =		11
corr(u_i, Xb) = -0.8521	F(16,54)	=	4.55
	Prob > F	=	0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA Ll.	.1131836	.3433672	0.33	0.743	-.5752263	.8015934
ex_China Ll.	.0477302	.1529631	0.31	0.756	-.2589424	.3544027
1.BRICS	0	(omitted)				
BRICS# cL.ex_China 1	.2222167	.2039845	1.09	0.281	-.1867475	.631181
inFDI_USAGDP Ll.	25.26271	39.51896	0.64	0.525	-53.96803	104.4934
inFDI_Chin~P						

L1.	114.7178	128.0286	0.90	0.374	-141.9642	371.3998
lnGDPpc						
L1.	3.240511	2.980466	1.09	0.282	-2.734963	9.215984
year						
2013	-.0601333	1.23937	-0.05	0.961	-2.54492	2.424653
2014	.1269037	1.307928	0.10	0.923	-2.495334	2.749142
2015	.570046	1.448414	0.39	0.695	-2.33385	3.473942
2016	.6861612	1.408434	0.49	0.628	-2.137579	3.509901
2017	2.041177	1.648224	1.24	0.221	-1.263312	5.345667
2018	3.967177	1.644132	2.41	0.019	.6708907	7.263462
2019	4.280134	1.714647	2.50	0.016	.842475	7.717794
2020	4.261114	1.757705	2.42	0.019	.7371278	7.785099
2021	5.471439	1.957551	2.80	0.007	1.546785	9.396093
2022	4.492728	1.992847	2.25	0.028	.4973097	8.488147
_cons	-35.16811	29.52042	-1.19	0.239	-94.35298	24.01676
sigma_u	5.87885					
sigma_e	2.463413					
rho	.85063965	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 3.76 Prob > F = 0.0022

22. xtreg ShareYUAN c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS L
> l.lnGDPpc i.year, fe
note: 1.BRICS omitted because of collinearity

Fixed-effects (within) regression	Number of obs	=	78
Group variable: country_id	Number of groups	=	8
R-sq:	Obs per group:		
within = 0.6213	min =		4
between = 0.3074	avg =		9.8
overall = 0.1560	max =		11
corr(u_i, Xb) = -0.9369	F(16, 54)	=	5.54
	Prob > F	=	0.0000

ShareYUAN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA						
L1.	.1581786	.320475	0.49	0.624	-.4843351	.8006923
ex_China						
L1.	.1740785	.1217036	1.43	0.158	-.0699224	.4180795
inFDI_USAGDP						
L1.	53.31444	34.73817	1.53	0.131	-16.33141	122.9603
inFDI_Chin~P						
L1.	8.959881	114.8645	0.08	0.938	-221.3295	239.2493
1.BRICS	0	(omitted)				
BRICS#						
cL.						
inFDI_Chin~P						
1	586.8425	206.7345	2.84	0.006	172.3649	1001.32
lnGDPpc						
L1.	5.304957	2.88196	1.84	0.071	-.4730248	11.08294
year						
2013	-.3292726	1.1732	-0.28	0.780	-2.681397	2.022851
2014	-.1082168	1.236637	-0.09	0.931	-2.587524	2.371091
2015	.0397167	1.380839	0.03	0.977	-2.728699	2.808133
2016	.1726764	1.339603	0.13	0.898	-2.513065	2.858418
2017	1.192451	1.582284	0.75	0.454	-1.979838	4.36474
2018	3.305578	1.568788	2.11	0.040	.1603467	6.45081

2019	3.817747	1.612031	2.37	0.021	.5858194	7.049675
2020	3.866284	1.651027	2.34	0.023	.5561731	7.176395
2021	5.05542	1.852401	2.73	0.009	1.341578	8.769261
2022	4.300366	1.870401	2.30	0.025	.5504371	8.050294
_cons	-58.09272	28.94099	-2.01	0.050	-116.1159	-.0695408
sigma_u	9.4080773					
sigma_e	2.3230384					
rho	.94253436	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 54) = 5.60 Prob > F = 0.0001

23. regress shareUSD c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGD
> Ppc i.year, robust cluster(country_id)

Linear regression

Number of obs	=	78
F(6, 7)	=	.
Prob > F	=	.
R-squared	=	0.4998
Root MSE	=	12.899

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA _L1.	2.085305	1.300734	1.60	0.153	-.990443	5.161053
im_China _L1.	-.7363607	.9588401	-0.77	0.468	-3.003657	1.530936
inFDI_USAGDP _L1.	-15.12793	135.761	-0.11	0.914	-336.1518	305.8959
inFDI_China~P _L1.	312.0482	442.0765	0.71	0.503	-733.2965	1357.393
lnGDPpcc _L1.	-7.027471	2.292232	-3.07	0.018	-12.44774	-1.607203
year						
2013	5.918765	3.801859	1.56	0.163	-3.071203	14.90873
2014	6.70567	4.653512	1.44	0.193	-4.298138	17.70948
2015	8.15396	4.885645	1.67	0.139	-3.398756	19.70668
2016	11.79941	6.404039	1.84	0.108	-3.343732	26.94256
2017	8.984117	6.556991	1.37	0.213	-6.520703	24.48894
2018	7.297635	5.850071	1.25	0.252	-6.535586	21.13085
2019	6.122581	4.499986	1.36	0.216	-4.518194	16.76336
2020	4.817437	5.11001	0.94	0.377	-7.265817	16.90069
2021	8.229625	6.522623	1.26	0.247	-7.193927	23.65318
2022	16.41117	8.929404	1.84	0.109	-4.70351	37.52586
_cons	105.824	23.78881	4.45	0.003	49.57241	162.0756

24. regress shareUSD c.L1.im_USA c.L1.im_China##BRICS L1.inFDI_USAGDP L1.inFDI_ChinaGDP
> L1.lnGDPpcc i.year, robust cluster(country_id)

Linear regression

Number of obs	=	78
F(6, 7)	=	.
Prob > F	=	.
R-squared	=	0.5875
Root MSE	=	11.907

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	2.627968	1.358249	1.93	0.094	-.5837822	5.839717
im_China L1.	-.0478018	.6093008	-0.08	0.940	-1.488569	1.392966
1.BRICS	41.04047	15.50211	2.65	0.033	4.383812	77.69712
BRICS# cL.im_China 1	-2.925405	1.110672	-2.63	0.034	-5.551728	-.2990831
inFDI_USAGDP L1.	-242.148	132.5519	-1.83	0.110	-555.5834	71.28739
inFDI_Chin~P L1.	479.655	403.7077	1.19	0.274	-474.962	1434.272
lnGDPpc L1.	-4.263657	1.95982	-2.18	0.066	-8.897896	.3705814
year						
2013	5.521596	4.682833	1.18	0.277	-5.551544	16.59474
2014	6.623621	4.987822	1.33	0.226	-5.170705	18.41795
2015	9.082392	4.460872	2.04	0.081	-1.465894	19.63068
2016	14.00943	5.941931	2.36	0.051	-.0410045	28.05986
2017	12.90201	6.222998	2.07	0.077	-1.813041	27.61706
2018	10.41	4.669011	2.23	0.061	-.6304609	21.45045
2019	9.091447	5.872418	1.55	0.166	-4.794616	22.97751
2020	8.051365	5.869458	1.37	0.212	-5.827699	21.93043
2021	13.30721	5.661012	2.35	0.051	-.0789571	26.69337
2022	17.74352	6.895226	2.57	0.037	1.438899	34.04814
_cons	75.61614	22.68436	3.33	0.013	21.97615	129.2561

25. regress shareUSD c.L1.im_USA L1.im_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS
> L1.lnGDPpc i.year, robustf cluster(country_id)

Linear regression	Number of obs	=	78
	F(6, 7)	=	.
	Prob > F	=	.
	R-squared	=	0.6202
	Root MSE	=	11.426

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA L1.	2.638014	1.177478	2.24	0.060	-.1462804	5.422308
im_China L1.	-1.025541	1.061792	-0.97	0.366	-3.536281	1.485198
inFDI_USAGDP L1.	-200.2979	101.2022	-1.98	0.088	-439.603	39.00719
inFDI_Chin~P L1.	1269.667	614.8594	2.06	0.078	-184.2442	2723.579
1.BRICS	-.1008281	7.000998	-0.01	0.989	-16.65556	16.4539
BRICS# cL. inFDI_Chin~P						

1	-1825.018	691.6119	-2.64	0.033	-3460.42	-189.6154
lnGDPpc L1.	-8.390431	2.628652	-3.19	0.015	-14.6062	-2.174657
year						
2013	6.614809	5.008681	1.32	0.228	-5.228839	18.45846
2014	6.695603	5.740383	1.17	0.282	-6.878246	20.26945
2015	9.151479	5.65785	1.62	0.150	-4.227211	22.53017
2016	12.47979	7.043794	1.77	0.120	-4.17614	29.13571
2017	11.3927	6.889571	1.65	0.142	-4.898551	27.68394
2018	8.94312	5.767794	1.55	0.165	-4.695545	22.58178
2019	7.008675	5.269414	1.33	0.225	-5.451511	19.46886
2020	5.217388	5.464407	0.95	0.371	-7.703882	18.13866
2021	9.680516	5.135145	1.89	0.101	-2.462173	21.8232
2022	17.42604	8.364461	2.08	0.076	-2.352771	37.20484
_cons	126.8835	33.3908	3.80	0.007	47.92677	205.8401

26. regress shareUSD c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP L1.lnGD
> Ppc i.year, robust cluster(country_id)

Linear regression	Number of obs	=	78
	F(6, 71)	=	.
	Prob > F	=	.
	R-squared	=	0.4970
	Root MSE	=	12.935

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA L1.	1.126195	1.061216	1.06	0.324	-1.383183	3.635573
ex_China L1.	.5200366	.4490468	1.16	0.285	-.5417902	1.581863
inFDI_USAGDP L1.	-3.806574	165.2435	-0.02	0.982	-394.5453	386.9321
inFDI_Chin~P L1.	-303.9786	458.6521	-0.66	0.529	-1388.518	780.5613
lnGDPpc L1.	-3.898813	3.435061	-1.14	0.294	-12.02144	4.223816
year						
2013	4.3627	2.9531	1.48	0.183	-2.620271	11.34567
2014	4.344415	4.865681	0.89	0.402	-7.161093	15.84992
2015	8.870372	4.423462	2.01	0.085	-1.589453	19.3302
2016	9.28966	6.461187	1.44	0.194	-5.988618	24.56794
2017	9.841138	5.878966	1.67	0.138	-4.060408	23.74268
2018	7.94855	7.169307	1.11	0.304	-9.004168	24.90127
2019	5.715742	6.897943	0.83	0.435	-10.5953	22.02679
2020	4.369246	7.206287	0.61	0.563	-12.67091	21.40941
2021	4.124052	7.640511	0.54	0.606	-13.94289	22.19099
2022	8.135239	8.902526	0.91	0.391	-12.91589	29.18637
_cons	72.43356	34.856	2.08	0.076	-9.987777	154.8549

```
27. regress shareUSD c.L1.ex_USA c.L1.ex_China##BRICS L1.inFDI_USAGDP L1.inFDI_ChinaGDP
> L1.lnGDPpc i.year, robust cluster(country_id)
```

```
Linear regression                               Number of obs   =           78
                                                F(6, 7)         =           .
                                                Prob > F         =           .
                                                R-squared        =          0.6002
                                                Root MSE        =          11.723
```

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA L1.	2.374969	1.600097	1.48	0.181	-1.40866	6.158598
ex_China L1.	.0080979	.3407089	0.02	0.982	-.7975507	.8137465
1.BRICS	17.41599	15.61408	1.12	0.302	-19.50544	54.33743
BRICS# cL.ex_China 1	.2580908	.4300484	0.60	0.567	-.758812	1.274994
inFDI_USAGDP L1.	189.1658	124.1303	1.52	0.171	-104.3559	482.6874
inFDI_China~P L1.	-74.77614	392.1434	-0.19	0.854	-1002.048	852.4956
lnGDPpc L1.	.3807419	4.907381	0.08	0.940	-11.22337	11.98485
year						
2013	3.889762	2.88071	1.35	0.219	-2.922035	10.70156
2014	5.092861	4.786186	1.06	0.323	-6.224671	16.41039
2015	7.465146	4.622595	1.61	0.150	-3.465555	18.39585
2016	8.696704	6.641417	1.31	0.232	-7.00775	24.40116
2017	7.197153	6.835468	1.05	0.327	-8.966159	23.36047
2018	5.918192	7.343994	0.81	0.447	-11.4476	23.28398
2019	5.17607	6.57689	0.79	0.457	-10.3758	20.72794
2020	3.810161	7.287988	0.52	0.617	-13.42319	21.04351
2021	5.671336	8.708217	0.65	0.536	-14.92033	26.263
2022	9.909828	9.369694	1.06	0.325	-12.24598	32.06563
_cons	7.216651	64.77243	0.11	0.914	-145.9458	160.3791

```
28. regress shareUSD c.L1.ex_USA L1.ex_China L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS
> L1.lnGDPpc i.year, robust cluster(country_id)
```

```
Linear regression                               Number of obs   =           78
                                                F(6, 7)         =           .
                                                Prob > F         =           .
                                                R-squared        =          0.6991
                                                Root MSE        =          10.169
```

(Std. Err. adjusted for 8 clusters in country_id)

shareUSD	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA L1.	3.062723	1.268132	2.42	0.046	.0640673	6.061379
ex_China L1.	-.0840093	.4090204	-0.21	0.843	-1.051189	.8831701
inFDI_USAGDP L1.	109.7912	122.7788	0.89	0.401	-180.5346	400.117

inFDI_Chin~P L1.	654.3318	433.5518	1.51	0.175	-370.8553	1679.519
1.BRICS	30.64326	10.30904	2.97	0.021	6.266238	55.02027
BRICS# cL.						
inFDI_Chin~P 1	-1724.369	571.123	-3.02	0.019	-3074.86	-373.8775
lnGDPpcc L1.	2.078688	2.809049	0.74	0.483	-4.563656	8.721033
year						
2013	3.861073	2.793388	1.38	0.209	-2.744239	10.46639
2014	4.919587	4.717326	1.04	0.332	-6.235116	16.07429
2015	8.259875	4.352384	1.90	0.100	-2.031879	18.55163
2016	8.663307	6.183275	1.40	0.204	-5.957816	23.28443
2017	8.681025	6.155762	1.41	0.201	-5.875038	23.23709
2018	7.147854	6.426322	1.11	0.303	-8.047983	22.34369
2019	6.317016	5.754332	1.10	0.309	-7.289818	19.92385
2020	4.577977	6.133305	0.75	0.480	-9.924986	19.08094
2021	7.51958	7.797539	0.96	0.367	-10.91867	25.95783
2022	11.08885	8.513207	1.30	0.234	-9.041686	31.21938
_cons	-14.068	42.23877	-0.33	0.749	-113.9468	85.81083

29. regress ShareYUAN c.L1.im USA c.L1.im China##BRICS L1.inFDI_USAGDP L1.inFDI_ChinaGDP
> L1.lnGDPpcc i.year, robust cluster(country_id)

Linear regression	Number of obs	=	78
	$F(6, 7)$	=	.
	Prob > F	=	.
	R-squared	=	0.6555
	Root MSE	=	2.3911

(Std. Err. adjusted for 8 clusters in country_id)

ShareYUAN	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
im USA L1.	-.3693029	.1582245	-2.33	0.052	-.7434444 .0048386
im China L1.	.2426405	.1069301	2.27	0.058	-.0102091 .49549
1.BRICS	-7.805114	4.782363	-1.63	0.147	-19.11361 3.503377
BRICS# cL.im China 1	.5825633	.3359776	1.73	0.127	-.2118976 1.377024
inFDI_USAGDP L1.	56.45324	23.84132	2.37	0.050	.0774839 112.829
inFDI_Chin~P L1.	-111.6322	60.90701	-1.83	0.109	-255.6544 32.38998
lnGDPpcc L1.	-.1672164	.3581538	-0.47	0.655	-1.014115 .6796827
year					
2013	-.3829955	.6310316	-0.61	0.563	-1.875148 1.109157
2014	-.3630646	.8338104	-0.44	0.676	-2.334713 1.608584
2015	.2660138	1.103594	0.24	0.816	-2.343571 2.875598
2016	-1.12969	1.307513	-0.86	0.416	-4.221466 1.962086
2017	.2903672	1.187622	0.24	0.814	-2.517912 3.098646
2018	2.711962	1.259943	2.15	0.068	-.2673306 5.691254
2019	3.088678	1.414204	2.18	0.065	-.2553827 6.432739

2020	3.100971	1.408177	2.20	0.064	-.2288395	6.430781
2021	2.983279	1.111867	2.68	0.031	.35413	5.612428
2022	1.966022	1.216176	1.62	0.150	-.9097765	4.84182
_cons	-.3004938	3.536975	-0.08	0.935	-8.664112	8.063124

30. regress ShareYUAN c.Ll.im_USA Ll.im_China Ll.inFDI_USAGDP c.Ll.inFDI_ChinaGDP##BRICS
> Ll.lnGDPpc i.year, robust cluster(country_id)

```

Linear regression      Number of obs      =           78
                      F(6, 71)              =           .
                      Prob > F                =           .
                      R-squared               =          0.6431
                      Root MSE             =          2.4339

```

(Std. Err. adjusted for 8 clusters in country_id)

ShareYUAN	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
im_USA _Ll.	-.3559372	.151993	-2.34	0.052	-.7153434	.003469
im_China Ll.	.4295148	.1487615	2.89	0.023	.0777498	.7812799
inFDI_USAGDP Ll.	41.67133	10.68821	3.90	0.006	16.39772	66.94494
inFDI_Chin~P Ll.	-230.1211	96.65412	-2.38	0.049	-458.6718	-1.570423
1.BRICS	.5772994	.7539487	0.77	0.469	-1.205506	2.360105
BRICS# cL. inFDI_Chin~P 1	278.2148	76.82743	3.62	0.008	96.5468	459.8828
lnGDPpc Ll.	.61029	.2823584	2.16	0.067	-.0573815	1.277962
year						
2013	-.5761217	.7268482	-0.79	0.454	-2.294845	1.142601
2014	-.3867673	.9790799	-0.40	0.705	-2.701923	1.928389
2015	.2941406	1.218325	0.24	0.816	-2.586739	3.175021
2016	-.8003903	1.354669	-0.59	0.573	-4.003674	2.402893
2017	.6829479	1.229782	0.56	0.596	-2.225024	3.590919
2018	3.069024	1.755359	1.75	0.124	-1.081741	7.219789
2019	3.535996	1.409151	2.51	0.040	.2038835	6.868108
2020	3.677515	1.481063	2.48	0.042	.1753576	7.179672
2021	3.748796	1.325093	2.83	0.025	.6154479	6.882144
2022	2.067158	.7835727	2.64	0.034	.2143034	3.920013
_cons	-9.875512	4.153283	-2.38	0.049	-19.69647	-.0545586

31. regress ShareYUAN c.Ll.ex_USA c.Ll.ex_China##BRICS Ll.inFDI_USAGDP Ll.inFDI_ChinaGD
> P Ll.lnGDPpc i.year, robust cluster(country_id)

```

Linear regression      Number of obs      =           78
                      F(6, 71)              =           .
                      Prob > F                =           .
                      R-squared               =          0.5131
                      Root MSE             =          2.8426

```

(Std. Err. adjusted for 8 clusters in country_id)

ShareYUAN	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA_L1.	-.2126582	.2962081	-0.72	0.496	-.9130792	.4877627
ex_China_L1.	.1303459	.0655196	1.99	0.087	-.0245833	.2852751
1.BRICS	-1.236714	3.232479	-0.38	0.713	-8.880312	6.406885
BRICS# cL.ex_China_L1	-.0925462	.1327479	-0.70	0.508	-.4064452	.2213528
inFDI_USAGDP_L1.	-31.36451	25.69163	-1.22	0.262	-92.11555	29.38653
inFDI_Chin~P_L1.	13.90249	70.84505	0.20	0.850	-153.6194	181.4244
lnGDPpc_L1.	-.5105728	.8706905	-0.59	0.576	-2.569429	1.548283
year						
2013	.1502561	.1644626	0.91	0.391	-.238636	.5391483
2014	.3152157	.502407	0.63	0.550	-.8727881	1.503219
2015	.9713006	1.053964	0.92	0.387	-1.520929	3.46353
2016	.7754831	.9225324	0.84	0.428	-1.405959	2.956926
2017	2.281809	1.024603	2.23	0.061	-.140992	4.70461
2018	4.333171	2.174417	1.99	0.087	-.8085097	9.474851
2019	4.649799	1.611294	2.89	0.023	.8396944	8.459904
2020	4.724582	1.646287	2.87	0.024	.831732	8.617431
2021	5.514157	1.998778	2.76	0.028	.7877981	10.24052
2022	4.242173	1.479872	2.87	0.024	.7428307	7.741515
_cons	8.074749	12.06766	0.67	0.525	-20.46073	36.61022

```
32. regress ShareYUAN c.L1.ex_USA_L1.ex_China_L1.inFDI_USAGDP c.L1.inFDI_ChinaGDP##BRICS
> L1.lnGDPpc i.year, robust cluster(country_id)
```

Linear regression	Number of obs	=	78
	F(6, 7)	=	.
	Prob > F	=	.
	R-squared	=	0.5646
	Root MSE	=	2.6882

(Std. Err. adjusted for 8 clusters in country_id)

ShareYUAN	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ex_USA_L1.	-.3786159	.2260202	-1.68	0.138	-.9130688	.155837
ex_China_L1.	.1351682	.0781709	1.73	0.127	-.0496767	.320013
inFDI_USAGDP_L1.	-15.11862	25.37232	-0.60	0.570	-75.11463	44.87739
inFDI_Chin~P_L1.	-106.2232	80.33297	-1.32	0.228	-296.1805	83.73409
1.BRICS	-4.318785	2.05529	-2.10	0.074	-9.178773	.5412035
BRICS# cL. inFDI_Chin~P						

1	287.7707	97.96537	2.94	0.022	56.11939	519.422
lnGDPpc						
L1.	-1.03034	.4701034	-2.19	0.065	-2.141957	.0812782
year						
2013	.1815377	.1005291	1.81	0.114	-.0561758	.4192512
2014	.3234929	.5110753	0.63	0.547	-.8850082	1.531994
2015	.8610597	1.026002	0.84	0.429	-1.56505	3.287169
2016	.7682491	.9539359	0.81	0.447	-1.487451	3.023949
2017	2.002851	1.02553	1.95	0.092	-.4221426	4.427845
2018	4.094469	2.003879	2.04	0.080	-.6439518	8.83289
2019	4.406267	1.600086	2.75	0.028	.6226644	8.18987
2020	4.552997	1.598688	2.85	0.025	.7726999	8.333295
2021	5.108445	1.814044	2.82	0.026	.8189131	9.397977
2022	4.032485	1.565542	2.58	0.037	.3305673	7.734404
_cons	14.44242	7.763254	1.86	0.105	-3.914758	32.7996

33. log close
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log: C:\Users\jm5926\Downloads\BRICS.smcl
log type: smcl
closed on: 7 Feb 2025, 12:56:54