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The Exorbitant Privilege Remains: Understanding the Dollar's Resilience in the Post Bretton-Woods Era

Beatriz Andreza Rosa Amaral

Master's Degree in Monetary and Financial Economics

Advisor:
Professor Carlos Coimbra, Invited Associate Professor,
ISCTE - University Institute of Lisbon

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Department of Political Economy

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To my father,

Acknowledgements

Writing this dissertation was a real challenge for me, and one that I am very proud of. Despite all the time invested in researching, analysing, and writing this piece of work, I can now say that it was worth it. There is no better feeling than finishing such an important chapter of my life. Still, none of this would have been possible without the support of some people who helped me in different ways throughout this past academic year.

I would like to dedicate this dissertation to my father, José Manuel Amaral. He is the reason why I am here today, thanks to the love, presence, and confidence he gave me growing up, for teaching me discipline, for always guiding me towards the right path, and, most importantly, for always believing in me. He would always tell me that I would have everything I wanted from life. Even though he is no longer with me, I know that he would be very proud of my work.

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Resumo

Esta dissertação analisa a persistência do "privilégio exorbitante" do dólar norte-americano desde o colapso do sistema de Bretton Woods. Utilizando dados anuais de 1973 a 2023, a análise centra-se em dois indicadores principais, que refletem a dupla função do dólar enquanto reserva de valor e unidade de conta nos mercados globais: a quota do dólar nas reservas internacionais e a sua quota nos títulos de dívida internacional. A análise econométrica foi feita utilizando regressões lineares após aplicar uma transformação logit às variáveis dependentes. Os resultados demonstram que a dominância do dólar tem sido resiliente, apesar dos acontecimentos económicos e geopolíticos que poderiam ter abalado a sua posição internacional ao abrir espaço para o avanço de moedas alternativas. Os efeitos de grandes eventos históricos, como a crise financeira global e a introdução do euro, revelaram-se meramente temporários. Curiosamente, os choques tendem a dissipar-se mais rapidamente nos mercados de dívida do que nas reservas, o que sugere que o papel do dólar como reserva de valor permanece mais enraizado. Além disso, ambas as funções apresentam uma forte persistência, enquanto os fundamentais macroeconómicos, como os saldos orçamental e externo, têm uma influência mais limitada. De um modo geral, os resultados sublinham a resiliência estrutural da dominância do dólar e levantam questões para futuras investigações sobre geopolítica, o renminbi e as moedas digitais.

Palavras-chave: Sistema monetário internacional, papel internacional do dólar, regressão linear, dummies step, dummies impulso, dummies ótimas.

Classificação JEL: F31, F33.

Abstract

This dissertation analyses the persistence of the "exorbitant privilege" of the U.S. dollar since the collapse of the Bretton Woods system. Using annual data from 1973 to 2023, the analysis focuses on two main indicators, which reflect the dual role of the dollar as a store of value and unit of account in global markets: the dollar's share in international reserves and its share in international debt securities. The econometric analysis was conducted using linear regressions after applying a logit transformation to the dependent variables. The results show that dollar dominance has been remarkably resilient, despite the economic and geopolitical events that could have undermined its international position by giving space for alternative currencies to raise. The effects on the dollar of major historical events such as global financial crisis and the introduction of the euro were found to be merely temporary. Interestingly, shocks tend to fade more quickly in debt markets than in reserves, suggesting that the dollar's role as a store of value remains more entrenched. Additionally, both functions display strong persistence, while macroeconomic fundamentals such as fiscal and external balances exert only limited influence. Overall, the findings underscore the structural resilience of the dollar's dominance and raise questions for future research on geopolitics, the renminbi, and digital currencies.

Key-words: International monetary system, dollar's international role, linear regressions, step dummies, impulse dummies, optimal dummies.

JEL Classification: F31, F33.

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1. Introduction

The collapse of the Bretton Woods system in the early 1970s started a new era for the international monetary system, characterized by flexible exchange rates and growing capital mobility. Nevertheless, the U.S. dollar has retained its dominant position in the three functions of currency use: store of value, medium of exchange, and unit of account. This phenomenon is often called the dollar's "exorbitant privilege", in the sense that it generates significant benefits for the United States, such as lower borrowing costs and enhanced geopolitical leverage, while imposing asymmetries on other economies. This concept will be further discussed in the literature review. This feature of U.S. currency was formally cemented by the Bretton Woods system in the aftermath of the second World War, but somehow it subsisted even after the collapse of that system, thus raising a central question for international macroeconomics and political economy: *What explains the resilience of the U.S. dollar's international role since the end of Bretton Woods?* Indeed, the dollar dominated financial assets remained the most important component in the composition of international reserves and the denomination of global debt securities. Thus, the fluctuation of the dollar value directly affects financial stability and the transmission of monetary policy across borders. The understanding of the determinants of dollar resilience helps understanding why the prospects for reforms in the international monetary system – whether through an increasing role of other potential alternatives such as the euro, the renminbi, or new forms of digital currencies – have not yet materialized. Our main objective with this work is to analyze if, despite major economic and geopolitical events affecting the U.S. dollar, the effects were temporary or not. If they are found to be temporary, we can state that the dollar's position remains unbreakable.

The persistence of the U.S. dollar dominance has been widely discussed in the literature. Eichengreen et al. (2018) emphasizes path dependence and network externalities: once a currency is widely used, the cost of switching becomes high, reinforcing incumbency. Chinn and Frankel (2007) show that relative macroeconomic fundamentals, particularly inflation and fiscal stability, play an important role in shaping reserve currency shares. Obstfeld and Zhou (2023) highlight the importance of U.S. safe assets – deep and liquid Treasury markets – in sustaining dollar demand. Other authors, including Cohen (2015), stress the geopolitical foundations of monetary leadership. Much sooner Triffin (1960) famously warned that persistent U.S. deficits, while supplying global liquidity, could ultimately undermine confidence in the dollar. This raises an interesting question: *Is persistent current account deficits a necessary condition for a currency to have a pivotal role in the international financial system? If so, what would be the maximum external debt threshold that would be allowed without jeopardizing the international confidence in the currency?* We will not go deeper into this question, but we will keep it in mind for future research.

This dissertation addresses the research question using an annual dataset covering the period 1973–2023. The analysis focuses on two dependent variables: (i) the share of the U.S. dollar in official international reserves, and (ii) the share of the U.S. dollar in international debt securities. Together, these indicators capture the dollar's dual role as a store of value for central banks and as a unit of account in global capital markets. To ensure comparability, all data were adjusted to constant 2024 exchange rates and transformed using a logit specification.

Explanatory variables include a set of macroeconomic differentials between the United States and other major economies (Euro Area, United Kingdom, Japan, and China), covering inflation, growth, fiscal and external balances, bond yields, unemployment, and military expenditure. In addition, dummy variables were constructed to capture the effects of major historical events, such as the Plaza Accord, the Asian financial crisis, the introduction of the Euro, China's WTO accession, the 2008 financial crisis, and the Covid-19 pandemic.

Methodologically, the study applies linear regressions with lagged dependent variables to capture persistence and network effects, alongside Engle–Granger cointegration tests to ensure long-run validity. Step and impulse dummies are used to capture the duration and intensity of shocks, with their optimal length determined empirically. Robustness checks include alternative dummy specifications.

The empirical analysis yields several important results. First, the regressions confirm the persistence of the U.S. dollar dominance, with lagged dependent variables consistently positive and highly significant. Second, some macroeconomic fundamentals, particularly fiscal and external balances, emerge as significant determinants of dollar shares, while other indicators play a limited role. Third, the effects of major historical shocks are heterogeneous: crises such as the 2008 financial crisis and the Covid-19 pandemic temporarily reduced the dollar's share in reserves, while episodes like the Asian financial crisis reinforced its role as a safe haven. By contrast, the euro's introduction had no significant effect, underscoring the structural barriers to its internationalization. Overall, the findings suggest that the dollar's role is both resilient and conditional: resilient due to network effects and safe asset demand, but conditional on U.S. macroeconomic credibility and vulnerable to systemic crises.

This dissertation is organized as follows. Section 2 provides de background and context necessary to understanding the research topic. Section 3 reviews the theoretical literature on international currency status, highlighting the debate on the dollar's exorbitant privilege. Section 4 describes the dataset, the construction of variables, and their sources, as well as it presents the econometric methodology, including the logit transformation, the treatment of non-stationary series, and the identification of historical shocks. Section 5 reports the empirical results and discusses their implications considering the literature. Finally, Section 6 concludes by summarizing the findings, discussing limitations, outlining real-world implications, and suggesting topics for future research.

2. Background and Context

The international role of the U.S. dollar has been shaped by decades of economic, political, and institutional developments, particularly following World War II. As the primary international reserve currency, the preferred currency for external debt and international loans, the most used currency in international deposits and the currency with the highest exchange turnover, the dollar has played a central role in global trade, finance, and monetary policy, influencing exchange rate regimes, capital flows, and financial stability worldwide. This chapter provides the background and context necessary to understand the elements that have contributed to the U.S. dollar's dominance. The understanding of these factors will set the foundation for a deeper analysis on the historical perspectives and academic debates that will be explored later in the literature review.

The Bretton Woods Conference in 1944 established a new system of international economic and financial relations governance for the post-war era. The United States, having emerged from WWII as a hegemonic power – reflecting its military dominance and the large dimension of its economy – had a pivotal role in the architecture of the system in which the World Bank and the International Monetary Fund were the main components (Obstfeld, 2024). These institutions were aimed to promote exchange rate stability and facilitate global economic development, based on fixed exchange rates pegged to the U.S. dollar, which was linked to gold. The system seeked to establish financial and commercial relations between the U.S., Western Europe, Canada, Japan, and Australia, and to deal with challenges such as *beggar-thy-country devaluation*[1], protectionism, unstable exchange rates, and hot money flows (Wu, 2022). The Marshall plan in 1948 further consolidated the U.S. political hegemony and contributed for prompting the dollar as the most important international currency (Eichengreen, 2011).

Under the Bretton Woods system, the other major global currencies were pegged to the U.S. dollar, which was convertible to gold at a fixed rate of $35 per ounce. The dollar became then the primary medium for international trade, investment, and reserve holdings. As a matter of fact, the U.S. dollar accounted for about 85% of foreign direct investment between 1945 and 1980 (Jones, 2005, as cited in Eichengreen, 2011), and by the early 1960s, approximately 70% of global foreign exchange reserves were held in U.S. dollars (Eichengreen et al., 2018). Additionally, the new institutions – the IMF and the World Bank – further reinforced the dollar's dominance by facilitating global financial stability under a dollar-based framework (Costigan et al., 2017). The authors state that during the 1950s and 1960s, the United States' economic, political and military supremacy, combined with the control over the world's largest gold reserves, ensured that the dollar remained the centre of international finance. Nevertheless, by the second half of the sixties some inflationary tensions had

[1] A term used to describe harmful domestic devaluations that end up damaging the implementing country itself rather than aiding its recovery or competitiveness.

begun to emerge, forcing exchange rates realignments (Ocampo, 2017). Additionally, the Vietnam War (1959-1975) forced the U.S. to undertake substantial military expenditures, leading to large fiscal deficits and inflationary pressures (Eichengreen, 2011). As the U.S. printed more dollars to finance the war, trade imbalances worsened, and confidence in the U.S. dollar began to erode. The rising fiscal pressures caused gold outflows, with foreign countries exchanging dollars for gold, depleting U.S. reserves. This situation led U.S. President Richard Nixon to suspend the dollar's convertibility into gold in 1971, an event known as the Nixon Shock, effectively marking the collapse of the Bretton Woods system (Eichengreen, 2011). In 1973, the abandonment of the fixed exchange rate regime represented the final blow to the Bretton Woods System and, consequently, the dollar ceased, at least formally, to be the anchor of the international monetary system (Ocampo, 2017).

Nevertheless, in the absence of a viable alternative, the dollar retained its dominance, despite a series of significant global events that could have potentially undermined its prominence. Notably, the introduction of the euro in 1999, given the economic dimension of the Euro Area, created some expectations that this new currency could become a competitor. But, as matter of fact, there was an increase in the share of international reserves denominated in U.S. dollars, rising from 59% in 1995 to 71% in 1999, while the euro accounted for only 18% of total allocated reserves at the time (International Monetary Fund [IMF], 2024). Although the introduction of the euro contributed to a diversification of global reserves, its highest recorded share peaked at 28% in 2009 (IMF, 2024). By 2023, the dollar still maintained a dominant position at 58% of allocated reserves, while the euro remained at 20% (IMF, 2024). These values translate the euro's inability to make a decisive leap toward challenging the dollar's global supremacy. Part of the explanation lies in the structural weaknesses inherent in the European monetary and fiscal framework. Unlike the United States, which benefits from a unified monetary and fiscal system under the Federal Government, the Eurozone – despite being covered by a monetary authority, the European Central Bank – lacks a centralized fiscal authority. This institutional asymmetry created fragilities that became evident during the 2008 sovereign debt crisis, when the absence of coordinated fiscal policies hindered effective crisis management and economic recovery. Beyond the euro, no other major international currency has come close to surpassing the U.S. dollar in key dimensions of global finance, namely international reserves, cross-border loans, international deposits, and foreign exchange turnover. Figure 2.1 joins a set of key indicators that capture the global relevance of currencies – international reserves, international loans, international debt, and foreign exchange turnover – for the five major international currencies – the U.S. dollar, the euro, the British pound, the Japanese yen and the Chinese renminbi. It illustrates the extent to which the dollar remains deeply entrenched in the international monetary system, serving not only as a store of value but also as a medium of exchange and a unit of account across diverse financial markets. Except for the period between 2004 and 2013, during which the euro temporarily

surpassed the dollar in international debt issuance, the U.S. dollar has maintained its leading role since 1973. Its predominance in international reserves signals enduring investor confidence; its centrality in international lending highlights its status as a global creditor; its widespread use in debt issuance, aside from the euro's temporary lead, reflects its perceived stability and broad acceptance; and its overwhelming share in foreign exchange turnover confirms its role as the principal medium of exchange in global markets.

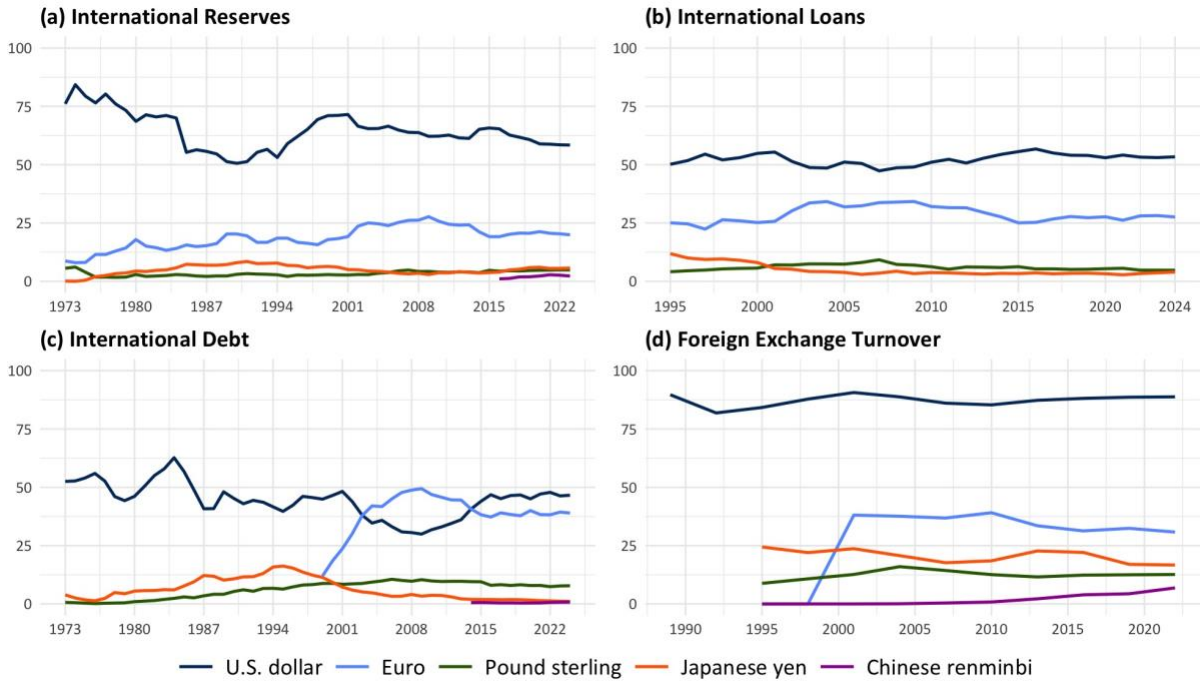

Figure 2.1 – Evolution of the Share of the Five Major Currencies Across Four Indicators of International Currency Use

Source: BIS, IMF and author's calculations.

Note: Each series represents the share of the respective currency relative to the total across all currencies for the given indicator. For the International Reserves indicator, the euro series includes a proxy based on the sum of the Deutsche mark, the French franc and the Netherlands guilder from 1973 to 1998. In the case of Foreign Exchange Turnover, data reported by the Bank for International Settlements (BIS) sum to 200% due to the bilateral nature of FX transactions (each involving two currencies); however, only the shares of the five major international currencies are presented. To ensure consistency and facilitate comparison across indicators, the Y-axis is standardized to a maximum value of 100%.

In conclusion, the post-Bretton Woods system has been characterized by a prominent role of the U.S. dollar as a store of value, a medium of exchange and a unit of account. This enduring dominance is possible due to the economic and political stability of the United States which fosters investor's confidence, by network externalities resulting from the widespread use of the dollar in global trade and finance, and by the U.S. monetary policy's influence globally, as changes in U.S. interest rates influence capital flows and economic conditions worldwide. Together, these factors reinforce the dollar's central role in the global financial system.

3. Literature Review

3.1. The Concept of the Exorbitant Privilege

This research seeks to answer a critical question: *What explains the resilience of the exorbitant privilege of the dollar after the Bretton-Woods collapse?* To approach this, we must first break down the privilege itself – *What are the several dimensions of the exorbitant privilege of the dollar?* This literature review begins by addressing this question, exploring the benefits this privilege grants the U.S., including economic and financial advantages, and its implications for the global economy.

The "exorbitant privilege" is a concept that has been widely discussed since the 1960s. In a press conference in Paris, on February 4, 1965, General Charles de Gaulle criticized the special status of the U.S. dollar under the Bretton Woods system, arguing that the widespread acceptance of dollars as equivalent to gold allowed the United States to accumulate debt without significant cost. By issuing dollars at will, the U.S. could finance its external deficits with minimal constraints. De Gaulle affirmed that this unique advantage fostered the perception of the dollar as an impartial international medium of exchange. Following this statement, French Finance Minister Valéry Giscard d'Estaing famously referred to this monetary dominance as an *exorbitant privilege*, a term that has since become central to debates on the dollar's global role (UN.ESCAP, 2012).

According to Meyermans (2022), the exorbitant privilege consists of the exclusive benefits a country holds due to its currency's dominant international status. Some of the benefits mentioned by the author are the ability of the issuing country to finance external deficits with low constraints, by issuing debt in its own currency, reducing the risk of balance of payment crisis. Additionally, the global demand for its currency enables it to borrow at low interest rates due to the perception of its assets as safe and liquid. Another key advantage is the "excess return" on external assets, as the country earns higher returns on foreign investments while paying lower yields on its own debt, mostly held by foreign governments and institutions, resulting in a positive income balance. To maintain this privilege, Meyermans (2022) points out five essential characteristics: 1) a high demand for the currency, 2) deep and liquid financial markets, particularly for government securities, which create a liquidity premium that lowers borrowing costs, 3) economic power and international trade influence that enable the extensive use of the currency, 4) low and stable inflation that ensures trust in the currency's long-term value, 5) fiscal and debt sustainability, ensuring confidence in the country's economic and political stability. Waller (2024) further emphasizes the benefits for the United States such as lower transaction and borrowing costs for U.S. economic agents, expanding a pool of investors and creditors and reducing the impact from worldwide economic shocks. However, the author attributes these advantages to the size and strength of the U.S. economy, its stability and openness to trade and capital flows, and strong property rights and rule of law. Eichengreen (2011) believes that the capacity of a currency to be the

most used in international transactions, to set prices of exports in the same currency, to denominate debt securities of other countries in that same currency, are characteristics that translate the exorbitant privilege, and the country that holds this privilege is a country that has extensive international trade and financial links, with mature financial markets, which is the case of the United States. Despite these benefits, Meyermans (2022) warns that the exorbitant privilege can also become an *exorbitant duty* in times of global stress. In such situations, the issuing country is expected to supply its currency as international lender of last resort, while addressing moral hazard risks. Besides this, it may also turn into an *exorbitant risk*, as a rapid sell-off of assets priced in the global currency, sparked by a decline in confidence in the currency, could have major economic consequences. Another important aspect to consider is the broader benefits that the exorbitant privilege provides the rest of the world. As Waller (2024) notes, a dominant international currency offers stability and reliability for global trade, reduces transaction costs for households and businesses, and facilitates cross-border payments by acting as a common denominator and dependable settlement instrument. (Wu, 2022) also states that the *dollarization* [2] allows for a commitment to financial transparency, fiscal responsibility, and low inflation, improving its reputation, and for low borrowing interest rates.

The three dimensions of the exorbitant privilege of the dollar as mentioned by Waller (2024) are its use as a medium of exchange, a store of value, and a unit of account. As a medium of exchange, the dollar remains the major player in global transactions, being the most used currency for trade invoicing, global banking, international debt issuance, and foreign exchange transactions. As a matter of fact, the U.S. dollar is used in approximately 88% of all foreign exchange transactions, and more than 40% of global payments are conducted in dollars, underscoring its importance in international trade (Bank for International Settlements [BIS], 2022). As a store of value, the dollar is the primary global reserve currency held by central banks and investors, accounting for nearly 60% of global reserves reported to the IMF (2024), and this status is reinforced during periods of global instability, such as the 2008 financial crisis and the Covid-19 pandemic, due to the dollar's status as a *safe haven* currency (Waller, 2024; Rao, 2024). Lastly, as a unit of account, the dollar serves as the standard for pricing commodities, international contracts, and financial assets (Waller, 2024), and companies worldwide often invoice in dollars as countries accept dollar payments (Rao, 2024), ensuring consistency and reducing currency risk in global trade and investment. Nevertheless, even though the U.S. dollar keeps its dominance position, challenges from other currencies like the euro and renminbi are emerging (Waller, 2024) and will be discussed later in this chapter.

[2] The process of aligning a country's currency with the dollar.

3.2. Historical Perspectives on the Role of the Dollar

Now that the reader is familiar with the concept of exorbitant privilege and its multiple dimensions, this section examines the historical evolution of the dollar's dominance in the international monetary system, particularly after Bretton Woods. It highlights how this privileged status was established and why it was never guaranteed.

Contrary to what was predicted at the time, the collapse of the Bretton Woods system, rather than weakening the role of the U.S. dollar, solidified its position as the dominant global currency, introducing the global dollar standard (Ocampo, 2017). According to the author, this was largely driven by the absence of feasible alternatives, as many currencies were anchored to the dollar even before the system's break down. Following the collapse, several Asian economies, including China, Singapore, and Indonesia, officially pegged their currencies to the dollar, reinforcing its central role in global trade and finance, that was further supported by its continued function as the world's primary unit of account (Mundell, 1973, as cited in Ocampo, 2017). Additionally, this shift helped address a key issue under the Bretton Woods system: the Triffin dilemma, a concept introduced in 1960 by the economist Robert Triffin in his book *Gold and the dollar crisis: The future of convertibility.* Under the Bretton Woods system, the U.S. was required to supply dollars to the rest of the world to meet global demand for reserves, creating the need for persistent current account deficits. However, these deficits gradually undermined confidence in the dollar's convertibility into gold, creating an unsustainable dynamic (Triffin, 1960). With the change to floating exchange rates, the dollar was no longer tied to gold, and countries were less dependent on U.S. reserves to stabilize their exchange rates. As a result, the provision of global liquidity became less constrained by U.S. external balances, reducing the systemic pressure originally identified by Triffin. Ocampo (2017) also noted that the dominance of dollar-denominated loans in global finance strengthened the U.S.'s control over international monetary institutions, and that geopolitical and economic strategies, such as the proposed Free Trade Area of the Americas (ALCA), helped reinforce U.S. influence through trade and financial agreements. Finally, the dollar's ability to provide global safe assets, the backup of several institutions, and its widespread use in trade and financial markets enabled it to emerge as the keystone of the modern international financial system after the end of the Bretton Woods (Ocampo, 2017).

Two important mechanisms that helped further consolidating the dollar's role internationally were the offshore dollar markets and the petrodollar system. Offshore dollar markets allowed banks outside the U.S. to hold and trade dollar deposits beyond the reach of U.S. banking regulations, providing an alternative and highly efficient source of international liquidity (Murau, 2018). The collapse of the Bretton Woods system contributed to this development by triggering increasing financial market integration and the liberalization of capital controls, which enabled the rapid expansion of offshore dollar markets, particularly the Eurodollar market (Helleiner, 1994; Ocampo, 2017). This expansion

facilitated the creation of dollar-denominated credit by both U.S. and non-U.S. financial institutions, further integrating the dollar into global financial networks and consolidating its role as the world's primary reserve and trade currency (Murau, 2018). Meanwhile, the petrodollar system, an arrangement established in 1973 between the Nixon administration and Saudi Arabia, ensured that all Saudi oil exports would be priced exclusively in U.S. dollars, creating an artificial demand for the currency, as countries that needed to purchase oil had to first acquire dollars (Salameh, 2015). Additionally, oil-exporting nations were encouraged to invest their surplus oil revenues in U.S. debt securities, further boosting the dollar's global role (Salameh, 2015). This system not only kept the dollar's status as the world's reserve currency but also allowed the U.S. to finance its deficits and sustain its economic hegemony by leveraging the global oil market.

Finally, another important outcome of the end of the Bretton Woods system was a shift to a less regulated and more flexible global monetary order. Under floating exchange rates, currencies became more volatile and dependent on market forces, which resulted in greater instability and higher financial speculations.

3.3. Key Events Shaping the Dollar's International Role Post-Bretton Woods

In this subchapter, we will go through the most important events that impacted the power of the dollar, either reinforcing it or threatening it. By examining these historical perspectives, we gain valuable insight into how the dollar's dominance has been reinforced and challenged over time.

A first important event following the collapse of the Bretton Woods system occurred on September 22, 1985, when the G-5[3] nations signed an agreement called the Plaza Accord, to intervene in currency markets to depreciate the overvalued U.S. dollar. At that time, the U.S. was having persistent and significative deficit in its current account, particularly with Japan, and this agreement was a way to force a revaluation of the yen vis-à-vis the dollar. Indeed, as remarked by Frankel (2015), between 1980 and 1985, the dollar had appreciated by 44% against other major currencies, contributing to a record U.S. trade deficit of $122 billion. According to the author, the 1985 accord successfully triggered a 40% depreciation of the dollar by 1987, yielding two significant outcomes: 1) It helped improve the U.S. trade balance by making exports cheaper and imports more expensive, 2) It reshaped international currency cooperation, leading to the formation of the G-7[4] Finance Ministers group, which has since played a key role in coordinating global economic policies. Frankel (2015) concludes that despite the dollar's short-term decline, the agreement did not undermine its position as the world's leading reserve

[3] In 1985, the G-5 was composed of the United States, Japan, West Germany, France and the United Kingdom.
[4] The G-7 was composed of G-5 nations plus Italy and Canada.

currency. On the contrary, it highlighted the U.S.'s ability to strategically leverage exchange rate interventions to shape global financial markets when necessary.

The creation of the World Trade Organization (WTO) on January 1, 1995, marked a pivotal moment in global economic governance and played an indirect yet significant role in reinforcing the dominance of the U.S. dollar in international trade and finance. By institutionalizing global trade liberalization and accelerating financial integration, the WTO fostered an environment of openness, predictability, and reduced tariff barriers, thereby boosting confidence in cross-border economic activity (Czinkota & Zeneli, 2016). This rules-based trading system contributed to a sharp increase in global trade volumes and capital mobility, which, in turn, amplified demand for the dollar as both a transactional and reserve currency. Key WTO agreements, such as the General Agreement on Trade in Services (GATS) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), further standardized and liberalized international commerce, reinforcing the preference for the dollar due to its stability, liquidity, and widespread acceptance (Rao, 2024; Costigan et al., 2017; Palley, 2022). Additionally, the WTO's dispute settlement mechanism contributed to preserving trust in international transactions, many of which were denominated in dollars, by providing a formal structure to resolve trade conflicts (Costigan et al., 2017; Palley, 2022). Nevertheless, China's WTO accession in 2001 accelerated its integration into the global economy, leading to a gradual shift in the international monetary system and increasing the prominence of the renminbi as a potential rival to the U.S. dollar. Altogether, the WTO's framework supported and institutionalized conditions favourable to dollar hegemony in the post-1995 global economy.

The Asian Financial Crisis, which began in September 1997, marked a period of global economic instability and had a great impact on the international role of the U.S. dollar by reinforcing its dominance as a safe haven currency. As capital rapidly flowed out of crisis-hit Asian economies, investors redirected funds into the United States in search of stability and security (Wincoop & Yi, 2000). This shift underscored the U.S.'s position as a primary destination for global capital during periods of uncertainty and further cemented the U.S. dollar's role in the international monetary system. Moreover, the dollar appreciated against several Asian currencies during the crisis, reflecting both its perceived strength and sustained global demand (Wincoop & Yi, 2000).

The next key event was the launch of the euro on January 1, 1999. The launch of the euro introduced a credible competitor to the dollar, leading to a slight diversification of reserves and international transactions. Nevertheless, the structural, institutional, and geopolitical dominance of the U.S. continues to underpin the dollar's primary role in the international monetary system (Eichengreen et al. 2018; Frankel, 2023; Waller, 2024). We will further develop this topic in the next section.

The most paradoxical event was the Great Recession, triggered by the collapse of Lehman Brothers on September 15, 2008. Although the crisis originated in the heart of the U.S.'s financial system, it did not weaken the dollar's global position. Instead, as Vasudevan (2009) explains, the dollar reasserted itself as "international money". According to the author, investors moved their assets into U.S. Treasury securities looking for safety and liquidity, even accepting negative returns, highlighting the dollar's unrivalled status as the safest and most liquid asset in global markets. Besides that, the global deleveraging process and the breakdown of credit chains triggered a scramble for cash in the form of U.S. dollars, translating the dollar's centrality in times of systemic stress (Vasudevan, 2009). This crisis revealed a fundamental contradiction: while the financial system that supported dollar hegemony was deeply destabilized, demand for the dollar surged, reinforcing the asymmetric privilege of the United States as a global reserve currency even when being the epicentre of the crisis.

The three quantitative easing (QE) policies enacted by the Federal Reserve in 2008 (QE1), 2010 (QE2), and 2012 (QE3) significantly influenced the global financial system and reinforced U.S. dollar hegemony. QE1, implemented following the 2008 financial crisis, focused on market repair through large-scale purchases of mortgage-backed securities and Treasury securities, leading to an appreciation of the U.S. dollar as investors reallocated capital out of emerging markets (EMEs) and into U.S. assets (Fratzscher et al., 2013). This portfolio rebalancing affirmed the U.S. as a financial safe haven and the dollar as a central currency in global markets. In contrast, the 2010 QE2 shifted toward Treasury purchases to stimulate domestic demand, resulting in dollar depreciation and renewed capital flows into EMEs (Fratzscher et al., 2013). This expansion of U.S. dollar liquidity intensified the dollar's role in global credit creation and carry trade activities. QE3 in 2012 continued the asset purchases, further enhancing global liquidity and confirming the dollar's dominance in international finance through its spillover effects on asset prices and cross-border flows (Fratzscher et al., 2013). Overall, these rounds of QE revealed how U.S. monetary policy influences capital reallocation worldwide, particularly via the dollar's role in global portfolios, and reinforces the dollar's hegemonic position in international finance.

The last shock we will mention is the Covid-19 pandemic. Its onsets triggered a spike in market uncertainty, prompting investors to turn to the U.S. dollar as a safe haven asset. This increased demand led to significant fluctuations in the USD/RMB exchange rate, reflecting broader market volatility (Li, 2023). Additionally, the dollar's role as a reserve currency was further cemented as central banks worldwide continued to hold substantial dollar reserves, despite ongoing discussions about de-dollarization. Overall, the impact of this crisis in the international role of the dollar was not fundamentally different from that of the 2008 global financial crisis: in both cases, the dollar maintained and even strengthened its dominant position in the global financial system.

In conclusion, the major global financial events examined in this section have not undermined the international role of the U.S. dollar. On the contrary, they have often reinforced its position as the dominant global currency by highlighting its stability, liquidity, and centrality in global financial markets.

3.4. Competing Currencies: Euro, Chinese Renminbi, and Cryptocurrencies

This section will focus on the principal competitors of the U.S. dollar's international role, namely the euro, the Chinese renminbi, and cryptocurrencies. To assess the extent to which these alternatives challenge the dollar's hegemonic power, the discussion is structured around three guiding questions: (1) *Does China and the renminbi menace the international role of the dollar?* (2) *Did the emergence of the euro reduce the dollar's international importance?* (3) *Do cryptocurrencies pose a threat to the dollar's dominance?*

The most important topic nowadays regarding the dollar's hegemonic power is the rise of the international use of the renminbi. China's rapid economic growth, its increasing share of global trade, and its rising geopolitical influence have led to discussions about the potential for the renminbi to challenge the dollar's dominance (Cao, 2023; Prasad, 2014). Despite the Chinese government's active efforts to promote the internationalization of the renminbi, most scholars do not believe it will replace the U.S. dollar as the global reserve currency soon. According to Eichengreen et al. (2018), since 2010, China has promoted the use of the renminbi in cross-border trade by allowing firms to settle international transactions in its currency. By 2015, 25% of China's trade was conducted in renminbi, making it the second most-used currency in global trade finance. To support this, China established renminbi clearing banks in major financial centres and signed currency swap agreements to boost renminbi liquidity abroad (Eichengreen et al., 2018). Additionally, the Belt and Road Initiative (BRI), combined with China's foreign direct investment projects and creation of development institutions like the Asian Infrastructure Investment Bank (AIIB), are also part of its renminbi strategy (Costigan et al., 2017). Another way that China is trying to expand the use of the yuan is through the digital RMB. The digitalization of the currency may enhance its role not only as a global store of value and reserve asset, but also as a medium of exchange in international payments (Brunnermeier et al., 2021, as cited in Huang & Mayer, 2022). The main objective of this digitalization is to enhance cross-border payment systems and establish exchange frameworks and regulatory collaboration with international central banks and monetary authorities (PBOC, 2021, as cited in Huang & Mayer, 2022). Choyleva (as cited in Huang & Mayer, 2022) argues that if the digital RMB becomes widely used it may help reduce China's dependence on the dollar-centric global financial framework and to contest the preeminent status of the dollar, a strategic objective that has long been pursued by the Chinese leadership. Despite these efforts, the currency faces deep constraints. Frankel (2023) believes that although the renminbi has two of the three necessary conditions to be a leading international currency – economic size and the

ability to keep its value – it lacks the third one which is deep, liquid and open financial markets. The author also argues that key political institutions such as a democratic form of government, a free and open media, and an independent central bank, are essential conditions for issuing a leading international currency. In this regard, China falls short, as it lacks these institutional foundations. Furthermore, the symbolic agreements to use renminbi in bilateral trade often have limited practical impact due to the lack of convertibility and global liquidity in renminbi markets. For instance, despite agreements with countries like Brazil, settlements continue to be largely conducted in dollars (Eichengreen, 2011). Another important aspect to consider is the geopolitical tensions between the U.S. and China. As mentioned by Costigan et al. (2017), U.S. sanctions and the use of the dollar in financial warfare have accelerated China's de-dollarization efforts. Besides that, China has settled energy deals with Russia and Brazil in local currencies and established the Cross-Border Interbank Payment System (CIPS) as an alternative to SWIFT. However, these remain marginal in scale and are often symbolic rather than transformative. In conclusion, while the renminbi has the potential to challenge the U.S. dollar's dominance as the global reserve currency, it is unlikely to replace the dollar soon, but it is likely to play an increasingly important role in the global monetary system, particularly in Asia, and could potentially become a major reserve currency in the long term.

Another currency that may be a potential competitor of the U.S. dollar is the euro. The emergence of the euro in 1999 as the successor to eleven European currencies marked a significant development in the international monetary system, introducing for the first time in decades a plausible competitor to the U.S. dollar. However, the euro quickly assumed a secondary role in global finance, being unable to undermine the dollar's primacy. In the early 2000s, the euro established itself as a significant international currency, gaining traction in trade invoicing, debt issuance, and reserve holdings. However, the onset of the global financial crisis and the subsequent eurozone sovereign debt crisis raised concerns about the fiscal sustainability of several member states and doubts over the long-term viability of the euro, leading to a sharp decline of the euro's international role (Maggiori et al., 2020). In the meantime, there was a marked resurgence in the demand for dollar-denominated securities, particularly among emerging market economies, reflecting a preference for the perceived safety, liquidity, and stability of U.S. dollar assets (Eichengreen et al., 2018). Besides this, the share of the euro in global FX turnover is relatively low, partly because the creation of the euro eliminated currency trading among the former European currencies, and due to the euro's post-2014 depreciation against the dollar (Eichengreen et al., 2018). The euro's rise was not possible due to structural weaknesses, including fragmented financial oversight in the eurozone and the sovereign debt crisis post-2009, which reduced investor confidence and widened the gap between the euro and the dollar in global usage. Nonetheless, the euro's emergence challenged the notion that international currency status is a

“natural monopoly.” Its sustained, though second-place, role suggests a more multipolar currency system is possible (Eichengreen et al., 2018).

Cryptocurrencies have sparked significant debate about their capacity to reshape the global monetary system and to challenge the U.S. dollar’s dominance. The rise of cryptocurrencies and Central Bank Digital Currencies (CBDCs) introduces new avenues for states to exercise or reclaim monetary sovereignty. As mentioned before, China’s digital RMB is designed to enhance monetary control and promote the internationalization of the RMB without fully liberalizing its capital account, but the U.S. has taken a more cautious regulatory approach, largely due to its entrenched position within the global financial infrastructure and the dollar’s role as a reserve currency (Huang & Mayer, 2022). Stablecoins, which are cryptocurrencies pegged to the value of traditional currencies like the U.S. dollar, have emerged as a significant player in the digital asset space. Azzimonti & Quadrini (2024) believe that these instruments could either strengthen or weaken the dollar’s dominance, depending on their design and adoption. If stablecoins are backed by dollar-denominated assets, they may increase demand for U.S. government debt as a reserve asset, reinforcing the dollar’s global role. Conversely, if they are backed by non-dollar assets, stablecoins can function as substitutes for U.S. government debt, reducing reliance on the dollar. Another important aspect of cryptocurrencies is that they can be seen as hedging instruments within their central bank reserves to countries that are vulnerable to U.S. sanctions. Ferranti (as cited in Frankel, 2023) finds that these assets may acquire long-term value since they are difficult for U.S. authorities to freeze, which justifies why some countries hold cryptocurrencies in their portfolios, despite lack of stability and liquidity of conventional reserve assets. Nevertheless, Waller (2024) believes that while CBDCs and stablecoins may serve niche or regional roles, they currently lack the institutional backing and liquidity to rival the dollar’s full spectrum of functions—namely, store of value, unit of account, and medium of exchange. Summing up, there is a general academic believe that cryptocurrencies are unlikely to dethrone the U.S. dollar in the short term. However, their increasing adoption coupled with geopolitical realignments and digital monetary innovations, may gradually reshape the global monetary power. Policymakers must be aware of these developments and strengthen financial governance frameworks to safeguard systemic stability and preserve strategic autonomy.

In conclusion, the potential erosion of dollar dominance depends not only on the technological viability of cryptocurrencies or CBDCs but also on broader systemic factors, which include trust in institutions, legal protections, political stability, and military power. Frankel (2023) believes that while the dollar continues to benefit from a lack of credible alternatives, persistent U.S. political dysfunction and overuse of financial sanctions could prompt gradual diversification in reserve holdings, making space for competitors such as the renminbi, the euro and the cryptocurrencies.

3.5. Structural Consequences of Dollar Dominance in the Post-Bretton Woods System

To finalize the literature review, now that we have covered the historical events that cemented the U.S. dollar's international role, it is also important to understand the enduring structural consequences of this dominance, particularly in the context of the post-Bretton Woods monetary order. In a highly globalized world, characterized by deep financial integration and global capital markets, it is important to understand the influence the United States's domestic monetary policy helds over the international economic panorama. This influence is a direct consequence of the dollar's exorbitant privilege, as the U.S.'s interest rate decisions have strong spillover effects in other countries' output, financial stability, and even fiscal policy. This action can trigger capital outflows, currency depreciations, and higher borrowing costs in emerging and developing economies, many of which have no other choice but to tighten their own monetary policy, regardless of their domestic economic conditions. This section explores this structural imbalance, connecting it to broader debates on monetary sovereignty, international policy coordination, and the need for reform in global economic governance. The three papers by Iacoviello and Navarro (2018), Arteta et al. (2022), and Caceres et al. (2016) provide robust empirical evidence of the international consequences of the exorbitant privilege and collectively demonstrate how U.S. monetary policy decisions impact the global economy, constraining the policy space of other sovereign states.

Iacoviello and Navarro (2018) demonstrate that a 100-basis point increase in the U.S. interest rates reduces the GDP of emerging markets by 0.8% and of advanced economies by 0.5%, values close to the 0.7% decline of U.S. output. According to the authors, for advanced economies, the transmission mainly occurs through standard trade and exchange rate channels, where countries more exposed to U.S. trade or with currencies pegged to the U.S. dollar have stronger declines. In contrast, in emerging markets, a vulnerability index combining the country's current account, foreign reserves, inflation, and external debt, and that captures a country's financial fragility, explains the differences across economies. Caceres et al. (2016) also state that, on average, short-term domestic interest rates respond modestly to changes in U.S. rates on average, while most countries' long-term interest rates move closely with U.S. rates, especially when shocks are unanticipated. The authors find that a higher share of the co-movement in interest rates is due to spillovers from the U.S. monetary policy, even when the domestic conditions wouldn't justify such changes, translating the limited monetary policy autonomy in most countries. This lack of independence is most accentuated in countries with rigid exchange rates, high levels of financial dollarization, or weak institutional credibility, resulting in a global environment in which U.S. financial conditions become effectively global financial conditions, irrespective of the domestic needs of other economies (Caceres et al., 2016). Another important aspect mentioned by Arteta et al. (2022) is the source of the shock. The authors specify three types of monetary shocks: those driven by inflation, by real economic activity, or by changes in the Federal Reserve's policy –

reaction shocks. They found that the reaction shocks are the most harmful, especially for emerging economies, as they raise bond yields and risk spreads, depress equity prices, trigger capital outflows, and increase the probability of financial crisis more than any other shock. Once again, this reflects how vulnerable dollar-exposed countries are, particularly those with exchange rate pegs or a high portion of dollar-denominated debt and trade. In such environments, domestic monetary policy becomes a reactive tool, used not for internal stabilization but for damage control in the face of external shocks (Arteta et al., 2022).

Although the United States retains disproportionate monetary influence through global financial channels, this dominance contrasts with an important geopolitical shift. As illustrated in Figure 3.1, the G7's share of world GDP has steadily declined across all measurement standards – current dollars, constant dollars, and purchasing power parity (PPP) – with similar downward trends for both the U.S. and the Euro Area. These structural shifts suggest a relative redistribution of economic weight toward emerging markets, particularly Asia. While the dollar continues to serve as the world's anchor currency, the long-run sustainability of this role may come under pressure if global output becomes increasingly decoupled from U.S.-centric financial architecture. In this context, geopolitical and institutional asymmetries may accentuate calls for alternative monetary poles, even if no rival currently matches the dollar's liquidity, safety, and institutional backing.

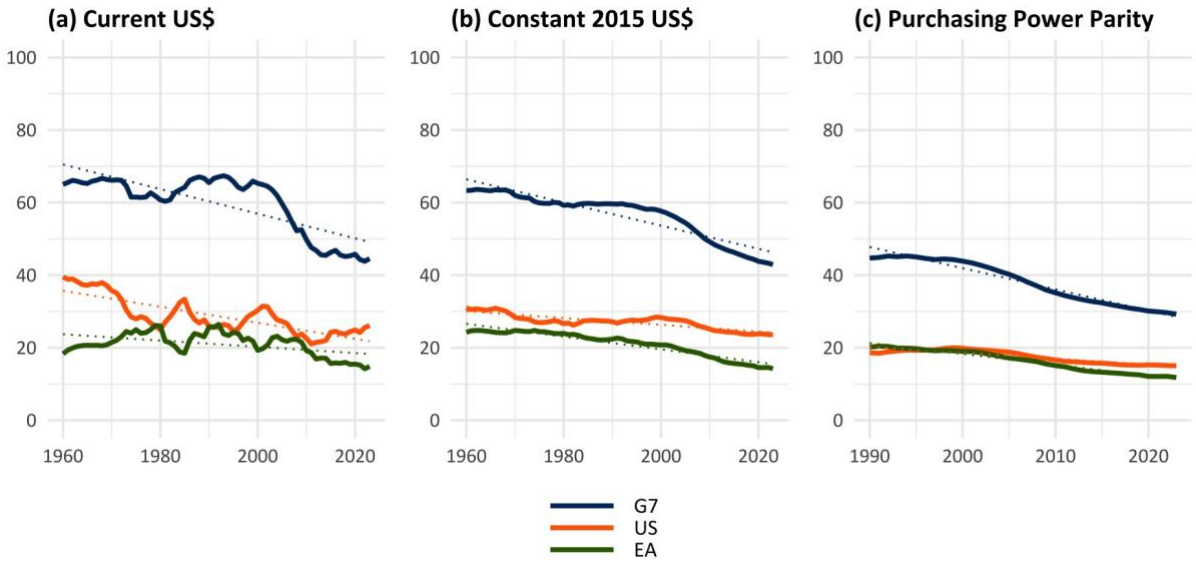

Figure 3.1 – Shares of G7, U.S. and Euro Area in World GDP

Source: World Bank and author's calculations.
Note: The G7 includes Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. The PPP series starts in 1990 due to data availability. Shares are shown as percentages of World GDP.

In summary, the exorbitant privilege of the U.S. dollar in the post-Bretton Woods era is sustained not only by financial dominance, but also by profound structural asymmetries in power, policy autonomy, and institutional accountability. The current global monetary system enables the United States to pursue domestic objectives with extensive international consequences, while the economic, political and social adjustment costs are disproportionately carried by other countries, particularly emerging and developing economies. Addressing this imbalance requires stronger multilateral surveillance, enhanced policy coordination, and possibly new conditionality mechanisms that reflect the shared nature of monetary interdependence in a deeply integrated global economy.

3.6. Empirical Strategy and Literature Gap

The literature on the dollar's primacy and the evolution of the international monetary system combines empirical, theoretical, and historical approaches. On the quantitative side, a prominent strand employs panel econometrics with fixed effects to examine the determinants of reserve currency composition and international debt issuance, as in Eichengreen et al. (2018). Other studies rely on structural VAR models, often identified through narrative instruments, to capture the transmission of global shocks and the dollar's safe haven role, as in Georgiadis et al. (2024) and Obstfeld and Zhou (2023). The narrative approach pioneered by Romer and Romer (2023) is also widely applied to identify exogenous monetary policy shocks from qualitative sources, thereby mitigating endogeneity concerns. Complementing these econometric strategies, conceptual frameworks such as Murau (2018) Money View of offshore dollar creation, together with the historical-institutional analyses of Eichengreen (2011) and Ocampo (2017), provide the necessary theoretical and historical context. Overall, the literature integrates econometric techniques with conceptual and historical perspectives, enabling a comprehensive understanding of both the causal mechanisms and the institutional evolution of the international monetary system.

In line with the literature, the present dissertation employs two indicators capturing distinct dimensions of the dollar's exorbitant privilege as dependent variables, explanatory variables based on differentials between the United States and its peers, and event dummies to model the impact of major shocks. Despite the breadth of existing research, most studies concentrate on macroeconomic fundamentals and long-term structural drivers, devoting far less attention to the quantitative modelling of historical events. This dissertation contributes by explicitly analyzing the role of major shocks in shaping the dollar's international status, assessing whether their effects were temporary or persistent, and how they influenced the resilience of the currency.

4. Data and Methodology

This section presents the dataset and empirical methodology used to assess the impact of major historical events on the hegemonic status of the U.S. Dollar — the central objective of this work.

4.1. Data

This section presents the data used in this work, namely the definitions, units, and sources of the variables, as well as their descriptive statistics.

4.1.1. Variables: Definitions, Units, and Sources

The empirical dataset covers the period 1973–2023, with annual frequency, starting with the collapse of the Bretton Woods system.

The dependent variables are:

(i) The share of U.S. dollars in official international reserves,

(ii) The share of U.S. dollars in international debt securities.

These two indicators were chosen because they represent the main dimensions through which the international role of the U.S. dollar can be assessed: as a store of value (official reserves held by central banks) and as a financing and investment vehicle (international debt securities). Other possible measures of international currency use, such as invoicing of trade flows or turnover in foreign exchange markets, were not selected due to limited data availability and comparability over the full sample period.

Both dependent variables are measured as fractions of the five major international currencies (U.S. dollar, euro, British pound, Japanese yen, and Chinese renminbi) and are subsequently transformed using a logit specification for the econometric analysis, which will be detailed later. To ensure comparability, all values were adjusted to constant exchange rates (base year: 2024)[5].

Explanatory variables comprise macroeconomic indicators reflecting differentials between the United States and other four economies (Euro Area, United Kingdom, Japan, and China), as well as step dummy variables designed to capture the effects of major historical events on the international role of the U.S. dollar. The duration of these dummies was optimized econometrically, with details provided in the methodology section. Data were collected from several sources such as the International Monetary Fund (IMF), the Bank for International Settlements (BIS), the World Bank, the Organisation for

[5] Constant exchange rates were obtained by fixing bilateral exchange rates against the U.S. dollar at their 2024 end-of-period levels and applying them retroactively to the series. For example, the EUR/USD exchange rate was normalized to 1 in 2024, and all previous values were rescaled proportionally. This procedure eliminates valuation effects stemming from exchange rate fluctuations and isolates changes due to portfolio reallocations and new issuance.

Economic Co-operation and Development (OECD), the Stockholm International Peace Research Institute (SIPRI), the European Commission, the Federal Reserve Bank of St. Louis, and IMF annual reports. All variables are expressed at annual frequency. A comprehensive list of variables, definitions, and sources is provided in Table 4.1.

Table 4.1. Definitions, Units, and Sources of Variables

Variable	Definition	Unit / Transformation	Source
Dependent Variables			
USD share in reserves	Fraction of official FX reserves held in USD, relative to the five major international currencies	Decimal share between 0 and 1 (logit transformation applied in econometric estimation)	IMF (COFER), IMF annual reports, author's calculations
USD share in debt securities	Fraction of international debt securities denominated in USD, relative to the five major international currencies	Decimal share between 0 and 1 (logit transformation applied in econometric estimation)	BIS , author's calculations
Control Variables			
Lagged dependent variable	First-order lag of each dependent variable	Decimal share (logit-transformed for estimation)	Author's calculation
Inflation differential	U.S. inflation (GDP deflator) minus average of peers	Decimal	World Bank (WDI)
Output gap differential	U.S. output gap minus average of peers	Decimal of potential GDP	European Commission (AMECO)
Unemployment differential	U.S. unemployment rate minus average of peers	Decimal of labour force	World Bank (WDI)
10-year bond yield differential	U.S. government bond yield minus average of peers	Decimal	Federal Reserve Bank of St. Louis (FRED)
Budget balance differential	U.S. budget balance minus average of peers	Decimal of GDP	World Bank (WDI)
Government debt differential	U.S. government debt minus average of peers	Decimal of GDP	IMF (GDD)
GDP growth differential	U.S. GDP growth minus average of peers	Decimal	World Bank (WDI)
GDP trend growth differential	U.S. long-term GDP trend growth minus average of peers	Decimal	European Commission (AMECO)
Trade balance differential	U.S. trade balance minus average of peers	Decimal of GDP	World Bank (WDI)

Variable	Definition	Unit / Transformation	Source
Military expenditure coefficient	U.S. military expenditure as share of world GDP divided by the sum of the corresponding shares for the peers	Unitless ratio	Stockholm International Peace Research Institute (Milex)
Event Dummies			
Plaza Accord (1985)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
WTO creation (1995)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
Asian financial crisis (1997)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
Euro introduction (1999)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
China WTO accession (2001)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
Global financial crisis (2008)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition
Covid-19 pandemic (2020)	Step dummy = 1 from 1985 to n*	Binary (0/1)	Author's definition

Notes: All variables are expressed in decimal form. Growth rates represent year-on-year changes. Dependent variables are transformed using the logit function for econometric estimation (see Section 4.2). Peer economies are the Euro Area, United Kingdom, Japan, and China (subject to data availability). The optimal duration (n*) of each step dummy is determined econometrically, as explained in Section 4.2. For some variables, proxies were constructed. Detailed procedures and data sources are reported in Appendix A.

4.1.2. Descriptive Statistics

The descriptive statistics for the main variables, including mean, minimum, maximum, standard deviation, skewness, and kurtosis, are presented in Table 4.2, to provide an overview of the distributional properties of the dataset and to highlight potential asymmetries or outliers that may influence the regressions results.

Table 4.2. Descriptive Statistics

	Mean	Min	Max	SD	Skewness	Kurtosis
Dependent variables						
USD share in reserves	0.6672	0.5508	0.8938	0.0854	0.7914	-0.3016
USD share in debt securities	0.5265	0.2476	0.8100	0.1507	-0.1312	-0.8588
Control variables						
Inflation differential	-0.0052	-0.0529	0.0365	0.0173	-0.3473	0.3441

	Mean	Min	Max	SD	Skewness	Kurtosis
Output gap differential	0.0008	-0.0265	0.0388	0.0129	0.1489	0.3610
Unemployment differential	0.0111	-0.0149	0.0474	0.0161	0.2612	-0.9372
10-year bond yield differential	0.0030	-0.0331	0.0225	0.0130	-1.0444	0.4907
Budget balance differential	0.0027	-0.0535	0.0536	0.0228	0.0658	-0.2358
Government debt differential	-0.1135	-0.3286	0.1856	0.1668	0.2161	-1.6021
GDP growth differential	-0.0095	-0.0555	0.0280	0.0149	-0.1359	0.9723
GDP trend growth differential	-0.0101	-0.0289	0.0226	0.0111	0.4227	0.3086
Trade balance differential	-0.0308	-0.0777	0.0171	0.0220	0.0357	-0.2722
Military expenditure coefficient	4.9207	3.8241	6.6348	0.7781	0.4191	-0.9117

Notes: All variables are expressed in decimal form. Growth rates represent year-on-year changes. The reported values correspond to the original series prior to the logit transformations applied to the dependent variables in the econometric analysis.

The descriptive statistics reveal meaningful differences across the variables. The USD share in reserves exhibits a relatively high mean (0.67) with moderate dispersion (SD = 0.09), while the USD share in debt securities shows a lower mean (0.53) but higher variability (SD = 0.15), indicating greater fluctuations in the dollar share of international debt issuance. As expected, most macroeconomic differentials have mean values close to zero, since they measure relative gaps between the United States and other economies. However, some indicators display wide ranges and higher variability. For example, the government debt differential spans from –0.33 to 0.19 with a relatively high standard deviation (0.17), while the military expenditure coefficient stands out with a much larger magnitude (mean = 4.92, SD = 0.78), suggesting substantial heterogeneity across observations. This variability can be partly explained by two structural factors. First, U.S. military expenditure represented a higher share of world GDP in the early 1970s, largely due to the Vietnam War. Second, over time the relative size of the U.S. economy has declined, so that even stable or rising spending translates into a smaller share of global GDP. These dynamics account for the pronounced fluctuations observed in the series between 1973 and 2023.

Figure 4.1 plots the evolution of the U.S. dollar share in international reserves and in international debt securities between 1973 and 2023. The two indicators follow broadly similar dynamics, but with notable divergences. The dollar's share in reserves has remained relatively high and stable over the period, fluctuating mostly between 55 and 80 percent, which underscores its persistent role as the dominant store of value currency in the international monetary system. By contrast, the share of international debt securities denominated in U.S. dollars displays greater variability, with a

pronounced decline from the mid-1990s to the early 2010s, followed by a partial recovery. This divergence suggests that while the demand for the dollar as an official reserve asset is structurally entrenched, its role in private international financing is more sensitive to cyclical factors and financial shocks.

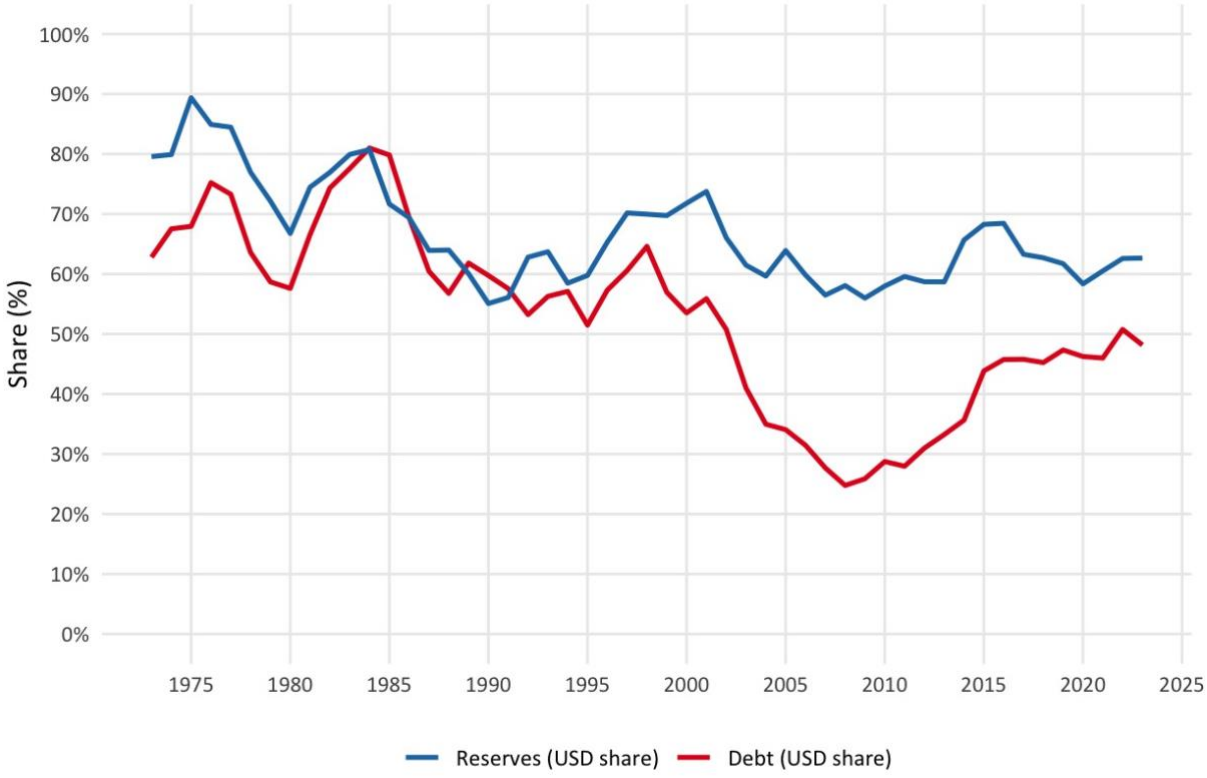

Figure 4.1 – U.S. Dollar Share in International Reserves and Debt Securities

Source: IMF (COFER), BIS (IDS) and author's calculations.

Pairwise Pearson correlations were also computed to assess potential linear associations among the variables. The results, reported in Figure 4.2, show that the two dependent variables are positively but not perfectly correlated (correlation of 0.72), while all other variables display correlations well below the conventional 0.8 threshold typically used as an indication of multicollinearity (Gujarati & Porter, 2009). Most macroeconomic differentials exhibit modest correlations, with somewhat stronger co-movements observed for fiscal indicators. These results support the formal multicollinearity diagnostics presented in Section 4.2.

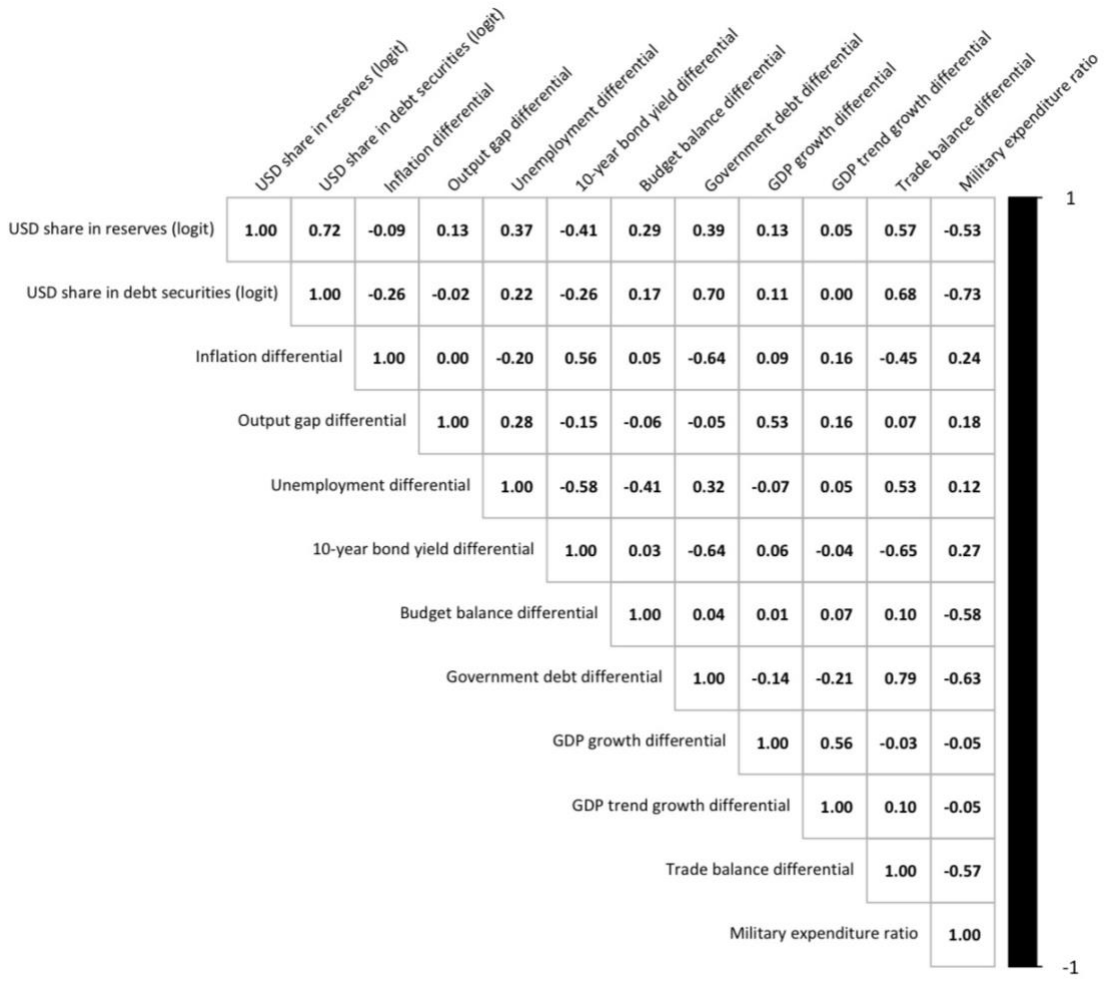

Figure 4.2 – Pearson Correlation Matrix

Source: Data sources are detailed in Appendix A. Author's calculations.

Figure 4.3 presents the distribution of the main variables used in the regressions. The boxplots confirm that most macroeconomic differentials are tightly concentrated around zero, consistent with their definition as relative gaps between the United States and peer economies. The dependent variables, reported in their original (pre-logit) values, show moderate dispersion, reflecting cross-country variation in the dollar share of reserves and debt securities. The government debt differential also exhibits relatively high variability, in line with persistent fiscal differences across economies. By contrast, military expenditure was excluded from the plot, as its extreme values would distort the scale of the figure.

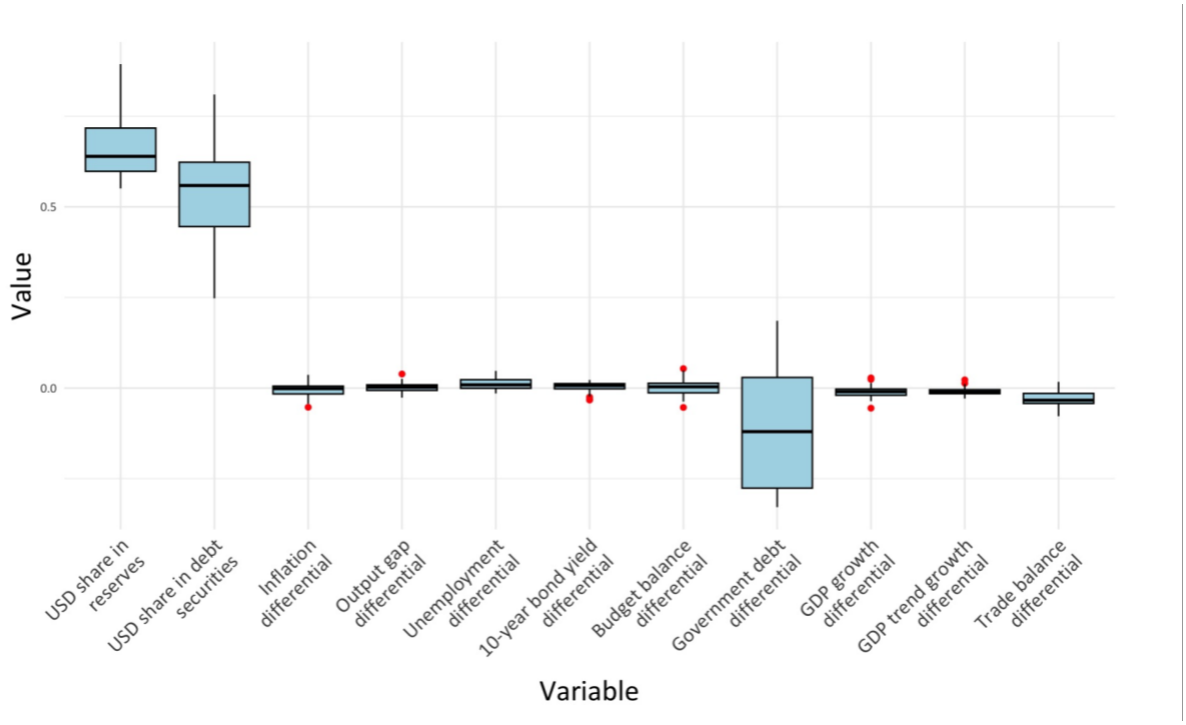

Figure 4.3 – Boxplot of Numeric Values

Source: Data sources are detailed in Appendix A. Author's calculations.
Note: The variable *military expenditure differential* was excluded because its extreme values (min = 3.8, max = 6.6, median = 4.9, Q3 = 5.5) distort the scale of the plot. The dependent variables are reported prior to the logit transformation applied in the econometric analysis.

In summary, the dataset confirms that the dollar's role in reserves has been more stable than in debt securities, while most explanatory variables behave as relative gaps centred around zero. The presence of variability in fiscal indicators and military expenditure highlights potential sources of structural differences. These characteristics underscore the importance of the econometric methodology, discussed in the next section, to properly assess the determinants of dollar dominance.

4.2. Methodology

This section presents the econometric methodology adopted in this work. It begins with the formal model specification, building on established contributions in the literature. The subsequent subsections provide the theoretical justification for the choice of dependent and explanatory variables, as well as the transformations applied; the empirical validation procedures employed — including tests for stationarity, multicollinearity, and model selection criteria – and, finally, the formulation of the main hypotheses to be tested in the empirical analysis.

4.2.1. Model Specification

The econometric framework of this work is based on Ordinary Least Squares (OLS) estimation, following the approach of Eichengreen et al. (2018). The specification incorporates lagged dependent variables to capture persistence and network effects, includes macroeconomic fundamentals as control variables, and models important economic events directly using dummy variables. Unlike other authors who used Local Projection Approach (Romer & Romer, 2023), or VAR-based identification strategies (Georgiadis et al., 2024), we decided to use a linear regression framework which allows for a direct estimation of long-run associations between the indicators of the international role of the dollar, macroeconomic fundamentals and historical events. This specification is particularly well-suited for analyzing structural economic shocks of varying durations, which is the main objective of our econometric analysis. Furthermore, the model distinguishes between international reserves and international debt securities, capturing two distinct dimensions of currency internationalization, which is not a common practice in the literature. The following equation represents the estimated model:

$$Y_{i,t} = \alpha_i + \beta_i Y_{i,t-1} + \gamma'_i X_t + \delta'_i D_t^{\text{opt}} + \varepsilon_{i,t} \quad (1)$$

where i denotes the type of dependent variable—either the logit of the share of international reserves held in U.S. Dollars or the logit of the share of U.S. Dollar-denominated debt securities—and t refers to the time dimension (years); X_t is a vector of control variables capturing macroeconomic fundamentals; D_t^{opt} is a vector of dummy variables representing historical shocks (with optimal duration selected empirically), and $\varepsilon_{i,t}$ is the idiosyncratic error term.

4.2.2. Choice of Variables

The selection of variables is grounded in both theoretical arguments and empirical findings from the literature on international currency use. The two dependent variables capture distinct but complementary dimensions of dollar internationalization, corresponding to its role as a store of value and as a unit of account in global capital markets, respectively (Eichengreen et al., 2018).

Since the dependent variables are measured as a fraction, by definition bounded between 0 and 1, a logit transformation was applied[6]:

$$y'_i = \ln\left(\frac{y_i}{1 - y_i}\right) \quad (2)$$

where i represents the dollar's share in each indicator. This transformation expands the domain of the variables to the interval $(-\infty; +\infty)$, allowing us to estimate a linear model without violating its

[6] Unlike models for censored data, such as tobit, the logit transformation does not assume artificial truncation but rather acknowledges the natural proportional nature of the data.

assumptions or generating predictions outside the feasible range. Although this procedure remains underutilized in the literature on currency composition (e.g. Eichengreen et al., 2018), it builds on methods developed by Papke and Wooldridge (1993), who designed a logit-based approach for dependent variables defined as continuous proportions. In the present case, boundary issues do not arise (since no observation equals 0 or 1), and the objective is not to forecast but to assess the impact of historical shocks through dummy variables. The logit transformation therefore provides a robust econometric treatment while preserving interpretability.

Among the explanatory variables, the lagged dependent variable is included to account for persistence and network externalities, reflecting the path dependence and incumbency advantages associated with international currencies (Eichengreen et al., 2018). In addition, a set of macroeconomic differentials and coefficients was constructed to capture the relative performance of the United States vis-à-vis other major economies (Euro Area, United Kingdom, Japan, and China). This approach is consistent with the literature showing that the demand for a reserve currency depends not only on domestic fundamentals but also on their comparison with available alternatives (Chinn & Frankel, 2007; Eichengreen et al., 2018). Specifically:

1) Inflation differential reflects relative price stability, with lower inflation differential supporting a currency's store-of-value function (Chinn & Frankel, 2017).
2) Output gap differential proxies for cyclical momentum, indicating whether the U.S. economy operates above or below potential relative to peers (Eichengreen et al., 2018).
3) Unemployment differential captures labour market resilience, a key dimension of macroeconomic stability, and although its behaviour is in part associated to the business cycle, it tends not to be entirely synchronized with the output gap.
4) 10-year bond yield differential reflects relative returns on safe assets, central to the role of the dollar in global debt markets (Obstfeld & Zhou, 2023).
5) Budget balance and government debt differentials capture relative fiscal positions, which influence credibility and expectations of long-term sustainability (Eichengreen et al., 2018).
6) GDP growth and trend growth differentials proxy short- and long-term dynamism, shaping market perceptions of future monetary leadership.
7) Trade balance differential accounts for external imbalances, which may affect confidence in a currency's stability in international transactions. This links to the Triffin dilemma (Triffin, 1960), whereby persistent U.S. deficits provide global liquidity but may ultimately erode confidence in the dollar's long-term stability.
8) Military expenditure coefficient captures geopolitical power and the ability to project monetary influence, as suggested in the political economy literature on reserve currency status (Eichengreen, 2011).

Finally, a set of step dummy variables is introduced to capture the impact of major historical events — including the Plaza Accord (1985), the creation of the WTO (1995), the Asian financial crisis (1997), the introduction of the Euro (1999), China's WTO accession (2001), the Global financial crisis (2008), and the Covid-19 pandemic (2020). These events have been widely identified in the literature as potential turning points in the international monetary system (Chinn & Frankel, 2007; Eichengreen, 2011; Georgiadis et al., 2024). The optimal duration of each dummy is determined empirically to account for the persistence of their effects. It should be noted that the Russian invasion of Ukraine in 2022 is not modelled through a time dummy in this study, due to two main reasons. First, the event is too recent, and applying the empirical procedure used to identify the optimal duration of shocks would be premature, as the geopolitical and economic consequences are still unfolding. Second, the limited number of post-2022 observations make it impossible to robustly estimate its impact econometrically. Instead, this issue is acknowledged as a topic for future research, where longer time series will allow a more accurate characterisation of its effects on the international role of the dollar.

4.2.3. Empirical Validation and Variable Selection

Before estimating the final models, a series of empirical procedures were conducted to validate the econometric specification and ensure the robustness of the empirical results. These steps aimed to verify the order of integration of the variables, choose the duration of the step dummy variables, test for the existence of a long-run equilibrium relationship and select appropriate control variables based on both theoretical relevance and statistical significance.

First, the Augmented Dickey–Fuller (ADF)[7] test was applied to all variables to determine their integration order. This step was essential to verify whether the series were suitable for cointegration analysis using the Engle–Granger methodology. As the ADF results indicated that most variables were non-stationary in levels (see Table B.1), the Engle–Granger two-step procedure was employed in each model to test for cointegration.

Before proceeding with the cointegration test, a sequential testing procedure was implemented to determine the optimal duration of each step dummy (n_j^*). For each historical event, a series of step dummies was constructed, with durations ranging from 1 year up to the maximum number of years possible in the dataset. Each dummy was included individually in a full regression model alongside all I(1) control variables[8]. The model was then estimated using ordinary least squares, and the p-value of

[7] The KPSS test was not applied, as the purpose was to identify I(1) variables suitable for the Engle-Granger procedure. Since the ADF test directly tests the null of a unit root, it is sufficient for determining the integration order required for cointegration analysis.

[8] Only variables identified as integrated of order one (I(1)) were retained, as required by the Engle–Granger cointegration framework. Stationary variables (I(0)) were excluded to avoid invalid inference.

the dummy coefficient was recorded. The step dummy that yielded the lowest p-value was selected as the optimal specification for that event. Mathematically:

$$n_j^* = \arg\min_n \{\mathrm{p} - \mathrm{value}(\hat{\beta}_{j,n})\} \quad (3)$$

This pragmatic approach allows the persistence of each structural shock to be determined empirically by the data, rather than by arbitrary assumptions. The optimal durations for each event-specific dummy are reported in Table B.2.

After selecting the optimal set of step dummies to be used in the model specifications, the Engle–Granger two-step procedure was applied. In the first step, the full regression models were estimated including all I(1) control variables and the corresponding dummies of each specification, without differencing the series. In the second step, the residuals from these regressions were tested for stationarity using the Augmented Dickey–Fuller (ADF) test. The residuals from all models were found to be stationary (see Table B.3), suggesting the presence of a cointegrating relationship and validating the use of the variables in their original form. This result mitigates concerns about spurious regression.

Subsequently, several diagnostic tests were conducted to assess potential econometric issues. The Breusch–Pagan test did not reveal evidence of heteroskedasticity in any of the model specifications (see Table B.4). The Breusch–Godfrey test also did not indicate the presence of first-order autocorrelation in any model (see Table B.5). Nevertheless, to ensure robust inference, all models were estimated using Newey–West heteroskedasticity- and autocorrelation-consistent (HAC) standard errors.

In addition, multicollinearity among the explanatory variables was assessed using the Variance Inflation Factor (VIF). All non-dummy variables in each model with VIF values greater than 10 (see Table B.6) were excluded from the corresponding regression to avoid distortions in the estimated coefficients. However, dummy variables were retained regardless of their VIF levels, as their inclusion is essential to evaluate the impact of historical events on the U.S. Dollar's share[9].

Finally, the control variables were selected using a *general-to-specific* approach proposed by Hendry and Richard (1982). The process began with a general specification that included all potential control variables for each model, excluding those that were stationary in levels or exhibited high multicollinearity. Event dummies, however, were retained due to their analytical importance. Variables with p-values exceeding a threshold of 0.15 were sequentially removed to improve parsimony (see Table B.7), provided that their exclusion did not compromise the model fit or introduce omitted

[9] High VIF values among dummies are expected due to overlapping or closely timed events, and do not compromise the model's interpretability since each specification isolates the effect of one event type at a time.

variable bias. This iterative process ensured that the final specification was both statistically robust and theoretically grounded, balancing explanatory power with degrees of freedom.

Since the dependent variables are logit-transformed shares, the estimated coefficients represent changes in log-odds and are not directly interpretable in their original scale. For control variables, interpretation focuses on the sign, statistical significance, and relative magnitude. For dummy variables, marginal effects are computed using Equation (4), which provides an estimate of the average change in the dollar share associated with each event:

$$\Delta y_i = \frac{e^{\left(\ln\left(\frac{y_i}{1-y_i}\right)+\delta_i\right)}}{1+e^{\left(\ln\left(\frac{y_i}{1-y_i}\right)+\delta_i\right)}} - y_i \tag{4}$$

Where i denotes the dependent variable (reserves or debt), y_i is the average pre-event share, and δ_i is the estimated coefficient of the dummy variable.

4.2.4. Hypotheses and Identification Strategy

Building on the theoretical framework and existing empirical evidence, the following hypotheses are formulated:

- H1 (Persistence and path dependence): The first hypothesis is that the dollar's international dominance exhibits strong persistence, reflected in a positive and significant coefficient on the lagged dependent variable. As stated by Eichengreen et al. (2018), international currencies benefit from network externalities and incumbency advantages, and once widely adopted, the costs of switching are high, which reinforces inertia. In the regressions, the coefficient β on the lagged dependent variable ($Y_{i,t-1}$) captures persistence. A positive and significant β would support the hypothesis.
- H2 (Impact of major historical shocks). The second hypothesis is that major historical events, while potentially generating short-term disruptions, do not durably undermine the dollar's dominant role in international reserves or debt markets. To test this hypothesis, event dummies D_t^{opt} capture the marginal effects of each shock. Their coefficients δ indicate the impact in the dollar's share associated with the event. Statistical significance and sign of δ determine whether shocks matter, and if so, the duration of the dummy shows how long the event affected the shares.

Together, these hypotheses and the identification strategy provide a coherent framework for testing the relative importance of structural fundamentals and exogenous shocks in shaping the persistence and adaptability of the dollar's hegemonic position in the international monetary system.

5. Results and Discussion

This chapter presents and discusses the results of the estimated models. In the following sections we interpret the estimated coefficients, evaluate their robustness, compare the findings with the literature, and discuss their economic relevance.

5.1. Results

This subsection presents the estimated results from the panel regressions on the U.S. dollar share in international reserves and debt securities. We will not yet engage in theoretical explanations, which is reserved for the discussion chapter. Table 5.1 presents the results of the two models.

Table 5.1. Determinants of the Dollar's International Role: Regression Results

	Reserves	Debt
Control Variables		
Lag dependent variable	0.6019***	0.8342***
Unemployment	11.9536**	—
Budget balance	—	-2.4477#
Trade balance	—	5.2152**
Dummy Variables		
Plaza	-0.1790***	-0.2494*
	(-3.12)	(-5.57)
Asian crisis	0.1364*	0.2535#
	(2.73)	(5.61)
Euro	0.0353	-0.0680
	(0.72)	(-1.58)
Crisis 2008	-0.3895*	-0.0857
	(-8.88)	(-2.09)
WTO	0.2123***	-0.0242
	(4.07)	(-0.55)
WTO China	-0.1346*	-0.0799
	(-2.85)	(-1.86)

	Reserves	Debt
Covid-19	-0.6084***	-0.1157*
	(-14.51)	(-2.89)
Nr. of observations	50	50
R^2	0.8531	0.9221

Note: P-values are based on heteroskedasticity- and autocorrelation-consistent (HAC) standard errors using the Newey–West estimator. Values in parentheses indicate the marginal effects (in percentage points). "—": variable not included in the specification. Only retained variables are reported. Significance levels: # p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

5.1.1. Interpretation of Control Variables

In both regressions, the lagged dependent variable is positive and highly statistically significant, confirming the strong persistence in the use of the U.S. dollar across international markets. These coefficients are consistent with the notion of path dependence, whereby past currency choices influence current ones.

In the reserves regression, the unemployment differential is positive and statistically significant, suggesting that when U.S. unemployment increases relative to that of other major economies, the dollar share in international reserves tends to rise.

In the debt regression, the budget balance differential is negative and statistically significant, indicating that an improvement in the U.S. fiscal position relative to other major economies is associated with a reduction in the dollar share of debt securities. The trade balance differential is positive and statistically significant, suggesting that a stronger U.S. external position corresponds to an increase in the dollar's share in global debt markets.

5.1.2. Effects of Historical Shocks on USD shares

Looking at the marginal effects presented in Table 5.1, we can see that the Plaza Accord of 1985 is negative and statistically significant in both regressions: -3.12 p.p. with a duration of 11 years (reserves) and -5.57 p.p. with a duration of 8 years (debt). These results suggest that coordinated efforts to depreciate the dollar were associated with a decline in its international use.

The Asian financial crisis of 1997 shows a positive and statistically significant effect in both specifications: 2.73 p.p. for 5 years (reserves) and 5.61 p.p. for 2 years (debt). This points to an increase in demand for the dollar during episodes of emerging market turbulence, likely reflecting the safe haven phenomenon.

The Euro introduction in 1999 is not statistically significant in either regression. The absence of a measurable effect suggests that the introduction of the euro did not lead to an immediate or discernible reduction in the dollar's global role during the sample period.

The 2008 financial crisis has a negative and statistically significant effect on the dollar share of international reserves (–8.88 p.p.), with the estimated impact lasting for 6 years. This suggests a prolonged, though ultimately temporary, erosion of the dollar's reserve role in the aftermath of the crisis. In contrast, the effect on the dollar's share in international debt issuance is not statistically significant, indicating that the crisis did not meaningfully alter the currency composition of new debt instruments.

The WTO creation in 1995 is positive and statistically significant in the reserves regression (4.07 p.p.) for a period of 7 years, indicating a reinforcement of the dollar's reserve role following the institutionalisation of global trade under the WTO framework. The effect is non-significant in the debt regression.

The dummy for China's entry into the WTO in 2001 is negative and statistically significant in the reserves regression (-2.85 p.p.) for a duration of 3 years, and non-significant in the debt regression. These results suggest a temporary shift in global monetary preferences or expectations following China's integration into the global trading system.

Finally, the Covid-19 pandemic of 2020 reveals a negative effect in the reserves regression (-14.51 p.p.) for a period of 2 years, and a significant, though smaller impact in the debt regression (-2.89 p.p.) for 1 year duration. These results point to a sharp reduction in the international use of the dollar during the Covid-19 period, particularly among reserve holders.

5.2. Robustness Check: Impulse vs. Step Dummies

To assess the robustness of the main results, this section re-estimates the baseline models using alternative specifications of the event dummy variables. While the previous chapter focused on optimized step dummies, the models presented here include impulse dummies that take the value of 1 only in the year of the event, and step dummies, which assume a lasting effect from the event onwards. This allows for the identification of both temporary and more persistent shifts in the international role of the dollar. More specifically:

$$Y_{i,t} = \alpha_i + \beta_i Y_{i,t-1} + \gamma'_i X_t + \delta'_i D_t^{impulse} + \varepsilon_{i,t} \quad (5)$$

$$Y_{i,t} = \alpha_i + \beta_i Y_{i,t-1} + \gamma'_i X_t + \delta'_i D_t^{step} + \varepsilon_{i,t} \quad (6)$$

Table 5.2 reports the results for the four regressions: reserves and debt models with both impulse and step dummies. The focus remains on the sign, statistical significance, and economic magnitude of the coefficients and marginal effects.

Table 5.2. Robustness of Dollar Determinants: Alternative Event Specifications

	(1)	(2)	(3)	(4)
Control Variables				
Lag dependent variable	0.7377***	0.5973***	0.8400***	0.8317***
Inflation	2.6550#	—	—	—
Unemployment	6.7299*	—	—	—
GDP trends growth	—	—	5.5563*	—
Trade balance	—	—	4.8187**	—
Military expenditure	-0.0863##	—	—	—
Dummy Variables				
Plaza	-0.2538***	-0.4053***	0.2257	-0.2287*
	(-4.52)	(-7.50)	(4.61)	(-5.09)
Asian crisis	0.2408**	0.1119**	0.1417**	0.1810
	(4.70)	(2.25)	(3.20)	(4.06)
Euro	0.0789	-0.0234*	-0.2705**	-0.3705***
	(1.60)	(-0.48)	(-6.44)	(-8.90)
Crisis 2008	0.1240*	0.0420	-0.1382**	0.1669*
	(2.59)	(0.89)	(-3.38)	(3.97)
WTO	0.1118	0.1508*	-0.2138***	0.0503
	(2.20)	(2.94)	(-5.01)	(1.14)
WTO China	0.1719*	-0.2222**	0.1200*	-0.0496
	(3.41)	(-4.78)	(2.72)	(-1.15)
Covid-19	-0.3042***	-0.0157	-0.1895*	0.0309
	(-7.04)	(-0.35)	(-4.73)	(0.77)
Nr. of observations	50	50	50	50
R^2	0.7818	0.7918	0.9159	0.9145

Note: (1) Reserves – Impulse; (2) Reserves –Step; (3) Debt –Impulse; (4) Debt –Step. Dummy variables represent impulse dummies in models (1) and (3) and step dummies in models (2) and (4). P-values are based on heteroskedasticity- and

autocorrelation-consistent (HAC) standard errors using the Newey–West estimator. Values in parentheses indicate the marginal effects (in percentage points). Only retained variables are reported. Significance levels: ## p < 0.15; # p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

5.2.1. Interpretation of control variables

The results for the control variables remain broadly consistent across the four specifications. In all models, the lagged dependent variable remains positive and highly statistically significant, confirming the strong persistence of the dollar's international role. For both reserves and debt, the step models are only significantly affected by the lagged dependent variable, suggesting that macroeconomic differentials have limited long-term explanatory power under this specification.

In the reserves impulse model, the unemployment differential is positive and statistically significant, confirming the results from the baseline model. Inflation also has a positive coefficient, which goes in line with the previous argument of the dollar as a safe haven. Military expenditure, included only in this model, shows a negative and statistically significant effect.

In the debt impulse model, the trade balance differential remains positive and statistically significant, indicating that relative external performance continues to be a relevant short-term driver of the dollar's share in international debt issuance. In contrast with the baseline model, the GDP trend growth differential is also positive and statistically significant in this specification. This result suggests that stronger long-term economic performance in the United States relative to other major economies increases the attractiveness of dollar-denominated debt on international markets.

Overall, the control variables display stable signs and comparable magnitudes across specifications. The impulse models yield more statistically significant effects than the step models, suggesting that the influence of macroeconomic fundamentals may be more relevant in the short term than in the long run.

5.2.2. Effects of Historical Shocks on USD shares

For the Plaza Accord, in the baseline model, the effect is negative and significant over 11 years (reserves) and 8 years (debt). This suggests a prolonged but not permanent reaction to the event. In the robustness models, the step dummy remains significant, implying a lasting shift in trend. The impulse dummy is only significant for reserves, indicating an immediate effect. The step models' assumption of a 38-year duration (1985–2023) likely overstates the persistence found in the main model but still supports the direction and relevance of the shock.

In the case of the Asian financial crisis, the baseline model indicates a short-to-medium-term effect: 5 years for reserves, 2 years for debt. The robustness models confirm a positive and significant impulse effect, with the step dummy losing strength, even if still positive in reserves. This pattern

supports the interpretation that the crisis triggered a temporary but impactful flight-to-safety towards the dollar, particularly among reserve managers.

As for the Euro introduction, in the main model, the euro dummy is not statistically significant in either regression, suggesting that thus event did not lead to a clear reduction in the dollar's shares. However, the optimal duration of the dummy in this model is 15 years for reserves and 25 years for debt, indicating that the estimation process did identify a potentially long-lasting effect, even if not statistically robust at conventional levels. In contrast, the robustness checks reveal a statistically significant and negative effect in the debt regressions, both for the impulse dummy (-6.44 p.p.) and the step dummy (-8.90 p.p.), as well as a significant negative effect, but way smaller, in the reserves step model (-0.48 p.p.). This discrepancy suggests that the euro may have contributed to a gradual and persistent erosion of the dollar's share in debt markets — an effect that gains statistical relevance in the step specification, where the dummy remains active from 1999 onward.

Regarding the 2008 financial crisis, in the main model, the dummy has a negative and statistically significant effect on reserves, with an estimated duration of 6 years, indicating a temporary erosion of the dollar's role in official reserve holdings. In the robustness checks, the impulse dummy is positive and significant for reserves, consistent with a short-term surge in demand for dollar-denominated assets as a safe haven. The step dummy for reserves is not statistically significant. For debt, the impulse dummy becomes negative and statistically significant, while the step dummy turns positive and significant, indicating that the effects on debt were more complex and time-varying — potentially reflecting both immediate disruptions and subsequent adjustments.

As for the creation of the WTO, the baseline model shows a positive effect on reserves for 7 years, and no effect for debt. In the robustness checks, the step dummy in reserves is also positive and significant, reinforcing the idea of a sustained boost to the dollar's reserve status. In contrast, the debt impulse dummy is negative and short-lived, with the step dummy becoming non-significant — mirroring the lack of persistence found in the baseline model.

In the baseline model, China's accession to the WTO is associated with a negative and statistically significant effect on the dollar's share in reserves, lasting 3 years, while the effect on debt is not statistically significant. These results suggest a temporary decline in the dollar's reserve role. In the robustness checks, the impulse dummy for reserves is positive and significant, while the step dummy becomes negative and significant, reversing the expected pattern. This conflicting result may reflect that China's WTO accession initially boosted demand for dollar reserves through trade integration, but over time encouraged reserve diversification, leading to a gradual decline in the dollar's relative role. For debt, the impulse dummy is negative and significant, aligning with the notion of a short-lived adjustment, while the step dummy is non-significant, confirming the absence of long-term effects.

For the Covid-19 pandemic, the baseline model identifies a sharp but short-lived negative effect: 2 years for reserves, 1 year for debt. The robustness models confirm this with significant impulse dummies and non-significant step dummies, reinforcing the view that the pandemic caused a temporary disruption in the international use of the dollar, particularly by reserve holders.

5.2.3. Confirmation of Baseline Findings

The robustness checks conducted through the inclusion of impulse and step dummies serve to validate and complement the findings of the baseline model. Overall, the key insights from the main estimations are broadly confirmed: the international role of the dollar remains highly persistent, although still sensitive to macroeconomic differentials, and responsive to major geopolitical and economic shocks.

Despite some discrepancies in magnitude and significance, the direction and interpretation of most estimated effects remain consistent. For example, the Plaza Accord and the Asian Financial Crisis show negative and positive effects, respectively, across both models, reinforcing the reliability of these findings. The Euro introduction, which was not significant in the main model, becomes significant in the robustness checks — particularly in the debt regressions with step dummies — suggesting a gradual and persistent erosion in that segment, partly missed by the optimal dummy approach focused on short-term deviations.

In contrast, the 2008 global financial crisis highlights the importance of modelling the duration of shocks accurately. The main model identifies a temporary decline in the dollar's share in reserves over six years, consistent with the nature of the shock. However, the step dummy — which imposes a permanent effect — fails to reflect this transitory nature, while the impulse dummy captures only the initial "safe haven" effect. These contrasting results support the use of optimally timed dummies to avoid overstating long-term consequences of short-lived disruptions.

A similar conclusion emerges from the case of China's WTO accession, where the baseline model identifies a short-lived decline in the dollar's reserve role (3 years), and no significant effect on debt. The robustness models show opposite signs between impulse and step dummies in reserves, and a short-term negative effect in debt, confirming that any market reaction was transitory and did not translate into lasting structural change.

Finally, in the case of Covid-19, both impulse models confirm a sharp and negative, yet transitory effect, consistent with the short two-year duration identified in the main model. Step dummies, by contrast, overstate the duration of the pandemic's impact, again highlighting the limits of long-run assumptions in the context of temporary shocks.

In summary, the robustness analysis reinforces the credibility of the baseline results while also underscoring the value of using optimally designed dummies. The dollar's global role appears resilient,

only temporarily affected by even the most severe shocks, and supported by a mix of historical inertia, macroeconomic fundamentals, and its safe-haven status in times of crisis.

5.3. Discussion

5.3.1. Comparison with Existing Literature

The empirical findings of this work contribute to the ongoing debate in the literature about the persistence of the U.S. dollar as the most important international currency. The results support the argument of Eichengreen et al. (2018) that since the collapse of the Bretton Woods system, inertia factors and the credibility of U.S. economic policies have gained importance as determinants of international currency choice. This is clearly reflected in the consistently high and significant coefficient of the lagged dependent variable across all specifications, confirming the presence of strong path dependence in both international reserves and debt issuance. In line with their work, this study finds that once a currency is widely adopted, its continued use tends to be self-reinforcing, providing a structural explanation for the dollar's durability.

Regarding the impact of macroeconomic fundamentals, the results confirm findings from Chinn and Frankel (2007, as cited in Eichengreen et al. (2018)), who argue that relative economic performance plays a role in shaping currency preferences. Specifically, the significance of differentials in unemployment, trade balance and budget balance suggest that the dollar's role is partially linked to the relative strength of U.S. fundamentals. However, the results also show that these effects are more relevant in the short-term (impulse models) than in the long run (step models), which may explain why the dollar has remained dominant even during periods of relative economic weakness.

When considering the influence of historical events, the findings generally align with previous studies that document the dollar's function as a safe haven during crises (e.g. Waller, 2024; Rao, 2024). The positive and significant impact of the Asian financial crisis on the dollar share and the temporary boost during the initial stage of the 2008 crisis support this interpretation. Nonetheless, the temporary nature of these effects, as captured by the optimal dummies, contrasts with more static models in the literature that do not account for dynamic duration. This nuance provides a more refined understanding of how and for how long shocks affect currency composition.

The study's findings also offer an important contribution to the debate on the euro's potential as a challenger to the dollar. As noted in Eichengreen et al. (2018), while early studies such as Chinn and Frankel (2007) and Papaioannou et al. (2008) were optimistic about the euro eventually overtaking the dollar, this work finds no robust evidence of a significant displacement effect. Even though the robustness models suggest a slow erosion in the debt segment, the euro's impact remains limited in scope and magnitude. This confirms more recent literature (e.g. Eichengreen, 2011; Eichengreen et al.,

2018; Waller, 2024) that downplays the euro's challenge due to institutional weaknesses and fragmentation within the eurozone.

With respect to China and the renminbi, the results do not point to a major shift in global monetary preferences following China's accession to the WTO. Although some temporary effects are observed, particularly in the reserves market, these are not persistent. This finding is consistent with Frankel (2023), who argued that China's economic size alone is not sufficient to elevate the renminbi's global status, especially in the absence of full capital account convertibility and deep financial markets.

Finally, the results indirectly touch upon the potential for emerging alternatives such as cryptocurrencies. Although not modelled directly, the enduring dominance of the dollar in both reserves and international debt markets — even in the face of systemic shocks — suggests that, at least over the sample period, no major shift toward decentralised or digital alternatives has occurred. This observation is in line with the conclusions of scholars such as Waller (2024) and Ferranti (2023, as cited in Frankel, 2023), who argue that, despite the rise of digital assets and decentralized finance, the overwhelming reliance on dollar-linked stablecoins and the functional limitations of cryptocurrencies like Bitcoin have so far reinforced — rather than challenged — the dominant international role of the U.S. dollar.

Taken together, the empirical results reinforce the dominant narrative in the literature: the dollar's exorbitant privilege remains largely intact due to a combination of structural inertia, short-term responsiveness to shocks, and the absence of viable systemic alternatives.

5.3.2 Economic Significance of the Results

The findings of this study confirm the structural resilience of the U.S. dollar in the international financial system and help to explain the economic mechanisms that sustain its exorbitant privilege.

The positive and highly significant coefficients on the lagged dependent variables, observed across all specifications, confirms the strong inertia in currency use. Once a currency achieves widespread adoption, it tends to retain this status because network-related barriers make switching costly. For instance, the fact that a large share of global transactions — whether in oil, aircraft, or other goods — is invoiced in U.S. dollars creates a self-reinforcing mechanism that encourages others to follow the same practice. These entrenched patterns shield the dollar from displacement, as economic or geopolitical shocks alone are insufficient to offset the coordination benefits and cost advantages of maintaining the status quo.

Regarding macroeconomic fundamentals, the results indicate that the relative economic performance of the United States vis-à-vis other major economies influences international demand for the U.S. dollar, although the magnitude and direction of the effect differ between reserves and debt. An intriguing finding is that, in the case of reserves, a positive unemployment differential — meaning

U.S. unemployment is higher than that of its peers — is associated with an increase in the dollar's share. This may suggest that, during periods of relatively weaker U.S. labour market performance (often coinciding with slower economic growth), central banks nonetheless view the dollar as a safe asset, reinforcing its role as a reserve currency. One possible explanation is that the magnitude of U.S. economic and financial linkages generates significant international spillovers, meaning that when the U.S. economy slows down, this tends to negatively affect other major economies as well. Thus, even when the signs coming from short-term developments of the U.S. economy are not positive, their negative influence on the other relevant economies tends to reinforce the demand for dollars as a safe haven currency. This interpretation is further supported by the robustness checks, which show that a higher inflation differential is also linked to an increased dollar share, likely reflecting a similar safe haven effect. Another noteworthy result is the decline in the dollar's share of reserves when the U.S. military expenditure coefficient is positive, suggesting that central banks may reduce their exposure to the dollar when they perceive heightened U.S. military activity. This could stem from concerns about potential conflicts involving the United States and the associated economic or financial risks that might undermine the stability of the dollar.

In the case of debt, a positive trade balance differential — meaning that the U.S. external position is stronger relative to that of its peers — is associated with a higher dollar share in debt issuance. This suggests that investors perceive a relatively favourable U.S. external balance as reinforcing the credibility of the currency. More broadly, however, the literature highlights that currencies of structurally surplus economies, such as the renminbi, face difficulties in achieving comparable international roles, as persistent surpluses constrain the global supply of liquidity — a dynamic consistent with the Triffin dilemma. Conversely, the negative relationship between the budget balance differential and the dollar's share in debt suggests that an improvement in the U.S. fiscal position relative to peers may coincide with greater currency diversification in debt markets. One possible explanation is that a healthier fiscal balance reduces the government's need to issue large amounts of debt, thereby limiting the supply of new dollar-denominated instruments and creating space for issuance in alternative currencies. Nevertheless, it should be noted that these relationships are unlikely to be strictly linear. In line with the Triffin dilemma, moderate U.S. deficits can sustain global demand for dollar assets, whereas excessive imbalances may eventually undermine confidence and trigger diversification away from the dollar. It is also noteworthy that the GDP trend growth differential exerts a positive influence on the dollar's share in debt issuance, indicating that sustained U.S. economic performance relative to other major economies strengthens confidence in the currency and supports its use as a denomination standard in international debt markets.

The analysis of historical shocks reinforces the interpretation that the dollar reacts asymmetrically to global events. Systemic crises, such as the 2008 financial crisis and the Covid-19 pandemic, had

statistically significant negative effects on reserves but of short duration, without structurally altering the currency's role. By contrast, events such as the Asian financial crisis and the creation of the WTO appear to have reinforced the dollar's status, reflecting its function as a safe haven currency and dominant medium in international trade. The introduction of the Euro and China's WTO accession did not produce sufficiently persistent effects to reshape the structure of the international monetary system, although they triggered temporary adjustments in shares.

These results confirm our main hypothesis that the dollar was not structurally impacted by economic shocks, and its exorbitant privilege remains unaltered, with no evident prospects of being replaced soon. From an economic perspective, these results imply that the dollar's dominant position continues to allow the United States to finance external and budget deficits at relatively low cost, benefiting from a strong demand for dollar-denominated assets. This sustained demand reduces the risk of balance-of-payments crises and preserves the country's ability to issue debt in its own currency without significant exchange-rate penalties. This study contributes with additional empirical evidence for a more recent period, showing that even in the face of major global economic shocks and the emergence of competitors such as the euro and the renminbi, the dollar remains the cornerstone of the international monetary system.

5.3.3. Implications for Economic and International Policy

This study found that there are several implications that are relevant for U.S. policymakers and the international community.

First, the results show that it is highly important to maintain macroeconomic stability to safeguard the exorbitant privilege of the dollar, since the persistence of the dollar's international role is largely driven by inertia, network effects, and macroeconomic performance. Therefore, it is important to continue reinforcing global confidence in the dollar by providing a trustful environment with stable inflation, credible fiscal policy, and robust external balances, thus reducing the incentives for diversification into other currencies.

Second, the findings imply that the dollar's role can be temporarily affected by geopolitical events, particularly in official reserves, but such effects tend to fade over time. This resilience of the dollar in absorbing shocks can be an advantage for U.S. policymakers, but it is important to note that some geopolitical risks — such as military interventions —may trigger short-term shifts away from the currency and open a door for other currencies to raise in the international sphere.

Third, for other countries seeking to internationalise their currencies — such as the Euro area or China — the evidence suggests that structural and institutional barriers remain high. Even when macroeconomic performance improves or alternative financial infrastructures are developed,

overcoming the entrenched dominance of the dollar requires sustained policy credibility and deep, liquid markets capable of matching U.S. financial depth.

Finally, the results have implications for international financial stability. The dollar's central role in trade invoicing, reserve management, and debt issuance means that U.S. domestic policy decisions have disproportionate spillover effects on global markets. This calls for a degree of international policy coordination and transparency from U.S. authorities, particularly in periods of monetary tightening or fiscal adjustment, to mitigate adverse impacts on dollar-dependent economies.

6. Conclusion

The central research question of this dissertation was: *What explains the resilience of the U.S. dollar's exorbitant privilege after the collapse of Bretton Woods?* To address this question, the study combined a comprehensive dataset (1973–2023) with econometric models designed to capture both structural fundamentals and the impact of major historical shocks. Two dependent variables were analysed: the share of the U.S. dollar in official international reserves and its share in international debt securities. These indicators correspond to the functions of the dollar as a store of value and as a unit of account and financing instrument in global markets.

Based on our results, and complemented with the existing literature, plausible answers to the question encompass the following lines. Although the relative share of the United States in global GDP has been declining over recent decades, while other economies such as China are rising, this downward trend is not mirrored in the role of the U.S. dollar in international finance. In particular, the dollar has maintained a disproportionately high and stable share both in official international reserves and in the denomination of international debt securities. This suggests that the global financial system continues to rely on the U.S. dollar, independently of the relative size of the U.S. economy alone. Additionally, some traumatic events that could potentially pronounce a structural decline of the international role of the U.S. dollar, had only temporary effects, with the shares ultimately converging back to previous levels. We call this recurring dynamic the "cork effect": no matter how deep the dollar's shares fall during a shock, they eventually float back to the surface. This feature is related to the fragilities of rival currencies. In the case of the euro, one of its fragilities comparing with the dollar relates to the lack of a fiscal centralized capacity in the Eurozone. In the case of the renminbi, despite the growing size of the Chinese economy, the financial system is not so developed and open to international transactions as it is in the United States. Moreover, the Chinese persistent large and positive current account does not facilitate providing enough currency to be used in external transactions by third parties, jeopardizing its possible use as mean of exchange. Finally, the analysis reveals an important asymmetry between the two functions of the dollar. The effects of historical events tend to dissipate more quickly in international debt securities than in official reserves, suggesting that the role of the dollar as a financing and investment instrument is more flexible and sensitive to cyclical shocks, while its role as a store of value for central banks is more entrenched and persistent.

Like all empirical research, this dissertation faces certain limitations. First, there were some data constraints, since alternative indicators of international currency use such as trade invoicing or FX turnover could not be incorporated due to lack of long-run consistent data. Second, the annual frequency of the dataset, by design, does not capture intra-annual dynamics or short-lived episodes of stress that may have influenced the dollar's role in more granular ways. Third, the use of reduced-form

regressions may not capture the underlying final causal mechanisms. Fourth, although the step and impulse dummy approach is widely used, it inevitably imposes simplifications on the true dynamics of shocks, which may have more complex or non-linear effects. Finally, the Russian invasion of Ukraine (2022) and the recent geopolitical tensions build-up were deliberately excluded due to insufficient observations, but this inevitably leaves out highly relevant events.

The findings of this dissertation carry important implications for both policymakers and market participants. For the United States, the results underscore that the exorbitant privilege remains intact but not immune. Maintaining macroeconomic credibility, particularly fiscal sustainability, is crucial to sustaining global confidence in the dollar. For other economies, the study highlights the challenges of reducing dollar dependence. Even major institutional innovations such as the euro or systemic crises did not displace the dollar's dominance. This structural asymmetry translates into continued vulnerability to U.S. monetary and financial conditions. For the international monetary system, the persistence of dollar dominance suggests that reform initiatives (e.g. diversification of reserves, regional monetary arrangements) face structural barriers. Nevertheless, the temporary effects of shocks indicate that under conditions of U.S. political or fiscal instability, diversification pressures may resurface.

The findings of this dissertation open the way for several avenues of future research. The first question proposed is*: How does the geopolitical tension Russia/Ukraine influence the international role of the dollar?* This concerns the impact of geopolitical tensions on the international role of the dollar, emphasizing on the ongoing Russia–Ukraine conflict. As shown in this study, crises often generate a short-term safe haven effect, reinforcing the demand for dollar assets. However, in the longer term, the use of the U.S. dollar as a geopolitical instrument, through economic sanctions, the freezing of foreign reserves, and restrictions on access to payment systems, may raise concerns among other countries regarding the risks of dollar dependence. This could lead countries to diversify reserve portfolios, increase the role of gold and alternative currencies, or even foster regional initiatives aimed at reducing exposure to the U.S. financial system. Future work should therefore assess whether this conflict can weaken the structural foundations of dollar dominance. The second question we find relevant for further research is *How will the renminbi and cryptocurrencies affect the dollar in the long run?* While the results of this dissertation confirm that neither the renminbi nor cryptocurrencies currently pose a systemic challenge to the dollar, their future trajectories remain uncertain. The internationalisation of the renminbi continues to advance incrementally, supported by China's growing economic weight and initiatives to expand its financial market infrastructure. Additionally, the rapid development of cryptocurrencies and central bank digital currencies (CBDCs) raises questions about how technological change might change the channels of international currency use. Further empirical analysis of these dynamics will be essential to determine whether they represent marginal adjustments

or genuine threats to the dollar's exorbitant privilege in the long run. It is also important to discuss the role of monetary gold as it represents an appreciable part of central banks reserves. Nevertheless, we believe that the limited quantities of gold probably do not allow the generalized use of this commodity as mean of exchange. In sum, our proposal for future research is a focus on the interaction between geopolitics, financial innovation, and currency competition, as these forces will likely shape the evolution of the international monetary system in the upcoming decades.

In conclusion, this dissertation shows that the U.S. dollar's exorbitant privilege, though periodically challenged, has proven remarkably resilient in the post-Bretton Woods era. Persistence, macroeconomic credibility and safe haven demand jointly sustain its global role. Yet, temporary vulnerabilities underscore that this dominance is not beyond question. As the international system faces geopolitical shifts, digital transformations, and potential U.S. domestic instabilities, the future of the dollar will continue to be tested. Whether resilience will once again prevail, or whether cracks in the privilege will widen into structural change, remains a central question for international political economy and global finance.

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Appendix A – Variable Construction

This appendix provides additional detail on the construction of the variables used in the econometric analysis. While Table 4.1 summarises the definitions, transformations, and sources, this section explains in more detail how the variables were calculated, as well as the proxies and procedures adopted when data was not available.

A.1. Dependent Variables

1) **USD share in international reserves:** For the years 1995-2023, annual data for the international reserves was retrieved from the *Currency Composition of Official Foreign Exchange Reserves (COFER)* database (International Monetary Fund [IMF], 2024). For the years prior to 1995 (1973-1994), data on the currency composition of official reserves were complemented with information from the *IMF Annual Reports* (IMF, 1980-2008), always relying on the most up-to-date figures available. Prior to 1999, the euro was proxied by aggregating the Deutsche mark, French franc, and Netherlands guilder (by far the most important currencies of the Euro Area countries in official reserves). Since the original figures were reported in SDR, they were converted into USD using the official USD/SDR exchange rate retrieved from the *Federal Reserve Economic Data (FRED)* database, sourced from the Organisation for Economic Co-operation and Development [OECD] (2016). All values were then converted into U.S. dollars at constant exchange rates. To construct these constant exchange rates, we fixed the average 2024 exchange rate for each currency as a benchmark and re-expressed all historical values accordingly. The bilateral exchange rates used for this conversion were retrieved from the *Bilateral exchange rates* data set (Bank for International Settlements [BIS], 2025). The shares of each currency were calculated relative to the total of the five major currencies considered. Finally, the logit transformation of the shares was applied for econometric estimation.

2) **USD share in international debt securities:** Quarterly data for international debt securities were retrieved from the *International Debt Securities (IDS)* data set (BIS, 2024). For the years prior to 1993Q3, a proxy for the euro was constructed by summing the values for the Deutsche mark and the French franc (values for the Netherlands guilder were not available). Values were then expressed in U.S. dollars at constant exchange rates, following the same procedure as for international reserves. The shares of each currency were calculated relative to the total of the five major currencies considered and then converted into annual values by applying the

arithmetic mean. Finally, the logit transformation of the shares was applied for econometric estimation.

A.2. Control Variables

For the control variables, in some cases, it was necessary to construct a proxy for the Euro Area for the years prior to 1999. In these cases, a weighted average of Germany, France, and the Netherlands was applied. The selection of these countries is consistent with the methodology used for the exchange rate proxy, which relied on the Deutsche mark, the French franc, and the Dutch guilder. The assigned weights — 54% for Germany, 36% for France, and 10% for the Netherlands — reflect the average shares in their combined GDP during the period 1973–1998, using data from the *World Development Indicators* (World Bank, 2025).

1) **Inflation differential:** Annual data for the inflation rate was retrieved from the *World Development Indicators* (World Bank, 2025). The differential was calculated as the values for the U.S. minus the arithmetic average of its four peers.

2) **Output gap differential:** Annual data for the output gap as share of potential GDP was retrieved from the *Annual Macro-Economic Database (AMECO)* (European Commission, n.d.). For the Euro Area, values for the period 1973–2000 were proxied as described above. In the case of the Germany values used in the proxy, these correspond to West Germany for the years 1973–1990 and to unified Germany from 1990 onwards. Data from Japan and China was not available. The differential was calculated as the values for the U.S. minus the arithmetic average of the U.K. and the Euro Area.

3) **Unemployment differential:** Annual data for the unemployment rate was primarily retrieved from the *World Development Indicators* (World Bank, 2025). Due to the absence of official unemployment statistics for China prior to 1978, the earliest available observation (1978, 5.3%) was extended backward to cover the years 1973–1977. This approach preserves continuity in the time series and provides a conservative estimate, consistent with the characteristics of China's centrally planned economy during that period. For some missing observations in recent years, data from the National Bureau of Statistics of China (2016, 2017, 2023, 2024) were used. To construct the Euro Area proxy (1973-1989), missing values for the Netherlands and Germany were supplemented using the *AMECO* database (European Commission, n.d.). The differential was calculated as the values for the U.S. minus the arithmetic average of its four peers.

4) **10-year bond yield differential:** Annual data for the 10-year bond yield was retrieved from the *FRED* database (Federal Reserve Bank of St. Louis, 2025). For missing values of Japan, for the year 1973 data was retrieved from *OECD economic surveys: Japan 1973* (OECD, 1973), and from 1974-1988 from the Ministry of Finance Japan (n.d.). The differential was calculated as the values for the U.S. minus the arithmetic average of the U.K., the Euro Area and Japan, as data for China was unavailable.

5) **Budget balance differential:** Annual data on the budget balance as a percentage of GDP was retrieved primarily from the *World Development Indicators* (World Bank, 2025). For Japan, data for the years 1991–1993 was obtained from the *OECD Economic Survey: Japan 1996* (OECD, 1996) and the *OECD Economic Survey: Japan 1997* (OECD, 1997). To construct the Euro Area proxy, the value for Germany in 2023 was retrieved from the *Monthly Report January 2024* (Deutsche Bundesbank, 2024), while for Japan, the value for 2023 was taken from the *Economic and Fiscal Projections for Medium- to Long-Term Analysis* (Cabinet Office, 2023). The differential was calculated as the value for the United States minus the arithmetic average of the United Kingdom, the Euro Area, and Japan, since data for China was unavailable.

6) **Government debt differential:** Annual data on the government debt as percentage of GDP was primary retrieved from the *Global Debt Database (GDD)* (IMF, n.d.). To construct the Euro Area proxy, values for France in 1973-1977 and for the Euro Area in 1995-2012 were retrieved from the *Fiscal Affairs Departmental Data* dataset (IMF, n.d.), while values for Euro Area in 2013-2023 were retrieved from the *Eurostat Database* (Eurostat, 2025). The differential was calculated as the value for the United States minus the arithmetic average of the United Kingdom, the Euro Area, and Japan, since data for China was unavailable.

7) **GDP growth differential:** Annual data on GDP growth rate retrieved from the *World Development Indicators* (World Bank, 2025). The differential was calculated as the values for the U.S. minus the arithmetic average of its four peers.

8) **GDP trend growth differential:** Annual data for trend GDP was retrieved from the *AMECO* database (European Commission, n.d.). Values for Japan and China were based on calculations previously performed by my adviser, where the trend series were obtained using a Hodrick-Prescott filter with a smoothing parameter of $\lambda=100$. To construct the Euro Area proxy prior to 1995, the Euro Area trend GDP value for a given year was adjusted by the relative change in the combined trend GDP of Germany, France, and the Netherlands between consecutive years. This approach captures the dynamic nature of the trend GDP series, which reflects the

underlying economic growth over time rather than static annual values. Then, we calculated the GDP trends growth for each country. The differential was calculated as the values for the U.S. minus the arithmetic average of its four peers.

9) **Trade balance differential:** Annual data for exports and imports of goods and services as percentage of GDP were retrieved from the *World Development Indicators* (World Bank, 2025). The trade balance was then computed as exports minus imports. The differential was calculated as the values for the U.S. minus the arithmetic average of its four peers.

10) **Military expenditure coefficient:** Annual data on military expenditure at constant 2023 USD were retrieved from the *SIPRI Military Expenditure Database* (Stockholm International Peace Research Institute [SIPRI], 2025) and a proxy for the Euro Area was constructed as described above. Annual data on world GDP at constant 2015 USD were obtained from the *World Development Indicators* (World Bank, 2025). The share of military expenditure in world GDP was then calculated for each country by dividing its military expenditure by world GDP. Finally, the coefficient was defined as the ratio of U.S. military expenditure to the combined military expenditure of the United Kingdom, the Euro Area, and Japan, since data for China were not available for the entire period.

Appendix B – Diagnostic Tests and Econometric Validation

Table B.1. Augmented Dickey-Fuller Test Results on Variables

Variable	ADF Statistic	ADF p-value	ADF Stationary (5%)
Reserves	-2.613	0.328	No
Debt	-1.788	0.659	No
Inflation	-3.148	0.113	No
Output gap	-3.318	0.078	No
Unemployment	-2.637	0.318	No
Yield	-4.808	0.010	Yes
Budget balance	-2.976	0.182	No
Government debt	-2.753	0.272	No
GDP growth	-3.659	0.037	Yes
GDP trends growth	-3.13	0.120	No
Trade balance	-1.971	0.586	No
Military expenditure	-1.987	0.579	No

Table B.2. Optimal Step Dummies - P-values

Model/Event dummy	Duration (years)	p-value
Reserves		
Plaza	11	0.040
Asian crisis	5	0.194
Euro	15	0.287
Crisis 2008	6	0.177
WTO	7	0.088
WTO China	3	0.125
Covid-19	1	0.405
Debt		
Plaza	8	0.045
Asian crisis	2	0.100

Model/Event dummy	Duration (years)	p-value
Euro	25	0.001
Crisis 2008	7	0.374
WTO	4	0.085
WTO China	4	0.095
Covid-19	1	0.624

Table B.3. Augmented Dickey-Fuller Test Results on Regression Residuals

Model	ADF Statistic	ADF p-value	ADF Stationary (5%)
Reserves	-7.9326	0.01	Yes
Debt	-5.7072	0.01	Yes

Table B.4. Breusch–Pagan Test for Heteroskedasticity

Model	BP Statistic	df	p-value	Heteroskedasticity (5%)
Reserves	14.4700	16	0.5637	No
Debt	23.9030	16	0.0916	No

Table B.5. Breusch–Godfrey Test for Autocorrelation

Model	BG Statistic	df	p-value	Autocorrelation (5%)
Reserves	2.0145	1	0.1558	No
Debt	2.3692	1	0.1238	No

Table B.6. Variance Inflation Factors (VIF)

Model/Variable	VIF	High VIF (>10)
Reserves		
Reserves lag	3.2018	No
Inflation	2.8168	No
Output gap	2.2089	No
Unemployment	6.8646	No

Model/Variable	VIF	High VIF (>10)
Budget balance	3.7511	No
Government debt	16.7008	Yes
GDP trends growth	2.4203	No
Trade balance	9.7308	No
Military expenditure	15.6491	Yes
Plaza	6.2442	No
Asian crisis	5.2680	No
Euro	5.0821	No
Crisis 2008	6.1945	No
WTO	6.1018	No
WTO China	2.7675	No
Covid-19	3.0899	No
Debt		
Debt lag	7.0561	No
Inflation	2.9157	No
Output gap	1.8933	No
Unemployment	6.7393	No
Budget balance	4.3257	No
Government debt	34.5059	Yes
GDP trends growth	2.6823	No
Trade balance	8.8884	No
Military expenditure	14.2104	Yes
Plaza	4.2447	No
Asian crisis	2.5504	No
Euro	30.0590	Yes
Crisis 2008	4.3803	No
WTO	3.8260	No
WTO China	1.8211	No
Covid-19	2.7125	No

Table B.7. Sequential Removal of Variables Based on p-values

Model/Variable	p-value (in corresponding step)	Removed in step
Reserves		
Trade balance	0.9717	Step 1
Budget balance	0.5234	Step 2
Output gap	0.5399	Step 3
Inflation	0.4750	Step 4
GDP trends growth	0.4200	Step 5
Debt		
Unemployment	0.6735	Step 1
GDP trends growth	0.4192	Step 2
Output gap	0.3201	Step 3
Inflation	0.2257	Step 4

Note: All p-values shown in the stepwise removal tables are based on HAC (Newey–West) standard errors with lag = 1, to ensure robust inference in the presence of heteroskedasticity and autocorrelation.

Appendix C – Diagnostic Tests and Econometric Validation (Robustness Checks)

Table C.1. Augmented Dickey-Fuller Test Results on Regression Residuals

Model	ADF Statistic	ADF p-value	ADF Stationary (5%)
Reserves - Impulse	-5.7085	0.0100	Yes
Reserves - Step	-6.5484	0.0100	Yes
Debt - Impulse	-4.9796	0.0100	Yes
Debt - Step	-5.6347	0.0100	Yes

Table C.2. Breusch–Pagan Test for Heteroskedasticity

Model	BP Statistic	df	p-value	Heteroskedasticity (5%)
Reserves - Impulse	20.1037	16	0.2156	No
Reserves - Step	23.5076	16	0.1008	No
Debt - Impulse	21.4294	16	0.1626	No
Debt - Step	19.4719	16	0.2450	No

Table C.3. Breusch–Godfrey Test for Autocorrelation

Model	BG Statistic	df	p-value	Autocorrelation (5%)
Reserves - Impulse	3.0367	1	0.0814	No
Reserves - Step	0.1388	1	0.7095	No
Debt - Impulse	8.0567	1	0.0045	Yes
Debt - Step	2.8866	1	0.0893	No

Table C.4. Variance Inflation Factors (VIF)

Model/Variable	VIF	High VIF (>10)
Reserves - Impulse		
Reserves lag	2.4112	No
Inflation	2.6230	No
Output gap	1.7796	No

Model/Variable	VIF	High VIF (>10)
Unemployment	3.8758	No
Budget balance	2.7675	No
Government debt	8.4300	No
GDP trends growth	2.5811	No
Trade balance	8.5481	No
Military expenditure	6.8694	No
Plaza impulse	1.3261	No
Asian crisis impulse	1.1335	No
Euro impulse	1.2019	No
Crisis 2008 impulse	1.2698	No
WTO impulse	1.4897	No
WTO China impulse	1.2594	No
Covid-19 impulse	2.4937	No
Reserves - Step		
Reserves lag	3.9125	No
Inflation	3.5093	No
Output gap	1.7075	No
Unemployment	4.3028	No
Budget balance	4.7679	No
Government debt	34.3109	Yes
GDP trends growth	2.1842	No
Trade balance	9.3346	No
Military expenditure	8.6296	No
Plaza step	6.3762	No
Asian crisis step	18.1128	Yes
Euro step	16.1555	Yes
Crisis 2008 step	7.8447	No
WTO step	15.2282	Yes
WTO China step	12.0791	Yes
Covid-19 step	2.5878	No

Model/Variable	VIF	High VIF (>10)
Debt - Impulse		
Debt lag	4.1592	No
Inflation	2.7237	No
Output gap	1.6354	No
Unemployment	3.2126	No
Budget balance	2.9269	No
Government debt	9.1380	No
GDP trends growth	2.4916	No
Trade balance	8.3389	No
Military expenditure	7.2994	No
Plaza impulse	1.4448	No
Asian crisis impulse	1.1319	No
Euro impulse	1.2009	No
Crisis 2008 impulse	1.2786	No
WTO impulse	1.3930	No
WTO China impulse	1.2596	No
Covid-19 impulse	2.2537	No
Debt - Step		
Debt lag	7.1463	No
Inflation	3.2290	No
Output gap	1.5771	No
Unemployment	4.2754	No
Budget balance	5.9499	No
Government debt	43.2092	Yes
GDP trends growth	2.1615	No
Trade balance	9.3562	No
Military expenditure	11.0296	Yes
Plaza step	5.2128	No
Asian crisis step	17.2405	Yes
Euro step	17.1388	Yes

Model/Variable	VIF	High VIF (>10)
Crisis 2008 step	7.8302	No
WTO step	16.1938	Yes
WTO China step	14.9968	Yes
Covid-19 step	2.6091	No

Table C.5. Sequential Removal of Variables Based on p-values

Model/Variable	p-value (in corresponding step)	Removed in step
Reserves - Impulse		
Output gap	0.8137	Step 1
GDP trends growth	0.5984	Step 2
Government debt	0.6154	Step 3
Trade balance	0.5606	Step 4
Budget balance	0.2180	Step 5
Reserves - Step		
Budget balance	0.7749	Step 1
Military expenditure	0.8103	Step 2
Inflation	0.7196	Step 3
Output gap	0.4153	Step 4
Unemployment	0.3657	Step 5
GDP trends growth	0.3178	Step 6
Trade balance	0.2192	Step 7
Debt - Impulse		
Government debt	0.9180	Step 1
Military expenditure	0.6944	Step 2
Output gap	0.6206	Step 3
Inflation	0.5243	Step 4
Budget balance	0.4296	Step 5
Unemployment	0.3983	Step 6
Debt - Step		

Model/Variable	p-value (in corresponding step)	Removed in step
Unemployment	0.7854	Step 1
Budget balance	0.5622	Step 2
Trade balance	0.5054	Step 3
Inflation	0.4040	Step 4
GDP trends growth	0.1660	Step 5
Output gap	0.1638	Step 6

Note: All p-values shown in the stepwise removal tables are based on HAC (Newey–West) standard errors with lag = 1, to ensure robust inference in the presence of heteroskedasticity and autocorrelation.