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COMPETITION BETWEEN THE DOLLAR AND EURO: RESULTS OF REGRESSION ANALYSIS FOR UKRAINE

Abstract

This study investigates factors influencing the stability of reserve currencies. Analysis of Ukraine's economic indicators reveals a strong relationship between GDP, CPI, exports, imports, and exchange rates. Despite 2022 being a turbulent year for the euro, the US dollar remains the primary global reserve currency. Factors contributing to the dollar's dominance include its stable value, the size of the US economy, and geopolitical power. Effective management of the interaction between the dollar and euro is crucial for global economic stability and

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growth. Both currencies can coexist and thrive, with the euro potentially contributing to a more balanced global monetary system. Correlation-regression analysis of their competition reveals significant relationships, underscoring their impact on global economic processes.

Key Words:

US dollar; euro; monetary system; exchange rate; reserves; regression; dispersion.

JEL: C30; E40; E50; F31.

5 figures, 6 tables, 32 references.

Introduction

In the global economy, the dollar and the euro serve as the primary reserve currencies, significantly influencing international trade, financial markets, and global macroeconomic stability. Understanding the competition between these currencies is crucial for understanding their broader impact. The increasing rivalry between the dollar, renowned for its stability and liquidity, and the euro, which reflects the substantial economic strength of the European Union, not only spurs the growth of trade transactions but also fosters the development of new financial instruments and investment strategies (Koziuk, 2022).

This study aims to analyse the competition between the dollar and the euro in the global economy, elucidating the relationship, influence, and competitive dynamics between these two leading world currencies within international financial markets.

Literature review

The emergence of the euro in the global market has intensified competition with the US dollar, particularly in exchange rates, invoicing, and reserves. The size and economic output of the euro area make it comparable to the US in terms of international trade and GDP. Although mainstream economists anticipated the euro's appreciation post-creation, the currency has experienced unexpected depreciation (Li, 2004; Alquist & Chinn, 2002). Various models explain this weakness, focusing on fundamental factors and market expectations, though these are not entirely satisfactory (Clostermann & Schnatz, 2000; Moosa, 2002; Schnatz & Vzjselaar, 2003; Norrlof, 2009). Despite these initial setbacks, the euro holds significant long-term potential, though its future role in international invoicing and as a reserve currency remains to be seen.

In the book (Hartmann, 1999) the author formulates a theoretical model of international currencies utilizing game theory, time series, and panel econometrics and integrates financial markets analysis with transaction cost economics. P. Hartmann analyzes the role and evolution of international monetary use, such as its function as a vehicle currency, and applies this analysis to assess the future role of the euro, particularly in comparison to the US dollar.

The article (Barrientos Nieto, 2023) deals with the phenomenon of economic dollarization. Examples of Panama, Ecuador, Argentina, El Salvador that have already dollarized their economies, show different effects – from currency stabilization to increased living costs, deindustrialization, and reliance on exports. The authors (Mačí, 2020; Jaworski, 2008; Rochon & Rossi, 2003) argue that euroization should be reflected in foreign trade, namely in the currency of invoicing. Today a lot of non-EU countries invoicing to third countries expressed in euro, dollars, and other currencies.

The article (Otero Iglesias, 2011) synthesizes both euro-optimist and euro-skeptical perspectives within the economic literature regarding the euro's challenge to the dollar. It highlights how current data reveal that the euro has not met the expectations of euro-optimists. Adopting a constructivist approach, the article also demonstrates that the euro has evolved into a truly global currency in a social context. Key financial agents increasingly perceive a transition from a unipolar system dominated by the dollar to a bipolar system, where a gradually declining senior currency (the dollar) and a gradually ascending junior currency (the euro) compete with one another. The findings of the research (Eun et al., 2015) indicate that the influence of the euro, relative to the dollar, on other currencies has increased since its introduction.

The literature (Farion et al., 2019; Dluhopolskyi et al., 2021; Suslenko et al., 2022; Zatonatska et al., 2022) underscores the evolution of digital currencies and

the transformation in the functional role of contemporary fiat money. In addition to the classical functions of money – medium of exchange, unit of account, and store of value – the function of ensuring the anonymity of transactions has emerged. This additional function is notably absent in electronic and digital transactions, which do not inherently guarantee transactional anonymity.

Research methodology

The scientific hypothesis of this study posits that various factors influence the stability of reserve currencies. This research examines the impact of several factors on the dynamics of the exchange rate (y) from 2015 to 2023 in Ukraine, specifically: the nominal Gross Domestic Product (GDP) (x1), the Consumer Price Index (CPI) (x2), the volume of exports (x3), and the volume of imports (x4). The analysis was conducted using correlation regression techniques. A high coefficient of determination in the results indicates a strong inter-factor dependence and the significant influence of these variables on the exchange rate dynamics.

Research results

In the field of economics, the study of reserve currencies within the global monetary system can be approached from two distinct perspectives. The first is the functional or general economic approach, which emphasizes the objective functional characteristics of reserve currencies. This perspective gained prominence during the Bretton Woods monetary system era when the US dollar was established as the official reserve currency. The second perspective, the capitalist approach, examines the role of reserve currencies within the framework of contemporary global economic relations, particularly following the global financial crisis of 2008-2009. This approach posits that reserve currencies function as sterilizers of an unsecured money supply, thereby sustaining the long-term existence of the virtual economy. Central to this discourse is the United States and its dollar, the preeminent global and reserve currency, which, according to critics, lacks a tangible foundation (Koziuk, 2014; Koziuk, 2022; Koziuk, 2023).

The United States dollar, along with the currencies of several other nations, plays a pivotal role in the global economy. Its status was initially established in 1792 through the enactment of the Coinage Act. In 1900, the Gold Standard Act linked the dollar to gold, with one dollar equating to 1.505 grams of gold. However, due to escalating inflation in the United States and the devaluation of other currencies in 1971, President Richard Nixon terminated the dollar's gold convertibility. This decision precipitated the adoption of a new system of floating ex-

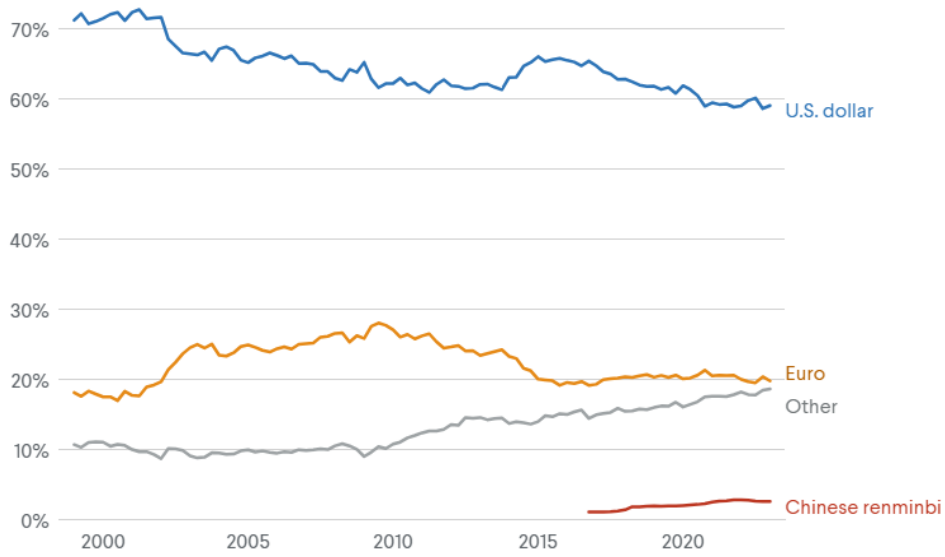
change rates, which was formally endorsed with the establishment of the Jamaican currency system in 1976 (Siripurapu & Berman, 2023).

The contemporary system of floating exchange rates emerged under conditions akin to those prevalent today, characterized by high inflation, significant fluctuations in commodity prices, and geopolitical tensions. Elevated inflation rates persisted in developed economies until the early 1980s (Nikolaichuk, 2023; Beck et al., 2022).

Subsequently, prices in the United States began to stabilize gradually. The development of American and global capital markets, along with the deepening of global trade ties, ultimately reinforced the dollar's status as the dominant world currency. Presently, the US dollar serves as the primary reserve currency globally (Figure 1). The political and currency policies of the United States exert significant influence on the global economy. Prices for oil, gold, industrial metals, and agricultural raw materials in world markets are determined in dollars.

Figure 1

Positions of U.S. dollar, Euro and other currencies 2000-2023, % of allocated reserves



Source: (Siripurapu & Berman, 2023; Bremmer, 2023)

Several factors influence the fluctuation of the dollar, including the rate of inflation in the United States. For instance, when inflation rises in the United States, the Federal Reserve System, which functions as the country's central bank, may increase interest rates to curb commodity prices. An increase in interest rates attracts foreign investment and boosts demand for the dollar, thereby leading to an appreciation of its value. Conversely, when interest rates are lowered to support economic growth, investors may seek opportunities in other countries, resulting in a decline in the value of the US dollar.

In 2022, the US dollar attained a 20-year peak against other global currencies, underscoring its increasing strength (Figure 2). This phenomenon has the potential to induce global economic instability or trade imbalances. Nevertheless, investors worldwide persist in favoring the US dollar, anticipating its continued robustness. The strengthening of the dollar is attributable to both economic and geopolitical factors. To contain inflation triggered by the COVID-19 pandemic and the war in Ukraine, the US Federal Reserve has been actively raising interest rates and phasing out quantitative easing measures.

Figure 2

U.S. Dollar Index

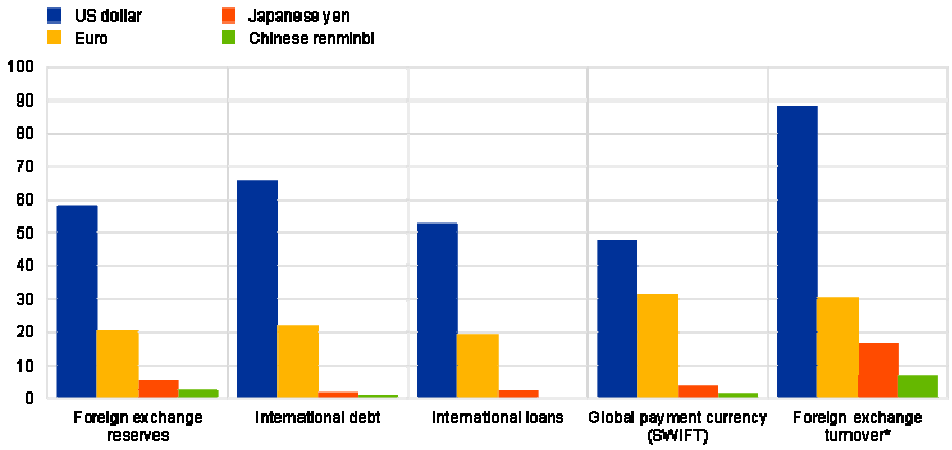
Source: (DXY, 2024)

European countries are also increasing interest rates, although not as rapidly as the United States. Meanwhile, the exchange rates of European Union countries, particularly the euro, are adversely affected by Europe's proximity to Ukraine, which is currently experiencing a war. Additionally, the euro is vulnerable to the influence of Russian energy supplies and may lose its standing due to the

potential for a further crisis in the Eurozone. In this context, the US dollar appears to be the most attractive investment option. The euro remains the second most important currency in the international monetary system (Figures 3-4).

Figure 3

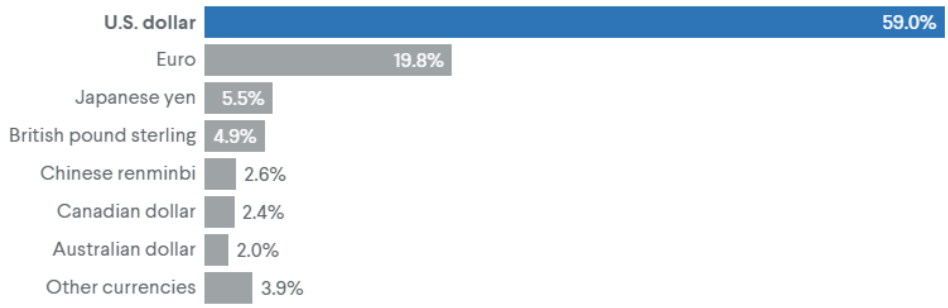
Snapshot of the international monetary system



Source: (Lagarde, 2023)

Figure 4

Share of allocated foreign exchange reserves



Source: (Siripurapu & Berman, 2023)

Using Ukraine's data on economic indicators (Table 1), the equation takes the form:

$$y = 815.9 + 0.0003x1 + 8.92x2 – 0.0007x3 + 0.0005x4. \quad (1)$$

Table 1

Economic indicators of Ukraine 2015-2023

Year	GDP nominal, UAH mln, x1	Inflation rate, %, x2	Export, UAH mln, x3	Import, UAH mln, x4	Exchange rate, UAH / euro, y
2015	1979458	143,3	1044541	-1084016	26,03
2016	2383182	112,4	1174625	-1323127	27,45
2017	2982920	113,7	1430230	-1618749	33,02
2018	3558706	109,8	1608890	-1914893	31,71
2019	3974564	104,1	1636416	-1947599	26,30
2020	4194102	105,0	1637399	-1681526	33,05
2021	5459574	110,0	2224704	-2286067	30,76
2022	5191028	126,6	1840563	-2712325	38,95
2023	6537825	105,1	1868904	-3237014	39,72

Source: (Ministry of Finance, 2024)

The coefficient of multiple correlation R = 0.91, which indicates a close relationship between the factors and the result. The coefficient of determination, R^2 = 0.83, so 83% of the change in the output variable is determined by the influence of the input variables (Table 2).

Table 2

Results of regression statistics – 1

Regression Statistics	
Multiple R	0,913460
R Square	0,834409
Adjusted R Square	0,613622
Standard Error	257,884872
Observations	8,000000

Source: created by the authors

The next step is to compare the obtained data (Table 3) with Fisher's tabular test, that is, there is a linear relationship between all input variables as a whole and the output variable (this linear model is significant).

Table 3

Results of dispersion analysis – 1

	df	*Sums of Squares*	*Mean Squares*	*F*	*Significance F*
Regression	4	1005347,68	251336,920	3,78	0,15172171
Residual	3	199513,82	66504,607		
Total	7	1204861,50			

Source: created by the authors

After that, we evaluate the statistical significance of the regression parameters using the Student's t-test (Table 4). The value of t_crit = 2.57, so for the variables x1 (GDP, nominal), x2 (CPI, consumer price index) and x4 (import) – |t_fact|<t_crit, that is, these variables are not statistically significant for the model. At the same time, for the variable x3 (export) – |t_fact |>t_crit , which indicates the presence of a linear relationship between these variables and the output variable, so they are statistically significant. Also, the p-value, which should be lower than 0.05, tells us about significance. Significant changes are highlighted in red.

Table 4

Results of regression analysis

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	815,9595	1453,7055	0,561	0,613793365
X 1	0,0003	0,0004	0,737	0,514415264
X 2	8,9181	8,7598	1,018	0,383599194
X 3	-0,0007	0,0011	-0,603	0,048923415
X 4	0,0005	0,0005	0,936	0,418162088

Source: created by the authors

Thus, the equation of the evaluation plane takes the form:

$$y = -1431.8 + 0.0005x1 + 43.49x2 – 0.00079x3 – 0.00054x4. \quad (2)$$

The coefficient of multiple correlation R = 0.82, indicating a close relationship between the factors and the outcome. The coefficient of determination R^2 = 0.67, so 67% of the change in the output variable is determined by the influence of the input variables (Table 5).

Table 5

Results of regression statistics – 2

Regression Statistics	
Multiple R	0,82
R Square	0,67
Adjusted R Square	0,01
Standard Error	422,07
Observations	7,00

Source: created by the authors

According to Fisher's tabular criterion, we compare the obtained data (Table 6) – there is a linear relationship between all input variables in general and the output variable (this linear model is significant).

Table 6

Results of dispersion analysis – 2

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	718387,319	179596,83	1,008	0,553
Residual	2	356292,209	178146,10		
Total	6	1074679,529			

Source: created by the authors

So, we can observe that the correlation coefficient R^2 ranges from 0.67 to 0.83, which indicates a high degree of relationship between the factors and the result. The exchange rate plays a key role in making international calculations and comparing the level of economic development of countries. Its formation is influenced by various factors, such as the state of the balance of payments, the volume of GDP, the inflation rate, exports and imports.

In the realm of finance and economics, the rivalry between the U.S. the dollar and the euro have become a focal point, significantly influencing global financial markets and shaping the economic policies of nations. This competition between the two currencies manifests itself across various domains.

In the sphere of international trade and investment, both the dollar and the euro vie for the position of the primary currency for transactions. Their standings are influenced by factors such as economic stability, inflation levels, and the economic policies of the issuing countries. Additionally, this competition extends to geopolitical relations, where the United States and European Union countries leverage their currency positions to exert global influence.

The year 2022 was particularly turbulent for the euro, with analysts dubbing it «the worst year in the history of the euro» (Cingari, 2023). The euro/dollar exchange rate began the year at $1.137 but fell below parity for the first time in 20 years in July, reaching a two-decade low. It hit a year-to-date low of $0.960 on September 27, following the indefinite shutdown of the Nord Stream 1 gas pipeline (Figure 5). However, following the European Central Bank's 75 basis point policy hike on October 27, the euro recovered above parity, and by the year's end, the euro/US dollar rate had reached $1.07 (Ilzetzki & Jain, 2023).

Three primary factors have been identified as contributing to the depreciation of the euro in 2022 (Ilzetzki & Jain, 2023):

1. Europe's significant reliance on Russian energy and the consequent economic downturn resulting from the invasion of Ukraine.

2. The increasing disparity in monetary policies between the Federal Reserve (Fed) and the European Central Bank (ECB).

3. The function of the US dollar as a «safe haven» currency during periods of financial and political instability.

Figure 5

US dollar to euro spot exchange rate in 2022

Source: (Ilzetzki & Jain, 2023; Federal Reserve Bank of St. Louis, 2024)

Thus, the US dollar continues to maintain its position as the world's leading currency despite recent challenges. It accounts for the majority of global reserves and remains the preferred currency for international trade. Major commodities, such as oil, are predominantly traded in US dollars. Furthermore, several significant economies, including Saudi Arabia, continue to peg their currencies to the dollar. Factors contributing to the dollar's dominance include its stable value, the size of the U.S. economy, and the geopolitical power of the United States. Additionally, no other country has a debt market comparable to that of the United States, which is approximately $34.7 trillion (Waters, 2021; Peter G. Peterson Foundation, 2024).

Practical implementation and limitations

The results of the research can be used to form a holistic concept of reserve currency management at the global and national levels, as well as in programmatic and advisory documents that structure the institutional field of monetary and currency policy. The limitations of this article pertain to the narrow time horizon and the exclusive focus on the case of Ukraine for analysis. Future research should consider extending the analysis to longer periods and including a broader sample of countries to address these limitations.

Conclusions

In general, both the dollar and the euro have their origins in the historical events and economic reforms of their respective regions. The dollar, which emerged from the development of the American economy, became the primary global currency after World War II. Conversely, the euro was created to strengthen the economic union of the European Union member states. Both currencies have endured various challenges and transformations throughout history, which have contributed to their stability and credibility in international trade. Ultimately, the dollar and the euro remain vital components of the global financial system, reflecting the influence and power of the economies of the United States and the European Union in the contemporary world.

The competition between the dollar and the euro plays a crucial role in shaping the global economy. Maintaining a balance between these two currencies and developing effective strategies to manage their interaction is essential for ensuring the stability and growth of the global economy. Both currencies can coexist and thrive in the global economy. The rise of the euro can positively contribute to a more stable and balanced global monetary system. A correlation-regression analysis of the competition between the dollar and the euro in the global economy reveals significant relationships and highlights the influence of these two major world currencies on economic processes.

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