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Evolution of Value and Structure of Currency Derivatives Market

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Abstract:

Purpose: *The purpose of the paper is to present the results of the analysis concerning the evolution of the global currency derivatives market in the context of the ongoing transformations.*
Design/methodology/approach: *The basis for achieving the assumed objective were literature studies, a review of external research results and an analysis of data on the global currency derivatives market, provided by the Bank for International Settlements.*
Findings: *Based on the conducted research, it was observed that the global currency derivatives market was systematically developing in the analysed period. The leading share in this market, and therefore its importance, was characterised by the over-the-counter market, which provides greater possibilities of adapting instruments to the expectations of entities. Currency forwards & FX swaps were characterised by particular interest in over-the-counter trading, and currency futures in exchange trading.*
Research limitations/implications: *The presented research is a preliminary analysis. The considerations presented herein focused on several selected issues determining the evolution of the global currency derivatives market. Therefore, the possibilities of evaluating the results and generalizing the conclusions are limited. Nevertheless, this study provides a basis for further research.*
Practical implications: *Currency derivatives traded on the OTC market are a more popular tool for managing currency risk. This is due to the greater possibilities of adapting the instrument's terms to the specifics of a given entity and its expectations. Therefore, when analysing potential changes in the functioning of the exchange market for currency derivatives, it is worth paying attention to the importance of flexibility in shaping the terms of these instruments from the perspective of financial market participants.*
Originality/value: *The article partly fills the research gap in the empirical studies on the evolution of the foreign exchange derivatives market. The conclusions formulated may find theoretical and practical application in analysed scope.*

Keywords: *Currency risk, currency derivatives, currency derivatives market.*

JEL classification: *G12, G15, G23, F31.*

Paper type: *Research article.*

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1. Introduction

In the current economic reality, uncertainty of currency exchange rate changes is one of the major factors affecting the operations of a large group of business entities. Many businesses are facing currency exchange risk, which forces them to take proper actions in order to reduce its impact on their accounting earnings. Currency derivatives are among the basic tools used for currency exchange risk management.

All transactions with this type of instruments constitute a specific segment of the financial market, called the currency derivatives market. Considering turbulent situation of international economic environment, significant capacity of currency derivatives to adjust to business conditions should be reflected in a systematic increase in their popularity and related market growth.

However, in the recent years, some unusual events were reported, with dynamic and unpredictable scenarios, and unexpected consequences, that had significant impact on the operations of businesses and the financial market. In that connection, the evolution of the currency derivatives market in the context of the ongoing transformations, is a very interesting issue.

Considering the relevance and significance of this problem, this paper is an attempt to analyse the evolution of the currency derivatives market. The study has been conducted using descriptive method, comparative method, based on literature analysis, review of external research and analysis of the Bank for International Settlements data.

2. Literature Review

Currency risk and the conditions that define its scale are a complex and variable issue (Coyle, 2013; Dziawgo 2010; Grobys, 2024; Misztal, 2004). The indispensability and scope of impact of the exchange rate fluctuations in the international business determines the development of processes that help manage that risk within organisations. The higher is the currency exchange risk exposure, the greater is the interest in instruments that reduce its impact on business operations (Papaioannou, 2006; Pobrić 2019; Puszer, Czech, and Szewczyk, 2022).

The basic tools allowing to reduce that impact, are currency derivatives. Bearing that in mind, their usage in order to reduce the impact of currency exchange rate fluctuations on the financial performance and the property and financial condition of enterprises, has been described in numerous publications (Allayannis and Ofek, 2001; Broll, Wahl, and Zilcha, 1995; Clark and Judge, 2009; Hagelin and Pramborg, 2004; Pawłowski, 2024).

Currency derivatives are financial instruments whose value is shaped depending on the changes in the currency exchange rate. Generally, they are perceived as currency

exchange risk transfer instruments, which means that they serve to reduce its negative consequences. However, there are other known reasons for their practical use, including speculation and arbitration (Cuthbertson and Nitzsche, 2006).

It is noteworthy that enterprises tend to use currency derivatives for hedging purposes (Allayannis and Weston, 2001; Grima and Thalassinos, 2020). The primary goal in those cases is to minimise variability in cash flow and in accounting earnings, arising from the operating activities of the organisation (Papaioannou, 2006).

It is noticeable that businesses use currency derivatives ineffectively, which has a negative impact on the fulfilment of assumed goals in the analysed aspect (Hentschel and Kothari, 2001). That problem has also been mentioned by Guay (1999). He emphasised the significance of developing a proper hedging policy, reflecting the currency exchange risk, particularly considering proper adjustment of derivatives selection and usage processes to the existing conditions in the context of the formulated goals and expectations (Guay, 1999).

The use of currency derivatives in order to hedge against unfavourable changes of currency exchange rates, is called currency hedging, and has been described in numerous publications. One of the most frequently analysed aspects of that problem, is the evaluation of derivatives usage effects, which is rather arguable.

On one hand, many publications indicate a positive relation between the use of currency derivatives and limiting currency exchange risk exposure (Bartram, Brown, and Conrad, 2011; Allayannis and Ofek, 2001; Clark and Judge, 2009). On the other hand, in certain publications there are doubts over currency hedging efficiency (Bali, Hume, and Martell, 2007; Guay and Kothari, 2003). Instability of economic environment, specificity of currency risk and derivatives, as well as particular conditions of business activity, apparently cause that currency hedging requires proper conditions in order to bring positive effects.

In that connection, the interest in those instruments among enterprises is diversified. Greater willingness to use currency derivatives might be determined by the branch in which the organization operates (Jin and Jorion 2006), industrial diversification, size of the company, actual and planned development, structure of assets, etc., (Bartram, Brown, and Conrad, 2011). When analysing the efficiency of currency derivatives, a number of factors could be brought into consideration.

However, two aspects are emphasised, that must be analysed in a coherent manner. One of them is performance in reducing currency exchange risk exposure, related with cash flow and stock returns variability. Another aspect is achieving positive effect of currency hedging on organization's value and performance. The efforts taken by the enterprises should lead to the achievement of positive effects in both areas (Bae, Kim, and Kwon, 2018).

Certainly, currency exchange risk hedging derivatives, in order to be effective, must be adjusted to the conditions of secured items, considering the character of given business operations. As a result, the selection of proper instruments is a complex process that involves appropriate resources (Battermann *et al.,* 2000; Alvarez-Diez, Alfaro-Cid, and Fernandez-Blanco, 2016), but still, the major problem is their availability. It has been reported that restricted access to proper markets is a barrier that prevents enterprises from effective use of these instruments.

As a result, popularisation of that hedging method might be limited because the interest of involved parties is an important factor determining the growth of derivatives markets (Broll, Wahl, and Zilcha, 1995). It is noteworthy that rapid growth of derivatives market has been observed in the recent years, with a noticeable differentiation in many aspects (Bartram, Brown, and Conrad 2011; Graham and Rogers, 2002).

The development of derivatives markets is significant, which is highlighted by their broad impact on the economic system, functioning of the financial market and activities of enterprises (Vo *et al.,* 2019; Sendeniz-Yüncü, Akdeniz, and Aydoğan, 2018; Alalmai, 2023). The findings of the research concerning the evolution of the world currency exchange derivatives market are quite interesting.

Above all, they indicate a leading role of that market within the world financial system (Grobys, 2024). They also highlight significant growth discrepancies between the stock exchange and over-the-counter segments.

It is worth mentioning that the OTC market is far more significant for the currency exchange derivatives. It is mainly connected with better possibilities to adjust the terms of derivatives contracts in order to meet the expectations of the involved parties. The analysis of practically used currency exchange derivatives indicates that currency forward contracts, currency option transactions and currency swaps were particularly popular (Bodnar *et al.,* 2013; Papaioannou, 2006; Ranaldo and Somogyi, 2021; Thalassinos and Kiriazidis, 2003).

Despite the observed growth of the currency derivatives markets, their insufficient development is seen as a significant barrier for effective currency risk management (Bae, Kim, and Kwon, 2018; Clark and Judge, 2009). Additionally, the recent Covid-19 pandemic had a significant impact on the financial market.

Considering its range and effects in that area, it is called the Covid-19 crisis (Ospina-Forero and Granados, 2023). Its consequences had a significant impact on the transformations on the currency derivatives market (Emm *et al.,* 2022). Bearing that in mind, this paper analyses the evolution of the currency derivatives market with a particular focus on the pandemic period.

3. Materials and Methods

At the research development stage, it has been assumed that the major goal would be the analysis of the evolution of the world currency derivatives market, considering both general changes and structural changes, based on selected criteria. Considering the availability of data, in order to ensure comparability of information concerning the stock exchange and OTC markets over time, it has been agreed that the analysis would describe the period from 1998 to 2023.

The research was based on the data of the Bank for International Settlements as well as information shared in the statistical databases. Depending on the methodology used by the Bank for International Settlements, the analysis of individual issues encompassed data presented at the end of individual 6-month or quarterly periods. Considering the goal of the research, it has been assumed that the analysis would refer to the following aspects:

- the size of the world currency derivatives market,
- the structure of the world currency derivatives market considering the organisation method criterion,
- yearly changes in the worth of the world currency derivatives market,
- the structure of the world stock exchange and OTC currency derivatives market considering the instrument type criterion,
- the structure of the world stock exchange and OTC currency derivatives market considering the contract currency criterion.

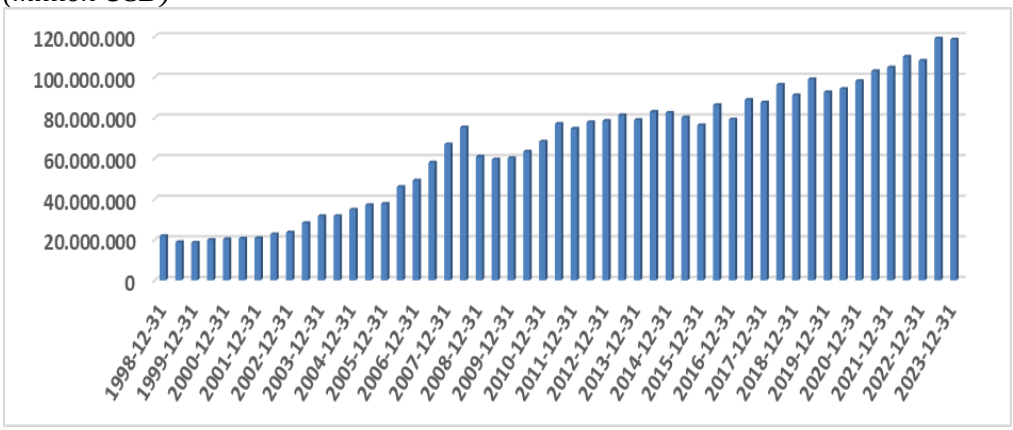
4. Results and Discussion

The results section starts with the presentation of the worth changes on the world currency derivatives market in the period from 1998 to 2023. The calculations are based on the estimate at the notional amounts of outstanding derivatives level. Relevant data are presented in Figure 1.

The presented data indicate that the value of the analysed market increased from around 21.8 trillion US dollars in 1998 to 118.5 trillion US dollars in 2023. This means that the scale of growth in the analysed 25-years period reached approximately 443.6 percent. The average yearly growth rate was around 17.7 percent. A systematic growth of the analysed market has been observed.

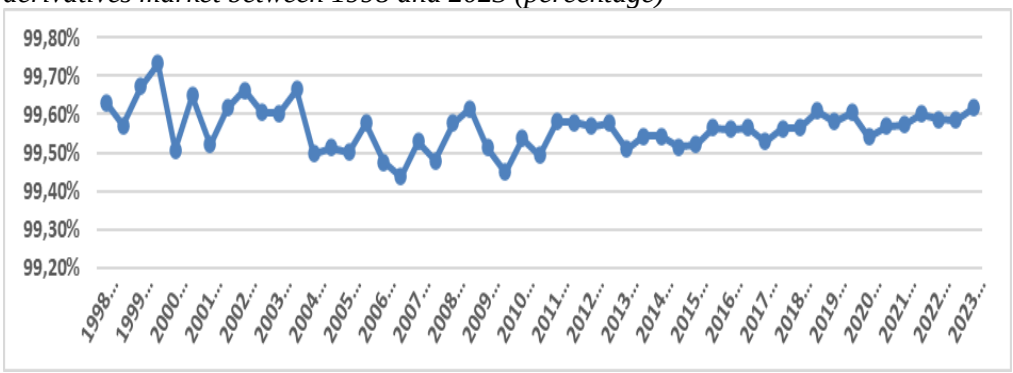
Another analysed aspect was the structure of the currency derivatives market, considering the organisation criterion. Consequently, the stock exchange market and the over-the-counter market have been distinguished. In order to ensure legibility of presented graphic content, data concerning the share of the OTC and stock exchange market segment in the overall market value are shown separately, in Figures 2 and 3.

Figure 1. *The value of the world currency derivatives market from 1998 to 2023 (million USD)*



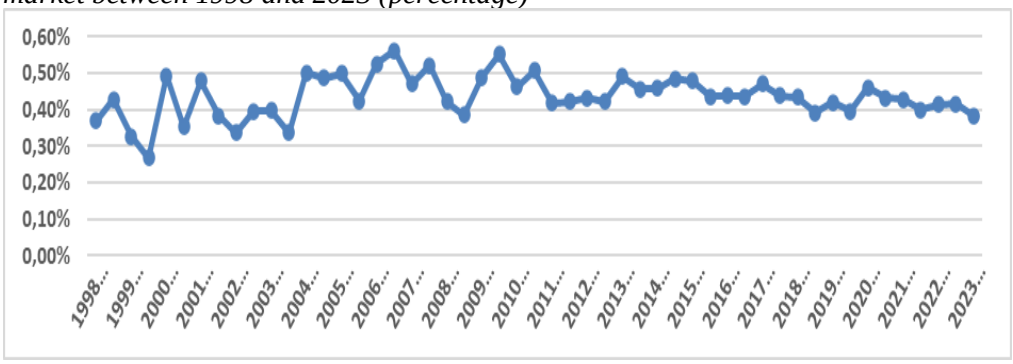
Source: *Own study based on BIS data.*

Figure 2. *The share of the over-the-counter market in the world currency derivatives market between 1998 and 2023 (percentage)*



Source: *Own study based on BIS data.*

Figure 3. *The share of the stock exchange market in the world currency derivatives market between 1998 and 2023 (percentage)*

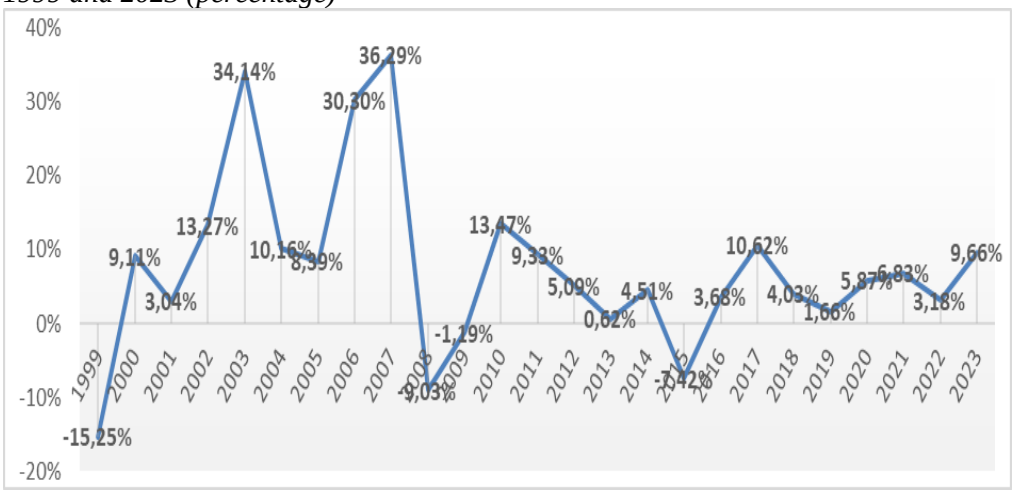


Source: *Own study based on BIS data.*

The data presented above indicate that the majority of currency derivative transactions were made on the over-the-counter market. The share of that segment in the overall market value in the analysed period reached from 99.4 up to 99.8 percent. The stock exchange segment had a marginal share. The presented research findings have confirmed the findings of the previous literature research, indicating the domination of the over-the-counter market in the field of currency derivatives transactions. Additionally, they have made us aware of its scale.

In the following part of the research, yearly changes in the value of the world currency derivatives have been analysed. For that purpose, relative increase chains have been used. Figure 4 presents the calculated values.

Figure 4. *Yearly changes in value of the world currency derivatives market between 1999 and 2023 (percentage)*



Source: *Own study based on BIS data.*

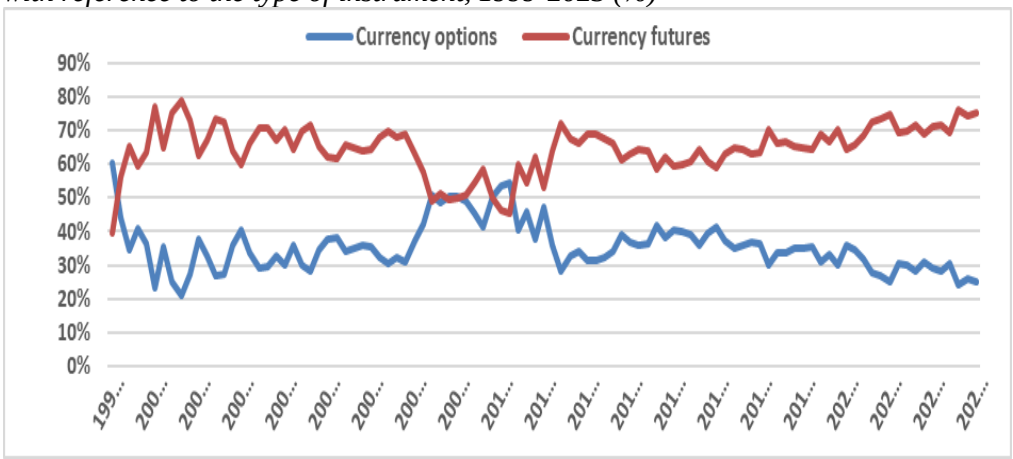
Presented data indicate positive changes in most of the years within the analysed period. The scale of increase varied, reaching record values in 2003 (34.14 percent), 2006 (30.3 percent) and 2007 (36.29 percent), that is before the world financial crisis. It is worth noting that the research period included 4 years when the value of the analysed market decreased.

That happened in, 1999 (-15.25 percent), 2008 (-9.03 percent), 2009 (-1.19 percent) and 2015 (-7.43 percent). Additionally, attention has been brought to the potential impact of the Covid-19 pandemic on the changes in the value of the analysed market. When considering the years before and after the Covid-19 pandemic, it is difficult to distinguish a clear change in the growth rate of the analysed market. However, relatively slower growth was observed in 2022, in comparison with the preceding and the following years.

Another analysed aspect was the structure of the currency derivatives market, with

reference to the type of traded instrument. Structural changes between 1998 and 2023 have been analysed. Considering the differences in the characteristics of the stock exchange and OTC market, the analysis was conducted separately for particular segments. Stock exchange data were made available once in 3 months, while the OTC data were published every 6 months. Figure 5 presents the data concerning the structure of the stock exchange market, while Figure 6 refers to the over-the-counter market.

Figure 5. *The structure of the world stock exchange market of currency derivatives with reference to the type of instrument, 1999-2023 (%)*



Source: *Own study based on BIS data.*

Considering the character of the stock exchange market, the only traded instruments are currency options and currency futures. Presented data indicate increased interest in currency futures among the market participants. In most of the analysed years, currency futures had a dominant share on this market, reaching as much as 60 to 80 percent. The cases of currency options share domination were rare and insignificant. They were reported in 1998 and between 2008 and 2010. It can be noticed that in the period of the world financial crisis, the interest in currency options increased in comparison with currency futures.

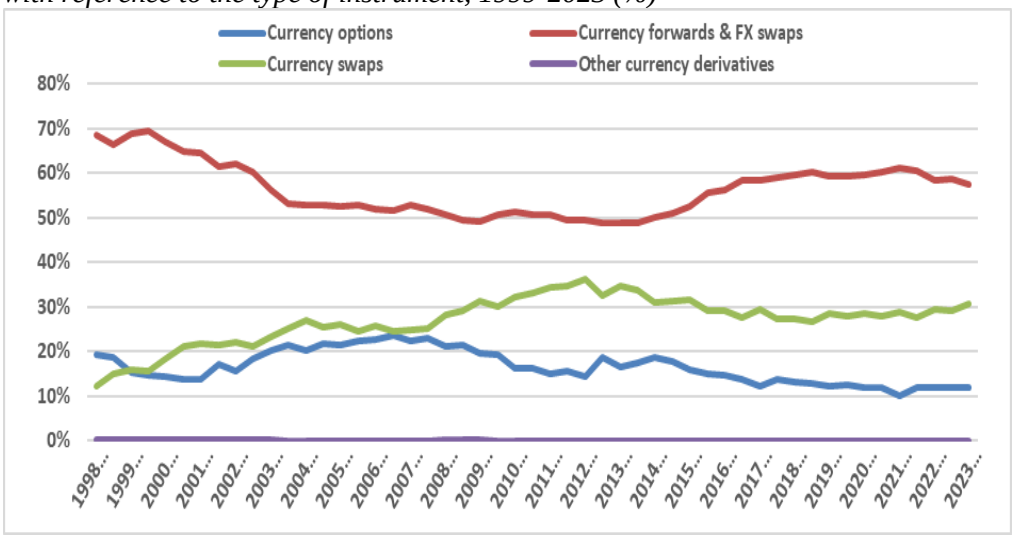
In accordance with the division rules applied by the BIS, currency derivatives on the over-the-counter market are classified in 4 following categories:

- currency options,
- currency swaps,
- currency forwards & FX swaps,
- other currency derivatives.

The results of the research show that currency forwards and FX swaps had a dominant share in the OTC market of currency derivatives in the analysed period. It

reached approx. 49 to 69 percent. The second group of most popular instruments were currency swaps. The value of currency swap transactions reached from 12 to 36 percent of the total value of the analysed market. Currency options had a relatively less significant share, reaching approximately 10 to 24 percent. Other types of over-the-counter currency transactions had marginal significance on the analysed market.

Figure 6. *The structure of the world over-the-counter market of currency derivatives with reference to the type of instrument, 1999-2023 (%)*



Source: *Own study based on BIS data.*

The structure of the currency derivatives markets in terms of the currency of traded instrument was another aspect of analysis. The data obtained in the course of the research clearly indicate that the dominant currencies were US dollar (USD), euro (EUR) and Japanese Yen (JPY).

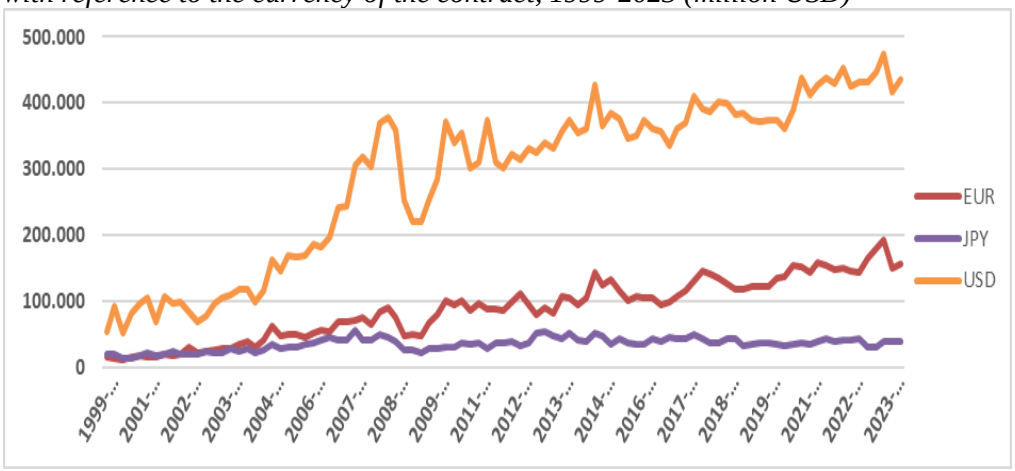
Other currencies were less significant. In order to ensure clarity of the graphic content, trends in currency derivatives have been presented with reference to these three currencies mentioned above. Figure 7 presents the data concerning the stock exchange market, while Figure 8 refers to the over-the-counter market.

Data presented above indicate that the major currency of the currency derivatives transactions on the stock exchange market was US dollar. Its dominance was clear and increased over time in relation to other currencies in the absolute dimension. Significant fluctuations in form of rapid decrease in the value of transactions in US dollars, followed by an increase, were seen only during the world financial crisis period, between 2007 and 2009.

The second most popular value of the described transactions was the euro. It must be

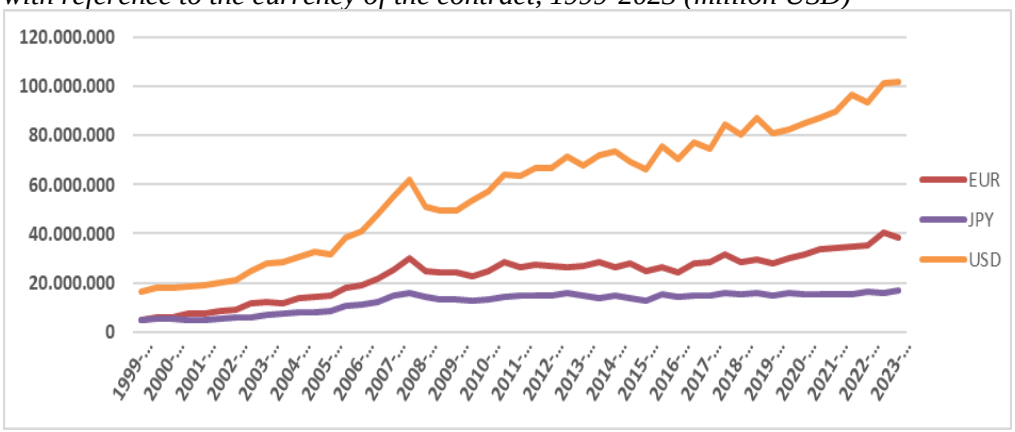
pointed out, however, that in the beginning of the analysed period, the interest in instruments traded in euro and Japanese Yen was similar. A relative increase in the popularity of derivatives in euro appeared after the mentioned financial crisis.

Figure 7. *The structure of the world stock exchange market of currency derivatives with reference to the currency of the contract, 1999-2023 (million USD)*



Source: *Own study based on BIS data.*

Figure 8. *The structure of the world over-the-counter market of currency derivatives with reference to the currency of the contract, 1999-2023 (million USD)*



Source: *Own study based on BIS data.*

The presented findings concerning the OTC market confirm significant domination of the US dollar. A systematic increase in the value of derivatives trade in the US dollar can be seen (with only a few exceptions), both in a general dimension and in relation to the value of contracts in other currencies.

The negative effects of the world financial crisis between 2007 and 2009 were relatively less significant on the over-the-counter market, as compared with the stock

exchange market. On one hand, it was reflected in a relatively smaller reduction in the value of the transactions concluded in that period. On the other hand, comparing the highest values before the crisis with the size of those markets in the post-crisis periods, it is noticeable that the scale of the growth was much larger on the OTC market. That could be a sign of higher resistance to financial fluctuations.

Also on the analysed OTC market, the euro was the second most popular currency of the described transactions. Similarly to the stock exchange market, in the first years of the analysed period, the interest in instruments offered in the euro and Japanese Yens was similar. The euro gradually gained an advantage over time.

5. Conclusions

The analysis of the currency derivatives market presented in this paper provides valuable information and allow to formulate quite interesting conclusions. The assessment of the size of the world currency derivatives market between 1998 and 2023 indicates a significant growth. Its size increased from 21.8 to approximately 118.5 trillion US dollars. It means that the value of the market increased by around 443.6 percent, with an average yearly rate of 17.7 percent.

Considering the structure of the analysed market in terms of trade organisation, we can confirm a significant domination of the over-the-counter segment. In the entire analysed period, its share was between 99.4 to 99.8 percent. In this connection, the share of the stock exchange market was marginal.

Comparing the size of that market in the period before the financial crisis from 2007 to 2009 and the share reached in the following years, we can conclude that the scale of the latter growth was much larger than on the over-the-counter market. That could be a sign of higher resistance to financial fluctuations.

The assessment of the change in the size of the world currency derivatives market indicates an increasing trend throughout the most of the analysed period. Its size decreased in only four years within the described timeframes. Additionally, considering the years just before and after the Covid-19 pandemic, it is difficult to distinguish a clear change in the growth rate of the analysed market. However, relatively slower growth was observed in 2022, in comparison with 2021 and 2023.

The analysis of the structure of the described market in terms of traded instruments indicates that the dominant share in the over-the-counter segment, reaching 49 to 69 percent, belonged to currency forwards and FX swaps. On the stock exchange market, relatively most popular derivatives were currency futures.

When considering the structure of the analysed market in the context of the currency of traded instruments, we can notice that the most popular currencies were US dollar (USD), euro (EUR) and Japanese Yen (JPY). A significant domination of US dollar

is apparent. It was the major currency of forward contracts both on the stock exchange market and on the OTC market. It should be noted that not only the overall value of transactions increased for that currency, but also the value in relation to contracts in other currencies.

Today, the euro is the second most popular currency of the described transactions. It needs to be emphasised that the increase in popularity of derivatives in the euro occurred during the financial crisis between 2007 and 2009. In the preceding years, the interest in derivatives traded in the euro and Japanese Yens was similar.

Finally, it should be noted that the analysis presented herein is not sufficient to describe the complexity of the described problem, but provides a basis for further research in this field.

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