Eurodollar Risk of Emerging Markets

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Abstract: The Eurodollar market is out of US monetary targets, but favorite financing item of emerging markets. Global economic prosperity raise the demand for Eurodollar loans but Fed's dollar supply is not linked to the Eurodollar market. This generate an increasing risk in the emerging markets in proportion with their demand for Eurodollar financing. This can have an unwanted backslash on both emerging markets risk premium. After an extensive explanation of the risk mechanism, the paper analyze the linkage between US interest rates as a proxy of business cycle and the CDS premia of emerging countries between 2001 and 2024 on daily bases with VECM regression. The results confirms that, in global prosperity indicated by lower US interest rate, the emerging countries with bigger exposure in external debt suffer bigger rise in their CDS premium as their risk indicator. Because of their higher cost of these countries can benefit less from growth trajectory of global business cycle and increase their risk of default.

JEL codes: C30, F34, G15,

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1. Introduction

In the 1970s, after the creation of the fiat money system, the greatest wave of financial globalization in history began. The globally dominant role of the US dollar, which developed at that time, has not diminished significantly to date, and dollarization and the so-called dollar cycles (see Bánkuty-Balogh et al. 2023)are also prominent in this context.US business cycles also affect the rest of the world through exposure to the dollar. The role of international spillovers is much more pronounced today than it was four or five decades ago. The euro-dollar market plays an important role in this, which is much more pronounced in the decade of 2020 than at any other time. The spillover effects were already present half a century ago, but then they posed less of a threat to the rest of the world. In the 1970s, a wave of supply-side inflation similar to the current one swept through the US and the global economy, but the US rate hike cycle (and the Volcker moment) at that time posed a much smaller threat to the rest of the world than even developments in the aftermath of the global financial crisis or the Covid-19 crisis. It is important to stress that there is another important difference, which is that debt levels have now reached historic highs. An economic system has developed that is largely based on credit, which constantly fuels debt problems. All this creates not only the problem of the present use of future resources, but also inflationary effects through many channels. And the devaluation of the world's reserve currency raises new questions. The US exposure is particularly pronounced in the case of emerging markets, which in many cases are considered more vulnerable and have higher levels of external debt. Higher levels of dollar-denominated debt combined with a high interest rate environment can pose significant risks, especially in countries with weaker institutional indicators. The study looks in detail at whether emerging markets are more vulnerable to dollar exposure in an economic environment characterised by high levels of (external) debt. The importance of this issue is given by the fact that high debt levels can also be a point of vulnerability for the sustainability of the dollar-based financial system (in addition to many other factors, including geopolitical, digitalisation, economic and green transition issues).

In line with the above, Chapter 2 of the study begins with a literature review, identifying the main links and risks associated with the Eurodollar market and increased debt levels. Chapter 3 presents the data and methodology. The study uses a vector error correction (VEC) model to analyse the spillover of exposure to US financial market developments on risk levels. The analysis is based on daily data for 28 emerging market countries, grouped by external debt. The hypothesis of the research is that countries with higher levels of external debt are more

vulnerable to US dollar cycles, which is reflected in CDS spreads in addition to exchange rate effects. The results of the analyses are presented in Chapter 4, while the main conclusions are drawn in Chapter 5.

2. Literature review

The term Eurodollar refers to liabilities denominated in dollars placed with banks outside the USA. The size of the Eurodollar market, which emerged in the mid-1900s, grew from a level of $75 billion in 1964 (Restrepo-Echavarría - Grittayaphong , 2022) to almost $5,000 billion at the beginning of the 2020s (Fowler , 2021). The size of the dollar market outside the US is therefore close to that within the US. However, despite the relatively large size of the market, these instruments are not subject to US banking regulations (Goodfriend, 1998) and the Federal Reserve does not control them. It also follows from this that a possible failure could represent a systemic risk. As a result, it can affect or even undermine the FED's monetary sovereignty and its ability to control the supply of US dollars. (Fowler , 2021). The risky characteristics are also supported by Dickens (2015), according to whose formulation the Eurodollar market has essentially been present since 1971 as a collection point for short-term capital, which is quite vulnerable to speculative attacks.

The popularity of the Eurodollar market is due to the fact that dollar-based loans (deposits) taken through banks operating in one's own country tend to have lower (higher) interest rates. However, the resulting narrower margin is due to the fact that US banking regulations do not apply to these markets. As a result, the Federal Reserve has no guarantee of the stability of the billions of dollars of outstanding assets that would ultimately have to be backed by dollars. (Heyneke-Daya, 2016) Murau et al. (2020) also highlight that the creation of the offshore dollar was an important moment in the development of today's monetary system with a hierarchical structure and the dollar at the top. The authors describe the current structure of the international monetary system as being based on the creation of foreign private loans denominated in US dollars, leading to what can be called an "offshore US dollar system". This system has been created on the initiative of for-profit private institutions whose credit money-creating activities have been moved offshore. In terms of content, the terms offshore and Eurodollar are practically synonymous.

The Eurodollar market is also closely related to foreign currency debt. The issuance of loans in dollars (or other foreign currencies) by Eurodollar banks generates foreign currency debt (Eurodollar debt). This is also related to the foreign exchange swaps and forwards market, which is not closely related to dollar loans, but actors using these instruments essentially create

foreign currency debt because they are committed to providing a specific currency at a future date. All of the above generate demand for dollars, as do international transactions in which the parties conduct their transactions in dollars even though their legal tender would be another currency. As a result of all these activities, the Eurodollar market generates a constant demand for dollars. However, a significant proportion of this is related to transactions outside the US, while the supply of dollars (which is not credit money) can be determined primarily by the US FED. Similarly, the international trade of individual countries in dollars creates a constant demand for dollars.

The issue is also highlighted by the fact that the dollar's share of global trade invoicing, international debt and cross-border non-bank borrowing exceeds the US share of trade, international bond issuance and cross-border borrowing and lending. (Boz et al., 2020) In addition, its share of international debt and international bank lending increased even further after the global financial crisis. (Eren-Malamud, 2021), (Arslanalp et al., 2022) By the end of 2020, 67 per cent of cross-border corporate bond positions were in US dollar-denominated bonds, up from 42 per cent at the end of 2007. (Coppola et al., 2023)

Given all this, it is necessary to talk about debt developments, especially foreign currency debt. Guiterrez et al. (2023) highlight that bank exposure to dollar-denominated corporate debt has been central to understanding the evolution of many emerging market crises. These include the East Asian crisis of the late 1990s (e.g. Krugman , 1999, Roper , Harvey, 1999) and the economic collapse in Brazil, Argentina and Uruguay half a decade later (e.g. Larosiere , 2005, Kalemli-Ozcan , Kamil , Villegas-Sanchez , 2016). More recently, the prevalence of dollar-denominated debt is behind the Turkish crisis of 2018. Despite the lessons of history, significant corporate borrowing in US dollars remains widespread.

Global debt levels have been on an upward trend for decades, but they began to rise dramatically after the Covid-19 crisis, when governments around the world used debt to finance their fiscal responses to the epidemic. Emerging market debt reached a record $105 trillion, almost double the level of the previous decade. (IIF, 2024) In many emerging markets, a significant proportion of debt is denominated in US dollars due to low confidence in the local currency and the higher risk of financial instability. However, this is a double-edged sword due to exchange rate risk. Improving US economic conditions and the emergence of inflationary pressures are becoming a worrying process for the situation in some emerging markets. Capital flight from emerging countries to the United States causes their currencies to depreciate. (Restrepo-Echavarría - Grittayaphong , 2022) The report by the Institute of International Finance (IIF) draws attention to the significant increase in the issuance of sovereign Eurobonds by emerging countries and

the risks involved. This is particularly true for low-income countries that have had limited access to international debt markets in recent years. (IIF, 2024) Debt repayment generates a continuous demand for dollars, which can create global risks through a number of mechanisms. Despite the risks, dollar loans have long been popular in emerging markets. Gutierrez et al. (2023) found in their analysis that interest rates on dollar loans are at least 2 percentage points lower than those on local currency loans. They also found that the preference for dollar loans is also due to the high share of dollar savings, which encourages banks to balance foreign currency assets and liabilities. Chen-Yin (2022) also examined the motivation of firms to issue dollar bonds based on Chinese bond issues between 2011 and 2017. He concluded that arbitrage motivation, limited domestic funding opportunities and easy access to foreign markets play the most important role. In addition to the above factors, it is worth mentioning that the low interest rate environment in the decade before COVID-19 increased the external debt from $3.3 billion at the end of 2010 to $5.6 billion by the end of 2019. The COVID-19 pandemic was a severe shock to global financial markets. Investors sought to sell assets perceived as risky, including emerging market securities, in exchange for cash and safe haven assets. The resulting correction in emerging market asset prices was very large, in some cases similar in magnitude to that experienced during the global financial crisis. Despite the improvement in global economic conditions, risks remain. (FSB, 2022)

Another potential source of danger is the $65 trillion of unregistered dollar debt in the global financial system, mostly in the form of currency swaps, on the balance sheets of non-American banks and shadow banks. (Neufeld , 2023) For comparison, the global GDP based on the Statista database is $100 trillion. Neufeld (2023) further highlights that FX swaps, futures and currency swaps create future dollar payment obligations that do not appear on the balance sheet and are missing from the usual debt statistics. Non-banks outside the United States owe $25 trillion in such "missing" debt, up from $17 trillion in 2016. Non-US banks owe more than $35 trillion. Much of this debt is very short-term, and the resulting need to roll it over could lead to dollar funding difficulties. However, policy responses to these problems, such as central bank swaps (currency swaps), are less transparent. McGuire (2022) also writes that payment obligations related to currency derivative transactions are often "missing liabilities" because they do not appear on balance sheets. This often leads to problems of transparency in the foreign exchange positions of individual countries and sectors, especially with respect to short-term dollar liabilities and revenues. If dollar liquidity problems arise outside the United States as a result of economic shocks, the measures to restore dollar liquidity (swap frameworks) cannot adequately assess the dollar liquidity needs. A massive increase in dollar debt carries significant

risks such as a liquidity crunch, increased volatility and instability in financial markets. According to Braun-Koddenbrock (2023), the BIS initially kept accurate statistics on Eurobonds, distinguishing between domestic (USD-denominated, issued in the US) and foreign (USD-denominated, issued outside the US) bonds. However, in the 1990s, as onshore and offshore bond prices began to converge, the BIS merged the two statistics. This merger made Eurobonds statistically invisible. All this created a rather complex and opaque system.

The Eurodollar market therefore also contributes to the creation of higher (non-US) dollar debt. However, there is no authority other than the FED that can print more USD. Eurodollar lending banks therefore do not have the authority to print new USD, they can only create dollar-based debt (loan money) through the money multiplier activity of commercial banks. The multi-billion dollar debt must also be repaid in dollars.

Under normal economic conditions, the countries and companies concerned can easily obtain dollars by exporting goods and services, but during an economic slowdown or recession, when exports decline, other ways must be sought. One way is to sell US assets, which can also have turbulent effects and require strong central bank intervention. We saw an example of this in March 2020, when international markets froze as a result of the Covid epidemic (Johnson, 2023).

As Rich (1972) pointed out in his study, it is often argued that the development of the euro-dollar market has had far-reaching effects on the financial and foreign exchange markets of various countries. The governments of many developing and emerging countries have expressed concern about the impact of euro-dollar transactions on the balance of payments and the effectiveness of monetary policy. Today, this effect is likely to be even more pronounced as a result of increasing international financial interdependence. The risks associated with exchange rates increase significantly due to higher debt levels and exposure in general. The research by Berthou et al (2022) also confirms that the increase in the cost of hedging against the fluctuation of the US dollar affects exporters and the performance of the companies involved. Dollar exposure also affects exporters through the bank lending channel when their exports are affected by the bank's ability to lend. In addition, the tightening of liquidity in international interbank markets typically increases the cost of US dollar-based financing. In the case of export-oriented countries, the impact can be quite significant, and the growing demand for dollars due to growing financing needs also amplifies the negative risks. According to research by Bems-Moussa (2023), the negative impact of a stronger US dollar is disproportionately higher for emerging market economies than for smaller developed economies. In emerging market economies, a 10% appreciation of the US dollar associated with

global financial market forces reduces economic output by 1.9% after one year, and the effects persist for two and a half years. In contrast, in advanced economies, the negative impact is much smaller, peaking at 0.6 per cent after one quarter and largely disappearing within a year.

When analysing the explanation of exchange rate movements, it can be concluded that they are not explained by interest rate differentials alone. Based on the theoretical concept of unhedged interest rate parity, exchange rate movements are determined by interest rate differentials. In practice, however, the bulk of exchange rate movements can often be attributed to changes in risk premia. Global risk appetite and spillovers from developments in the United States are also important factors. (Ferrari, 2019) Verdelhan (2018) explores the above relationships in the context of regression studies. His analysis for 2018 highlights the important role of spillovers from the United States and global risks. The model also highlights that domestic monetary policies aimed at widening interest rate differentials with the United States were largely unable to mitigate the impact of global and American factors on currencies. Lustig et al. (2014) also highlight that the exchange rate return of the dollar can be identified as an overall global risk factor. As the global financial cycle is a dollar cycle, the US dollar plays a central role in the international financial system. (Jiang et al., 2023) During global downturns, the dollar appreciates and dollar bond prices rise. Jiang's (2021) study also highlights that the US fiscal cycle plays an important role in the evolution of the dollar and currency risk premiums. A stronger US fiscal position predicts higher excess returns for the dollar over foreign currencies in the coming year, and even more so over currencies with a higher dollar beta. Due to global financial cycles, US monetary policy plays an outsized role in the macroeconomic outcomes of other countries around the world (Rey , 2013). This outsized role is manifested with even stronger effects through higher dollar exposures.

The risks and turbulent spill-over effects generated by offshore euro-dollar markets were recognised as early as the 1970s. In his study, Rich (1972) demonstrates the interdependence of the US dollar, pound sterling and eurodollar markets. This means that Eurodollar deposit rates are highly sensitive to disturbances from the US and abroad. Over time, however, the risks have only increased because financial globalisation is deeper than ever. In his analysis, McCauly (2024) confirms that the large amount of dollar borrowing outside the United States in 2008 and 2020 made non-American banks particularly vulnerable to dollar attacks. Domestic central banks could not create dollars to lend to their banks. The Fed's swap lines provided dollars to partner central banks to lend to offshore banks to get them through the crisis. The Fed's open-ended international lending in dollars successfully stabilised the situation while ensuring the public good of global financial stability. Similar thoughts are expressed by Eren et al. (2020),

who write in their study that non-American banks significantly lost the possibility of funding from money market funds and were forced to take out shorter-term loans after the outbreak of the Covid-19 crisis.

3. Data and methodology

3.1 Data

The main objective of the methodological studies is to determine how financial/monetary developments in the US - as the epicentre of dollar cycles - affect the exchange rates of emerging market economies, and how this is reflected through spillover effects in a possible increase in country risk. As noted in the literature section, the basic idea of the research is that for countries with higher external (dollar) debt, changes in US interest rates and hence exchange rates can lead to debt financing difficulties. Debt sustainability is a complex issue that requires the identification of complex relationships (see Czeczeli (2023)). This analysis is not intended to attempt to define debt sustainability. The main objective of the analysis is to identify the dollar exposure and the associated risks. The analysis uses daily frequency data. Our full panel database contains data from October 2001 to May 2024 for 28 emerging markets and their group breakdowns.

The variables included in the studies are the WTI crude oil price index (OIL), the US short-term interest rate (3-month Treasury bill) (USINT), nominal exchange rates (FX) and CDS spreads (CDS). Descriptive statistics and precise definitions of the data are presented in Table 1.

Table 1.: Descriptive statistics of the data

Variable	Mean	Std . Dev.	Min.	Max.	Obs .	Data source
OIL	66.32	24.08	-36.98	145.31	116613	FRED
USINT	1.47	1.71	-0.05	5.36	116361	FRED
FX	632.17	2550.59	0.38	16678.5	114849	BIS
CDS	322.72	783.96	11.00	21290	98395	Bloomberg

Source : Author's creation

The data have been sorted into groups for the purpose of testing.

The reason for this is that the research tries to distinguish between countries with low and high external debt. Since higher external debt typically means higher foreign currency debt, we

included the external debt indicator in the models due to data availability. The basic assumption is that countries with higher levels of external debt may be associated with higher risks, presumably reflected in higher CDS spreads. In the analyses, external debt is defined as the ratio of the country's debt to non-resident creditors to nominal GDP as a percentage of gross domestic product (GDP). Debtors can be individuals, corporations or the government. (FocusEconomics, 2024) Emerging markets have been grouped on the basis of their external debt as follows: the low-risk group includes countries with less than 30% external debt, the medium-risk group includes countries with 30-60% external debt, and the high-risk group includes countries with more than 60% external debt. The detailed grouping can be found in Table 2.

Table 2.: Country groups based on external debt

level of external debt		
High	**Medium**	**Low**
Bahrain	Colombia	Algeria
Chile	Indonesia	Brazil
Hungary	Mexico	China
Malaysia	Peru	India
Oman	South_Africa	Philippines
Poland	Thailand	Saudi_Arabia
Qatar		
Serbia		
Uruguay		

Source: authors' own editing

Since the econometric study assumes a stationary time series, the first step in the methodological study is to conduct stationarity tests. As defined by Manik (2016), stationarity is an important factor in generalising the model. The stationarity test is based on the Augmented Dickey-Fuller (ADF) test, Levin, Lin and Chu, and Im, Pesaran and Shin W-stat tests. The results are presented in Table 3.

Table 3. Results of stationarity coefficients

Variable	Low	Medium	High
OIL	I(0)	I(0)	I(0)
USINT	I(1)	I(1)	I(1)
FX	I(1)	I(1)	I(1)
CDS	I(0)	I(0)	I(1)

Note: I(1) indicates that it is necessary to take the first differentiated values of the data, and I(0) indicates that the data can be considered stationary in level

Source: authors' own editing

3.2. Methodology

The basis of the methodological part of the research is the Vector Error Correction Model (VECM). VECM is the cointegrated vector autoregression (VAR) model, which can be described by the following formula. The traditional (restricted) VAR model cannot handle cointegration relationships, so it is necessary to use the error correction model.

$$Dy_t = \mu + \Pi y_{t-1} + \sum_{i=1}^{p} \Gamma_i^* Dy_{t-1} + \varepsilon_t \quad (1)$$

where: y_t is an $m \times 1$ vector of variables similar to a VAR, μ is an $m \times 1$ vector of intercept coefficients. Dy_t is an $m \times 1$ vector of the first differentiated variables in y_t; Π and Γ_i^* are $m \times m$ coefficient matrices and ε_t is an $m \times 1$ error vector with contemporaneous correlation but no autocorrelation (Kilian-Lütkepohl, 2017).

The VEC model can be used to analyse the interactions between the variables involved in such a way that each variable is expressed as an equation. The equations of the variables include all the other variables and their lags, including their own lags. When a variable changes, the system adjusts towards the long-run equilibrium. The speed of adjustment towards the long-run equilibrium is indicated by the error correction term.

The application of VECM requires the determination of the number of cointegrating equations. As defined by Engle-Granger (1987), two or more non-stationary time series can have a linear combination that can be stationary. In this case, the time series can be said to be cointegrated. The cointegrating equation, which is a stationary linear combination of variables, assumes a long-run equilibrium relationship between the variables. By specifying the number of

cointegrating equations, we can constrain certain coefficients of the VAR model, allowing for more efficient estimation of the coefficients. Dwyer (2015) points out that if there are more than two variables and each of them has a unit root, then there are at least n-1 cointegrating vectors. A widely used approach for estimating cointegration and long-run relationships and co-movements is that of Johansen and Juselius (1990).

4. Results

The sub-model was built on the basis of the three external debt panel databases, and we also perform the analysis on the entire panel database without groups. The order of the variables included in the model was determined using the Cholesky order, which resulted in the following order of variables: *OIL -> USINT -> FX -> CDS*. The order outlined is based on the fact that the oil price index is intended to reflect the global economy, i.e. it serves primarily as a proxy in the model. The US interest rate reacts to this, which affects the exchange rate. The article focuses on the fact that the appreciation of the exchange rate is unfavourable for emerging countries, especially those with high external (dollar) debt. If this leads to extreme effects, then debt sustainability or any other deterioration in the fiscal position, etc. leads to an increase in CDS spreads (i.e. the last variable in the sequence).

First, the tests were run based on the period between October 2008 and May 2024. Since everything in the model affects everything else, and every equation contains lagged versions of all variables, the Γ_i^* $m \times m$ interpretation of the coefficient matrix is difficult, especially if the number of variables included in the model is high. For this reason, we rely on impulse response functions (IRFs) in our interpretations. IRFs measure the effect of a shock of one unit (usually one standard deviation) in variable j on variable a, projected for period t. In other words, impulse response functions show the effect of a shock to an endogenous variable on itself and on other endogenous variables.

The general formula of the IRF functions, taking into account the delays, can be written as follows:

$$IRF_{ij}(t) = \beta_i \alpha_j \sum_{s=0}^{t-1} (\Gamma_{\boldsymbol{j}} \beta_j' \alpha_i^s + \sum_{\boldsymbol{i=1}}^{\boldsymbol{p-1}} \Gamma_{\boldsymbol{i}} \beta_i' \alpha_j^{s-i})$$

where

Where

$IRF_{ij}(t)$ is the impulse response of variable Y_i to a shock in variable Y_j at time t

β_i is the i-th row of the cointegrating vector matrix β

α_j is the j-th column of the adjustment speed matrix α

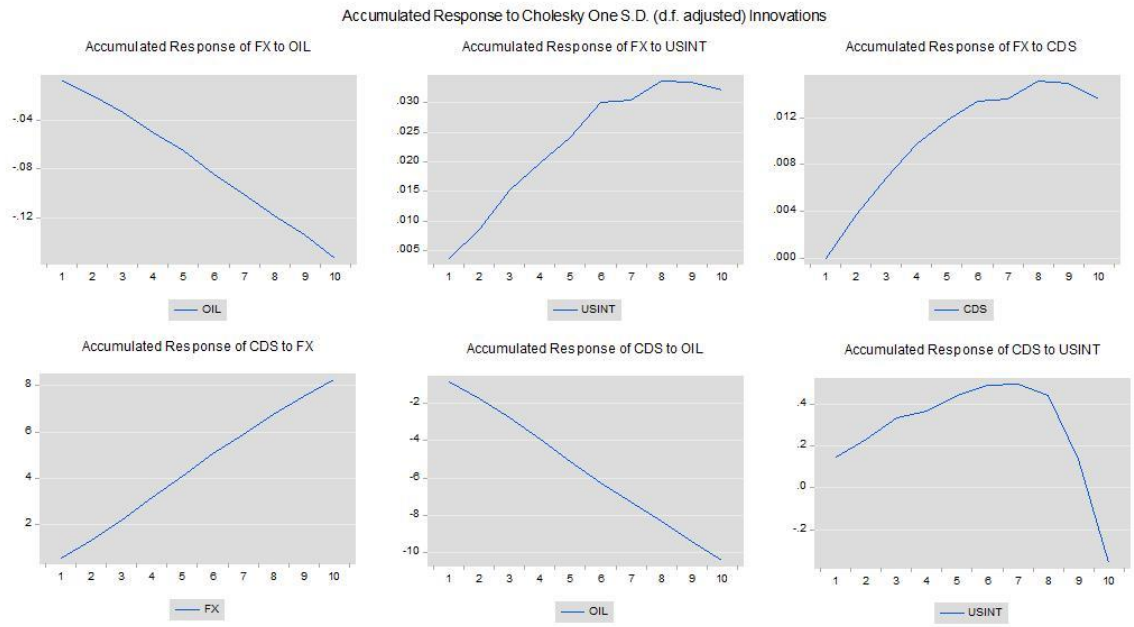
α_i^s represents the i-th i-th row of the matrix α raised to the power of s.

Γ_i are the coefficient matrices corresponding to lag i.

The optimal number of lags was determined using the is VAR Lag Order Selection Criteria test. Since the model defined the largest number of delays as significant, but too many delays also increase the number of coefficients and thus contribute to the possible distortion of the model, the number of delays was maximised at 10.

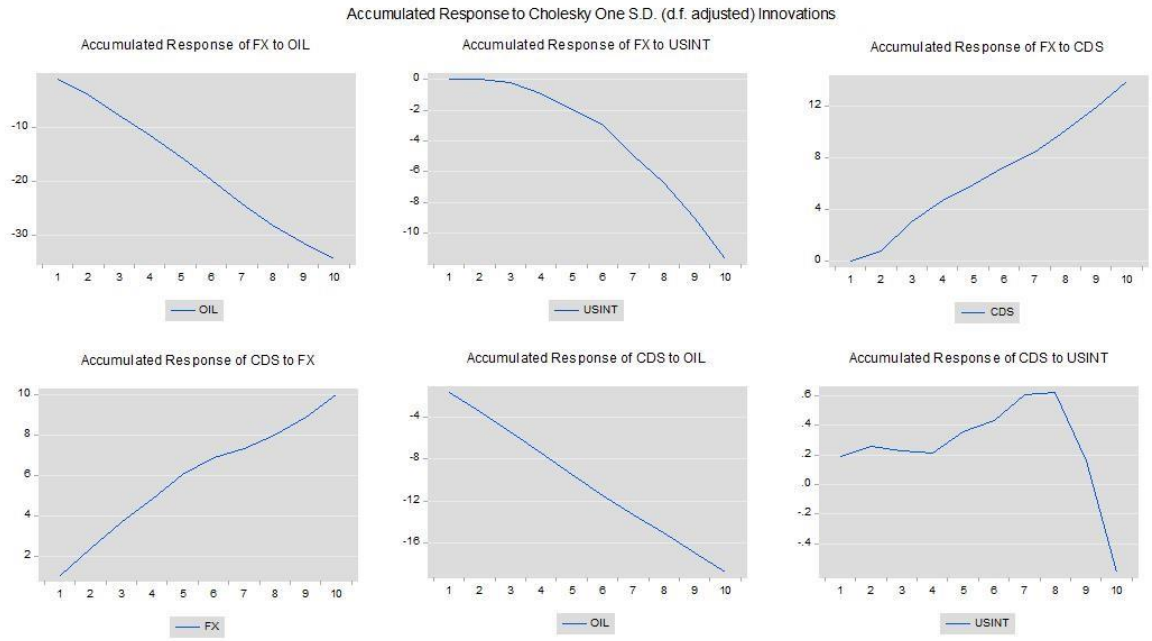
Cointegration was found for all groups, which justified the use of vector error correction models. The number of cointegrating equations is 2 for the low-risk group, 2 for the medium-risk group and 1 for the high-risk group.

Figure 1. Impulse response functions of the group of countries with low external debt



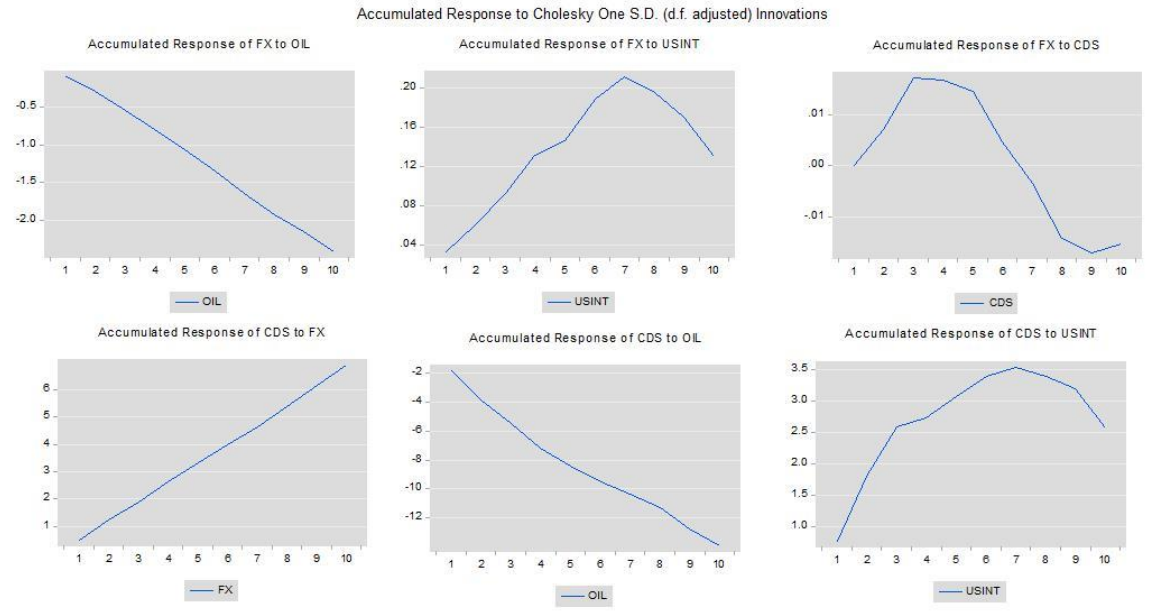
Source: Eviews output based on own calculations

Figure 2. Impulse response functions of the group of countries with medium external debt



Source: Eviews output based on own calculations

Figure 3. Impulse response functions of a group of countries with high external debt



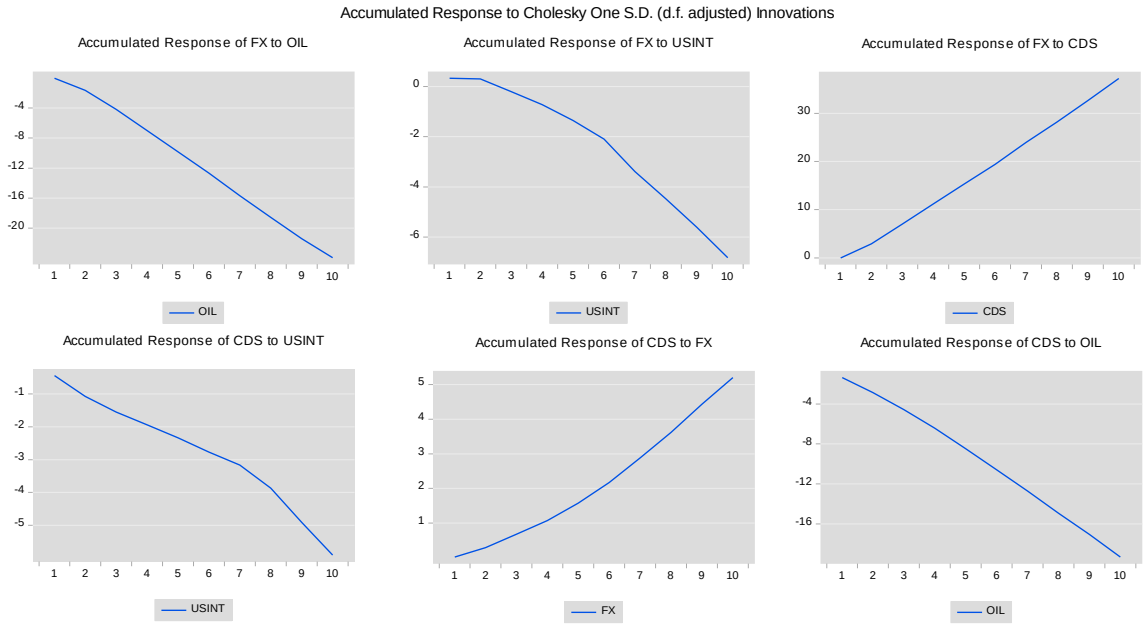
Source: Eviews output based on own calculations

What is clear from the three sets of figures above is that, comparing the groups of countries classified as low and high risk, the group of countries with high external debt experienced a much larger exchange rate depreciation following the positive US interest rate shock (US rate hike). The reaction of exchange rates to the increase in the CDS premium also shows a different pattern and time path. Although the positive effect is visible, the correlations are basically weak. All this can be explained by the fact that the model does not include other political, institutional or risk indicators that might play a role in these processes. For all three groups, the increase in the CDS premium due to the depreciation of the exchange rate is clearly visible. It is also significant that the increase in CDS spreads due to the rise in US interest rates is highest for the high-risk group. As a result of rising oil prices, CDS spreads start to fall in all tests.

As commodity exports play a crucial role in the economies of a significant number of emerging markets, we have further analysed the more complex picture and run the analysis for the group of oil-exporting countries as well. In the case of oil and commodity exporters, where the price of the export in question is expressed in dollars, the impact can be different. A rise in US interest rates may lead to an appreciation of the exchange rate (except, of course, in countries where the exchange rate is fixed). A rise in US interest rates means that holding dollar assets becomes more attractive. Oil then becomes a more attractive investment, even as an inflation hedge, since it is often the period of high inflation when interest rates are raised. Another reason is that, as a result of the rate rise, oil-exporting countries experience a strengthening of their balance of payments due to the stronger dollar, and the effect of the inflow of foreign exchange from oil sales offsets possible capital outflows (due to higher interest rates in the US). Thus, if the positive balance of payments effects of higher oil prices offset the negative effects of possible capital outflows, exchange rate appreciation may occur.

If the above processes also improve fiscal positions through higher prices, this could explain the stable or falling CDS spreads, as previous models have partly shown. However, the issue is quite complex and complicated, because if dollar debt is high despite all this, then these positive effects can be eliminated in the same way. Despite higher income levels, servicing dollar debt becomes increasingly difficult. The impulse response functions in figure 4 confirm this. The above serves to explain the exchange rate appreciation.

Figure 4: Impulse response functions of oil exporting countries



Source: Eviews output based on own calculations

It should be noted that if the tests were carried out over a longer period (from October 2001 to May 2024), the results would show the same correlations. The analyses carried out for the period after 2020 also strengthen the above correlations. The same effects also occur when the OIL variable is not included in the model. It should also be noted that the models do not take into account political aspects, institutional indicators and investor confidence, which can also play an important role in the development of the processes.

Conclusion and discussion

The novel approach of this paper is given by the fact that the role of the Eurodollar and offshore dollar market, especially with regard to its sustainability effects on the financial system as well as its link with debt sustainability aspects, is rather under-researched and, despite its importance, receives very little attention in the national and international literature. This paper aims to fill this gap. The fiat monetary system that emerged in the early 1970s has not yet encountered a global economic environment characterised by high inflation, high interest rates and extremely high debt levels similar to the current one. In addition, a number of geopolitical, technological (see digital central bank money) and sustainability (see green transition and the decline of oil) developments and phenomena are taking place at the same time, increasing the role of (country) risks and global spillovers. The empirical part of the study tried to capture the relationships related to financial exposure. The results confirm that the exchange rate and the

CDS premium of countries with higher foreign debt are more sensitive to the impact of US interest rates.

Harking back to the cited literature, the coherence between bigger external debt and increasing CDS beside decreasing US rates confirms what was concluded by Dickens (2015), i.e. the Eurodollar market is vulnerable to speculative attacks. The result supports, also, Guiterrez et al. (2023) who stated that that bank exposure to dollar-denominated corporate debt is the key factor of emerging market crises, just like in the East Asian crisis of the late 1990s analyzed by Krugman (1999) or Roper & Harvey (1999). Moreover, it is consonant with Larosiere (2005), Kalemli-Ozcan, Kamil and Villegas-Sanchez (2016) in relevance of Latin-American crises. From a differed aspect, the results are in line with Neufeld's (2023) statement about the risk of missing external debt from futures and swaps.

It should be noted, however, that the opposite effects can also prevail. The results confirms that, in global prosperity indicated by lower US interest rate, the emerging countries with bigger exposure in external debt suffer bigger rise in their CDS premium as their risk indicator. Because of their higher cost of these countries can benefit less from growth trajectory of global business cycle and increase their risk of default.

References

Arslanalp, S., Eichengreen, B., & Simpson-Bell, C. (dátum nélk.). The stealth erosion of dollar dominance and the rise ofnontraditional reserve currencies. *Journal of International Economics Volume 138*. doi:https://doi.org/10.1016/j.jinteco.2022.103656

Bánkuty-Balogh, L., Lehmann, K., & Szalai, Z. (2023). A dollárdominancia fenntarthatósága endogén pénzelméleti és geopolitikai megközelítésben. In H. P. (szerk.), *Fenntarthatóság a közgazdaságtudományban.* Budapest: Akadémiai Kiadó.

Bems, R., & Moussa, R. (2023). Emerging Market Economies Bear the Brunt of a Stronger Dollar. *IMF Blog*. Forrás: https://www.imf.org/en/Blogs/Articles/2023/07/19/emerging-market-economies-bear-the-brunt-of-a-stronger-dollar

Berthou, A., Guillaume, H., & Mésonnier, J.-S. (2022). The real effects of invoicing exports in dollars. *Journal of International Economics Volume 135*. doi:https://doi.org/10.1016/j.jinteco.2022.103569

Boz, E., Casas, C., Georgiadis, G., Gopinath, G., Le Mezo, H., Mehl, A., Nguyen, T., 2020. Invoicing Currency Patterns in Global Trade. IMF Working Paper 20/126.

Braun, B., & Koddenbrock, K. (2023). *Capital Claims: Power and Global Finance.* Routledge.

Chen, S., & Yin, L. (2022). Why do firms issue U.S. dollar bond abroad? Evidence fromChinese non-financial listed corporations. *Research in International Business and Finance Volume 60*. doi:https://doi.org/10.1016/j.ribaf.2021.101600

Coppola, A., Lewis, A., Maggiori, M., Schreger, J., Sun, Z., & Tinda, S. (2023). *Dynamics of global finance: The US dollar's grip and China's offshore ascent.* Stanford Institute for Economic Research (SIEPR).

Czeczeli, V. (2023). Az államadósság fenntarthatósága alacsony kamatkörnyezetben. *Közgazdasági Szemle 70 (12). pp. 1361-1388. ISSN 1588-113X*. doi: https://doi.org/10.18414/KSZ.2023.12.1361

Dickens, E. (2005). The Eurodollar Market and the New Era of Global Financialization. In G. A. Epstein, *Financialization and the World Economy.*

Dwyer, G. P. [2015]: The Johansen Test for Cointegration. Source: http://www.jerrydwyer.com/pdf/Clemson/Cointegration.pdf.

Engle, R., & Granger, C. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica Vol. 55, No. 2 pp. 251-276*. doi:https://doi.org/10.2307/1913236

Eren, E., & Malamud , S. (2021). Dominant currency debt. *Journal of Financial Economics Volume 144, Issue 2, May 2022, Pages 571-589*. doi:https://doi.org/10.1016/j.jfineco.2021.06.023

Eren, E., Schrimpf, A., & Sushko, V. (2020). *US dollar funding markets during the Covid-19 crisis – the international dimension.* BIS Bulletin.

Ferrari, M. (2019). *Emerging market currencies: the role of global risk, the US dollar and domestic forces.* ECB Economic Bulletin, Issue 3/2019. Forrás: https://www.ecb.europa.eu/press/economic-bulletin/focus/2019/html/ecb.ebbox201903_02~29b4722819.en.html

FocusEconomics. (dátum nélk.). External Debt (% of GDP). Forrás: https://www.focus-economics.com/economic-indicator/external-debt/

Fowler , S. (2021). *The Monetary Fifth Column: The E y Fifth Column: The Eurodollar Thr odollar Threat to Financial o Financial.* 47 Vanderbilt Law Review 825 (2021). Forrás: https://scholarship.law.vanderbilt.edu/vjtl/vol47/iss3/5

FSB. (2022). *US Dollar Funding and Emerging Market Economy Vulnerabilities.* Financial Stability Board. Forrás: https://www.fsb.org/wp-content/uploads/P260422.pdf

Goodfriend, M. (1998). Eurodollars. *Federal Reserve Bank of Richmond*. Forrás: https://econpapers.repec.org/bookchap/fipfedrmo/1998.htm

Guiterrez, B., Ivashina, V., & Salomao, J. (2023). Why is dollar debt Cheaper? Evidence from Peru. *Journal of Financial Economics Volume 148, Issue 3*, Pages 245-272. doi:https://doi.org/10.1016/j.jfi neco.2023.04.003

He D, McCauley RN (2010) Offshore markets for the domestic currency: monetary and financial stability issues. BIS Working Paper n. 320

Heyneke, N., & Daya, M. (2016). *The rise and fall of the eurodollar system.* NEDBANK, CIB. Forrás: https://www.nedbank.co.za/content/dam/nedbank-crp/reports/Strategy/NeelsAndMehul/2016/September/TheRiseAndFallOfTheEurodollarSystem_160907.pdf

IMF . (1998). The Asian Crisis: Causes and Cures. *Finance and Development, Volume 35, Number 2*.

Jiang, Z. (2021). US Fiscal cycle and the dollar. *Journal of Monetary Economics Volume 124 Pages 91-106*. doi:https://doi.org/10.1016/j.jmoneco.2021.10.002

Jiang, Z., Krishnamurthy, A., & Lustig, H. (2023). *Dollar Safety and the Global Financial Cycle.* The Review of Economic Studies. doi:https://doi.org/10.1093/restud/rdad108

Johansen, S. – Juselius, K. [1990]: Maximum Likelihood Estimation and Inferences on Cointegration—with applications to the demand for money. Oxford Bulletin of Economics and Statistics, 52, 169–210.

Johnson, B. (2023). The Dollar is Not Done. *MacroVoices*. Forrás: https://www.macrovoices.com/podcast-transcripts/1234-brent-johnson-the-dollar-is-not-done

Kilian, L., - Lütkepohl, H. [2017]: Vector Error Correction Models. In Structural Vector Autoregressive Analysis. Themes in Modern Econometrics, pp. 75-108. DOI: 10.1017/9781108164818.004

Lustig, H., Roussanov, N., & Verdelhan, A. (2014). Countercyclical currency risk premia. *Journal of Financial Economics*, 527-553.

Manik, N. (2016). Causal Nexus between Public Debt and Economic Growth: The Case of India, International Affairs and Global Strategy, Vol. 46. pp. 36-46.

McGuire, P. (2022). FX swaps and forwards in global dollar debt: “Knownknowns” and “known unknowns”. *Japan and the World Economy Volume 64*. doi:https://doi.org/10.1016/j.japwor.2022.101160

Murau, S., Rini, J., & Haas, A. (2020). The evolution of the Offshore US-Dollar System: past, present and four possible futures. *Journal of Institutional Economics 16(6):1-17*. doi:10.1017/S1744137420000168

Neufeld, D. (2023). *The global financial system is facing $65 trillion in hidden dollar debt.* World Economic Forum. Forrás: https://www.weforum.org/agenda/2023/01/65-trillion-debt-bank-financial-system-economic/

Rey, Helene (2013) “Dilemma not trilemma: the global cycle and monetary policy independence,” Proceedings - Economic Policy Symposium - Jackson Hole, pp. 1–2.

Restrepo-Echavarría, P., & Grittayaphong, P. (2021). *Dollar-Denominated Public Debt in Asia and Latin America.* Federal Reserve Bank of Saint Louis. Forrás: https://www.stlouisfed.org/on-the-economy/2021/august/dollar-exposure-public-debt-asia-latin-america

Restrepo-Echavarría, P., & Grittayaphong, P. (2022). *Bretton Woods and the Growth of the Eurodollar Market.* Federal Reserve Bank of Saint Louis. Forrás:

https://www.stlouisfed.org/on-the-economy/2022/january/bretton-woods-growth-eurodollar-market#authorbox

Rich, Georg, 1972. "A Theoretical and Empirical Analysis of the Eurodollar Market," Journal of Money, Credit and Banking, Blackwell Publishing, vol. 4(3), pages 616-635, August.

Tiftik, E., Mahmood, K., Aycock, R., & Gibbs, S. (2024). *Global Debt Monitor, Politics, Policy, and Debt Markets – What to Watch in 2024.* Institute of International Finance.

Verdelhan, Adrien. "The share of systematic variation in bilateral exchange rates." The Journal of Finance 73, no. 1 (2018): 375-418.