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PROSPECTS FOR JOINING THE EURO AREA: NEW EVIDENCE THROUGH THE LENS OF THE UNCOVERED INTEREST PARITY APPROACH

Abstract. *The paper investigates the prospects of six European candidate countries for the euro area accession in the light of the uncovered interest rate parity (UIP) theory. Testing the UIP validity is relevant for policymakers since EURO adoption requires exchange rate stability. Using monthly data from May 2002 to March 2021, we provide country-level empirical evidence on the effect of interest rate differentials on the expected exchange rate change. The econometric analysis employs a threshold regression approach by controlling for both the global and country-specific financial stress as threshold variables. The empirical results show that the UIP condition holds, especially during high-financial stress periods such as the COVID-19 pandemic or the Global Financial Crisis. Moreover, domestic financial stress has a stronger discrimination power in validating the UIP condition compared to the global financial stress. UIP holds for only one country (Czech Republic) if considering global financial stress as threshold, and for two countries (Czech Republic and Sweden) if employing Country-Level Index of Financial Stress as threshold.*

Keywords*: UIP, financial stress, EURO adoption, threshold regression*

JEL Classification: C24, F31

1. Introduction

The uncovered interest rate parity (UIP) is a significant indicator of a country's financial and monetary integration status, as it reflects deviations from the expected exchange rate change caused by differences in domestic and foreign

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interest rates (Lothian 2002, Holtemoller 2003). Revisiting the validity of UIP is crucial for exchange rate theories and stabilization policies, as evidence supporting it can boost confidence in existing exchange rate models (Omer et al., 2013). Saadon and Sussman (2018) also emphasize that increasing global economic integration and central banks' concerns about exchange rate fluctuations with their domestic currency are key drivers for reevaluating UIP, a fundamental theory of exchange rate equilibrium.

Starting from this premise, which lies at the core of theoretical monetary international economic models, the contribution of our paper is to bring a fresh perspective on the prospects depicted by several European countries for the successful eurozone accession, from the standpoint of the monetary integration path. One essential stage in this regard is the fulfilment of the convergence criterion on exchange rate stability that requires the smooth participation of non-eurozone countries' currencies in the Exchange Rate Mechanism (ERM) II, for at least two years before adopting the EURO. The purpose of the ERM II mechanism is to ensure that the exchange rate fluctuations between the EURO and other EU currencies are kept within a narrow fluctuation band so as not to disrupt the economic stability within the single market.

In particular, we investigate the convergence path of interest rates and the stability of exchange rates (domestic rates compared with eurozone ones) by validating the UIP hypothesis, with a focus on the European countries that have officially announced their intention of joining the eurozone and thus will participate in the ERM II mechanism. The findings are of great relevance for decision makers, as they reveal those countries recording the highest degree of monetary integration due to stable spreads against eurozone rates, as well as those for which the UIP does not hold and hence exhibit persistent deficiencies in the process of monetary convergence to EURO.

The novel features of our empirical approach are manifold. To the best of our knowledge, it represents a singular and topical approach that relies on the UIP theory in order to assess the status of monetary convergence between a European country and the eurozone, as a precursor of the decision regarding the most suitable moment as well as the optimality for entering the ERM II mechanism.

Another feature that distinguishes our paper from existing literature is that most studies in this field of research consider as reference or anchor currency either the US dollar or the pound sterling and use to focus on developed countries such as the US, China, Canada, Japan or African countries. We demonstrate the UIP validity by investigating this theory in a bilateral currency setup, considering the EURO against six selected national currencies.

A third novelty resides in the methodology employed, as the validity of the UIP is examined by the threshold regression model. This method has the advantage of a granular approach that allows us to focus on the possible divergence between the interest rate differentials and foreign exchange rates that form the parity, by discriminating between upper and lower values of a predefined threshold (in our case, periods of low and high financial stress) when validating the UIP assumption.

Our approach integrates two key threshold variables that proxy financial stress: the Country-level index of financial stress (CLIFS) by the European Central Bank, which captures domestic financial stress, and the Financial Stress Index developed by the Office of Financial Research, which measures global financial stress. Our work complements the existing literature by providing broader and more recent time coverage.

The paper is structured as follows: Section 2 introduces the theoretical background of the UIP theory. Section 3 covers existing literature, Section 4 discusses our methodology and dataset while Section 5 presents the Findings Finally, Section 6 concludes the paper.

2. Theoretical background of the UIP

The Uncovered Interest Rate Parity theory assumes that under an efficient market hypothesis, which includes risk neutrality and rational expectations, the interest rate differential between two countries should equal the expected exchange rate change (Jiang et al., 2013). Put differently, UIP ensures that any arbitrage opportunity between interest-earning assets with similar features, of two different countries, will disappear due to exchange rate movements (Omer et al., 2013). Thus, the domestic currency is likely to depreciate when the interest of the domestic rate exceeds the foreign interest rate. Recent empirical evidence shows that a country with a relatively steep yield curve will tend to experience depreciation in excess of UIP especially at business cycle horizons of 3 to 5 years (Lloyd and Marin, 2020). Analytically, the UIP can be specified as:

$$1 + i_t = \frac{S_{t+1}^e}{S_t}(1 + i_t^*) \tag{1}$$

In Eq. (1), i_t represents domestic nominal interest rate, i_t^* denotes the foreign nominal interest rate, S_t is the spot exchange rate in period t, while the expected exchange rate is given by S_{t+1}^e. After the logarithmic transformation, we have the following approximation of UIP:

$$i_t = i_t^* + s_{t+1}^e - s_t \tag{2}$$

As Ferreira and Kristoufek (2020) pointed out, the expectation regarding the future evolution of the exchange rate cannot be observed, which complicates the testing procedure for UIP validity. The most common approach to dealing with this issue is to use the current data as a proxy for the assumption of rational expectations (agents use rationally all available information), hoping that there are no systematic errors, i.e., there is no statistical difference between the expected exchange rate and its effective value at $t + 1$. This translates to:

$$\begin{cases} \mathbb{E}(S_{t+1}) - S_{t+1} = \varepsilon_t \\ \mathbb{E}(\varepsilon_{t+1} | I_t) = 0 \end{cases} \tag{3}$$

In Eq. (3), $\mathbb{E}$ represents the expectation operator while I_t denotes the information set available at time t. The UIP can be econometrically tested by regressing $s_{t+1}^{e} - s_t$, i.e., the changes in future exchange rate, on interest rate differential as presented in Eq. (4):

$$\Delta s_{t+1} = \alpha + \beta(i_t - i_t^{*}) + u_t \quad (4)$$

To validate the UIP hypothesis α must be zero, indicating no forward risk premium and the coefficient of the interest rate differential β must equal one. Despite this, most empirical studies report an estimated slope coefficient β that is either negative or smaller than one. This finding is known as the UIP puzzle and is explained by the fact that "*the expected returns across currencies do not equalise, as economies with a higher interest rate display a more appreciated exchange rate than that implied by the UIP condition*" (Ramirez-Rondan and Terrones, 2021).

However, as Afat and Frömmel (2020) pointed out, "*the deviations from UIP should not be considered as market inefficiency since the model is generally applied with the ex-post change in nominal exchange rate and it is not a violation of efficiency when the expectation does not match the future value. It only signals that using the interest rate differential is not helpful to predict the exchange rates*." A complementary reasoning belongs to Gali (2020), who argues that the empirical rejection of the UIP, often found in the literature, "*does not render the exercise without interest, since it is not clear what are the implications, if any, of the empirical failure of UIP on the effects of anticipated interest rate changes on the exchange rate*".

3. Review of Literature

Until now, the validity of UIP has been studied in different countries of the world with conclusions that are extremely mixed given the regional features, the specification of UIP, time horizons, and the various econometric approaches. However, most of the papers have reported conclusions that are inconsistent with the UIP hypothesis. For instance, Lloyd and Marin (2020) argue that there is a robust strand of literature which rejects the UIP condition when typically using short-horizon interest rates and exchange rate moves of up to 4 years, while UIP seems to hold at longer time horizons, of around 5-10 years. Kalemli-Özcan and Varela (2021) delineate between advanced and emerging economies and provide evidence that the UIP holds among advanced economies but does not validate for emerging market economies.

Deutsche Bundesbank (2022) empirically tested the validity of the UIP for different periods and currency pairs. They examined two periods: one from 1999 until the outbreak of the global financial crisis, and the other from the onset of the 2007 financial crisis until end-2021. The currency pairs analysed were euro and the US dollar, the Japanese Yen, the GBP, and the CHF. The results indicate that in the post-financial crisis period, the currency with the higher-interest investment experienced a depreciation trend over the investment period. In contrast, for the pre-crisis period, the validity of the UIP was rejected for all currency pairs. Therefore, the evidence supports the UIP for the post-financial crisis sample but not for the pre-crisis sample.

A different approach belongs to Cyn-Young and Shin (2023) according to which the development of domestic financial markets and institutions may trigger improvements in market efficiency and a reduction in the risk premiums, hence supporting the UIP condition. Findings reveal that when the local currency bond markets develop and the activity of nonbank financial institutions is expanding, the UIP condition is validated and tends to hold more tightly in both advanced and emerging economies.

In terms of the sample of countries considered, most papers attempt to validate the UIP for the case of developed countries or a mix of advanced and emerging ones. Only two studies focus exclusively on the European Union member countries and their findings are divergent. Although all of them cover long periods, exceeding 10 years, the UIP theory is not validated in all cases.

As regards the methodology side, the techniques used are very diverse, so we cannot conclude that there is a best practice or common practice that can be extracted from the existing literature. Most papers apply a panel regression framework and the OLS estimation method, but there are also various singular empirical approaches. However, in recent years large strands of literature employ threshold regression with or without smooth transition among regimes, which can better capture the nonlinear pattern describing the foreign exchange market (e.g., Ramirez-Rondan and Terrones, 2021; Cho, 2015; Lothian and Wu, 2011).

During the literature review stage we identified only three papers that have investigated the UIP validity, by augmenting the econometric model with a measure of macroeconomic uncertainty represented by the economic policy uncertainty (EPU), or with a measure of the exchange rate uncertainty (Ismailov and Rossi, 2018). Their findings suggest that the UIP holds or that deviations from UIP are smaller in cases of less uncertainty.

Our paper presents distinct methodological approaches compared to existing literature. Firstly, we estimate the Uncovered Interest Parity (UIP) equation, accounting for threshold financial stress effects by dividing the initial sample into low and high financial stress regimes. Secondly, we use an exogenous measure of financial stress instead of constructing one from the variable of interest. Thirdly, we rigorously test the validity of UIP in each regime to achieve a detailed and comprehensive understanding. Lastly, our focus is on five countries with a goal of adopting the EURO in the near future - Czech Republic, Hungary, Poland, Romania, and Sweden - and Croatia, which adopted the EURO in 2023 as a benchmark.

4. Data and Methodology

To investigate the validity of the UIP across European currencies, we select a time span that covers two major crises (the global financial crisis and the COVID-19 pandemic. In our opinion, testing the UIP validity is relevant for the abovementioned countries since EURO adoption requires exchange-rate stability, to demonstrate that a Member State can manage its economy without recourse to excessive currency fluctuations as well as stable interest rates. The sample of countries excludes Bulgaria due to its specific exchange rate regime, which is fixed (hard peg) by a currency board. Our reasoning is confirmed by Saadon and Sussman (2018), who argue that "*for testing the dynamics of nominal exchange rates, flexible exchange rates are required; otherwise the economic conditions for successfully examining the validity of UIP are not met*".

We collect from Bloomberg monthly data spanning 2002:M05 to 2021:M03 on exchange rates against EURO, as well as monthly average values for EURIBOR3M, ZIBOR3M – Croatia's (Zagreb) Three Month Interbank Rate, PRIBOR3M – Czech Republic's (Prague) Three Month Interbank Rate, BOBOR3M- Hungary's (Budapest) Three Month Interbank Rate, WIBOR3M – Poland's (Warsaw) Three Month Interbank Rate, ROBOR3M- Romania's (Bucharest) Three Month Interbank Rate, and STIBOR3M – Sweden's (Stockholm) Three Month Interbank Rate. All the variables used to estimate the validity of UIP (exchange rate changes or interest rate differentials)[1] are level-stationary based on ADF and KPSS tests.

To account for the financial stress, as a factor that may condition the validation or not of the UIP, we use a threshold approach to estimate Eq. (4). More specifically, as Li et al. (2013) or Adewuyi and Ogebe (2019) among others pointed out, UIP has been rejected in most empirical studies using linear approaches. Indeed, the adjustment of the exchange rate to the interest rate differential is possible to follow a non-linear pattern which is more visible during financial turmoil (Ismailov and Rossi, 2018). Therefore, we use the Global Financial Stress Index (FSI)[2] and the Country-Level Index of Financial Stress (CLIFS)[3] as threshold variables, to capture the impact induced on the validity of UIP by the occurrence of various economic, financial, or pandemic crises around the world or in a specific country, respectively.

First of all, FSI measures systemic financial stress, i.e., disruptions in the normal functioning of financial markets. Each factor in the index measures a feature of financial stress. Financial stress can be captured by how the variables move together through time. A statistical algorithm captures this co-movement and produces a set of weights for the variables. The FSI is positive when stress levels

[1] The exchange rate change is constructed as the first difference of the logarithm of monthly rates. The interest rate differential is the difference between the domestic interest rate and the foreign interest rate.

[2] Source: Office of Financial Research.

[3] Source: European Central Bank: Statistical Data Warehouse.

are above average and negative when stress levels are below average. On the other hand, CLIFS includes six, mainly market-based, financial stress measures that capture three financial market segments: equity markets, bond markets, and foreign exchange markets. Unlike FSI which is a global measure of financial stress reported on a daily basis[4], CLIFS is reported monthly. Table 1 below provides some descriptive statistics of the variables included in the UIP estimation.

Table 1. Descriptive statistics

Country	Exchange rate change			Interest rate differential		
	Min.	*Max.*	*Std. dev.*	*Min.*	*Max.*	*Std. dev.*
Croatia	-2,2%	2,0%	0,01	0,0%	9,6%	0,02
Czech R.	-4,9%	6%	0,01	-1,4%	2,7%	0,01
Hungary	-5,3%	7,5%	0,02	0,3%	10,7%	0,03
Poland	-5,0%	9,4%	0,02	0,3%	5,8%	0,01
Romania	-3,8%	8,5%	0,01	1,0%	29,7%	0,06
Sweden	-5,8%	6,4%	0,01	-0,6%	1,7%	0,01
Country	**CLIFS**			**FSI**		
	Min.	*Max.*	*Std. dev.*	*Min.*	*Max.*	*Std. dev.*
Croatia	0,02	0,37	0,06	-0,96	2,34	0,46
Czech R.	0,02	0,81	0,13	-0,96	2,34	0,46
Hungary	0,01	0,91	0,17	-0,96	2,34	0,46
Poland	0,02	0,48	0,08	-0,96	2,34	0,46
Romania	0,02	0,47	0,09	-0,96	2,34	0,46
Sweden	0,03	0,63	0,11	-0,96	2,34	0,46

As mentioned earlier, to test the validity of UIP we use a threshold regression analysis. This approach is a valid alternative to classical OLS or GMM methods, to capture the asymmetric patterns or sudden breaks that can be observed in financial time series, as well as to better model and explain economic relationships that are characterised by non-linear features. In particular, the threshold regression models represent a versatile approach to estimate the relationship between given factors, in the presence of a threshold variable (Ramirez-Rondan and Terrones, 2021). The main feature consists in splitting the initial sample into two regimes or regions, based on the threshold estimated value, and the distinct estimation of the regression coefficients which are allowed to differ across regions.

[4] We use average monthly values.

In this study we use a threshold regression with two regimes:

$$y_{t+1} = \begin{cases} x_t\beta + z_t\delta_1 + \epsilon_t, & -\infty < w_t \leq \gamma \\ x_t\beta + z_t\delta_2 + \epsilon_t, & \gamma < w_t \leq \infty \end{cases}. \tag{5}$$

In Eq. (5), y_{t+1} is the dependent variable (monthly exchange rate percentage change against EURO), the set of explanatory variables without threshold effects are given by x_t and might also include lagged values of y_t, while z_t is a matrix of independent variables featuring some region-specific coefficients captured by δ_1 and δ_2. Furthermore, β is a vector containing region-invariant estimates, w_t is the threshold variable given by FSI or CLIFS while ϵ_t is an IID error term with zero mean and constant variance σ^2. Region 1 contains those observations associated with w_t less than the threshold γ. Similarly, Region 2 is restricted to the subset of observations where the value of w_t is greater than γ. Carrying out inference on γ i.e., the nuisance parameter is a difficult mission mainly due to its non-standard asymptotic distribution. In this regard, to identify the threshold value $\hat{\gamma}$ is mandatory to perform the least square optimisation to Eq. (6) with T observations and two regions:

$$y_{t+1} = x_t\beta + z_t\delta_1 I(-\infty < w_t \leq \gamma) + z_t\delta_2 I(\gamma < w_t \leq \infty) + \epsilon_t. \tag{6}$$

The threshold is calculated based on the following minimisation algorithm:

$$\hat{\gamma} = \arg min_{\gamma\in\Gamma} S_{T_1}(\gamma). \tag{7}$$

In Eq. (7), $\Gamma \in (-\infty, \infty)$, $T_1$is a sequence of values in w_t, with $T_1 < T$ and corresponds to the number of observations between two certain quantiles of w_t distribution. In addition, $S_{T_1}(\gamma)$ can be computed as:

$$S_{T_1}(\gamma) = \sum_{t=1}^{T} [y_t - x_t\beta - z_t\delta_1 I(-\infty < w_t \leq \gamma) - z_t\delta_2 I(\gamma < w_t \leq \infty)]^2 \tag{8}$$

Eq. (8) represents a T_1x1 vector of SSR given γ which is a T_1x1 vector of potential thresholds.

5. Results

We conjecture that financial stress affects the regression in Eq. (4) by separating the initial sample into two regimes, of high and low stress. By employing a threshold regression approach, we allow for the presence of potential differences in the slope and intercept parameters across the low-stress and high-stress regimes. We test a series of country-level threshold regression models, to uncover the particular countries for which UIP theory is validated. Another finding shows whether the domestic financial stress is of more importance than the global financial stress, when conditioning for the validation of the UIP. Table 2 synthesises the results when considering the global Financial Stress Index as the threshold variable.

Table 2. UIP estimates (FSI as threshold)

Currency Pairs	Regimes	Threshold	Intercept (α)	Int. Rate Differential (β)	R^2
EUR/CZK	Regime 1	FSI < 0.2845	-0.0013 (0.1250)	-0.0163 (0.8497)	0.0155
	Regime 2	FSI >0.2845	0.0048 (0.3280)	0.9104** (0.048)	0.1276
EUR/HRK	Regime 1	FSI<0.1950	-0.0001 (0.9160)	-0.0051 (0.8080)	0.0003
	Regime 2	FSI >0.1950	0.00197 (0.1680)	-0.0116 (0.7690)	0.0002
EUR/HUF	Regime 1	FSI <0.2908	0.0046** (0.0010)	-0.1065*** (0.0020)	0.0348
	Regime 2	FSI >0.2908	0.0037 (0.7290)	0.2289 (0.4400)	0.0303
EUR/PLN	Regime 1	FSI <0.2905	-0.0032 (0.2510)	0.1027 (0.3810)	0.0054
	Regime 2	FSI >0.2905	-0.0243 (0.1570)	2.0132** (0.042)	0.1609
EUR/RON	Regime 1	FSI <-0.1617	0.0002 (0.9130)	-0.0445 (0.1290)	0.0390
	Regime 2	FSI >-0.1617	-0.0005 (0.7110)	0.0825*** (0.0000)	0.1302
EUR/SEK	Regime 1	FSI <0.2878	-0.0002 (0.8300)	0.0237 (0.880)	0.0002
	Regime 2	FSI >0.2878	0.0053* (0.0600)	0.9324 (0.2020)	0.0118

The UIP holds if the beta coefficient is equal to unity and the intercept is close to 0. The p-values are in parentheses. The level of significance is: *** 1%, ** 5% and * 10%.

First, the relationship between the interest rate differential and exchange rates is persistent in terms of statistical significance for 4 out of 6 countries. Additionally, statistical significance is found mainly for the high-financial stress regime (Regime 2). Another important finding reveals that the UIP hypothesis is rejected for Hungary, Poland, and Romania when accounting for FSI as threshold variable. Consequently, our study confirms the general consensus in the literature regarding the existence of an UIP puzzle and suggests that deviations from UIP tend to occur more often during periods of high financial uncertainty, similar to the findings of Ismailov and Rossi (2018).

Interestingly, we report similar threshold estimates for Czech Republic, Hungary, Poland and Sweden – the FSI value ranges between 0.28 and 0.3. This empirical fact suggests that exchange rate dynamics for all these countries are sensitive to global financial stress in a similar fashion, even though the coefficients are different as magnitude. The UIP appears to hold only in the case of Czech Republic, with a positive and close to unity slope coefficient and an almost zero value for the intercept, but only during high-stress periods at global level. This finding is robust to the inclusion of a different proxy of financial stress, namely the domestic stress represented by CLIFS (see results in Table 3).

Table 3. UIP estimates (FSI as threshold)

Currency Pairs	Regimes	Threshold	Intercept (α)	Int. Rate Differential (β)	R^2
EUR/CZK	Regime 1	CLIFS <0.2427	-0.0011 (0.2610)	-0.0353 (0.7350)	0.0180
	Regime 2	CLIFS >0.2427	0.0007 (0.8070)	0.8985*** (0.0010)	0.0949
EUR/HRK	Regime 1	CLIFS < 0.0505	0.0004 (0.7250)	0.0710 (0.3150)	0.0009
	Regime 2	CLIFS >0.0505	-0.0004 (0.5600)	0.0014 (0.9430)	0.0008
EUR/HUF	Regime 1	CLIFS <0.2961	0.0032 (0.1090)	-0.0810*** (0.0076)	0.0234
	Regime 2	CLIFS >0.2961	0.0512 (0.0000)	-0.7009*** (0.0000)	0.1798
EUR/PLN	Regime 1	CLIFS <0.1990	-0.0007 (0.8960)	-0.0143 (0.8080)	0.0020
	Regime 2	CLIFS >0.1990	0.0040 (0.6900)	0.4695 (0.1380)	0.0304
EUR/RON	Regime 1	CLIFS <0.2005	-0.0015 (0.2780)	0.0580*** (0.0000)	0.0360
	Regime 2	CLIFS >0.2005	0.0121 (0.0110)	-0.1124** (0.0340)	0.0538
EUR/SEK	Regime 1	CLIFS < 0.156	0.0005 (0.6310)	-0.1318 (0.4230)	0.0048
	Regime 2	CLIFS >0.156	0.0001 (0.9640)	1.0300*** (0.0098)	0.0666

The UIP holds if the beta coefficient is equal to unity and the intercept is close to 0. The p-values are in parentheses. The level of significance is: *** 1%, ** 5% and * 10%.

More to the point, when accounting for CLIFS as a threshold variable, the estimate of the slope coefficient is statistically significant for Czech Republic, Hungary, Romania, and Sweden, during episodes of high-financial stress. Consequently, changes in the interest rate differential determine further changes in exchange rate dynamics, although the UIP theory is not validated for all countries. This finding reinforces our previous conclusion that deviations from UIP tend to arise more often during periods with increased financial stress, regardless of whether financial stress occurs at the global or national level. The only countries where we obtain robust results on UIP testing are Czech Republic and Sweden with a slope coefficient close to unity and statistically significant and almost null intercept, but only in times of high-stress periods at country-level.

The single-country regressions conducted for Hungary and Romania reveal a statistically significant slope coefficient for both low and high financial stress regimes; however, it is either negative or smaller than one, hence rejecting the UIP condition. This situation is documented in the literature as the UIP puzzle and seems to be quite common (Ismailov and Rossi, 2018; Lloyd and Marin, 2020; Ramirez-Rondan and Terrones, 2021).

Another interesting result indicates that domestic financial stress seems to have more of an impact on the UIP condition than global one. When conditioning for the global financial stress, UIP appears to hold for only one country, while when accounting for the domestic financial stress, UIP is validated for two countries. Appendix 1 and Appendix 2 present a graphical comparison regarding the threshold values for both situations.

6. Conclusions

The paper aims to contribute to the discussion on whether a European country is prepared for joining the euro-area, by participating in the Exchange Rate Mechanism and proving low fluctuations of its national currency. In this regard, regular monitoring is performed by the European Commission's Directorate-General for Economic and Financial Affairs, who is publishing a Convergence Report once at every two years, to examine whether the European countries satisfy the necessary conditions for adopting the single currency. The most recent report (EC, 2020) explains that, for the assessment of the exchange rate stability criterion, it is taken into account not only the developments in exchange rate policies and interventions meant to ensure a reasonable fluctuation against the EURO, but also several other indicators such as the short-term interest rates and the 3-month interest rate differential against the euro area.

In particular, we study whether periods of financial stress can influence a country’s interest rate and exchange rate convergence to euro-area ones. As postulated by economic literature, when the returns on domestic and foreign assets, measured in a common currency, do equalise then it is evidence of the uncovered interest parity (UIP) validation.

The interplay between financial stress (at both global and country-specific level) and the UIP has been modelled by using a threshold regression framework in a single-country approach, in order to obtain a granular picture for each of the six candidate countries to the euro-area. For each threshold variable it is estimated an optimal cut-off value that splits the initial sample into two regimes: a low financial stress regime and a high-stress one.

We find evidence that the UIP condition holds especially during high-financial stress periods. Our results are robust to the use of different financial stress measures (FSI, CLIFS). When discriminating between the sources of financial stress, namely global and country-specific ones, the findings show that UIP appears to hold for only one country (Czech Republic) if considering FSI as threshold, and for two countries (Czech Republic and Sweden) if employing CLIFS. Therefore, we can argue that these countries record the highest degree of monetary convergence with the euro-area.

For Hungary and Romania, there is evidence of an UIP puzzle in both threshold model specifications summarised in Tables 2 and 3. However, when using FSI as threshold, deviations from UIP tend to occur during periods of high financial uncertainty for Romania and, respectively, in times of low financial stress for Hungary. If considering CLIFS as threshold, deviations from UIP are present in both regimes. We can conclude that our results for these two countries persistently reject the UIP, and hence it is not advisable to participate yet in the Exchange Rate Mechanism due to deficiencies in the process of monetary convergence to euro.

An interesting finding suggests that regardless of the model specification, the UIP does not hold for Croatia. A survey of the most recent opinions and analyses regarding Croatia's accession to the eurozone, advanced by journalists, economists and European institutions, shows that arguments remain divided in terms of the technical compliance with the accession requirements. Most people and economists' positions preponderantly point toward the potentially negative consequences of this enlargement on the state of economic stability of the eurozone itself. There is the belief that Croatia did not totally meet the eurozone's accession criteria (Maastricht criteria), at least in terms of the public debt to GDP level. Skeptics also claim that it was not the most opportune moment for the accession to the eurozone, amidst a weakening of the euro itself and a looming recession in Europe (Malhotra 2023).

Similarly, a European Commission survey cited by Wesel (2023) claims that almost one in two respondents believe that the adoption of the euro will have negative economic consequences, while one out of three believe the country is well-prepared. The same editorial claims that the Croatian government is giving up the only instrument of its fiscal policy and that Croatia's joining of the euro area is a purely political decision. The arguments rely mainly in the belief that Croatia meets the Maastricht criteria in form, but not in substance, as it doesn't have the same level of economic development as the EU average.

This idea is reinforced by the National Bank of Belgium (Bisciari and Pausan, 2022), acknowledging that the decision to accept Croatia in the euro area is political in nature, being taken by the EU Council after the analysis of two convergence reports prepared by the European Commission and by the European Central Bank. Although Croatia is less developed compared to other euro area countries, the euro area and Schengen integration will facilitate its economic convergence with other countries in the eurozone. Complementarily, a communication issued by Banque de France (Faubert and Le Gallo, 2022) outlines those areas that still need to be improved by Croatia, namely: fighting against money laundering, strengthening the quality of public institutions and governance, increased convergence of living standards and economic structures.

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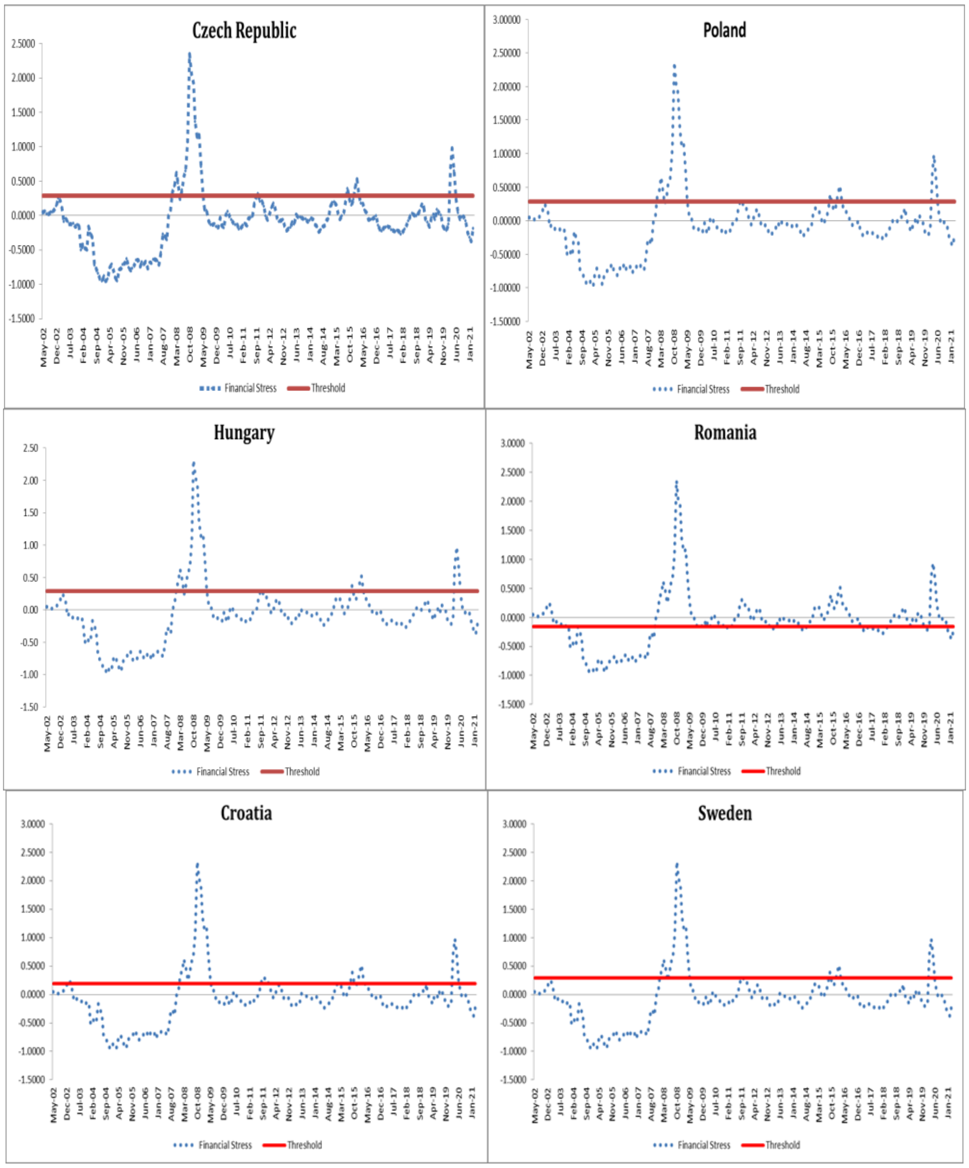
Appendix 1. Financial Stress Index as threshold



Appendix 2. CLIFS as threshold