

# Local and External Economic Policy Uncertainty and Their Impact on Exchange Rates in Emerging Markets: Evidence from Poland

*Jędrzej Białkowski*

Department of Economics and Finance  
University of Canterbury, New Zealand

[jedrzej.bialkowski@canterbury.ac.nz](mailto:jedrzej.bialkowski@canterbury.ac.nz)

(corresponding author)

*Rafał Klepka*

Institute of Journalism, Media and Social Communication  
Jagiellonian University in Kraków, Poland

[rafal.klepka@uj.edu.pl](mailto:rafal.klepka@uj.edu.pl)

*Anna Sławik*

Institute of Economics, Finance and Management  
Jagiellonian University in Kraków, Poland

[anna.slawik@uj.edu.pl](mailto:anna.slawik@uj.edu.pl)

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# **Local and External Economic Policy Uncertainty and Their Impact on Exchange Rates in Emerging Markets: Evidence from Poland**

## **Abstract**

Our study introduces an Economic Policy Uncertainty (EPU) index for the fast-growing emerging economy of Poland. We show that the local economic policy uncertainty, as measured by the EPU Poland index, has a positive and statistically significant impact on direct exchange rates in Poland. Moreover, the influence of local economic policy uncertainty on the foreign exchange (FX) market surpasses that of external economic policy uncertainty, proxied by global, US, and European indices in influencing. The results remain robust across various GARCH-type models applied to three key exchange rate pairs: PLN/EUR, PLN/USD, and PLN/CHF. This study underscores the importance of local EPU indices in understanding the dynamics of FX markets.

**JEL Codes:** D81, F3, F31, G12, G15,

**Keywords:** Uncertainty, Economic Policy Uncertainty, Foreign exchange market, Emerging economy, EPU Poland index

## 1. Introduction

The Economic Policy Uncertainty (EPU) index introduced by Baker et al. (2016) has quickly become a highly regarded benchmark in finance and economics. The EPU index was developed to measure uncertainty regarding economic policy by analyzing the frequency of newspaper articles that discuss economic policy uncertainty. This measure was initially constructed for the United States, and its development significantly contributed to understanding the relationship between policy uncertainty and economic outcomes. Given the importance of uncertainty in decision-making processes across financial markets, corporate governance, and policymaking, the EPU index has been widely adopted and recognized in both academic and applied contexts.

The impact of the EPU index has extended to multiple domains within economics and finance, particularly in corporate finance and asset pricing. Researchers have explored how economic policy uncertainty influences corporate decision-making (Gregoriou et al., 2021, Kong et al., 2022, Campello et al., 2024), investment behavior (Jo and Lee, 2024), stock market performance (Chan and Marsh, 2021, Hong et al., 2024), and asset prices (Goodell et al., 2020), Du et al., 2023). Furthermore, due to its significance as a measure of uncertainty, the EPU index is frequently incorporated as a control variable in studies across various subfields of economics, enhancing the robustness of empirical analyses. The ability to control for the level of economic policy uncertainty allows researchers to isolate other factors influencing economic decisions and performance, providing more precise insights into the drivers of economic behavior.

The initial success and widespread acceptance of the US EPU index have spurred the creation of similar indices for 28 other countries<sup>1</sup>, allowing for a more global examination of the role of economic policy uncertainty ([www.policyuncertainty.com](http://www.policyuncertainty.com)). By developing country-specific EPU indices, researchers have been able to explore the effects of uncertainty in diverse economic and political environments.

This paper examines whether the local economic uncertainty or international/global has a more severe impact on key exchange pairs for Poland, a primary example of a leading economy in

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<sup>1</sup> The EPU indices are available for the following countries (in the brackets references to published studies for a given country): Australia, Belgium, Brazil, Canada, Chile, China, Colombia, Croatia (see Soric, 2017), Denmark, France, Germany, Greece (Fountas et al., 2018), Hong Kong (see Luk et al., 2020), India, Ireland (see Zalla, 2017), Italy, Japan (see Arbatli Saxegaard et al., 2022), Mexico, Netherlands, New Zealand (see Ali et al., 2022), Nigeria, Pakistan, Russia, Singapore, South Korea, Spain, Sweden (see Armelius et al., 2017), United Kingdom (see Lennard, 2020) and the United States of America (see Baker et al., 2016).

Central and Eastern Europe (CEE)<sup>2</sup>. However, Poland is a unique case that calls for examination. At least a few factors make it a compelling case study. First, it is the largest EU economy maintaining its own currency; its currency, Polish zloty (PLN), is Europe most traded emerging market currency. Second, it has characteristics of an emerging market<sup>3</sup>, including a notable divergence between an accelerating economy and lagging politics. At the same time Poland has strong socio-economic connections with developed economies of Europe and the Eurozone members due to EU integration. Finally, Poland's unique geopolitical position and relationships with the USA, EU, and Russia make it a unique case in the EU and beyond.

This research contributes to the growing literature on economic policy uncertainty and its impact on the FX market. Previous studies have examined the impact of economic policy uncertainty on exchange rates in the EU area (Pastorek, 2023), the GBP/USD exchange rate (Bartsch, 2019)), exchange rates in Mexico (Bush and Noria, 2021), 16 exchange rates against the USD (Balcilar et al., 2016), and exchange rate returns and volatility in China (Wang et al., 2022). Nevertheless, our key contribution lies in the introduction of the EPU index for Poland. Following the methodology proposed by Baker et al. (2016), we have adjusted it to reflect the specific characteristics of Polish mass media.

The remainder of this paper is structured as follows: Section 2 describes the data and variables, and the methodology employed. Section 3 reports and discusses the results. Section 3 concludes the study.

## **2. Data and Methodology**

Our analysis focused on currency pair exchanges involving the Polish Zloty (PLN), specifically PLN/USD, PLN/EUR, and PLN/CHF. The PLN/USD exchange rate was particularly significant during the early transition period of the Polish economy, reflecting patterns observed in other emerging markets. As Poland joined the European Union on May 1, 2004, the importance of the EUR became evident. It was driven by increasing trade links with key EU economies. The PLN/EUR exchange rate is the most important for the Polish economy.

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<sup>2</sup> This can be partially explained by the fact that emerging markets are typically less transparent and often pose a language barrier, making it difficult to analyze legal and governmental documents or media coverage.

<sup>3</sup> On 24 September 2018, the FTSE Russell index agency decided to reclassify the Polish market from emerging to developed. On the other hand, MSCI Inc. (Morgan Stanley Capital International Indices) still recognizes Poland as an emerging market (<https://www.msci.com/documents/10199/c0db0a48-01f2-4ba9-ad01-226fd5678111>).

The PLN/ CHF exchange rate is included in our analysis for at least two reasons. First, the Swiss franc is recognized as a safe haven asset (Rinaldo and Söderlind, 2011); Christiansen et al., 2011), making its value highly responsive to risk-on/risk-off dynamics in emerging markets. Second, in the early 21st century, there was a surge in Swiss franc-denominated mortgages (see Białowolski and Więziak-Białowolska, 2017; Brown et al., 2009; Buszko, 2018); turning the PLN/CHF exchange rate into a key prosperity benchmark for a significant portion of Polish households. These facts indicate that the PLN/EUR, PLN/USD, and PLN/CHF exchanges rates are key to the Polish economy (see Appendix, Figure A1).

Following Baker's et al. (2016) methodology, we constructed two monthly EPU indices for Poland that measure uncertainty related to economic policy. The EPU Poland Short is based on news articles published by five Polish newspapers over an eight-year period (from July 2018 to January 2024). The EPU Poland Long utilizes articles from three Polish newspapers spanning a significantly longer period of over 20 years (from March 2003 to January 2024). The selection of news sources for our database was carried out with consideration for 1) ensuring significant national coverage of the newspapers, as measured by average daily sales of copies, 2) inclusion of diversified topic profiles, formats, and editorial lines, and 3) representation of diversified ownership, to encompass a wide range of viewpoints. As a result, the dailies included one tabloid, "*Fakt*", with the highest sales among dailies in Poland, and the most opinion-forming general dailies "*Gazeta Wyborcza*", "*Rzeczpospolita*" and "*Dziennik Gazeta Prawna*", as well as the leading Polish economic daily "*Parkiet*". The newspaper articles are obtained from the Factiva dataset. The start and end dates for individual newspaper titles are determined solely by data availability. Detailed information about our research sample is presented in Table A1 in Appendix.

We analyzed the monthly coverage of the selected newspapers by searching for articles that contained predefined terms related to the *economy*, *policy*, and *uncertainty*. The keywords chosen for each category are listed in Table 1. A newspaper article is classified as an EPU-generating article if it contains at least one word from each of the three word categories. In addition, articles were automatically filtered by applying geographical restrictions within Factiva's interface, meaning regions not encompassing the analyzed country were excluded.

TABLE 1 HERE

In our analysis, we required a proxy for external economic policy uncertainty, and therefore considered the following EPU indices: the US Daily News Index for the United States, and the

European News Index and Germany News Index for Europe, all available on the webpage [www.policyuncertainty.com](http://www.policyuncertainty.com) administrated by the authors of Baker et al. (2016) study<sup>4</sup>.

Autoregressive conditional heteroskedastic (ARCH) model proposed by Engle (1982, 1983) has been widely used to analyze and forecast economic or financial time series characterized by periods of high or low volatility and significant kurtosis. Bollerslev (1986) proposed the generalized autoregressive conditional heteroskedastic (GARCH) model, which recognized the difference between the unconditional and the conditional variance, allowing the latter to change over time as a function of past errors. This generalized model provides a longer memory and a more flexible lag structure (see Brockwell and Davis, 1996). However, the GARCH model has the disadvantage that conditional variance depends on the magnitude of delayed innovations but not on their sign. This problem was solved with the exponential generalized autoregressive conditional heteroskedastic (EGARCH) model (see Nelson, 1991) by introducing a measure of the sign of innovations. While the starting point of GARCH models is that positive and negative error terms have a symmetric effect on the volatility, previous research has shown that this effect is in fact asymmetric in financial time series due to market imperfections such as transaction costs (Aliyev et al., 2020) and the different response of investors to good and bad news (see Barberis et al., 1998; Bentes, 2018). Thus, EGARCH model allows for asymmetric effects of positive and negative shocks on volatility. It is particularly useful in FX markets where negative news may impact volatility differently than positive news. Our models consist of two equations for the level of returns and variance:

$$r_t = c + \varphi_0 r_{t-1} + \varphi_1 EPU_t^{Local} + \varphi_2 EPU_t^{External} + y_t, \quad y_t = \varepsilon_t \sigma_t, \quad (1)$$

where a variance of error term is modelled by one of GARCH models, such as ARCH(q), GARCH (p,q) and EGARCH (p,q), respectively:

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i y_{t-i}^2, \quad (2)$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i y_{t-i}^2 + \sum_{i=1}^p \beta_i \sigma_{t-i}^2, \quad (3)$$

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<sup>4</sup> Our analysis indicated that EPU Germany News index had a more substantial impact on the PLN/EUR exchange rate than the European News Index. Therefore, in our study, we used the Germany News Index as a benchmark.

$$\ln(\sigma_t^2) = \alpha_0 + \sum_{i=1}^q (\alpha_i y_{t-i} + \gamma_i (|y_{t-i}| - E|y_{t-i}|)) + \sum_{j=1}^p \beta_j \ln(\sigma_{t-j}^2), \quad (4)$$

We assume standard set of assumptions related to parameters of GARCH-type models (2)-(4).  $r_t$  is defined as natural logarithm of the daily exchange rates vs. PLN.  $EPU_t^{Local}$  is defined by the EPU Poland Long (or Short) index.  $EPU_t^{External}$  refers to the EPU index corresponding to each currency: EUR (Germany News Index), USD (US Daily News Index) and for CHF (European News Index).

## Results

The analysis of Figure 1 reveals that the EPU Poland index, similar to indices of other countries, increases following national elections when the questions about economic policy become particularly relevant. These post-election periods with elevated EPU Poland index levels often coincide with the depreciation of the PLN against the EUR, USD, and CHF. Additionally, at least two other events resulted in substantial increases in the EPU Poland index: the Global Financial Crisis (2008/09) and the Russian invasion of Ukraine in the first quarter of 2022. Both events were accompanied by a significant depreciation of the polish currency. Notable, since 2015, there has been inflated uncertainty about economic policy in Poland, as reflected by the EPU index.

FIGURE 1 HERE

TABLE 2 HERE

Table 2 demonstrates that our two measures for Polish economic policy uncertainty (EPU Poland Short and EPU Poland Long) are highly correlated at a level 0.90. This indicates that constructing a benchmark using three or five leading newspapers yields an index with similar properties. It is worth noting that uncertainty about economic policy in Poland has a similar correlation with economic policy uncertainty in Europe and the United States of America. The analysis of three exchange rates reveals that, over the examined period, the Swiss franc tends to appreciate against the PLN, while the negative mean of daily return for PLN/USD and PLN/EUR indicates a strengthening tendency of the emerging market currency. Among the three currency pairs, PLN/USD exhibits the highest volatility, followed by PLN/CHF and

PLN/EUR. Table 2 also presents the analysis results of the impact of EPU indices on exchange rate levels against the Polish zloty. Among the three currency pairs, the selection of a benchmark for economic uncertainty affecting the Swiss franc (PLN/CHF) posed a challenge, as no EPU index is available for Switzerland. To address this, we selected appropriate proxies. Given the well-established role of the Swiss franc as a safe haven asset, we considered proxies for international economic policy uncertainty, including the European News Index, Global EPU, and the US Daily News Index indices. Since the results were not materially different across these proxies, we chose to report the findings for the European News Index.

For PLN/EUR and PLN/USD, the choice of benchmarks was more straightforward, with the Germany News Index and the US Daily News Index indices selected, respectively. The table is divided into three panels, each corresponding to one of the currency pairs. Our model comprises two equations, with the second modelling variance using GARCH-type models.

#### TABLE 3 HERE

In Table 3, we report results for key models ARCH(1), GARCH(1,1), and EGARCH(1,1) commonly used for modeling financial time series, such as daily returns or changes in exchange rates. While we considered other GARCH-type models, the results did not materially differ from our main conclusions, therefore we omitted them from the paper for brevity. All three models demonstrate a good fit with daily changes in the Polish exchange rate.

Even though EGARCH (1,1) is often a preferable model as it captures the leverage effect, where negative shocks have a larger impact on volatility than positive shocks of the same magnitude, the model with GARCH (1,1) for a variance has better goodness-of-fit based on level of Akaike Information Criterion (AIC). Most parameters of the variance equation are statistically significant, as expected. A positive  $\gamma_1$  indicates that negative shocks (bad news) lead to a greater increase in future volatility of exchange rate changes compared to positive shocks (good news) of the same magnitude. It reflects the tendency for market volatility to respond more strongly to adverse events across all three currency pairs.

The analysis of the equation for changes in exchange rate levels reveals that local economic policy uncertainty, as proxied by the EPU Poland index, has a positive and nearly always statistically significant impact on these changes. In other words, as economic policy uncertainty in Poland increases, the Polish zloty depreciates against the EUR, USD, and CHF. Conversely, external EPU indices generally do not impact exchange rates, with the exception of the Germany News Index. We found some evidence that increased economic policy uncertainty in



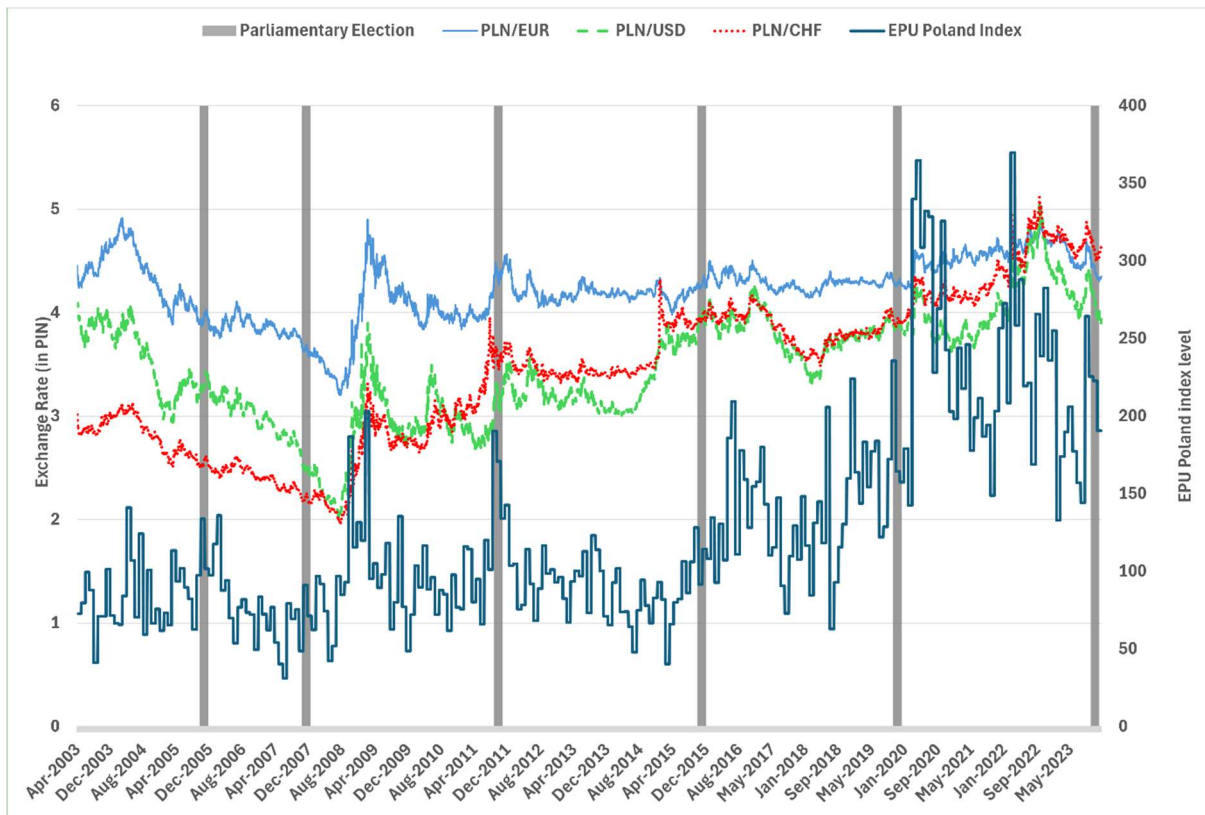
main European economy leads to an appreciation of the PLN (Panel A: GARCH (1,1) model). It is worth mentioning that this effect is not economically insignificant, given the magnitude of the coefficient. Overall, the reported results support the hypothesis that, in emerging economies, local economic policy uncertainty plays a key role in shaping direct exchange rate levels.

### **3. Conclusions**

Our analysis shows that increased local economic policy uncertainty has a strong and statistically significant impact on the depreciation of the PLN against the EUR and USD. The impact of external economic policy uncertainty is both statistically insignificant and economically negligible. The results for PLN/CHF are inconclusive due to the lack of statistical significance, which may partly be explained by the absence of an EPU index for Switzerland.

The contribution of our study is twofold. First, we introduced the economic policy uncertainty index for the fast-growing Polish economy (the EPU Poland index), constructed using the methodology proposed by Baker et al. (2016). Second, we demonstrated that local economic policy uncertainty has a robust impact on the key exchange rate pairs: PLN/EUR, PLN/USD, and PLN/CHF. An uncertainty increases, it leads to the depreciation of the local currency. Our findings align with the results reported by Abid (2019) for non-European emerging markets.

**Figure 1:** Exchange rates against PLN and the Economic Policy Uncertainty Index for Poland



Note: The performance of the PLN vs. the EUR, USD and CHF vs. the EPU Poland index. The grey area highlights a two-month period post parliamentary elections.

**Table 1:** The list of words included in construction of the EPU Poland index

Category	Economy	Policy	Uncertainty
<b>keywords translated into English</b>	economy, economics, economic	policy, politics, politician, political, parliament, parliamentary, senate, senator, bill, act, legislation, legislator, legislative, regulation, president, the National Bank of Poland, ministry, minister	uncertainty, uncertain, uncertainly
<b>original keywords in Polish</b>	ekonomi-, gospodar-	polit-, parlamen-, sejm-, sena-, ustaw-, regulacj-, prezydent-, NBP, minist-	niepewn-

Note: The construction of the EPU Poland index is based on Baker's et al. (2016) methodology.

**Table 2:** Summary statistics and correlation matrix

Panel A: Summary statistic	Mean	Median	Std. dev	5 <sup>th</sup> pctl	95 <sup>th</sup> pctl
EPU Poland Long	126.80	103.76	66.62	59.40	264.28
EPU Poland Short	113.82	115.09	32.86	64.69	170.79
European News Index	181.96	173.39	81.32	71.22	328.15
US Daily News Index	127.26	119.78	46.08	69.89	204.63
PLN/EUR	-0.0002	0.0000	0.5192	-0.7409	0.7807
PLN/USD	-0.0005	-0.0052	0.9407	-1.2283	1.3337
PLN/CHF	0.0083	-0.0027	0.7327	-0.9506	1.0769

Panel B: Correlation	EPU Poland Long	EPU Poland Short	US Daily News Index	European News Index
EPU Poland Long	1			
EPU Poland Short	0.90351	1		
US Daily News Index	0.60905	0.58469	1	
European News Index	0.72073	0.51395	0.59707	1

This table shows the pairwise correlation for the main variables. The EPU Poland Long is the index constructed using data from three newspapers from April 2003 to January 2024. The EPU Poland Short is the index constructed using data from five newspapers from August 2018 to January 2024.

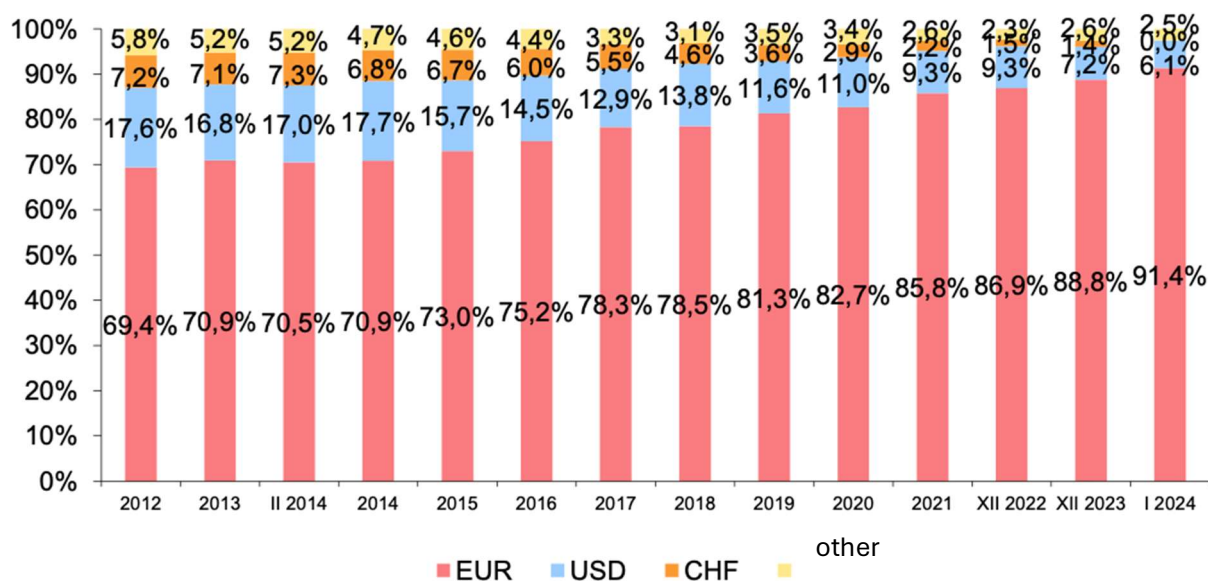
**Table 3:** Estimated parameters of GARCH models and goodness of fit

Panels	Level equation			Variance equation				AIC
	$\varphi_0$	$\varphi_1$	$\varphi_2$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\gamma_1$	
A: PLN/EUR								
<i>ARCH(1)</i>	-0.0202 (0.2550)	0.0076** (0.0324)	0.0025 (0.1655)	0.0001*** (0.001)	0.3146*** (0.001)			-20783.359
<i>GARCH(1,1)</i>	-0.0456** (0.0173)	0.0078** (0.0375)	-0.0004*** (0.001)	0.0001*** (0.001)	0.0700*** (0.001)	0.9208*** (0.001)		-21421.787
<i>EGARCH(1,1)</i>	-0.0446** (0.0174)	0.0062 (0.747)	0.0001 (0.976)	-0.1341*** (0.001)	0.1465*** (0.001)	0.9866*** (0.001)	0.2800*** (0.001)	-21403.16
B: PLN/USD								
<i>ARCH(1)</i>	0.0310 (0.234)	0.0216*** (0.002)	0.0028 (0.6424)	0.0001*** (0.001)	0.1669*** (0.001)			-17521.65
<i>GARCH(1,1)</i>	-0.0276 (0.1386)	0.0130** (0.050)	-0.0003 (0.9532)	0.0000*** (0.005)	0.0430*** (0.001)	0.9579*** (0.001)		-18454.96
<i>EGARCH(1,1)</i>	-0.0188 (0.2991)	0.0142** (0.025)	-0.0017 (0.6274)	-0.0017 (0.7842)	0.0843*** (0.001)	0.8993*** (0.001)	0.4179*** (0.001)	-18448.35
C: PLN/CHF								
<i>ARCH(1)</i>	-0.1533*** (0.001)	0.0038 (0.384)	0.0004 (0.889)	0.0000*** (0.001)	0.4089*** (0.001)			-19126.97
<i>GARCH(1,1)</i>	-0.0498 (0.2054)	0.0037* (0.100)	0.0003 (0.4337)	0.0001 (0.893)	0.0809*** (0.001)	0.9103*** (0.001)		-20016.221
<i>EGARCH(1,1)</i>	-0.0435 (0.1846)	0.0020*** (0.021)	0.0023 (0.6590)	-0.1179*** (0.001)	0.1428*** (0.001)	0.9876*** (0.001)	0.4299*** (0.001)	-20012.079

Note: \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The table shows the estimated value for each parameter and below, in italics, the  $p$ -value of the significance test.

## Appendix

**Figure A1:** Currency structure of Poland's foreign public debt (including swap transactions)



Source: Ministry of Finance Republic of Poland. Zadłużenie Skarbu Państwa, Biuletyn miesięczny 1/2024, p. 12.

**Table A1:** Polish Newspapers included in the construction of the EPU Poland index

Title	Description	Published since	Daily circulation	Period	Ownership
<i>Rzeczpospolita</i>	A nationwide economic and legal daily with a conservative-liberal profile.	1982	30,343	March 2003 – January 2024	Gremi Media Inc.
<i>Gazeta Wyborcza</i>	A leading opinion-forming daily with a center-liberal profile.	1989	37,276	March 2003 – January 2024	Agora Inc.
<i>Parkiet</i>	A specialized economic daily, without a clear political editorial line.	1994	3,334	March 2003 – January 2024	Gremi Media Inc.
<i>Fakt</i>	A nationwide tabloid, with features typical of the tabloid press, without a clear political line.	2003	118,632	August 2018 – January 2024	Ringier Axel Springer Polska
<i>Dziennik Gazeta Prawna</i>	A nationwide legal and economic daily, without a clear political editorial line.	2009	26,619	August 2018 – January 2024	Infor PL Inc.

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