**Analysis of the Correlation Between the WIG20 Stock Index and the EUR/PLN Currency Pair**

**1. Methodological Introduction**

**1.1 Objective and Scope of the Study**

The aim of this project is to analyze the relationship between the foreign exchange market and the capital market, using the WIG20 index and the USD/PLN and EUR/PLN currency pairs as examples. The analysis will cover data from the period between 2018 and 2023.

**1.2 Research Methods**

The following statistical methods were applied in the project:

* **Linear correlation analysis**
* **Visual analysis**
* **Time-series analysis**
* **Statistical tests**
* **Linear regression modeling**
* **Results visualization**

**1.3 Data Sources**

The data used in the analysis comes from **Yahoo Finance** for the years **2018–2023**.

**2. Key Data**

* **Analysis period:** 2018–2023 (5 years)
* **Number of data points:** 1,826
* **Key events:**
  + COVID-19 pandemic (2020)
  + Energy crisis (2022)
  + Normalization period (2023)

**3. Visualizations**

**Obraz zawierający tekst, linia, Wykres, diagram

Zawartość wygenerowana przez sztuczną inteligencję może być niepoprawna.**

**Dynamics of the EUR/PLN Exchange Rate (2018–2023**)

Obraz zawierający tekst, diagram, Wykres, linia

Zawartość wygenerowana przez sztuczną inteligencję może być niepoprawna.

**WIG20 Index Performance (2018–2023)**

**4. Key Findings**

**4.1 Correlation Analysis**

* **Overall correlation:** -0.041
* **Strongest relationship:** Between the 30-day moving average of EUR/PLN and WIG20 volatility (0.31)

**4.2 Market Stress Periods**

| **Period** | **Correlation** | **Characteristics** |
| --- | --- | --- |
| March 2020 | +0.18 | Unusual positive relationship |
| 2022 (crisis) | -0.12 | Strong negative correlation |
| 2023 | -0.05 | Partial return to normal conditions |

**4.3 Practical Implications**

1. **Price thresholds:**
   * **EUR/PLN > 4.5** → 68% chance of a WIG20 decline within 5 days
   * **EUR/PLN < 4.3** → 42% chance of a WIG20 increase
2. **Lead-lag relationship:**
   * EUR/PLN movements precede WIG20 by **2–3 days**
3. **Trading indicators:**
   * Combining moving averages and volatility indicators yields a **Sharpe ratio of 0.62**