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OIL PRICES AND INVESTMENTS ACROSS THE EASTERN EUROPEAN COUNTRIES

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ABSTRACT: This research examines the impact of oil prices on investment dynamics in Eastern European countries using quarterly data from 2010 to 2023. The main objective is to assess the short-run and long-run effects of oil price fluctuations on investment levels, considering the role of exchange rates and interest rates as additional macroeconomic determinants. The study employs the autoregressive distributed lag (ARDL) model, which allows for the analysis of both immediate and equilibrium relationships between variables. Specifically, a positive long-run impact of oil prices on investment is observed in 10 out of 11 countries. A negative impact is only found in Croatia, while in Slovakia, oil prices do not affect investment. Regarding short-run effects, there is a strong positive correlation between oil price and investment in Slovenia and Latvia, whereas a negative effect is found for 6 countries. It is worth noting that using the real exchange rate instead of the nominal one significantly weakens the relationship between oil prices and investment. Among other findings, investment is positively associated with higher interest rates in 7 countries, while the intuitively expected negative effects are only found in Hungary and Poland. Investment reacts more strongly to the nominal exchange rate compared to the effect of the real exchange rate. Although the long-run impact of the exchange rate is predominantly negative, this does not hold for short-run effects. In particular, our results suggest a significant heterogeneity of exchange rate effects across the studied countries.

KEYWORDS: investments, oil price, exchange rate, ARDL, Eastern Europe

Introduction

The study of the impact of oil prices on investment in Eastern Europe is particularly critical, as these economies are highly sensitive to changes in oil prices. Unlike major oil-producing nations, Eastern European countries are largely oil importers, making them vulnerable to fluctuations in global oil markets. Rising oil prices can significantly affect their macroeconomic indicators, including investment activity, yet research on this subject remains limited. In 2023, total global oil demand reached 102.21 million barrels per day, with a record monthly high in June (*World Energy Outlook, 2023*). Forecasts suggest that oil will remain a dominant energy source for the next two decades (*Short-Term Energy Outlook*, 2024). Rising oil prices particularly burden economies dependent on imports, constraining investment and growth. Kilian (2008), Hamilton (2003) and Blanchard and Galí (2007) have extensively studied the transmission mechanisms of oil price shocks, focusing on their macroeconomic effects and the responses of monetary policy, especially in the U.S. context. Research addressing the specific impacts of oil shocks on investment in Eastern Europe remains insufficient. Jiménez-Rodríguez and Sánchez (2005), analysing OECD countries, provide valuable insights into oil price impacts but often exclude detailed analyses of Eastern Europe. Arouri and Nguyen (2010) explore sector-specific responses to oil price volatility in Europe, emphasising the need for region-specific studies. Recent analyses highlight that oil price uncertainty can significantly influence investment efficiency and expenditure decisions. Shang et al. (2024) examine how unpredictable crude oil prices shape investment expenditures, particularly in Chinese enterprises, and argue that oil price volatility introduces inefficiencies in capital allocation. Similarly, Zorgati (2023) investigates the relationship between exchange rates and oil price fluctuations, revealing that during financial crises, oil-importing economies experience heightened risk exposure, which can lead to investment contractions. Given the complexities of oil price dynamics and their wide-reaching implications, understanding their effects on Eastern European investment activity is crucial for formulating effective policy measures.

An overview of the literature

The relationship between oil prices and macroeconomic indicators, including investment, has been a prominent area of economic research. Numerous studies have explored the effects of oil price volatility, but significant gaps remain, particularly in the context of Eastern European countries. Regional and sectoral studies illustrate the varied effects of oil price volatility. Morana (2017) highlights the financial and macroeconomic repercussions in the Eurozone, while Bouri (2015) demonstrates how oil volatility affects stock markets in oil-importing countries during financial crises. Cunado et al. (2015) explores the regional and sectoral impacts of oil prices in Asia. The study focuses on aggregate macroeconomic indicators, leaving investment as a secondary concern. Herwartz and Plödt (2016) use advanced statistical techniques to identify the effects of oil shocks, demonstrating promising methods for future regional analyses but not directly considering Eastern Europe. As highlighted by Jiménez-Rodríguez and Sánchez (2005), oil-importing economies face substantial GDP impacts due to oil price shocks. Eastern Europe's reliance on external energy supplies exacerbates this issue, underscoring the need for targeted studies. Sill (2007) and Cunado et al. (2015) provide macroeconomic perspectives, they fail to address the micro-level implications for investment activity within this region. Employing advanced econometric approaches and integrating insights from global studies, such as those by Fan and Zhu (2010) or Łamasz and Iwaszczuk (2020), can shed light on these dynamics. Currently Audi et al. (2025) employ quantile regression techniques to demonstrate that the impact of oil price shocks on investment is significantly shaped by stock market conditions. They found that bearish markets amplify negative investment reactions, whereas bullish markets tend to absorb oil price shocks with less severe consequences. This aligns with Morana (2017), who highlights how financial market conditions moderate macroeconomic responses to oil volatility. Zorgati (2023) contributes to this discourse by examining the risk interactions between exchange rates and oil prices, particularly during periods of economic crises. The study finds that oil-importing economies face heightened financial risks when oil price volatility coincides with exchange rate instability. This relationship suggests that policymakers in Eastern European countries should focus on

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stabilising currency markets to mitigate investment uncertainty driven by oil price fluctuations. Shang et al. (2024) explore how crude oil price uncertainty influences investment behaviour, showing that unpredictable oil price movements increase capital misallocation and lower investment efficiency. This study reinforces the notion that oil price uncertainty creates systemic risks that can disrupt financial planning and economic stability. Advances in econometric modeling, such as the Autoregressive Distributed Lag (ARDL) approach by Pesaran et al. (1999) and the time-varying models utilised by Ben Salem et al. (2024), enable nuanced analyses of dynamic relationships between oil prices and investment. These methods are particularly suited to capturing the complexities of Eastern European economies, where structural dependencies on oil imports play a critical role.

Research methods

The primary objective of this study is to analyse the impact of oil price fluctuations on investment dynamics in Eastern European countries. The research aims to assess how changes in oil prices influence investment levels while accounting for the moderating roles of exchange rates and interest rates. A key focus is to assess the long-run relationship between oil prices and investment. Additionally, the short-term responsiveness of investments to oil price volatility is analysed. This research incorporates exchange rate movements, both nominal and real, to evaluate their role in mediating the oil price-investment nexus. Recognising the structural heterogeneity of Eastern European economies, a comparative analysis is conducted to identify country-specific factors that may influence the extent and direction of these effects. To accomplish these objectives, we employ the Autoregressive Distributed Lag (ARDL) model, which offers several methodological advantages. The ARDL approach allows for flexibility in handling time-series data with mixed integration orders, as it can accommodate variables that are either stationary at levels (I(0)) or first differences (I(1)). This is particularly relevant given the economic heterogeneity of Eastern European countries. Second, ARDL enables simultaneous estimation of both short-run and long-run effects (Pesaran et al., 2001)., thereby providing a more comprehensive understanding of the dynamic relationship between oil prices and investment. This model is well-suited for small sample sizes, which is crucial given the limited availability of high-frequency macroeconomic data for the region. Additionally, the model incorporates bound testing procedures to assess cointegration among variables, ensuring robustness in long-term relationship estimations. Similar econometric approaches were employed by Zorgati (2023) on exchange rate volatility and oil price interactions and Ben Salem et al. (2024), who utilised ARDL to assess oil price effects on GDP components under varying economic conditions. Empirical justification for employing the ARDL framework is supported by its successful application in similar macroeconomic studies. Previous research has demonstrated its effectiveness in capturing the interactions between macroeconomic variables under conditions of economic volatility. Recent studies, such as those by Shang et al. (2024), have shown that the ARDL model effectively distinguishes between immediate investment shocks and long-term structural adjustments, particularly in energy-dependent economies. Audi et al. (2025) applied ARDL to investigate the impact of oil price shocks on financial markets, illustrating how short-term price fluctuations translate into long-term investment shifts. Van Dinh (2022) further supports the suitability of the ARDL model, demonstrating its ability to capture the complex relationship between crude oil price fluctuations and economic growth. His findings highlight how short-term volatility in energy markets can have significant long-term macroeconomic consequences, reinforcing the model's relevance for policy analysis. The methodology allows for the inclusion of additional macroeconomic determinants, such as interest rates and exchange rates, enhancing the explanatory power of the model, as seen in Kripfganz and Schneider (2023), who highlight its suitability for analysing economic stability and policy responses.

All time series covering the period from Q1 2010 to Q4 2023 were sourced from the FRED database (Federal Reserve Economic Data, 2024). The following variables were used:

- investment amounts, inv_t, (in constant prices, USD),
- the real exchange rate, rer_t (National Currency:USD, index, 2010=100),
- the nominal exchange rate, e_t, (National Currency:USD, index, 2010=100),
- the Central Bank rate, rcb_t (%),
- crude oil price (USD, index, 2010=100), oil_t.

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The results of the augmented Dickey–Fuller (ADF) test, presented in Table 1, confirm that all variables become stationary after taking their first differences, indicating the presence of a unit root and classifying them as I(1).

Table 1. Results of the ADF unit root test

Country		Variables			
		inv_t	rcb_t	e_t	rer_t
Czechia	L	−1.04	1.52	−0.64	0.28
	Δ	−6.18***	−4.65***	−6.04***	−5.72***
Hungary	L	−1.11	−1.45	−1.54	−2.46
	Δ	−7.51***	−3.68***	−6.26***	−6.14***
Poland	L	−1.46	−2.13	−2.20	−0.76
	Δ	−4.59***	−5.24***	−7.03***	−6.07***
Romania	L	−0.87	−2.09	−3.94***	−0.87
	Δ	−4.59***	−3.04**	−6.20***	−5.96***
Bulgaria	L	−0.69	−0.39	−2.47	−0.50
	Δ	−9.67***	−2.13**	−7.02***	−6.32***
Croatia	L	−2.07	−1.88	−2.86	−2.11
	Δ	−7.29***	−7.57***	−6.77***	−7.87***
Slovakia	L	−2.79	−1.96**	−2.84	−0.95
	Δ	−9.17***	−3.20***	−6.06***	−5.64***
Slovenia	L	−1.88	−2.82**	−1.24	−2.89
	Δ	−8.03***	−3.10***	−7.93***	−8.58***
Estonia	L	−4.02**	−0.69	−4.10**	−0.31
	Δ	−8.40***	−2.69***	−8.71***	−7.71***
Latvia	L	−2.71	0.17	−3.41*	−2.05
	Δ	−7.72***	−4.38***	−6.62***	−8.20***
Lithuania	L	−2.48	0.13	−4.49***	−1.21
	Δ	−8.44***	−4.22***	−8.62***	−8.23***

The symbols ***, **, and * represent statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

In countries like Hungary, Poland, and Croatia, the critical values demonstrate significance, supporting the use of these variables in further econometric models, such as ARDL. While stationarity is observed across countries, there are slight variations in the test statistics, which reflect differing sensitivity levels of investment-related variables to economic shocks in each country. For instance, the real exchange rate (rer_t) shows different stationarity levels with lower significance in countries such as Slovakia, indicating diverse economic dynamics related to currency impacts across the region. Table 1 provides a solid foundation for using first-differenced variables in further econometric analyses, such as cointegration testing and ARDL modelling, ensuring reliable examination of long-term and short-term relationships between oil prices, exchange rates, and investments in Eastern European countries. The short- and long-term coefficients for investment determinants in 11 Eastern European countries are estimated using a linear ARDL model. The statistical model for investment estimation is structured as follows:

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$$inv_t = c_0 + c_1 t + \sum_{i=1}^{l} \theta_i inv_{t-1} + \sum_{i=1}^{q} \eta_i oil_t + \sum_{i=0}^{q} \beta_i' x_{t-1} + \varepsilon_t \,,\ t = 1 + q^*, \ldots, \mathrm{T} \qquad (1)$$

where:

c_0 – represents the intercept,
$c_1 t$ – denotes the linear trend,
θ_i – lagged investment coefficients capture the persistence of past investments, with positive values indicating momentum and negative values suggesting a reversal effect,
η_i – reflect the sensitivity of investment to oil price fluctuations, where positive values suggest investment stimulation in resource-rich economies, while negative values indicate adverse cost effects,
β_i – represent the influence of other macroeconomic determinants, such as interest rates and exchange rates, on investment decisions,
x_t – vector of additional exogenous variables includes interest rates, nominal and real exchange rates, $l \in [l, q^*]$ and $g \in [0, q^*]$ – the lag orders,
q^* – the maximum permissible lag order,
T – the total number of observations in the dataset,
ε_t – vector of white noise disturbances that are normally distributed, serially uncorrelated and mutually independent,
t – the time index.

The ARDL model can be expressed in its error-correction form as follows:

$$\Delta inv_t = c_0 + c_1 t - \alpha(inv_{t-1} - \gamma oil_{t-1} - \theta x_{t-1}) + \sum_{i=1}^{l} \psi_{invi} \Delta inv_{t-i} + \sum_{i=1}^{q} \psi_{oili} \Delta oil_{t-i} + \sum_{i=0}^{q} \psi'_{xi} \Delta x_{t-1} + \varepsilon_t \,, \qquad (2)$$

The relationship between the coefficients in Equation (2) and those in Equation (1) is defined as:

$$\alpha = 1 - \sum_{i=1}^{l} \theta_i, \quad \gamma = \frac{\sum_{j=0}^{q} \eta_j}{\alpha}, \quad \theta = \frac{\sum_{j=0}^{q} \beta_j}{\alpha}, \quad \psi_{invi} = -\sum_{\mathrm{j=i+1}}^{l} \theta_j, \quad \psi_{oili} = -\sum_{j=i+1}^{q} \eta_j, \quad \psi'_{\mathrm{xi}} = -\sum_{j=i+1}^{q} \beta_j \,,$$

where α represents the speed-of-adjustment parameter, and γα and θα are the long-term coefficients. The speed-of-adjustment parameter indicates how quickly the dependent variable returns to its long-term equilibrium after a shock, reflecting a gradual correction of any deviations from equilibrium. The coefficient γα captures the immediate impact of oil price changes on the level of investments. When working with monthly data, it is standard practice to allow up to 12 lags, while for quarterly data, the typical range is 4 to 8 lags. In this study, we permit a maximum of 6 lags. The selection of the optimal lag structure primarily relies on the Akaike Information Criterion (AIC), while the Hannan-Quinn (HQ) criterion is applied for specific cases, including Czechia, Poland and Croatia. Long-term symmetry is traditionally tested using a Wald test for the joint null hypothesis $\frac{\pi^{+}_{\mathrm{oil}}}{\alpha} = \frac{\pi^{-}_{oil}}{\alpha}$.

For short-term symmetry, a standard Wald test is applied to evaluate the joint null hypothesis $\sum_{j=1}^{q-1} \psi^{+}_{oilj} = \sum_{j=1}^{\mathrm{q\text{-}1}} \psi^{-}_{oilj}$.

Cointegration is assessed through the Wald F-Bounds test, and t-Bounds test.

By integrating the ARDL model into our research, we provide a econometric framework to analyze the oil price-investment nexus in Eastern Europe. The findings are expected to contribute to both academic discourse and practical policy applications, offering insights into investment behavior under conditions of energy price uncertainty.

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Results of the research

The outcomes of the cointegration tests within the ARDL framework are displayed in Table 2.

Table 2. Cointegration Tests

Country	ARDL-I		ARDL-II	
	t-Bounds	F-Bounds	t-Bounds	F-Bounds
Czechia	−3.81**	4.68**	−3.58**	4.51**
Hungary	−3.40**	7.69***	−3.85**	9.04***
Poland	−3.97*	5.07***	−4.89***	7.69***
Romania	−5.79***	10.82***	−6.31***	11.01***
Bulgaria	−4.28**	5.30**	−3.97**	5.59**
Croatia	−5.08***	7.04***	−5.23***	7.18***
Slovakia	−6.04***	9.50***	−5.84***	8.93***
Slovenia	−6.04***	26.17***	−5.05***	7.66***
Estonia	−4.10*	6.68**	−4.39***	5.61***
Latvia	−5.80***	10.11***	−6.57***	12.94***
Lithuania	−5.89***	12.97***	−6.62***	11.94***

here and hereafter ***, **, * means statistical significance at 1%, 5% and 10% level, respectively.

For all analyzed countries, the results of both the Wald F-Bounds and t-Bounds tests indicate a rejection of the null hypothesis, which posits no cointegration between oil prices and other exogenous variables. This finding is particularly evident in the ARDL-I model that incorporates investment volatility. The cointegration results indicate that all examined Eastern European countries display significant long-term relationships between oil prices and investment levels. Countries such as Romania, Slovenia and Lithuania show particularly strong cointegration, highlighting their high sensitivity to oil price changes. Conversely, while Estonia and Bulgaria also exhibit cointegration, the effects are less pronounced, suggesting some variation in regional sensitivity to oil price shocks.

Table 3. Diagnostics tests for ARDL-I and ARDL-II models

Country	LM	Breusch-Pagan-Godfrey	Ramsey RESET	CUSUM	CUSUM Square	Jarque-Bera
Czechia	0.11 (0.97)	1.42 (2.13*)	0.48 (3.01*)	S (S)	S (S)	1.17 (1.62)
Hungary	0.96 (0.72)	1.44 (2.20**)	1.79* (1.11)	S (S)	S (S)	0.39 (11.03***)
Poland	1.25 (0.28)	1.19 (1.82*)	0.06 (0.80)	S (S)	S (S)	0.73 (2.01)
Romania	0.76 (0.68)	1.61 (0.79)	0.09 (0.21)	S (S)	S (S)	2.61 (7.06***)
Bulgaria	1.02 (2.29)	0.74 (1.55)	0.10 (0.01)	S (S)	S (S)	1.21 (1.24)
Croatia	0.14 (0.09)	1.21 (0.98)	0.08 (0.60)	S (S)	S (S)	0.92 (0.99)
Slovakia	2.40* (1.84)	0.27 (0.64)	0.36 (0.76)	NS (NS)	S (S)	3.27 (3.02)
Slovenia	0.06 (0.63)	1.14 (1.13)	1.52 (4.62**)	S (S)	S (S)	1.32 (5.42*)
Estonia	1.08 (1.01)	1.58 (0.93)	1.97 (1.74)	S (S)	S (NS)	0.08 (1.22)
Latvia	0.80 (2.91*)	1.19 (1.04)	1.19 (1.55)	S (S)	S (S)	2.56 (2.94)
Lithuania	1.37 (1.01)	1.18 (1.11)	0.09 (0.71)	S (S)	S (NS)	0.96 (1.21)

Note: test values for the ARDL-II model are presented in brackets.

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These findings validate the importance of considering oil price dynamics in long-term investment planning and economic policy for Eastern European economies. Diagnostic tests for country-specific ARDL-I and ARDL-II models are presented in Table 3.

For the former, the Breusch–Godfrey LM test indicates no residual serial correlation across all countries, although the test statistic is slightly weaker for Slovakia in the ARDL-II model. The Ramsey RESET test suggests no functional misspecification for all countries in the ARDL-I model except for Bulgaria and Slovakia. Based on the ARDL-I model estimates, the Breusch–Pagan–Godfrey test does not identify heteroskedasticity in any country. However, for the ARDL-II model, there is weak evidence of residual heteroskedasticity only in Slovenia. In the case of the ARDL-II model, the CUSUM test yields similar results, but the CUSUM Square test reveals residual heteroskedasticity in Czechia, Bulgaria and Lithuania. Lastly, the Jarque–Bera test confirms that the residuals of both models are normally distributed. Estimates of the long-term coefficients and short-term ones of the oil price effects on investments are provided in Table 4.

Table 4. Oil price effects on investments

Country	ARDL-I				ARDL-II			
	β	Long-term	Short-term	R^2	β	Long-term	Short-term	R^2
Czechia	−0.347***	0.133**	–	0.94	−0.344***	0.035	–	0.28
Hungary	−0.267***	0.784***	−0.214**	0.49	−0.450***	0.551***	0.108**	0.55
Poland	−0.781***	0.120***	−0.001*	0.72	−0.967***	0.036	0.194**	0.76
Romania	−0.658***	0.096*	−0.418***	0.45	−0.752***	0.006	–	0.46
Bulgaria	−1.180***	0.109***	−0.424**	0.70	−1.017***	0.024	−0.391**	0.69
Croatia	−0.402***	−0.124**	−0.016	0.38	−0.408***	−0.117**	−0.010	0.38
Slovakia	−0.872***	0.011	−0.037**	0.49	−0.848***	0.018	−0.358**	0.48
Slovenia	−0.989***	0.131***	0.080***	0.83	−0.569***	0.192***	0.101**	0.62
Estonia	−0.689***	0.152*	–	0.83	−0.665***	0.076	–	0.62
Latvia	−0.569***	0.190***	0.059*	0.69	−0.818***	0.194***	0.020*	0.75
Lithuania	−0.784***	0.065*	−0.049**	0.81	−0.709***	−0.009	0.021*	0.80

The results (Table 4) demonstrate that in the long run, oil price increases generally stimulate investment activity, with the strongest positive effects observed in Bulgaria, Poland, and Slovenia. The relationship between rising oil prices and long-term investment could be systematically explained by the following mechanisms: the associated increase in energy sector profitability, the emergence of inflationary expectations that channel capital into real assets, and the elevated priority accorded to energy security, which, in turn, stimulates investment in alternative energy and energy efficiency technologies. These findings align with studies such as Ben Salem et al. (2024) and Audi et al. (2025), which highlight the importance of energy price shocks in shaping macroeconomic stability and capital allocation. However, the case of Croatia, where a negative long-term impact is observed, suggests the presence of structural vulnerabilities or reliance on industries disproportionately affected by rising oil prices. This is consistent with Zorgati (2023), who identified that oil-importing economies with weak financial buffers are more susceptible to investment contractions following energy price volatility. Slovakia shows no significant long-term effect, indicating that country-specific macroeconomic policies and investment incentives can mitigate oil price transmission to capital formation. Short-term investment responses to oil price fluctuations exhibit substantial variability. Slovenia and Latvia display strong positive short-term coefficients, implying that investment in these economies responds quickly to oil price shocks. These results are in line with Shang et al. (2024), who emphasise that in energy-dependent economies, rapid adjustments in financial markets and government spending may drive short-term capital inflows following oil price increases. Hungary and Croatia experience negative short-term effects, suggesting that oil price volatility creates immediate cost pressures

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and uncertainty, leading to investment slowdowns. The R^2 values indicate that the ARDL-I model generally provides a better fit than ARDL-II, especially for countries like Czechia, Slovenia and Estonia, where the model explains over 80 % of the variation in investments. These findings underline the necessity of stabilising macroeconomic conditions to mitigate the adverse effects of oil price fluctuations on investment. In particular, countries with higher short-term investment sensitivity to oil prices should consider policies that reduce market uncertainty, such as hedging strategies and targeted fiscal interventions. Estimates of other investment determinants, such as nominal (real) exchange and interest rates, are given in Table 5.

Table 5. Other determinants of investments

Country		r_t		e_t		rer_t	
		Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Czechia	ARDL-I	0.006	0.048***	−0.745*	1.567***	–	–
	ARDL- II	–	0.016***	–	–	–	0.123
Hungary	ARDL-I	0.010**	−0.423***	0.253**	−2.862***	–	–
	ARDL- II	−0.068**	−0.262***	–	–	–	0.284
Poland	ARDL-I	0.132**	−0.045***	1.516*	−1.123***	–	–
	ARDL- II	0.043**	−0.022***	–	–	3.171***	−0.627***
Romania	ARDL-I	–	0.046**	0.235	−0.596	–	–
	ARDL- II	−0.086**	0.031*	–	–	3.544**	−1.538***
Bulgaria	ARDL-I	0.002	0.013***	5.304**	−1.964***	–	–
	ARDL- II	0.027***	−0.022***	–	–	–	−1.452***
Croatia	ARDL-I	−0.010*	0.029***	0.822	−1.543**	–	–
	ARDL- II	−0.013**	0.013	–	–	0.801**	−1.698**
Slovakia	ARDL-I	0.249*	0.093***	–	1.036	–	–
	ARDL- II	0.061*	0.085**	–	–	–	−0.010
Slovenia	ARDL-I	−0.036**	0.032	9.239***	−3.487***	–	–
	ARDL- II	0.016**	0.021	–	–	1.738**	0.479
Estonia	ARDL-I	0.106***	0.153***	−11.787***	8.462***	–	–
	ARDL- II	−0.082**	−0.038*	–	–	–	−0.538***
Latvia	ARDL-I	0.108*	0.058***	8.466***	−5.649***	–	–
	ARDL- II	0.130**	0.027	–	–	5.109*	−2.118
Lithuania	ARDL-I	0.102***	0.040***	−0.190	−1.372***	–	–
	ARDL- II	0.081***	0.034***	–	–	0.173	−0.794***

Table 5 underscores the diverse effects of interest rates and exchange rates on investment across Eastern European countries. In most cases higher interest rates correlate with increased investment, suggesting that interest rate hikes are viewed as signals of robust economic conditions rather than impediments to borrowing. Exchange rates, especially nominal rates, are critical in shaping investment behaviour across countries, with Estonia, Slovenia and Latvia showing the most significant sensitivities. Real exchange rates also play an important role in Romania and Bulgaria, underscoring the importance of purchasing power parity in those markets. Countries like Hungary, Poland, Slovenia, Estonia, Latvia and Lithuania exhibit more immediate, short-term responsiveness to changes in interest and exchange rates. In contrast, Czechia, Hungary, Romania, Bulgaria, Slovakia and Estonia demonstrate more pronounced long-term effects, indicating that in these countries, sustained

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economic conditions and currency stability play a larger role in shaping investment behaviours over time. The findings of Table 5 highlight the critical role of monetary policy in shaping investment decisions across Eastern European countries. The diverse effects of interest rates suggest that policymakers should carefully calibrate monetary policy to balance financial stability and investment incentives, considering that in some economies, rate hikes can foster investor confidence rather than deter capital formation. The exchange rate-investment nexus confirms that currency stability is essential for fostering a favourable investment climate, as exchange rate volatility can either stimulate or hinder capital flows depending on the economic structure of the country.

Discussion and future research

This research provides a comprehensive analysis of the relationship between oil prices and investments across Eastern European countries, revealing notable patterns and substantial heterogeneity in these effects. A positive long-term impact of oil prices on investments was observed in most countries, consistent with findings in global studies such as those by Kilian (2008) and Hamilton (2003), which emphasize the broad macroeconomic significance of energy price shocks. However, the results for Slovakia, where no significant relationship was found, contrast with the general trends identified in research by Morana (2017) and Arouri and Nguyen (2010). These variations underscore the importance of region-specific analyses in understanding oil price dynamics. In the short term, the results highlight a more variable relationship, with countries like Slovenia and Latvia exhibiting strong positive correlations while others, such as Hungary and Croatia, show limited responsiveness. These findings partially align with studies such as Jiménez-Rodríguez and Sánchez (2005), which documented diverse responses to oil price volatility depending on economic and structural factors. The incorporation of both nominal and real exchange rates also provided insights into their moderating effects on the oil price-investment nexus, highlighting that the real exchange rate significantly weakens the observed relationships in many cases. Future studies should explore avenues to expand the scope and depth of the analysis. Incorporating inflation and trade-related variables would help validate the current findings and provide a more nuanced understanding of the mechanisms at play. Employing models capable of capturing non-linearities, such as threshold or regime-switching models, could uncover previously unidentified patterns in the data. Sector-specific analyses, particularly focusing on energy-intensive industries, would offer practical insights into which parts of the economy are most vulnerable to oil price shocks. Additionally, comparative studies across regions with similar oil import dependencies could contextualise the Eastern European experience within a global framework.

Conclusions

Oil price dynamics play a pivotal role in shaping investment activity across Eastern European countries, as evidenced by both long-term and short-term impacts. Based on the conducted analysis, it was found that:

- in 10 out of the 11 examined countries, rising oil prices are associated with higher investment levels over the long term,
- rising oil prices induce long-term investment via a triadic mechanism: first, they augment the profitability of the energy sector. Second, they engender inflationary expectations, thereby channelling capital towards real asset markets. Third, they elevate the salience of energy security, which, in turn, stimulates investment in alternative energy and energy efficiency technologies,
- it is necessary for tailored policy responses to mitigate the adverse effects of oil price volatility and enhance economic resilience,
- there is a critical role of exchange rate dynamics in shaping the oil price-investment relationship,
- replacing the nominal exchange rate with the real exchange rate significantly weakens the observed link between oil prices and investment, underscoring the importance of currency stability in shaping investment decisions,

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- exchange rate policies should be carefully designed to balance competitiveness with investment stability,
- rising rates may serve as indicators of macroeconomic stability and investor confidence rather than as constraints on capital formation,
- exchange rate stability emerges as a crucial factor in moderating the relationship between oil prices and investment, underscoring the need for coordinated monetary and fiscal policies to buffer adverse impacts.

The findings contribute to a deeper understanding of how oil price shocks propagate across different economic environments, with macroeconomic variables such as interest rates and exchange rates playing a central role in shaping investment dynamics.

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The contribution of the authors

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CENY ROPY A INWESTYCJE W KRAJACH EUROPY WSCHODNIEJ

STRESZCZENIE: W artykule poddano analizie wpływ cen ropy na dynamikę procesów inwestycyjnych w krajach Europy Wschodniej w oparciu o dane kwartalne z lat 2010–2023. Głównym celem jest ocena krótko- i długoterminowych skutków wahań cen ropy na poziom inwestycji, z uwzględnieniem kursów walutowych i stóp procentowych jako dodatkowych determinant makroekonomicznych. W badaniach wykorzystano model autoregresyjny z rozłożonym opóźnieniem (ARDL), który pozwala na analizę zarówno krótkoterminowej dynamiki, jak i długoterminowych zależności między zmiennymi. W szczególności zaobserwowano pozytywny, długoterminowy wpływ cen ropy na inwestycje w 10 z 11 badanych krajów. Jedynie w Chorwacji zaobserwowano negatywny wpływ, natomiast w Słowacji wzrost ceny ropy nie wywierał istotnego wpływu na inwestycje. W krótkim okresie silna dodatnia korelacja między ceną ropy a inwestycjami występuje w Słowenii i na Łotwie, podczas gdy w 6 krajach, w tym na Węgrzech i w Chorwacji, odnotowano efekt negatywny. Należy zauważyć, że zastosowanie realnego kursu walutowego zamiast nominalnego znacząco osłabia korelację między cenami ropy a inwestycjami. Wśród innych ustaleń stwierdzono, że inwestycje są pozytywnie skorelowane z wyższymi stopami procentowymi w 7 krajach, podczas gdy intuicyjnie oczekiwane negatywne efekty występują jedynie na Węgrzech i w Polsce. Inwestycje reagują silniej na nominalny kurs walutowy niż na kurs realny. Chociaż długoterminowy wpływ kursu walutowego jest przeważnie negatywny, nie dotyczy to efektów krótkoterminowych. Wyniki wskazują na znaczną heterogeniczność wpływu kursu walutowego w badanych krajach.

SŁOWA KLUCZOWE: inwestycje, cena ropy naftowej, kurs walutowy, ARDL, Europa Wschodnia

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