Corporate Investment, Economic Policy Uncertainty Geopolitical Risk in BRICS Countries and

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Abstract

Objective: This study aims to analyze the effects of economic policy uncertainty (EPU) and geopolitical risk (GPR) on the corporate investment levels (INV) of publicly traded companies in emerging countries within the BRICS group. It seeks to understand how these uncertainties, often associated with governmental decisions and geographical conflicts, influence the postponement of corporate investments, particularly in the context of developing economies, in light of real options theory.

Methodology: The analysis is based on quarterly financial data from 192 companies based in Brazil, 33 in Russia, and 1,890 in China, except those in the financial sector, collected from LSEG's Refinitiv Datastream database, from 2004 to 2019. Regression with fixed effects panel data was used, considering as explanatory variables the characteristics of the firms (size, leverage, operating cash flow, sales growth, profitability, Tobin's Q, cash retention, and tangible assets) and macroeconomic indicators (GDP and inflation).

Results: The results indicated a negative relationship between EPU, GPR, and INV, with varying intensities between countries. This suggests that consistent with the option to wait, firms reduce their level of investment during periods of high economic uncertainty or geopolitical risk. In addition, the results highlighted that environments with less economic and geopolitical uncertainty favor the level of investment by companies in emerging countries. In addition, the negative effects identified persisted in crisis contexts, as well as the moderation of uncertainty measures by companies' profitability and tangibility.

Contributions: The results broaden the understanding of the predominantly negative effects of economic policy uncertainty and geopolitical risk on corporate investment decisions, in the context of emerging countries. The results, in line with some of the literature, highlight the importance of mitigating these effects to stimulate investment in emerging countries. The findings provide crucial inputs for governments, regulators, and economic policymakers to implement measures capable of reducing uncertainty and risk, thus fostering a more favorable business environment for investment.

Keywords: Corporate Investment; Economic Policy Uncertainty; Geopolitical Risk; BRICS.

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Introduction

E conomic Policy UncertaEconomic Policy Uncertainty (EPU) refers to an estimate of uncertainties arising from political and economic decisions at macro and micro levels (Baker et al., 2016; Lee et al., 2021). Furthermore, there is Geopolitical Risk (GPR), which stems from fluctuations caused by natural disasters, conflicts arising from geographical and/or political tensions between States, and terrorist acts (Caldara & lacoviello, 2022).

Discussions regarding the effects of uncertainties on corporate decision-making have gained relevance in the literature (Caldara & lacoviello, 2022; Montes & Nogueira, 2022; Jumah et al., 2023), especially in recent times due to the increase in uncertainties and due to the greater availability of indicators, such as the EPU index initially proposed by Baker, Bloom, and Davis (2016). Following the creation of the GPR index by Caldara and lacoviello (2022), studies on geopolitical tensions have also gained prominence. In this context, studies reveal that both EPU and GPR exert influence on business decisions, such as stock returns, investment asset volatility, and the economy in general (Baum et al., 2009; Julio & Yook, 2012; Liu & Zhang, 2019; Arif & Shahbaz, 2020; Khoo & Cheung, 2020; Le & Tran, 2021; Caldara & lacoviello, 2022; Jumah et al., 2023).

In the corporate context, there is significant evidence that EPU and/or GPR influence various financial aspects of companies, such as the level of debt (Zhang et al., 2015; Khoo & Cheung, 2020; Lee et al., 2021), merger and acquisition decisions (Nguyen & Phan, 2017; Batista et al., 2023), and cash flow (Demir & Ersan, 2017) of companies in the financial market. The literature has been investigating the effects of EPU and GPR on the investment level (INV) of firms, which represents a key variable for innovation and consolidation of companies through future cash generation. The decision to invest considers future expectations of internal and external scenarios of firms. Additionally, factors such as crises have been considered, as they constitute and represent contexts of high uncertainty and risk (Wang et al., 2014; Gu et al., 2021; Chen, 2023).

Among empirical studies that analyzed the effects of EPU and/or GPR on firms' INV, certain ambiguities in results can be observed, in addition to the predominance of studies focusing on developed markets. On the one hand, some studies indicate that, during periods of high uncertainty, companies tend to postpone their investments until market conditions improve or stabilize, suggesting a negative relationship between EPU and/or GPR and the level of firms' INV (Wang et al., 2014; Berg & Mark, 2018; Liu & Zhang, 2019; Wang et al., 2019; Chiang, 2021; Le & Tran, 2021; Jiang et al., 2022; Montes & Nogueira, 2022; Jing et al., 2023; Jumah et al., 2023).

On the other hand, some studies argue that uncertainty can arise as a form of opportunity for companies to invest, pointing to a positive or even asymmetric influence of EPU and/or GPR on INV (Bahmani-Oskooee & Maki-Nayeri, 2019; Wu et al., 2020). In this context, the firm's investment opportunity is sometimes compared to a call option and investing is equivalent to exercising this option (Bernanke, 1983; Smit & Ankum, 1993; Liu & Zhang, 2019), whenever the expected future gains are attractive enough to adequately compensate the invested capital.

Furthermore, Cheng et al. (2018) presented evidence that geopolitical shocks are significant sources of price fluctuations in emerging countries' economies. The authors explained that the occurrence of geopolitical risks triggers changes in business cycles and capital flows, and that emerging economies are more vulnerable to these sudden changes. Moreover, companies tend to postpone investments, while consumers delay consumption decisions due to increased geopolitical uncertainty (Bloom, 2009; Cheng et al., 2018; Wang et al., 2019; Le & Tran, 2021).

Few studies investigate how these uncertainties have impacted emerging countries (Chen et al., 2018) and how local uncertainty in them is associated with the uncertainty of developed economies (Arif & Shahbaz, 2020). According to Arif and Shahbaz (2020), American economic policy uncertainty significantly influences uncertainty in the BRICS countries – an organization that, along with India and South Africa, represents the largest and most promising emerging economies worldwide. The BRICS countries contribute significantly to global economic growth, and a series of events, such as political changes in Brazil, turbulence in the international oil market, and economic sanctions against Russia by American and European countries, show that they tend to face greater challenges compared to developed economies (Wang et al., 2014). Thus, this research provides relevant implications for literature and various stakeholders.

Companies from the BRICS countries are economically important; together, these countries are responsible for over 21% of the global GDP and form the group of fastest-growing countries (Li et al., 2024), accounting for more than 45% of the world's population (Wang et al., 2022). Their relevance to the global economy, and their diverse and rich institutional environments, make it necessary to understand companies' investment decisions in the face of uncertainty affecting their markets. These countries play a central role in their effects on global EPU (Demir & Ersan, 2017). As highlighted by Li et al. (2024), considering EPU and GPR measures in the context of BRICS countries is important. This helps decision-makers prepare for possible unexpected events that could negatively impact the economy.

Thus, the study aims to analyze the effects of EPU and GPR on the investment level (INV) of publicly traded firms in Brazil, China, and Russia, three emerging countries that are part of the BRICS. The sample considered companies headquartered in Brazil, Russia, and China from 2004 to 2019, and multivariate regressions were estimated, controlled for variables determining the firms' investment level, such as size, profitability, and sales growth, among others, and for macroeconomic variables, according to the literature. The results revealed that, in periods of high EPU or high GPR, companies tend to reduce INV levels, reinforcing the Real Options Theory, which states that companies prefer to 'wait and see' until market conditions improve and avoid investments with the possibility of irreversible losses.

This research contributed: (i) to the understanding of the effects of EPU and GPR on INV by considering the particularities of companies in the largest emerging countries in the world, given the predominance of studies on developed economies; (ii) it discusses the separate and joint effects of EPU and GPR in diverse contexts (of the measures themselves, with crises in the countries, and moderated by the profitability and tangibility of companies), which provides robustness and clarity to the results; (iii) it adds new empirical evidence on uncertainties and INV for emerging markets in a different period than those addressed in similar studies; (iv) it supports the investment decision-making of managers in periods of high uncertainty; and (v) it signals to governments, regulators, and economic policymakers the predominantly negative effects of EPU and GPR on investments/possibilities of economic growth, even supporting actions in favor of reducing these effects through, for example, incentive policies.

2 Theoretical Framework

2.1 The uncertainty of economic policy and geopolitical risk

The EPU and GPR indices are mostly derived from the analysis of newspaper articles and documents relevant to the market (Wang et al., 2014; Balcilar et al., 2018; Wu et al., 2020; Montes & Nogueira, 2022; Jumah et al., 2023). Generally, these indicators are associated with levels of transparency and instability identified in economic, political, and geographical issues and governmental decisions that influence capital markets (Kim & Kung, 2017; Das et al., 2019).

The EPU represents a monthly average of news and

reports associated with political, economic, legislative, and regulatory issues and even those associated with monetary reserves and government deficits (Baker et al., 2016; Kannadhasan & Das, 2020). The Baker et al. (2016) proxy is strongly associated with the other measures of economic uncertainty and the implied volatility of the stock market affecting investment decisions.

On the other hand, the GPR portrays the practice of States and Organizations in competition and conflicts for territorial control, it is associated with tensions, terrorist acts, wars, and events that affect a country (Kannadhasan & Das, 2020; Caldara & lacoviello, 2022). It is a less explored measure than EPU in research, which also considerably affects firms' investment policy, and the intensity of the effect varies between sectors and companies (Dissanayake et al., 2018; Wang et al., 2019; Le & Tran, 2021).

The GPR reflects the effects of geopolitical tensions that lead to a drop-in real activity and financial markets, lower returns and greater volatility in stock markets and movements of capital flows from emerging to developed economies (Caldara & lacoviello, 2022). Investment strategies become even more essential in periods of high turbulence (Das et al., 2019).

2.2 Effects of economic policy uncertainty on corporate investment decisions

The influence of EPU on INV is not uniform, studies empirically prove that uncertainty can increase or even reduce INV (Kang et al., 2014; Gulen & Ion, 2016; Bahmani-Oskooee & Maki-Nayeri, 2019; Wu et al., 2020; Jing et al., 2023; Jumah et al., 2023). From Real Options Theory, there is evidence that EPU discourages corporate investment for the value of a real "wait and see" option because there are adjustment costs and irreversibility of losses (Dixit & Pindyck, 1994; Bloom, 2009; Chen et al., 2020).

On the other hand, a positive effect of EPU on corporate investment can be seen according to option theory from the perspective of a growth option. Companies have investment lags and develop them in several stages due to constraints, obtaining an increase in the value of future growth options and flexibility in increased uncertainty (Bar-Ilan & Strange, 1996; Weeds, 2002; Chen et al., 2020).

The positive effects of EPU on INV are also associated with companies' monopoly over their investment decisions. In more competitive markets, firms tend to take advantage of investment opportunities and consider that these types of decisions can considerably affect the company's future cash flow. Investment is considered to be directly correlated with the firm's ability to expand in the future, growth opportunities, and competitive advantage for companies (Brown et al., 2009; Van & Le, 2017; Wu et al., 2020).

In countries such as Australia, positive impacts of EPU on INV are also identified (Wu et al., 2020). The positive influence is more evident for companies headquartered in smaller states, with larger: tangible assets, operating cash flow and cash reserves, as well as more profitable, leveraged, and paying fewer dividends.

However, most studies show a negative relationship between EPU and INV. High levels of EPU harm INV, because there is a tendency for the amounts invested to decrease in periods of high EPU, especially in more profitable companies. These companies are expected to make more investments in the face of low uncertainty (Wang et al., 2014). In addition, companies with a high return on invested capital, which make more use of internal resources and depend less on the state, are generally less exposed to the influence of political uncertainty (Wang et al., 2014; Kim & Kung, 2017).

INV is negatively influenced by political and economic tensions (Kang et al., 2014; Gulen & Ion, 2016). New investments are postponed due to unpredictability in the market context. These effects tend to extend over the long term and are greater in periods of recession (Kang et al., 2014).

According to Gulen and Ion (2016) INV is influenced by EPU and should be evaluated in conjunction with sales growth, operating cash flow and Tobin's Q of companies. The authors suggest controlling for these effects and including macroeconomic variables and dummies for election periods. Above all, they recognize that these effects can manifest themselves in different ways between companies (Kang et al., 2014).

In China, changes in government are associated with periods of high EPU, during which uncertainty harms INV (An et al., 2016; Su et al., 2020; Montes & Nogueira, 2022). These exchanges are positively associated with higher INV volatility. Given the high turnover of government members, there is a decline in INV in line with firms' search for opportunities.

According to Julio and Yook (2012), the economic cycles of corporate investment vary from country to country and are influenced by the political uncertainty associated with election periods. Elections limit corporate investment, and reductions can reach an average of 4.8% compared to periods without elections (Julio & Yook, 2012). According to Dreyer and Schulz (2023), investment reductions in the face of political uncertainty are even greater in public companies compared to reductions in private companies.

In Brazil, high levels of domestic uncertainty have had a considerable impact on economic activity, such as a contraction in industrial activities, especially investments. The economic performance and value of companies are significantly influenced by political uncertainty in the country (Julio & Yook, 2012; Barboza & Zilberman, 2018; Souza et al., 2019).

Based on the arguments presented, the EPU is expected to influence INV in emerging markets, the first research hypothesis consists of:

H1: EPU influences the INV of companies in emerging economic markets.

2.3 Effects of geopolitical risk on corporate investment decisions

Emerging markets represent investment opportunities even for developed markets (Das et al., 2019; Bouras et al., 2019). However, asset owners do not overlook the existence of certain investment risks due to the weak regulatory structure of these countries when compared to the legal structures of developed economies (Das et al., 2019; Bouras et al., 2019; Le & Tran, 2021).

Research indicates that the individual GPR of emerging countries does not have statistically proven effects on stock returns (Balcilar et al., 2018; Bouras et al., 2019), but on their volatility. When considering the global GPR, there is also no proven impact on returns, and the effect on volatility tends to be even greater.

According to Dissanayake et al. (2018), GPR negatively affects INV and is associated with Real Options Theory, which considers the net present value of projects and assumes that investment adjustment costs are asymmetric and makes it difficult to reverse investment decisions (Dissanayake et al., 2018; Wang et al., 2019; Le & Tran, 2021). According to the literature, companies have different capacities to respond to INV and changes in this type of risk. Managers consider moving assets to be more costly than reallocating them. Although the risk measure is recent, the literature shows a negative effect of GPR on INV.

The effects of GPR on INV are evident in companies with greater market power and are less pronounced for firms with greater ease in substituting labor for capital (Wang et al., 2019). The risk measure negatively influences INV. Geopolitical tensions drive increased uncertainty in the market and there is a tendency for investors and managers to postpone investment decisions to safer market contexts (Das et al., 2019; Wang et al., 2019; Caldara & Iacoviello, 2022). Thus, the second hypothesis of this study is:

H2: GPR influences the INV of companies in emerging markets.

In addition, studies have shown a correlation between the EPU and GPR indices. The measures share information

and differ in terms of electoral issues, trade wars, and terrorist attacks. There is also contemporaneous causality between the variables and few studies have investigated EPU and GPR as a unified framework that influences investors (Gu et al., 2021). There is a dependency between the measures that need to be analyzed based on different market conditions. Both developed and emerging economies are exposed to the measures, especially the effect of combining them (Kannadhasan & Das, 2020). In addition, studies that have shown significant effects of the combination of measures have been carried out predominantly on developed economies (Kannadhasan & Das, 2020; Chiang, 2021; Jiang et al., 2022). So, the third hypothesis is:

H3: EPU and GPR influence the INV of companies in emerging markets.

According to Arif and Shahbaz (2020), evidence shows that there is an asymmetrical relationship between the United States EPU and BRICS GPR. United States EPU has a negative relationship with the GPR of China and Russia and a positive relationship with the geopolitical risk of Brazil and India.

3 Methodological Procedures

The accounting and financial variables relating to companies were collected from the Thomson Reuters Refinitiv Datastream database. The other variables used were collected from the International Monetary Fund, the OECD and the Economic Policy Uncertainty Index. Quarterly data from 2004 to 2019 was used. The sample consisted of 192 companies based in Brazil, 33 in Russia, and 1,890 in China, which together with India and South Africa make up the BRICS group. The two countries were not included due to a lack of data: quarterly accounting data for Indian companies and African EPU.

The following filters were applied to select the companies: i) observations with net revenue, total assets, and/or

 Table 1. Definition of variables and expected signs

shareholders' equity greater than zero; ii) for the Chinese case, only class A shares were considered; iii) companies in the financial sector were excluded according to the North American Industry Classification System (NAICS), procedures from the literature (Wang et al., 2014; Kim & Kung, 2017; Liu & Zhang, 2019). After these filters, the sample included 6,896, 112,360, and 1,102 firm-quarter observations for Brazil, China, and Russia, respectively.

The EPU and GPR variables were collected from https:// www.policyuncertainty.com/ and the macroeconomic variables: nominal gross domestic product (GDP) taken from the International Monetary Fund (IMF), and inflation was taken from the Organization for Economic Cooperations and Development (OECD), collected quarterly from January 2004 to December 2019. To mitigate the impact of outliers, data winsorization was employed. Specifically, continuous variables were winsorized at the 1st and 99th percentiles of their respective distributions, a common procedure in this field (Wang et al., 2014; Gulen & Ion, 2016; Kim & Kung, 2017; Liu & Zhang, 2019).

Firm investment (INV) quantifies the financial capital companies allocate to investments promising future growth. This is calculated as the ratio of capital expenditure (CAPEX) to total assets from the previous period (Wang et al., 2014; Kim & Kung, 2017; Chen et al., 2019; Wu et al., 2020). CAPEX encompasses expenses or investments in fixed assets.

The EPU and GPR measures were used based on the natural logarithm of the average values for each quarter and are available at https://www.policyuncertainty. com/ (Baker et al., 2016). It should be noted that EPU is associated with political and economic decision uncertainties (Baker et al., 2016; Wang et al., 2019). GPR is the risk resulting from uncertainties related to geographical, territorial, and commercial tensions (Das et al., 2019; Wang et al., 2019; Caldara & lacoviello, 2022). Table 1 shows the variables in this research.

Variable	Expected Sign	Operationalization	References
Corporate investment	Variable Dependent	CAPEX _{it} /AT _{i,1} (Capital expenditures / lagged total assets)	Wang et al. (2019); Chen et al. (2019); Liu e Zhang (2019); Wu et al. (2020). Gulen e lon (2016): Van e le (2017): Berg e Mark (2018):
EPU	Negative/Positive	Economic Policy Uncertainty (EPU)	Dissanayake et al. (2018); Wang et al. (2019); Wu et al. (2020);
GPR	Negative	Geopolitical Risk (GPR)	Montes e Nogueira, (2022). Caldara e Iacoviello (2018); Bouras et al. (2019); Wang et al. (2019).
Size (SIZE)	Negative/Positive	Natural logarithms of total assets	Wang et al. (2014); An et al. (2016); Chen et al. (2019); Wu et al. (2020).
Leverage (LEV)	Negative	Total debt/ total assets of the firm	Dissanayake et al. (2018); Liu e Zhang (2019); Wang et al. (2019); Wu et al. (2020).
Operating Cash Flow (FCO)	Positive	Operating cash flow/ total assets	Wang et al. (2014); Gulen e Ion (2016); Dissanayake et al. (2018); Liu e Zhang (2019); Wang et al. (2019).
Sales growth (SG)	Positive	(Sales in t - Sales in t-1) / Sales in t-1	An et al. (2016); Gulen e Ion (2016); Dissanayake et al. (2018); Liu e Zhang (2019); Wang (2019).
Return on Assets (ROA)	Negative	Return on Firm's Assets	Kim e Kung (2017); Liu e Zhang (2019); Wu et al. (2020).
Tobin's Q (TB'Q)	Positive	Market value of the firm / replacement cost of physical assets	Gulen e Ion (2016); Dissanayake et al. (2018); Liu e Zhang (2019); Wu et al. (2020).
Cash retention (CH)	Positive	Changes in cash reserves / lagged total assets	An et al. (2016); Kim e Kung (2017); Liu e Zhang (2019); Wu et al. (2020).
Tangibility (TANG)	Positive	Tangible assets (property, plant, and equipment) / total assets	Gulen e Ion (2016); Dissanayake et al. (2018).
Gross Domestic Product growth (GDP)	Positive	Gross Domestic Product growth in the country (GDP growth)	An et al. (2016); Gulen e lon (2016); Wang et al. (2019); Wu et al. (2020).
Consumer Price Index (CPI)	Negative	Variation in current prices	Chen et al. (2019); Wu et al. (2020).

The control variables are divided into accounting and with continuous variables, the centering procedure was macroeconomics and are shown in Table 1. Among the used to control collinearity (lacobucci et al., 2017). control variables, the accounting variables express the specific characteristics of the firms, namely: Size (SIZE), Leverage (LEV), Operating Cash Flow (FCO), Sales Growth (SG), Profitability (ROA), Tobin's Q - ratio between market value and replacement cost of physical assets (TB'Q), Cash Retention Rate (CH) and Tangibility (TANG). The macroeconomic ones represent the economic and financial market characteristics of each country: GDP Growth Rate (GDP), Inflation Rate (CPI), and Crisis Dummies (CS).

The effects of EPU and GPR on the INV of companies from Brazil, China, and Russia were tested with multivariate panel data regression and fixed effects (2020), and zero otherwise. For Russia, a crisis dummy (Wang et al., 2014; Gulen & Ion, 2016; Dissanayake et al., 2018; Wang et al., 2019; Le & Tran, 2021). The estimated model is shown in Equation 1.

Where: i, k and t represent firm i, from country k in quarter t-1; INV: corporate investment; EPU: economic policy uncertainty of the country's; GPR: geopolitical risk of the country; SIZE: size; LEV: leverage; FCO: operating cash flow; SG: sales growth; ROA: profitability: TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility; GDP: GDP growth rate; CPI: inflation rate. The data was processed in R. The models were estimated using the EPU variables and the GPR variables, control variables, and macroeconomic variables. Dummies were added to control for industry and year effects and the standard errors were clustered by firm in the models. In interactions

The robustness of the results was initially tested by trimming the sample period used for the estimations, specifically excluding the timeframe corresponding to the global financial crisis. Accordingly, the models were re-estimated using data starting from the third quarter of 2009. In the case of Brazil, a recession dummy variable was included, assigned a value of 1 from the second guarter of 2014 to the fourth quarter of 2016, based on the chronology established by the Committee for Dating Economic Cycles (CODACE) of the Getúlio Vargas Foundation - FGV (2015, 2017), and by Cardoso and Pinheiro was assigned for all guarters of 2014 and 2015, in line with Viktorov and Abramov (2020). Subsequently, the models were also estimated using uncertainty measures that interacted with profitability and tangibility (Wang et al., 2014; Gulen & Ion, 2016; Wu et al., 2020).

4 Results Analysis

Table 2 shows the descriptive statistics of the variables by country. The EPU was on average, median and standard deviation higher in China (217.76, 137.61, and 199.90), followed on average and median by Russia and Brazil. The mean (and median) values of EPU indicate more uncertainty in China than in Russia and Brazil. The GPR was higher on average, median, and standard deviation in Russia (201.37, 181.69, and 89.47), followed by China and then Brazil. On average and median, companies faced higher levels of EPU in China and GPR in Russia than in Brazil.

Table 2. Descriptive statistics for accounting, uncertainty, and macroeconomic variables by country

						Br	azil						
Measures	INV	SIZE	LEV	FCO	SG	ROA	TB'Q	CH	TANG	EPU	GPR	GDP	CPI
Mean	0,01	14,04	0,53	0,02	0,04	0,01	1,41	0,14	0,31	121,60	49,76	2,33	1,36
Median	0,01	14,01	0,54	0,02	0,01	0,01	1,14	0,12	0,27	103,89	43,60	3,13	1,37
Minimum	0,00	10,12	0,10	-0,10	-0,60	-0,07	0,48	0,00	0,00	46,91	18,57	-7,29	0,19
Maximum	0,10	18,44	0,96	0,15	1,30	0,08	5,12	0,58	0,88	342,63	165,36	8,32	3,22
SD	0,02	1,65	0,19	0,04	0,26	0,02	0,82	0,11	0,24	61,76	27,36	3,86	0,64
China													
Measures	INV	SIZE	LEV	FCO	SG	ROA	TB'Q	CH	TANG	EPU	GPR	GDP	CPI
Mean	0,02	13,09	0,44	0,01	0,14	0,01	2,57	0,18	0,28	217,76	138,89	3,66	0,68
Median	0,01	12,96	0,44	0,01	0,04	0,01	1,99	0,14	0,25	137,61	120,84	7,86	0,56
Minimum	0,00	10,65	0,04	-0,12	-0,79	-0,05	0,93	0,01	0,00	49,62	73,95	-16,60	-0,93
Maximum	0,11	16,76	0,89	0,16	4,09	0,07	10,85	0,67	0,80	854,21	347,69	13,81	3,63
SD	0,02	1,23	0,21	0,04	0,65	0,02	1,79	0,14	0,19	199,90	58,45	10,69	0,93
						Ru	ssia						
Measures	INV	SIZE	LEV	FCO	SG	ROA	TB'Q	CH	TANG	EPU	GPR	GDP	CPI
Mean	0,02	16,38	0,46	0,03	0,03	0,02	1,21	0,08	0,62	123,83	201,37	3,73	2,02
Median	0,02	16,22	0,41	0,03	0,02	0,02	1,03	0,06	0,63	108,31	181,69	7,75	1,55
Minimum	0,00	13,46	0,18	-0,04	-0,50	-0,05	0,40	0,00	0,17	47,19	76,87	-21,51	0,13
Maximum	0,08	19,64	0,90	0,11	0,92	0,11	4,06	0,29	0,90	302,23	488,75	15,67	8,10
SD	0,01	1,35	0,17	0,03	0,22	0,03	0,66	0,06	0,15	57,32	89,47	10,00	1,42

Note: SD: standard deviation. INV: corporate investment. SIZE: size. LEV: leverage. FCO: operating cash flow. SG: sales growth. ROA: profitability. TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility. EPU: economic policy uncertainty. GPR: geopolitical risk. GDP: GDP growth. CPI: inflation.

Table 3 shows the results of Pearson's correlation tests 2021). On the other hand, the correlation between EPU between the variables. INV showed significant and negative correlations with EPU and GPR, an inverse mutual relationship between investment and uncertainty measures. further indicating the negative influences of measures on corporate investment in the literature (Dissanayake et al., 2018; Das et al., 2019; Wu et al., 2020; Le & Tran,

and GPR, which is significant and positive, indicates a possible direct relationship between the measures in emerging countries, which corroborates findings in the literature (Arif & Shahbaz, 2020; Kannadhasan & Das, 2020; Gu et al., 2021; Chiang, 2021; Chen, 2023).

Table 3. Person correlation test results

	INV	SIZE	LEV	CFO	SG	ROA	TB'Q	CH	TANG	EPU	GPR	GDP
INV												
SIZE	-0,04											
LEV	-0,07	0,39										
CFO	0,06	0,04	-0,05									
SG	-0,04	-0,01	0,04	0,14								
ROA	0,13	0,03	-0,30	0,25	0,19							
TB'Q	0,05	-0,42	-0,36	0,02	0,02	0,23						
CH	0,04	-0,19	-0,41	0,11	0,01	0,24	0,24					
TANG	0,28	0,10	0,11	0,13	-0,08	-0,09	-0,17	-0,35				
EPU	-0,11	0,21	-0,09	-0,01	-0,03	-0,02	0,00	-0,01	-0,14			
GPR	-0,02	-0,03	-0,11	-0,04	0,02	0,00	0,07	0,02	-0,06	0,38		
GDP	0,03	-0,02	0,01	0,23	0,26	0,06	-0,01	0,03	0,01	-0,08	0,00	
CPI	0,01	0,03	0,03	-0,09	-0,15	0,00	0,00	-0,01	0,03	-0,08	-0,18	-0,60

Note: Values in bold are significant at the 5% level. SD: standard deviation, INV: corporate investment, SIZE: size, LEV: leverage, FCO: operating cash flow, SG: sales growth, ROA: profitability, TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility, EPU: economic policy uncertainty, GPR: geopolitical risk, GDP: GDP growth, CPI: inflation.

to explain variations in the INV of Brazilian, Chinese, and Russian firms. The two models indicated statistically significant negative influences of EPU on INV, which shows that in periods of greater uncertainty, companies tend to carry out less INV, i.e. the increase (reduction) in EPU influences the reduction (increase) in firms' INV given the other variables in the models, results consistent with most of the literature (Wang et al., 2014; Gulen & Ion, 2016; Berg & Mark, 2018; Dissanayake et al., 2018; Wang et al., 2019; Montes & Nogueira, 2022; Jumah et al., 2023). The confirms H_1 that EPU significantly influences the INV of authors point out that negative influences result from greater companies in emerging markets, Brazil, China, and Russia.

Table 4 shows the results of the models (equation 1) estimated risk aversion in INV decisions in the face of greater EPU.

This result differs from the perspective of Wu et al. (2020), who argue for a positive influence, considering that initial investment decisions in high uncertainty are associated with the acquisition of future growth opportunities. The purpose of carrying out more INV in periods of high EPU would be to create competitive advantages. However, the authors acknowledge that the negative impact of uncertainty is more recurrent. The negative effect found

Table 4. The effects of the EPU and GPR on firms' INV

			Dependent Variable -	Corporate Investment			
	Brazil			ina	Rus	Russia	
	(1)	(2)	(1)	(2)	(1)	(2)	
EPU	-0,004***	-0,004***	-0,001 * * *	-0,001***	-0,003*	-0,003*	
	(0,001)	(0,001)	(0,0001)	(0,0002)	(0,002)	(0,002)	
GPR	-0,0004	-0,001***	-0,001***	-0,001***	-0,005***	-0,005 * * *	
	(0,0003)	(0,0003)	(0,0002)	(0,0002)	(0,001)	(0,001)	
EPU * GPR		-0,002*		-0,0002		-0,009***	
		(0,001)		(0,0002)		(0,003)	
SIZE	-0,0001	-0,0001	-0,0003*	-0,0003*	0,0003	0,0003	
	(0,0004)	(0,0004)	(0,0001)	(0,0001)	(0,001)	(0,001)	
LEV	0,004	0,004	0,00001	0,00001	-0,005	-0,005	
	(0,002)	(0,002)	(0,001)	(0,001)	(0,008)	(0,008)	
FCO	0,026*	0,026*	-0,015***	-0,015***	0,038	0,037	
	(0,015)	(0,015)	(0,002)	(0,002)	(0,024)	(0,025)	
SG	-0,001	-0,001	-0,001***	-0,001***	-0,007***	-Ò,ÓO6***	
	(0,001)	(0,001)	(0,0001)	(0,0001)	(0,003)	(0,003)	
ROA	0,036**	0,035*	0,153***	0,153***	0,062**	0,065**	
	(0,018)	(0,018)	(0,006)	(0,006)	(0,026)	(0,026)	
TB'Q	0,003***	0,003***	0,0002***	0,0002***	0,001	0,002	
	(0,001)	(0,001)	(0,0001)	(0,0001)	(0,002)	(0,002)	
CH	0,008*	0,008*	0,015***	0,015***	0,003	0,003	
	(0,005)	(0,005)	(0,001)	(0,001)	(0,013)	(0,013)	
TANG	0,018***	0,018***	0,031***	0,031***	0,031***	0,031***	
	(0,003)	(0,003)	(0,001)	(0,001)	(0,008)	(0,008)	
GDP	-0,0001	-0,0001*	0,0001***	0,0001***	0,0001***	0,0002***	
	(0,00005)	(0,00005)	(0,00001)	(0,00001)	(0,00004)	(0,00004)	
CPI	-0,001***	-0,001***	0,001***	0,001***	0,001***	0,001***	
	(0,0003)	(0,0003)	(0,0001)	(0,0001)	(0,0002)	(0,0003)	
Observations	6.896	6.896	112.360	112.360	1.102	1.102	
Adjusted R ²	0,173	0,174	0,127	0,127	0,213	0,219	
Standard deviation of	0.014	0.014	0.018	0.018	0.013	0.013	
residuals	0,014	5,514	5,510	\$,510	\$,510	3,510	

Note: Variable Statistically significant with *p<0.1; **p<0.05; *p<0.01. Models without multicollinearity. Standard error in parentheses. Lagged dependent variables. Interactions centered at the mean. INV: corporate investment, SIZE: size, LEV: leverage, FCO: operating cash flow, SG: sales growth, ROA: profitability, TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility, EPU: political economic uncertainty, GPR: geopolitical risk, GDP: GDP growth, CPI: inflation.

significance of GPR on INV in China and Russia and economic structure, inconclusive results in Brazil (non-significant GPR in model language are evident (Biggemann & Fam, 2011; 1). The results generally confirmed the significant negative Thorstensen & Oliveira, 2012; Milani Filho et al., 2016). influence identified in prior research (Julio & Yook, 2012; Balcilar et al., 2018; Das et al., 2019; Wang et al., 2019; In the political sphere, for example, China and Russia stand Le & Tran, 2021; Caldara & lacoviello, 2022; Montes out for adopting stricter international policies. In addition, & Noqueira, 2022; Dreyer & Schulz, 2023), allowing both countries have internal ethnic tensions and tensions us to infer an inverse relationship between geopolitical with neighboring nations (Biggemann & Fam, 2011; Milani uncertainties and conflicts and investment (INV) in Filho et al., 2016). Furthermore, China and Russia are more both China and Russia. Consequently, these findings prone to natural disasters when compared to Brazil, which support the H2 that aeopolitical risk exerts a significant is evidenced by the significant difference in average GPR negative impact on corporate investment within emerging values according to descriptive statistics. All these factors economies, particularly in the Chinese and Russian markets. contribute to explaining the differences in the results found.

The results from Model 2 also confirmed H2 for Brazil In the robustness test with additional effects of crises on and Russia, demonstrating a combined effect of EPU and companies' INV, the results of which are described in GPR on corporate investment (INV) within these emerging Table 5, two models were estimated per country, with economies. However, this joint influence was not observed in and without interactions (EPU and GPR), taking crises China. In line with prior studies (Kannadhasan & Das, 2020; into account. High uncertainty is experienced in periods Chiang, 2021; Jiang et al., 2022), these results indicated an of crisis and is therefore associated with EPU and GPR inverse relationship between the joint movement of EPU and (Julio & Yook, 2012; Wang et al., 2014; Gu et al., 2021;

Concerning the non-uniform results between the to adjust economic policies, which consequently alter countries, it should be noted that despite the common investor behavior and negatively influences investments. denominator of growth and development in the BRICS

The models in Table 4 also showed the statistical economic bloc, the differences in terms of politics, demographics, culture, and

GPR and the resulting changes in firms' investment (INV). Chen, 2023; Montes & Nogueira, 2022; Dreyer & Schulz, 2023). The literature argues that crises require governments

Table 5. Effects of EPU and GPR on firms' INV in periods of crisis

			Dependent Variable -	Corporate Investment				
	Br	azil	Ch	ina	Ru	Russia		
	(1)	(2)	(1)	(2)	(1)	(2)		
EPU	-0,003***	-0,003***	-0,001***	-0,001***	-0,0005	-0,001		
	(0,001)	(0,001)	(0,0001)	(0,0001)	(0,001)	(0,001)		
GPR	0,001*	0,0003	-0,001***	-0,001***	-0,004***	-0,005***		
	(0,0004)	(0,0003)	(0,0002)	(0,0002)	(0,001)	(0,001)		
EPU * GPR		-0,001*		0,0002		-0,016***		
		(0,001)		(0,0003)		(0,003)		
SIZE	-0,00003	-0,00003	-0,0005***	-0,0005***	0,001	0,001		
	(0,0003)	(0,0003)	(0,0002)	(0,0002)	(0,001)	(0,001)		
LEV	0,003	0,003	-0,001	-0,001	0,0004	-0,0004		
	(0,002)	(0,002)	(0,001)	(0,001)	(0,008)	(0,008)		
FCO	0,012	0,012	-0,017***	-0,017***	0,018	0,016		
	(0,009)	(0,009)	(0,002)	(0,002)	(0,023)	(0,023)		
SG	-0,001	-0,001	-0,001***	-0,001***	-0,007**	-0,006*		
	(0,001)	(0,001)	(0,0001)	(0,0001)	(0,003)	(0,003)		
ROA	0,015	0,015	0,133***	0,133***	0,037	0,041		
	(0,020)	(0,020)	(0,007)	(0,007)	(0,029)	(0,028)		
TB'Q	0,002***	0,002***	0,0002**	0,0002**	0,002	0,002		
	(0,001)	(0,001)	(0,0001)	(0,0001)	(0,003)	(0,003)		
CH	0,008	0,008	0,012***	0,012***	0,010	0,008		
	(0,005)	(0,005)	(0,001)	(0,001)	(0,013)	(0,013)		
TANG	0,016***	0,016***	0,028***	0,028***	0,031***	0,031***		
	(0,004)	(0,004)	(0,001)	(0,001)	(0,010)	(0,010)		
GDP	0,0002***	0,0001***	0,0001***	0,0001***	0,0002***	0,0002***		
	(0,00004)	(0,00004)	(0,00001)	(0,00001)	(0,00004)	(0,00005)		
CPI	-0,0003	-0,0003	0,001***	0,001***	0,001***	0,002***		
	(0,0003)	(0,0003)	(0,0001)	(0,0001)	(0,0002)	(0,0003)		
Crisis	-0,001	-0,001			-0,006***	-0,006***		
	(0,001)	(0,001)			(0,001)	(0,001)		
Observations	5.789	5.789	89.159	89.159	962	962		
Adjusted R ²	0,147	0,147	0,118	0,118	0,173	0,193		
Standard deviation of residuals	0,013	0,013	0,017	0,017	0,012	0,012		

Note: Variable Statistically significant with *p<0.1; **p<0.05; *p<0.01. Models without multicollinearity. Standard error in parentheses, Lagged dependent variables. Interactions centered at the mean. INV: corporate investment, SIZE: size, LEV: leverage, FCO: operating cash flow, SG: sales growth, ROA: profitability, TBQ: Tobin's Q; CH: cash retention; TANG: tangibility, EPU: political economic uncertainty, GPR: geopolitical risk, GDP: GDP growth, CPI: inflation.

Table 5 shows negative EPU effects for Brazil and China, the results of this research, as well as corroborating the except for Russia. Regarding GPR, the negative effect literature (Kannadhasan & Das, 2020; Gu et al., 2021; remained significant for China and Russia, except Chen, 2023). According to the results of the two models, for Brazil (although significant in only one model as the effect of uncertainties remained negative in the case before, the effect remained positive and reinforced the previous inconclusive analysis, Table 4). As for the interactions between EPU and GPR, the significant In terms of firm characteristics, the effects of EPU and and negative effects remained for Brazil and Russia.

The three hypotheses of this research were confirmed, since even in a context of crisis, most of the significant and negative effects of uncertainties on INV were maintained. Most of the results in Table 5 reinforce the persistence of

of China and Russia, even considering periods of crisis.

GPR on INV vary (Wang et al., 2014; Gulen & Ion, 2016; Wu et al., 2020). For example, Wu et al. (2020) point out that the effect of EPU is greater for firms with high tangible assets and profitability, also showing that firms with fewer financial difficulties tend to invest more.

Table 6. Effects of EPU and GPR on firms' INV moderated by ROA

	Dependent Variable - Corporate Investment								
	Bro	azil	Ch	ina	Russia				
	(1)	(2)	(1)	(2)	(1)	(2)			
EPU	-0,004***	-0,004***	-0,001***	-0,001***	-0,003*	-0,003*			
	(0,001)	(0,001)	(0,0002)	(0,0002)	(0,001)	(0,001)			
GPR	-0,001***	-0,001**	-0,001***	-0,001***	-0,005***	-0,005***			
	(0,0003)	(0,0003)	(0,0002)	(0,0002)	(0,001)	(0,001)			
EPU*GPR	-0,002*	-0,001*	-0,0003	-0,0003	-0,009**	-0,009***			
	(0,001)	(0,001)	(0,0002)	(0,0002)	(0,004)	(0,003)			
ROA	0,035*	0,036**	0,154***	0,152***	0,065**	0,064**			
	(0,018)	(0,018)	(0,006)	(0,006)	(0,025)	(0,026)			
EPU*ROA	-0,004		-0,046***		-0,052				
	(0,023)		(0,006)		(0,055)				
GPR*ROA		0,017		-0,057***		-0,076			
		(0,020)		(0,011)		(0,060)			
Controls	Yes	Yes	Yes	Yes	Yes	Yes			
Observations	6.896	6.896	112.360	112.360	1.102	1.102			
Adjusted R ²	0,173	0,174	0,128	0,127	0,219	0,220			
Standard deviation of residuals	0,014	0,014	0,018	0,018	0,013	0,013			

Note: Variable Statistically significant with *p<0.1; **p<0.05; *p<0.01. Models without multicollinearity. Standard error in parentheses. Lagged dependent variables. Interactions centered at the mean. INV: corporate investment, SIZE: size, LEV: leverage, FCO: operating cash flow, SG: sales growth, ROA: profitability, TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility, EPU: political economic uncertainty, GPR: geopolitical risk, GDP: GDP growth, CPI: inflation.

Table 6 shows the results of the models moderated by of EPU and GPR remained significant and negative profitability. It was observed that the effect of EPU, GPR, for Brazil and Russia, giving robustness to the results. and moderation remained significant and negative, in line with the literature (Gulen & Ion, 2016; Berg The effect of moderating EPU and GPR by ROA was & Mark, 2018; Dissanayake et al., 2018; Wang et al., 2019). It is worth noting that the pure effect of the GPR was negative and significant (it converges with the model 2 result in Table 4 and diverges from model 1 in Table 5), leading us to believe in the negative effect In this study, the characteristics of the firm, given its

significant and negative only for China, with no change in the sign of the uncertainty parameter even when controlled for the firms' ROA. However, this result did not converge with that of Wang et al. (2014), whose effect was positive. of the literature, also for Brazil. The moderate effect profitability, did not mitigate the effects of uncertainty on INV.

			Dependent Variable -	Corporate Investment			
	Bro	azil	Ch	ina	Russia		
	(1)	(2)	(1)	(2)	(1)	(2)	
EPU	-0,004***	-0,004***	-0,001 * * *	-0,001***	-0,003*	-0,003*	
	(0,001)	(0,001)	(0,0001)	(0,0002)	(0,002)	(0,002)	
GPR	-0,001***	-0,001***	-0,001 * * *	-0,001***	-0,005***	-0,005***	
	(0,0003)	(0,0003)	(0,0002)	(0,0002)	(0,001)	(0,001)	
EPU*GPR	-0,001*	-0,002*	-0,0003	-0,0003	-0,010***	-0,009***	
	(0,001)	(0,001)	(0,0002)	(0,0002)	(0,003)	(0,003)	
TANG	0,018***	0,018***	0,031***	0,031***	0,032***	0,032***	
	(0,003)	(0,003)	(0,001)	(0,001)	(0,008)	(0,008)	
EPU* TANG	-0,013***		-0,004***		0,012		
	(0,003)		(0,001)		(0,013)		
GPR* TANG		0,001		-0,005***		0,012	
		(0,002)		(0,001)		(0,013)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	6.896	6.896	112.360	112.360	1.102	1.102	
Adjusted R ²	0,182	0,173	0,128	0,127	0,220	0,220	
Standard deviation of residuals	0,014	0,014	0,018	0,018	0,013	0,013	

Table 7. Effects of EPU and GPR on firms' INV moderated by TANG

Note: Variable Statistically significant with *p<0.1; **p<0.05; *p<0.01. Models without multicollinearity. Standard error in parentheses. Lagged dependent variables. Interactions centered at the mean. INV: corporate investment, SIZE: size, LEV: leverage, FCO: operating cash flow, SG: sales growth, ROA: profitability, TB'Q: Tobin's Q; CH: cash retention; TANG: tangibility, EPU: political economic uncertainty, GPR: geopolitical risk, GDP: GDP growth, CPI: inflation.

by the tanaibility of the firms. The results remained the same regarding the pure effects of EPU and GPR, together with some moderations with significant TANG, which were negative.

and negative for Brazil and China, and not significant for Russia. Finally, the effect of GPR moderated by TANG also remained significant and negative for China and not significant for Brazil and Russia, which gave robustness to the results. The characteristics of the firm, given the tangibility, did not mitigate the effects of EPU on the INV of Brazilian firms, nor the EPU and GPR in Chinese firms, since the effects remained negative.

5 Concluding Remarks

This study aimed to analyze the effects of Economic Policy Uncertainty (EPU) and Geopolitical Risk (GPR) on the investment level (INV) of publicly traded firms in Brazil, China, and Russia, three emerging countries that are part of the BRICS group. EPU and GPR were found to be influential factors on firms' investment behavior. The effects of these variables were analyzed over the period from 2003 to 2019, and the hypotheses regarding the impacts of EPU, GPR, and the interaction between both on INV were confirmed.

It was observed that the results revealed a negative influence of Economic Policy Uncertainty (EPU) on investment (INV), one possible explanation being that an increase in uncertainty raises risk aversion in firms' investment decisions. This finding contrasts with the view that initial investments would be associated with future growth opportunities and competitive

Table 7 presents the results of the models with effects controlled advantage. The identified negative relationship is in line with the literature (Julio & Yook, 2012; Wana et al., 2014; Gulen & Ion, 2016; Berg & Mark, 2018; Dissanayake et al., 2018; Wang et al., 2019; Montes & Nogueira, 2022).

The effects of EPU moderated by TANG were significant Concerning the effects of the GPR, the results also corroborated the literature, showing a significant and negative influence on INV (Balcilar et al., 2018; Das et al., 2019; Wang et al., 2019; Caldara & lacoviello, 2022). There were indications that geopolitical conflicts, as well as EPU, have a negative impact on the INV of companies in emerging countries, especially China and Russia, where the results were more consistent in the robustness tests. For the Brazilian market, the results were inconsistent and therefore inconclusive in all the specifications analyzed.

> It was further observed that, according to the Real Options Theory, during periods of high uncertainty, firms tend to delay their investments until market conditions improve or stabilize. Additionally, crisis periods showed statistical relevance for Russian firms. EPU and GPR maintained statistical significance and the same signs as in previous models, except in one specification for Brazil. In the tests with moderation by firm characteristics, the individual effects of EPU and GPR remained significant and negative. Furthermore, the moderation of EPU by ROA was significant and negative only for China; the interaction of EPU with TANG was significant for both China and Brazil; and the interaction of GPR with TANG was significant only for China.

> However, this study is not without limitations. The proxies, the analysis period, and the sample may have influenced the results. Future research could investigate the effects

of the analyzed variables using alternative proxies for International Money and Finance, 88, 212-227. https:// INV, or assess whether global EPU, such as that of Davis (2016), constitutes a risk factor in emerging markets. It is also suggested to employ other methodologies, such as quantile regressions and estimates for future periods.

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