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Economic Policy Uncertainty And Investment: A Comparative Analysis Of India And Brazil

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Abstract

This article investigates the effects of economic policy uncertainty (EPU) on investment in two major emerging economies, Brazil and India, from 2008 to 2018. We utilize the news-based index in Baker et al. (2016) to measure EPU. We show that as EPU increases, Indian firms increase, and Brazilian firms reduce their investment. An examination of cross-sectional heterogeneity shows that smaller, more vulnerable firms are most affected by the adverse outcomes of uncertainty in Brazil. However, larger and more leveraged firms are those that take advantage of the investment opportunities in India in times of increased EPU. Our results are robust to endogeneity and alternative EPU measures, regression models, and investment measures.

Keywords *Investment, Economic Policy uncertainty, Brazil, India, Emerging economies*

1. Introduction

Risk and uncertainty are part of any investment valuation and corporate decision. Investors may know how to manage risk but are doubtful when facing uncertainty, especially economic policy uncertainty (EPU). EPU is linked to the actions that governments take or deliberately reject and their ability to achieve their goals. Since the global financial crisis (2007–2009) and the ensuing sluggish growth EPU and its impact on investment have been a major concern. The International Monetary Fu[1]nd (IMF) and the Federal Open Market Committee (FOMC) have blamed increased EPU in the US and Europe for the intensified global economic slump and the subsequent slow recovery (FOMC, 2009; IMF, 2012, 2013). EPU is particularly concerning because its relationship to market volatility on the one hand, and economic growth on the other hand, is ambiguous (Białkowski et al., 2022; Veronesi & Pástor, 2017).

Measuring the EPU faced by firms is complex. Some studies employ variables like election years (Colak et al., 2017; Jens, 2017; Julio & Yook, 2012, 2016)[2] and political changes (An et al., 2016; Xie et al., 2019). However, these indicators are static and discrete; they may not correctly capture the actual concerns of managers regarding future economic policy

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[2] Presidential, parliamentary, gubernatorial etc.

decisions and do not provide an accurate understanding of firms' behavior and concerns under different EPU conditions. Baker et al. (2016) developed a newspaper-based EPU index (EPUI), which they note has power beyond the indicators traditionally used to explain economic behavior. The EPUI captures economic turmoil; it is positively correlated with the Chicago Board Options Exchange index (VXO) and in a countercyclical relationship with real GDP growth (Baker et al., 2016). However, since the EPUI is derived from a count of newspaper articles containing key terms related to policy uncertainty, it may deviate from economic indicators when political information generates excessive noise (Białkowski et al., 2022; Veronesi & Pástor, 2017). The EPUI measures the impact of concern about future policies, as reflected in public opinion, rather than the real uncertainty observed in the markets, which may have opposite effects on investment, as shown by Suh & Yang (2021).

Given the importance of uncertainty in the actual economic environment, its effect on corporate decisions has become pertinent and, over the last decade, has attracted considerable attention from researchers, practitioners, managers, and policymakers. The EPU–investment relationship depends on the country and industry in which investment occurs (Boutchkova et al., 2012). Several studies investigate the effect of political uncertainty on investment by US firms, finding that elections decrease firm investment because of the lower quality of information in electoral periods (Durnev, 2010; Julio & Yook, 2012). There is less research on emerging markets, except for China (An et al., 2016; G. Liu & Zhang, 2020; Xie et al., 2019). For Brazil, Caixe (2022) shows that EPU has a stronger negative impact on investment for well-governed firms. Aggarwal & Saradhi (2022) study the relationship between domestic and global EPU and the Indian stock market. They find evidence of the Indian stock market's positive reaction to domestic EPU. To our knowledge, no existing studies have analyzed the EPU–investment relationship for India or performed a comparison of this relationship for India and Brazil. Some studies include emerging economies in their overall sample and account for country-specific effects, but none specifically compare these two countries. This study aims to fill these gaps.

This study aims to analyze and compare the impact of EPU on investment in two developing economies, Brazil and India, from 2008 to 2018. This period is particularly interesting for the economic reforms initiated in many developing countries. According to Rodrik (1991), even sensible reforms implemented in developing countries can lead to increased uncertainty and function as a form of investment tax. Investment may be delayed if the outcomes of the reforms are not adequately explained. It is worth noting that the sample period falls between the global financial crisis and the COVID-19 crisis. We chose to deliberately exclude these crisis periods to assess the effect of domestic EPU on firms' investment decisions in non-stress periods.

The choice of Brazil and India is based on their importance as part of the BRICS countries. Moreover, emerging economies face particular issues, such as inefficient judicial and legal systems, political connections, pervasive weaknesses in financial systems, and corruption (Ayyagari et al., 2010; Faccio, 2006). These might exacerbate the outcome of increased uncertainty (Durnev, 2010) or, as Caixe (2022) finds, might offset the negative effect of EPU on investment. Both India and Brazil face the types of problems noted and have implemented new financial standards to overcome the weaknesses in their financial systems. India, Brazil, and South Africa are the only BRICS countries to uphold principles of real

democracy and press freedom. However, ethnic and political issues in India and Brazil have negatively impacted press freedom over the past decade.[3]

India and Brazil have each implemented economic reforms over the last decade but in different political environments. Brazil has had to cope with the political fallout of several corruption scandals and incidents of money laundering between 2012 and 2018[4] (Evangelista & Bruno, 2019). These events led to massive protests and an economic recession from 2014 to 2017, significantly increasing political uncertainty in the country. The Brazilian economy also suffers from high fiscal pressure, low credit access,[5] and poor investor protection. In India, the last decade was also marked by several notable economic events, such as the 2012 inflation crisis and the so-called "Taper Tantrum" in 2013. These events, among others, increased India's domestic EPU. The government has stimulated domestic and foreign demand over the last decade by instituting economic reforms (Aggarwal & Saradhi, 2022). As a result, the country has become a major recipient of foreign direct investment and has experienced continuous growth. Compared to Brazil, the political environment in India is relatively stable.

First, we use several models to examine the impact of EPU on investment for 762 Indian firms (7,535 observations) and 153 Brazilian firms (1,467 observations) between 2008–2018. We show that EPU has a significant but different impact on firm investment in India and Brazil. Increased EPU depresses investment in Brazil but is an incentive for investment in India. Second, we find that there is cross-sectional heterogeneity between firms. In Brazil, more vulnerable firms, specifically smaller ones, are more impacted. In India, larger and highly indebted firms are more likely to seize investment opportunities. Our results confirm that, in a stable political environment, increased EPU offers investment opportunities. Our findings are important, adding a new perspective to existing research on EPU's impact on investment. The unexpectedly positive relationship between investment and EPU in India is an important contribution and offers insights into the EPU–investment relationship; almost all existing studies find that EPU negatively impacts investment. The IMF has highlighted the importance of a politically stable environment for growth and investment (IMF, 2018). Our results also demonstrate the direct influence of the statements and actions of policymakers on political uncertainty and the behavior of companies, particularly those that are most vulnerable.

The remainder of the article is organized as follows. In Section 2, we discuss the literature and develop the study hypotheses Section 3 presents the data., and in Section 4, we describe the empirical methodology. In Section 5, we present and discuss the empirical results. Section 6 concludes.

2. Literature review

A review of the theoretical literature on the relationship between investment and uncertainty shows a lack of consensus. For those that find a negative relationship, this is explained by the

[3] For more information about press freedom in these two countries https://rsf.org/en/country/inde and https://rsf.org/en/country/brazil.

[4] The Petrobras case in 2014, Brazil food and JBS S.A cases in 2017, dismissal of Dilma Rousseff in 2016.

[5] World Trade Organization https://www.wto.org/english/tratop_e/tpr_e/s283_sum_e.pdf, accessed on February 15, 2023.

real options and financing channels. Concerning the real options channel, when uncertainty increases, firms adopt more conservative policies and deliberately postpone investment until they can obtain further information, especially when investment is irreversible (Bernanke, 1983; Bloom et al., 2007; Dixit & Pindyck, 1994). As regards the financing channel, a higher level of uncertainty increases financial distortions (Bernanke et al., 1996) and reduces financial stability and liquidity (Phan et al., 2021). It also augments the firm's cost of financing by magnifying default risk (Gilchrist et al., 2009; Kaviani et al., 2020; Liu & Wang, 2022; Pástor & Veronesi, 2012; Tran, 2021). If equity financing becomes costlier, firms will prefer debt financing (Ashraf et al., 2022; Bajaj et al., 2021, Schwarz & Dalmácio, 2020), and if borrowing becomes more expensive, they will opt to decrease their leverage (Li & Qiu, 2022; Pan et al., 2019). These changes will result in lower investment (Liu & Zhang, 2015; Pástor & Veronesi, 2014). Bernanke et al. (1996) refer to this mechanism as the financial accelerator.

The positive effects of EPU on investment are explained by the growth option channel and the Oi–Hartman–Abel effect. Underlying the growth option channel is the "good news principle." On this understanding, uncertainty becomes an opportunity to look for a potentially higher return. This argument has been used to explain the dot.com expansion of the 1990s. Bar-Ilan & Strange (1996) note that uncertainty matters when a firm expects short-term cash flows; however, if there are investment lags, the investment–uncertainty relationship becomes positive. Stein & Stone (2013) and Vo & Le (2017) find that the real-options theory does not hold for strategic investment in innovations because this type of investment cannot be postponed. Liu et al. (2022) show that EPU positively affects innovation investment in China, and Sha et al. (2020) explain that Chinese firms are more inclined to engage in acquisitions during periods of heightened EPU, in contrast to the behavior observed among US firms. Finally, the Oi–Hartman–Abel effect is based on the theoretical work of Abel (1983), Hartman (1972), and Oi (1961) and holds that firms operating in perfect competition can expand to capitalize on positive outcomes and contract to insure against negative outcomes. Therefore, when uncertainty increases, firms will be risk seekers and increase their investment.

The empirical literature on political uncertainty is unanimous regarding the negative effect of EPU on investment using elections, EPUI, or other equivalent indexes. Durnev (2010) investigates the sensitivity of investment decisions to stock price movements during elections across 79 countries, showing that increased EPU deteriorates the information quality on stock markets, thereby decreasing investment. Julio & Yook (2012) find that in 48 countries, national elections led firms to reduce their investment expenditures until electoral uncertainty was resolved. Further, they suggest that US firms decrease foreign direct investment during elections in host countries. They are more affected by increased uncertainty than domestic firms because of the additional risk of expropriation. Julio & Yook (2016) point out that a stable political environment, less corruption, and greater control over executives mitigate this effect. Jens (2017) uses US gubernatorial elections to demonstrate that firms delay equity and debt issuances tied to investments and postpone investment in the lead-up to elections.

Regarding the effect of EPU on economic activity, Kang et al. (2014) document a significantly negative long-term effect of uncertainty shocks on US firms' investment via the interaction between the volatility of stock prices and EPU. This effect is not observed for very large firms. Using US data, Gulen & Ion (2016) stress the strong negative impact of increased EPU on investment by US firms. They document a stronger relationship for firms that are dependent on public spending and with more irreversible investments. Bonaime et al. (2018) and Nguyen & Phan (2017) focus on mergers and acquisitions in the US, concluding that increased EPU depresses mergers and acquisitions; it also increases the time to accomplish

acquisitions (Nguyen & Phan, 2017). Bonaime et al. (2018) ascribe their findings to the real-options channel as irreversibility exacerbates this effect.

Meinen & Roehe (2017) study the effect of EPU on investment in five European countries and identify the financing channel as the most probable source of decreased investment. Drobetz et al. (2018) point out that increased EPU alters the relationship between investment and the cost of capital. Using EPUI in 21 countries, they show that this decreased sensitivity leads to lower investment expenses. They also document a higher impact on small firms, without a credit rating, in countries with high state ownership and those operating in countries with an opaque institutional environment. Suh & Yang (2021) investigate the effect of uncertainty on investment in 36 countries between 1997 and 2006 using various measures of global uncertainty. Their findings indicate that only the global EPU negatively affects investment while the other measures of uncertainty show a positive impact of uncertainty on investment.

Another strand of the literature focuses on developing countries, with the Chinese case being the most studied. Wang et al. (2014) use EPUI and find that higher uncertainty leads to lower investment. However, they find that firms with higher returns on capital, utilizing more internal financing, located in less marketized regions, and that are not state-owned can mitigate this effect. An et al. (2016), G. Liu & Zhang (2020), and Xie et al. (2019) corroborate these results in their studies using changes by government officials, the supply side reform of 2015, and the Five-Year Plan Cycles implementation in China, respectively. They also note that Chinese public companies might overinvest to support government policy. Xie et al. (2019) show that these companies might obtain policy benefits to improve investment behavior. Caixe (2022) focus on the role of governance in the investment–EPU relationship in Brazil, finding EPU negatively impacts investment, and this negative effect is greater for firms with better governance. The author concludes that better legislation and stronger monitoring will align the interest of controlling shareholders with those of minority shareholders.

Given the previous findings, we propose to test the following hypothesis:
H1: Higher EPU decreases corporate investment.

It would be reasonable to think that firms are not equally affected by EPU. The relationship between EPU and investment may depend on firm characteristics. From the perspective of the financing channel, investment is driven by financial conditions. Existing studies on EPU show that it increases risk premia (Brogaard & Detzel, 2015; Nodari, 2014; Pástor & Veronesi, 2012, 2013, 2014) and the cost of debt (Bajaj et al., 2021; Bradley et al., 2016; Kaviani et al., 2020; Waisman et al., 2015), making fundraising more costly for firms and inhibiting investment; vulnerable firms may be especially effected (Colak et al., 2017; Jens, 2017; Kelly et al., 2016; Pástor & Veronesi, 2012). Duchin et al. (2010) explain that standard investment models with financing constraints suggest that financially constrained firms will be more sensitive to external financing supply. These effects will be particularly severe for firms that face relatively higher costs of external capital or that have a greater need to raise such capital (Xie et al., 2019). Highly leveraged[6] firms face higher external funding costs because

[6] Highly leveraged firms are not necessarily financially distressed as long as they continue to generate sufficient cash flow to pay off their debts.

of liquidity and solvability risks (Whited & Wu, 2006). Bolton et al. (2019) show that firms prioritize internal funding because of the expensive external financing and focus on both real and financial flexibilities. As highly leveraged firms face higher borrowing costs (Whited & Wu, 2006), they are likely to be more affected by increased EPU. Wang et al.'s (2014) results on corporate investment in China show that firms that rely on internal funding can mitigate the negative effect of increased EPU. Suh & Yang (2021) explain that firms with high investment irreversibility and leverage experience more pronounced adverse impacts of EPU. Therefore, we formulate the following hypothesis:

> **H2:** Highly leveraged firms exhibit a more pronounced effect of EPU on investment than firms with lower leverage.

Firm size is an additional indicator of financial constraints, as suggested by Panousi & Papanikolaou (2012). Large firms have more access to external financing, either short or long-term, and enjoy a lower cost of financing (Duchin et al., 2010). Bernanke et al. (1996) argue that large firms tend to exhibit a relatively smaller and delayed reduction in their activities during economic shocks than small firms. According to the real options channel, firms are willing to postpone investment until uncertainty decreases. Firms with stronger cash flows would experience a more significant impact as they can afford a "wait and see" approach until they have more information (Li et al., 2015). Conversely, firms with weaker cash flows must maintain their investment levels to sustain their business operations or accumulate sufficient physical capital to serve as collateral for future borrowing (Hennessy et al., 2007). The life-cycle theory suggests that larger firms have fewer investment opportunities, higher cash flows, and higher dividends (Fama & French, 2001) and might be more willing to postpone investment when facing uncertainty (Li et al., 2015). Kang et al. (2014) confirm the real options channel for the largest manufacturing firms in the US. However, according to the financing channel smaller firms that have more difficulty raising external capital will be more affected by uncertainty as stated by Drobetz et al. (2018). Based on these findings, we propose this third hypothesis:

> **H3:** The EPU–investment relationship is more pronounced for larger companies.

3. Methodology

Our main empirical specification is the following:

$$INV_{i,t} = \beta_0 + \beta_1 LEPU_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 Q_{i,t-1} + \beta_4 L_{i,t-1} + \beta_5 Size_{i,t-1} + \beta_6 M_{t-1} + \varepsilon_{i,t}$$

With $INV_{i,t}$: the investment ratio of firm i in year t measured as capital expenditure scaled by the beginning of the year assets (Duchin et al., 2010; Gulen & Ion, 2016; Julio & Yook, 2012; Kahle & Stulz, 2013; Kim & Kung, 2017; Wang et al., 2014).

$LEPU_{i,t-1}$ is the natural logarithm of the average monthly EPUI (Gulen & Ion, 2016; Javadi et al., 2021; Phan et al., 2019) of the year preceding the fiscal year end t. We added a firm index i because the fiscal year end is different across firms and there are some cross-sectional variations in the EPUI.

$CF_{i,t}$ is the cash flow ratio that is the net operating cash flow scaled by the beginning of the year assets (Gulen & Ion, 2016; Wang et al., 2014). Following D. Li et al. (2015) and Wang et al. (2014), the CF variable is not lagged.

$Q_{i,t-1}$ is Tobin's Q measured as the book value of assets minus the book value of equity plus the market value of equity plus deferred taxes all divided by the book value of assets (Gulen & Ion, 2016).

$L_{i,t-1}$ is the book leverage measured first by long-term debt leverage over assets (BLDLT) and then by short-term leverage over total assets (BLST) (models M(1) and M(2), respectively). Then in model M(3), we replace both ratios with total liability over total assets (BLLT).
$Size_{i,t-1}$, is the firm size at the beginning of the year measured as the natural logarithm of assets. M_{t-1} is a set of macro data to account for general economic conditions which are GDP growth (Bhagat et al., 2016; Drobetz et al., 2018; Suh & Yang, 2021) and inflation (Phan et al., 2021).

We ran a fixed effect panel regression[7]. Standard errors are clustered at the firm level to account for heteroskedasticity. We do not include year-fixed effects to avoid absorbing the explanatory power of EPU. Because our model is a fixed effect model, we give up on controlling for the industry effect. Three models are estimated. M(1) is a reduced model incorporating LEPU and firm-specific control variables. M(2) adds the macroeconomic variables (DGP and INF). M(3) replaces short and long-term debt ratios with total liability ratio.

4. Data

We use a sample of Indian firms listed on the Bombay Stock Exchange (BSE) and Brazilian listed firms on B3 (Brazil Bolsa Balcaõ). Our dataset consists of yearly observations over the period 2008–2018 and includes the most recent observation at the time of database collection and is winsorized at the 1st and 99th levels. All accounting data come from the COMPUSTAT database. We exclude financial, utilities, and real estate firms (SIC 40-55-60) and firms with fewer than seven observations. Since we deal with uncertainty, our sample is unbalanced as we tried to avoid a survival bias. We require non-missing data on the main variables. Our final sample comprises 762 firms (7,535 observations) for India and 153 firms (1,467 observations) for Brazil. The EPUI values are collected from the economic uncertainty website.[8] GDP growth and inflation are sourced from the World Bank database.[9]

Table 1 displays the descriptive statistics. On average, the LEPU measure is 0.06 in India and 0.508 in Brazil, exhibiting a relatively lower standard deviation in India (0.35) than in Brazil (0.41); this might be the result of greater political instability in Brazil. In fact, during the 2008–2018 period, India went through two parliamentary elections, in 2009 and 2014. The ruling party won both elections, resulting in a relatively stable political environment. For India, the shifts in EPU are transitory and essentially the result of economic events or related to reforms. India experienced elevated EPU from 2011 to 2012 due to the European debt crisis, in 2013 following the conclusion of the US quantitative easing policy, and in 2016 when the government introduced new regulations, including the Insolvency and Bankruptcy Code. However, India has a relatively low EPUI compared to other BRICS countries. LEPU has varied between −0.57 and 0.603, which is lower than the range for Brazil. We also note greater GDP growth in India, with an average of 5.42. The situation in Brazil is quite different. as the country faced significant political instability in the period. Brazil's government experienced a series of corruption scandals, and there were three elections in the sample period, in 2010,

[7] The Hausman test results do not reject the null hypothesis of fixed effects. Results can be obtained from the corresponding author upon request.

[8] https://www.policyuncertainty.com/

[9] https://databank.worldbank.org/source/world-development-indicators#

2014, and 2018. The president, who was reelected in 2014, was subsequently dismissed in 2016. This political turmoil has had ramifications for the country's economy, as evidenced by the average GDP growth of only 0.406. Moreover, Brazil endured three consecutive years of recession from 2014 to 2017.

Table 1: Descriptive Statistics

	India						**Brazil**					
	N	Mean	Std. Dev.	Median	min	max	N	Mean	Std. Dev.	Median	min	max
LEPU	7535	0.06	0.354	0.011	-0.57	0.603	1467	0.508	0.41	0.321	-0.075	1.243
INV	6773	0.069	0.095	0.044	0	2.629	1314	0.049	0.058	0.034	0	0.791
Q	7479	1.659	2.134	1.065	0.097	81.937	1467	1.588	9.233	1.011	0.027	352.66
CF	6773	0.082	0.142	0.078	-2.87	6.783	1314	0.079	0.1	0.074	-0.376	0.543
Size	7535	9.443	1.639	9.288	3.749	16.12	1467	7.648	1.815	7.469	2.731	13.71
BLLT	7535	0.531	0.208	0.552	0	0.999	1467	0.544	0.207	0.548	0.003	0.996
BLDLT	7535	0.139	0.151	0.09	0	0.858	1467	0.178	0.151	0.154	0	0.666
BLST	7535	0.356	0.169	0.34	0	0.981	1467	0.275	0.162	0.247	0.001	0.902
GDP	7535	5.42	1.621	5.912	1.588	7.083	1467	0.406	3.079	0.526	-4.351	6.524
INF	7535	7.981	2.849	8.349	2.491	11.989	1467	5.995	1.759	6.204	3.446	9.03

Notes: This table reports the descriptive statistics for the sample (2008-2018). INV is investment, Q is Tobin's Q, cash flows (CF), total leverage (BLLT), long-term (BLDLT) and short-term (BLST) leverage GDP is GDP growth and INF inflation. Std. Dev. denotes standard deviation.

Regarding firm characteristics, Table 1 shows higher levels of investment for Indian firms. Firms in the two countries exhibit similar levels of total leverage and relatively high short-term debt, which aligns with the findings of Adams and Goyal (2008), who suggest that long-term debt tends to be relatively limited in developing countries. Indian firms, on average, are larger than those in Brazil. However, the average Tobin's Q values are similar between the two countries, albeit with a higher standard deviation in Brazil.

Table 2 exhibits the correlation matrix for India and Brazil and shows notable differences in the correlation patterns in the two cases. Specifically, LEPU is positively correlated with investment in India, while the correlation is negative in Brazil. Although the correlations between most of the variables are low, the GDP and EPU correlation is higher. We ran a VIF test to ensure all variables could be included in the same equation. We did not detect any multicollinearity problem (VIF<5).

Table 2: Correlation matrix

Variables	INV	LEPU	Q	CF	Size	BLLT	BLDLT	BLST	GDP	INF
INDIA										
INV	1.000									
LEPU	0.151	1.000								
Q	0.020	-0.165	1.000							
CF	0.143	-0.005	0.146	1.000						
Size	0.077	-0.104	0.068	0.051	1.000					
BLLT	0.080	0.084	-0.154	-0.095	0.244	1.000				
BLDLT	0.225	0.098	-0.198	-0.079	0.289	0.592	1.000			
BLST	-0.106	0.028	-0.009	-0.062	-0.006	0.661	-0.168	1.000		
GDP	-0.041	-0.654	0.121	0.019	0.070	-0.049	-0.070	-0.005	1.000	
INF	0.162	0.667	-0.140	-0.004	-0.112	0.068	0.130	-0.005	-0.156	1.000
BRAZIL										
INV	1.000									
LEPU	-0.200	1.000								
Q	0.071	-0.023	1.000							
CF	0.254	-0.052	0.414	1.000						
Size	0.127	0.111	0.011	0.132	1.000					
BLLT	-0.042	0.063	0.008	-0.081	0.200	1.000				
BLDLT	0.151	0.056	0.005	-0.042	0.444	0.551	1.000			
BLST	-0.149	0.061	0.009	-0.015	-0.066	0.616	-0.145	1.000		
GDP	0.172	-0.714	-0.004	0.045	-0.068	-0.075	-0.062	-0.071	1.000	
INF	0.003	0.280	-0.026	-0.017	0.020	0.071	0.050	0.040	-0.563	1.000

Notes: This table reports the correlation matrix. INV is investment, LEPU is the natural logarithm of EPUI, Q is Tobin's Q, cash flows (CF), the firm's size (Size), total leverage (BLLT), (BLDLT is long-term leverage, BLST is short-term leverage, GDP is GDP growth and inflation (INF).

5. Results

5.1 Economic policy uncertainty

Table 3 presents the estimation results for India and Brazil of the three basic models: M(1), M(2), and M(3). It shows that LEPU is significant in both countries but with opposite signs. The EPU negatively impacts investment in Brazil, whereas it positively affects investment in India.

Table 3: EPU and firm investment

	India			Brazil		
	M(1)	**M(2)**	**M(3)**	**M(1)**	**M(2)**	**M(3)**
$LEPU_{i,t-1}$	0.009**	0.018***	0.022***	-0.016***	-0.011**	-0.01*
	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)	(0.005)
$Q_{i,t-1}$	0.004*	0.004*	0.004*	-0.000008	-0.000004	-0.000003
	(0.002)	(0.002)	(0.002)	(0.00003)	(0.00003)	(0.00003)
$CF_{i,t-1}$	0.061**	0.062**	0.063**	0.114***	0.113***	0.113***
	(0.028)	(0.028)	(0.027)	(0.042)	(0.042)	(0.042)
$Size_{i,t-1}$	-0.058***	-0.056***	-0.055***	-0.027***	-0.027***	-0.028***
	(0.006)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
$BLDLT_{i,t-1}$	-0.135***	-0.14***		-0.039*	-0.034	
	(0.023)	(0.023)		(0.022)	(0.022)	
$BLST_{i,t-1}$	-0.101***	-0.101***		-0.013	-0.009	
	(0.02)	(0.019)		(0.03)	(0.03)	
$BLLT_{i,t-1}$			-0.131***			-0.024
			(0.018)			(0.023)
$GDP_{i,t-1}$		0.005***	0.005***		0.001	0.001
		(0.001)	(0.001)		(0.001)	(0.001)
$INF_{i,t-1}$		0.002***	0.002***		-0.001	-0.001
		(0.001)	(0.001)		(0.001)	(0.001)
Constant	0.658***	0.588***	0.593***	0.267***	0.265***	0.277***
	(0.061)	(0.066)	(0.066)	(0.056)	(0.055)	(0.054)
Observations	6720	6720	6720	1314	1314	1314
R-squared	0;3385	0.3475	0.3487	0.5017	0.5040	0.5038
Adj R squared	0.2532	0.2631	0.2647	0.4335	0.4352	0.4354

Notes: This table shows the estimation results for India and Brazil from regressing investment on EPU (LEPU), Tobin's Q, cash flows (CF), size, and long-term (BLDLT) and short-term (BLST) leverage (model M1). Model M2 incorporates GDP Growth and inflation. Model (M3) replaces long and short-term leverages by total book leverage (BLLT) leverage. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

The negative effect of EPU on investment by Brazilian firms aligns with most previous studies, including Caixe (2022), Drobetz et al. (2018), Gulen & Ion (2016), Julio & Yook (2012), and Wang et al. (2014). This negative effect could be explained by either the financing channel or the real options theory. Despite implementing economic reforms, the country has struggled to fully overcome the consequences of its political problems. For Brazil, the EPUI accurately reflects the political turmoil the country has experienced. Even after controlling for economic events, EPU continues to have a dampening effect on investment. The uncertainty surrounding government decisions and the heightened risky environment will likely lead investors to postpone their investment decisions until they have a clearer understanding of the future. As highlighted by Daude and Stein (2007), the institutional quality is crucial in shaping investment dynamics. Specifically, government instability and a lack of commitment can have a sizeable negative impact on investment.

In India, the positive effect of EPU on investment is unexpected and contradicts most existing research on the relationship between investment and EPU. It is worth noting, however, that this result is in line with the finding in Aggarwal & Saradhi (2022) that EPU increases

prices on the Indian stock market. Soni et al. (2023) document a positive effect of lagged EPU on investment by Indian hospitality firms. The results for India support the growth option channel.

Our findings indicate that EPU, as measured by EPUI, can have a positive or negative effect on investment. It may depend on the nature or type of uncertainty involved. EPUI responds to information regarding government decisions and potential future developments. Investors utilize this information to anticipate government decisions. However, when these signals become excessively volatile or unreliable, investors may become less responsive to the information (Pástor & Veronesi, 2017) or exhibit exaggerated reactions (Meinen & Roehe, 2017).

An increase in EPUI, which is a news index, does not necessarily imply an unfavorable, negative form of uncertainty. Rather, it indicates that newspapers extensively cover economic matters, including economic uncertainty, prospects, and potential challenges. According to Segal et al. (2015), there are "good" and "bad" uncertainties in the market. The EPU in India during the last decade could be characterized as a form of "good" EPU. In this scenario, EPU may present investment opportunities for exploitation by rational investors, and the negative impact typically associated with uncertainty can be rationalized. The opposite case applies in Brazil, where the political environment was unstable and turbulent, increasing apprehension and shaking confidence in the potential of reform efforts.

5.2 Cross-sectional heterogeneity

Following Kang et al. (2014), we split our sample by firms' leverage and then by firms' size to test our second and third hypotheses. We ran M(1) and M(2) for all subsamples in both countries. The estimation results are displayed in Tables 4 and 5 for Brazil and India, respectively.

Table 4 shows a heterogeneous investment response in Brazilian firms to increased uncertainty, depending mainly on firm size. The negative sensitivity of investment to EPU is significant for the smaller firms, suggesting that smaller Brazilian firms decrease their investments sharply and significantly when facing increased EPU. This result is in line with the findings of Drobetz et al. (2018) and Jens (2017). It also confirms the results of Kang et al. (2014) on US manufacturing firms and Duchin et al. (2010) for US firms after the 2007–2009 crisis, supporting our second hypothesis. This may be explained by the rising cost of financing for small firms over the last decade; they are more vulnerable and have been severely impacted by the increased cost of debt due to increased uncertainty.[10] This finding confirms the financing channel and supports the idea that smaller firms have less access to financing and are forced to decrease their investment; this result confirms the findings of Drobetz et al. (2018) and Jens (2017). Finally, it seems that leverage does not significantly affect the EPU investment

[10] IEDI. (2018) https://www.iedi.org.br/artigos/imprensa/2018/iedi_na_imprensa_20181228_pequena_empresa_tera_dificil_acesso_ao_credito_e_juros_altos.html (translated from Portuguese). Accessed on February 15, 2023.

relationship in Brazil. This result contradicts the findings of Suh & Yang (2021) and Li et al. (2015), who find that indebted companies usually reduce their investments more significantly.

Table 4: EPU and firm investment: size and leverage effects in Brazil

	Brazil							
	Small		**Large**		**High**		**Low**	
	M(1)	M(2)	M(1)	M(2)	M(1)	M(2)	M(1)	M(2)
$LEPU_{i,t-1}$	-0.019***	-0.017***	-0.011*	-0.002	-0.014***	-0.011*	-0.015***	-0.006
	(0.005)	(0.006)	(0.006)	(0.008)	(0.005)	(0.006)	(0.004)	(0.008)
$Q_{i,t-1}$	0.008	0.007	-0,000008.	0.000013	0.000006	0.000006	0.008*	0.008*
	(0.005)	(0.005)	(0.00002)	(0.000023)	(0.00002)	(0.00002)	(0.005)	(0.005)
$CF_{i,t}$	0.136**	0.135**	0.083**	0.083**	0.021	0.02	0.224***	0.225***
	(0.063)	(0.063)	(0.04)	(0.04)	(0.022)	(0.022)	(0.078)	(0.078)
$Size_{i,t-1}$	-0.035**	-0.033**	-0.026***	-0.027***	-0.015*	-0.015*	-0.035***	-0.035***
	(0.016)	(0.015)	(0.009)	(0.01)	(0.008)	(0.008)	(0.011)	(0.011)
$BLDLT_{i,t-1}$	-0.032	-0.027	-0.052	-0.049	-0.069***	-0.064***	-0.048*	-0.044*
	(0.028)	(0.028)	(0.032)	(0.032)	(0.024)	(0.024)	(0.027)	(0.026)
$BLST_{i,t-1}$	0.002	0.004	-0.034	-0.029	-0.034	-0.03	-0.022	-0.02
	(0.039)	(0.039)	(0.047)	(0.047)	(0.033)	(0.033)	(0.054)	(0.054)
$GDP_{i,t-1}$		-0.0002		0.002*		0.0003		0.002
		(0.001)		(0.001)		(0.001)		(0.001)
$INF_{i,t-1}$		-0.003**		0.001		-0.001		0.0003
		(0.001)		(0.001)		(0.001)		(0.002)
Constant	0.251***	0.256***	0.305***	0.302***	0.201***	0.203***	0.291***	0.288***
	(0.086)	(0.086)	(0.086)	(0.085)	(0.068)	(0.067)	(0.071)	(0.07)
Observations	621	621	693	693	663	663	651	651
R-squared	0.4571	0.4617	0.5505	0.5544	0.5570	0.5585	0.5066	0.5097
Adj R squared	0.3790	0.3820	0.4876	0.4903	0.4926	0.4926	0.4384	0,4399

Notes: This table shows the estimation results for Brazil from regressing investment on EPU, Tobin's Q, cash flows (CF), size, long-term (BLDLT), and short-term (BLST) leverage. First without macro variables then adding GDP and INF. We split according to size: small firms with size below the median and large firms with size above the median. Then we split the sample for each country according to total book leverage: high are firms with leverage above the median and low are firms with leverage below the median. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 shows that in India, unlike Brazil, highly leveraged and large firms respond more aggressively to EPU intensification and increase their investment levels. When uncertainty becomes an opportunity, larger firms will quickly seize it. One explanation might be that larger firms in India are mainly family firms (Chakraborty, 2010) that are powerful and more likely to benefit from increased investment opportunities. They have close relationships with politicians and might benefit from low financing costs and high internal financing (Gopalan et al., 2007). Highly leveraged firms might also be young firms with many investment opportunities. According to Bajaj et al. (2021), Indian firms with good growth prospects increase their leverage when EPU increases, stressing that group-affiliated firms in India have better access to finance, and EPU has a stronger positive effect on leverage. These results are not discussed further since, to our knowledge, this is the first study to find that EPU positively impacts investment.

Table 5: EPU and firm investment: size and leverage effects in India

	India							
	Small		**Large**		**High**		**Low**	
	M(1)	M(2)	M(1)	M(2)	M(1)	M(2)	M(1)	M(2)
$LEPU_{i,t-1}$	0.003	0.001	0.015***	0.036***	0.009*	0.03***	0.015***	0.013
	(0.005)	(0.009)	(0.005)	(0.009)	(0.005)	(0.01)	(0.004)	(0.008)
$Q_{i,t-1}$	0.002	0.002	0.007*	0.007	0.013**	0.013**	0.003	0.003
	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)	(0.005)	(0.002)	(0.002)
$CF_{i,t-1}$	0.06*	0.061*	0.073***	0.073***	0.151***	0.151***	0.034*	0.036**
	(0.035)	(0.035)	(0.019)	(0.017)	(0.053)	(0.053)	(0.018)	(0.018)
$Size_{i,t-1}$	-0.041***	-0.038***	-0.068***	-0.068***	-0.081***	-0.082***	-0.036***	-0.032***
	(0.01)	(0.01)	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)
$BLDLT_{i,t-1}$	-0.105***	-0.114***	-0.155***	-0.156***	-0.195***	-0.197***	-0.093***	-0.103***
	(0.034)	(0.034)	(0.032)	(0.031)	(0.035)	(0.035)	(0.029)	(0.03)
$BLST_{i,t-1}$	-0.091***	-0.093***	-0.115***	-0.112***	-0.186***	-0.186***	-0.018	-0.022
	(0.025)	(0.024)	(0.031)	(0.03)	(0.031)	(0.031)	(0.024)	(0.023)
$GDP_{i,t-1}$		0.002		0.008***		0.008***		0.002
		(0.002)		(0.002)		(0.002)		(0.002)
$INF_{i,t-1}$		0.002**		0.002***		0.002**		0.003***
		(0.001)		(0.001)		(0.001)		(0.001)
Constant	0.43***	0.376***	0.851***	0.783***	0.96***	0.905***	0.397***	0.316***
	(0.082)	(0.085)	(0.082)	(0.088)	(0.08)	(0.083)	(0.067)	(0.07)
Observations	3315	3315	3405	3405	3290	3290	3430	3430
R-squared	0.2878	0.2920	0.3804	0.3955	0.3716	0.3821	0.3218	0,3311
Adj R squared	0.1953	0.1994	0.3000	0.3166	0.2882	.2997	0,2356	0.2455

Notes: This table shows the estimation results for India from regressing investment on EPU, Tobin's Q, cash flows (CF), size, long-term (BLDLT), and short-term (BLST) leverage. First without macro variables then adding GDP and INF. We split according to size: small firms with size below the median and large firms with size above the median. Then we split the sample for each country according to total book leverage: high are firms with leverage above the median and low are firms with leverage below the median. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.3 Robustness tests

We assess the robustness of our results by conducting several additional regression analyses. The estimation results are presented in Tables 6 and 7 for Brazil and India, respectively.

First, we use alternative EPU measures, the average EPU (AEPU) (M(4)) and the natural logarithm of a weighted average EPU: LEPUP= L($\frac{\sum_1^4 T*EPU_T}{10}$) with EPU_T average EPU of quarter T (M(5)), following Schwarz & Dalmácio (2020).

Table 6: Robustness tests results for Brazil

	Brazil						
	M(4)	**M(5)**	**M(6)**	**M(7)**	**M(8)**	**M(9)**	**M(10)**
$INV_{i,t-1}$							0.051
							(0.133)
$LEPU_{i,t-1}$				-0.01**	-0.167**	-0.024***	-0.012*
				(0.005)	(0.073)	(0.005)	(0.006)
$AEPU_{i,t-1}$	-0.004*						
	(0.002)						
$LEPUP_{i,t-1}$		-0.01**					
		(0.005)					
$LCEPU_{i,t-1}$			-0.007**				
			(0.003)				
$Q_{i,t-1}$	0.000003	-0.000004	-0.000004	-0.000004	-0.001*	-0.00003	0.011**
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.001)	(0.00004)	(0.005)
$CF_{i,t}$	0.113***	0.114***	0.115***	0.114***	-0.247	0.107***	0.08***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.39)	(0.016)	(0.021)
$Size_{i,t-1}$	-0.028***	-0.027***	-0.028***	-0.027***	-0.312***	0.001	0.015
	(0.008)	(0.008)	(0.008)	(0.008)	(0.113)	(0.001)	(0.011)
$BLDLT_{i,t-1}$	-0.034	-0.034	-0.035	-0.034	-0.389	0.015	-0.057
	(0.022)	(0.022)	(0.022)	(0.022)	(0.308)	(0.015)	(0.059)
$BLST_{i,t-1}$	-0.009	-0.009	-0.011	-0.009	0.532	-0.027**	0.025
	(0.03)	(0.03)	(0.029)	(0.03)	(0.425)	(0.013)	(0.038)

$GDP_{i,t-1}$	0.001	0.001	0.001**		-0.028**	0.0001	0.004***
	(0.001)	(0.001)	(0.001)		(0.013)	(0.001)	(0.001)
$INF_{i,t-1}$	-0.001	-0.001	-0.001	-0.001	-0.05***	-0.002**	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.015)	(0.001)	(0.001)
$FGDP_{i,t-1}$				0.001			
				(0.001)			
Constant	0.272***	0.26***	0.274***	0.266***	3.873***	0.062***	-0.097
	(0.054)	(0.056)	(0.054)	(0.056)	(0.88)	(0.011)	(0.075)
Observations	1314	1314	1314	1314	1314	1314	1161
R-squared	0.5038	0.5041	0.5040	0.5041	0.2025	0.131	
Adj R squared	0.4349	0.4353	0.4351	0.4353	0.0918		

Notes: This table reports the robustness test estimation results for Brazil from regressing investment on EPU, Tobin's Q, cash flows (CF), size, long-term (BLDLT), and short-term (BLST) leverage. M(4) AEPU is the average EPU, M(5) LEPUP is the natural logarithm of a weighted average EPU, M(6) EPU of China (LCEPU), M(7) FGDP is the forecasted GDP from the World Economic Outlook. INV_{t-1} is the lagged investment and regression M(10) is a GMM model. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Then, we address endogeneity concerns since EPUI could reflect economic uncertainty not driven by policy uncertainty but that might impact investment. EPUI is not completely exogenous and may be affected by other domestic factors related to firm behavior or characteristics. Following Gulen & Ion (2016) and Wang et al. (2014), we use Chinese LEPU (LCEPU; M(6)) as these economies are highly linked. There is intensive trade activity between BRICS countries, and many of the shocks that affect China will impact the others in the group as it is the strongest economy among them. The rationale behind that is that since economic and trade relationships are important between the two countries, then the shocks affecting the general economic uncertainty in one country will also affect the other country. The findings in Column 3 show the same significant effect and sign, although with less sensitivity.

Table 7: Robustness test results for India

	India						
	M(4)	**M(5)**	**M(6)**	**M(7)**	**M(8)**	**M(9)**	**M(10)**
$INV_{i,t-1}$							0.186*
							(0.1)
$LEPU_{i,t-1}$				0.021***	0.261**	0.027***	0.131***
				(0.006)	(0.126)	(0.006)	(0.049)
$AEPU_{i,t-1}$	0.012**						
	(0.005)						
$LEPUP_{i,t-1}$		0.021***					
		(0.005)					
$LCEPU_{i,t-1}$			0.007**				

			(0.003)				
$Q_{i,t-1}$	0.004*	0.004*	0.004**	0.004*	0.009	0.002***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.009)	(0.001)	(0.002)
$CF_{i,t}$	0.062**	0.062**	0.063**	0.062**	0.32	0.077***	0.032
	(0.028)	(0.027)	(0.028)	(0.027)	(0.268)	(0.012)	(0.026)
$Size_{i,t-1}$	-0.056***	-0.055***	-0.054***	-0.056***	-0.409***	-0.001	0.006
	(0.007)	(0.007)	(0.007)	(0.007)	(0.115)	(0.001)	(0.012)
$BLDLT_{i,t-1}$	-0.14***	-0.14***	-0.144***	-0.14***	-0.394	0.002	0.444***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.331)	(0.016)	(0.146)
$BLST_{i,t-1}$	-0.101***	-0.102***	-0.099***	-0.101***	-0.584*	-0.058***	-0.088***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.353)	(0.009)	(0.028)
$GDP_{i,t-1}$	0.004***	0.005***	0.003***		0.053**	0.004***	0.046**
	(0.001)	(0.001)	(0.001)		(0.023)	(0.001)	(0.019)
$INF_{i,t-1}$	0.003***	0.003***	0.005***	0.002***	-0.032*	0.003***	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.019)	(0.001)	(0.001)
$FGDP_{i,t-1}$				0.005***			
				(0.001)			
Constant	0.574***	0.582***	0.565***	0.58***	5.163***	0.038***	-0.347*
	(0.064)	(0.065)	(0.064)	(0.064)	(1.066)	(0.012)	(0.193)
Observations	6720	6720	6720	6720	6720	6720	5991
R-squared	0.3473	0.3482	0.3470	0.3481	0.1325	0.053	
Adj R squared	0.2630	0.2640	0.2626	0.2639	0.0203		

Notes: This table reports the robustness tests estimation results for India from regressing investment on EPU, Tobin's Q, cash flows (CF), size, long term (BLDLT), and short-term (BLST) leverage. M(4) AEPU is the average EPU, M(5) LEPUP is the natural logarithm of a weighted average EPU, M(6) EPU of China (LCEPU), M(7) FGDP is the forecasted GDP from the World Economic Outlook. INV_{t-1} is the lagged investment and regression M(10) is a GMM model. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In M(7), we use forecast GDP instead of GDP and source this from the World Economic Outlook as it might better reflect the investment opportunities on which investors rely. In M(8), we use an alternative measure of investment, property, plant, and equipment net (PPENT) growth: $PPENT_t / PPENT_{t-1}$.

In Models M(9) and M(10) we use alternative regression methods. In M(9), we run a panel-corrected standard error regression (PCSE) to account for heteroskedasticity and autocorrelation. Finally, M(10) is a GMM regression. The conclusions remain unchanged through the different regressions.

6 Conclusion

Increasing EPU became a major issue following the 2008–2009 global financial crisis, highlighting the structural weaknesses within emerging economies. This study explored the relationship between EPU (as measured by the EPU index) and investment in two emerging BRICS countries, Brazil and India, between 2008 and 2018. The existing empirical literature on political uncertainty is unanimous in underlining the negative effect of EPU on investment. Our results show that higher uncertainty is associated with lower investment in Brazil, but the opposite outcome is seen in India. Moreover, the negative effect is stronger for more vulnerable firms, which, in Brazil, are the smaller firms; this result supports the financing channel. The positive impact of uncertainty on investment in India might be explained by the growth option theory. This positive effect benefits more to larger companies and highly leveraged firms that take the opportunity to increase their cash flows.

Previous research shows that when politicians make decisions, investors listen and react. Companies hesitate to invest when decisions regarding future financial or macroeconomic regulations are unclear or unpredictable. Our study reveals that this reaction varies across countries. Suh & Yang (2021) observe that the response of investments to uncertainty differs when using economic indicators of uncertainty or the EPUI. They explain that the index based on information depends on reader interpretations. Our study highlights the significant relationship between the political situation and firm reactions to increased EPU. The EPUI reflects concerns about a country's economic policy, which lead to uncertainty. Our results show that when decisions are made by governments in a politically stable environment, as in India, these decisions are understood and positively interpreted by firms, resulting in increased investments even if the EPU increases. However, when reforms are undertaken in a situation of political turmoil, as in the Brazilian case, investors are uncertain about whether governments have the means to implement the reforms or will last long enough to do so. Regardless of the merit of these changes, they lead to an increase in uncertainty and a decrease in investments.

To the best of our knowledge, we are the first to assert that this positive relationship between investment and EPU is specific to India. Our result is significant as it sheds light on a new aspect of the impact of the EPU on investment. While previous studies have focused on the need to reduce uncertainty, our study demonstrates the importance of ensuring a healthy political climate to reassure investors. This finding underscores the importance of considering economic factors and political stability when analyzing the relationship between uncertainty and investment. Policymakers can foster investor confidence and promote increased investment by creating a favorable political environment.

The results here are important because they shed light on the nature of economic uncertainty. Our study contributes to the expanding literature on EPU and introduces a novel finding that enriches the existing body of knowledge in the field. Our results hold significance for managers and policymakers. Since the focus was on a relatively normal period, future research could consider an extended period and the effect of different crises, such as the global financial crisis, Covid-19, and Russia's war in Ukraine, on the EPU–investment relationship.

Abbreviations:

B3: Brazil Bolsa Balcaõ

BRICS: Brazil, Russia, India, China, and South Africa

BSE: Bombay stock exchange

EPU: Economic Policy Uncertainty

EPUI: Economic Policy Uncertainty Index

FOMC: Federal Open Market Committee

IMF: International Monetary Fund

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