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Effects of Economic Policy Uncertainty on the Cash Level of Brazilian Companies

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Abstract

Objective: To investigate the effects of economic policy uncertainty on the cash and financial slack of publicly traded companies listed in the Brazilian stock market.

Method: The uncertainty measures Economic Policy Uncertainty Index (EPU) and the Brazilian Economic Uncertainty Indicator (IIEBr) were adopted in addition to cash holdings and cash equivalents and financial slack to make estimations using the quarterly data (from 2010 to 2020) of 152 companies listed on B3 using the GMM-System, the application of which can mitigate endogeneity problems.

Results: In general, evidence was found that economic policy uncertainty is positively related to the companies' cash level, suggesting that companies withhold more cash when uncertainty increases. Additional analyses suggest that economic policy uncertainty also influences future cash levels. The results also indicate that, compared to the EPU, more pronounced and consistent results were obtained when the IIEBr was used, regardless of the different calculation methods.

Contributions: This study's results have implications for the literature and companies as it presents the role of cash reserves among Brazilian companies in mitigating the adverse effects of economic policy uncertainty.

Keywords: Cash Policy; Financial Slack; Economic Policy Uncertainty.

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1. Introduction

The environment in which companies operate is dynamic and shaped by different political decisions and regulatory institutions. Therefore, changes in economic policy are expected to affect the economic environment of organizations, leading to resources and policies often impossible to sustain, which might increase the risk of corporate investments and operations (Cheng & Geng, 2021). Hence, given the uncertainty of future government policies and their potential effects on the companies' financial decisions, organizations and the market need to understand how this relationship occurs (Demir & Ersan, 2017).

Corporate liquidity management, or corporate cash policy, is fundamental for a company's financial flexibility (Cheng, Huang, & Li, 2020). The reason is that companies often strategically decide to delay or reduce investments until uncertainty related to a given regulation or macroeconomic policy is resolved (Julio & Yook, 2012; Cheng & Geng, 2021). Additionally, economic policy uncertainty might affect cash holdings in different ways, such as decreasing asset returns and increasing the cost of external financing, which may increase the companies' financial constraints and the need to hold cash to buffer financial shocks; giving them the flexibility to explore opportunities of future profitable investments – by holding cash, considering uncertainty may be temporary; or increasing managerial conservatism, leading managers to hold more cash, which is the most liquid asset (Phan, Nguyen, Nguyen, & Hedge, 2019).

In any case, the analysis of the companies' cash policy based on cash holdings does not necessarily express the companies' real financial slack. The reason is that the cash available may be insufficient to meet the companies' working capital investment needs, not generating excess resources (Shaikh, O'Brien, & Peters, 2018). Hence, to capture the resource that can be useful for companies, the analysis of a company's financial slack enables verifying the availability of cash to assume potential risks in times of uncertainty (Wiengarten, Fan, Lo, & Pagell, 2017). Nonetheless, it is worth noting that, if on the one hand, excess resources can mitigate contingencies in times of uncertainty, on the other hand, it may indicate inefficient investment projects that do not generate value for shareholders (Picolo, Dal Magro, Silva, & Bernardo, 2018).

Economic policy uncertainty is mainly caused by governmental interventions concerning taxes, government spending, and monetary and regulatory policies (Bonaime, Gulen, & Ion, 2018). Perceptions of its magnitude in the environment can be captured by the Economic Policy Uncertainty (EPU) index, which was proposed by Baker, Bloom, and Davis (2016) and is available for various countries. Another index, the Brazilian Economic Uncertainty Index (IIE-Br), was developed by Getulio Vargas Foundation's Brazilian Institute of Economics (IBRE-FGV) (Ferreira, Vieira, Silva, & Oliveira, 2019), precisely to measure uncertainty in the Brazilian economic environment.

The Brazilian context is favorable for the analysis of economic policy uncertainty because it has been part of the country's everyday life since the 2014 presidential elections, which is confirmed by the indexes' high volatility (Barboza & Zilberman, 2018; Schwarz & Dalmácio, 2020). Additionally, Brazil's uncertainty indexes are among the highest worldwide and are more resistant to decline (Gouveia, 2021). These factors motivate a specific investigation of the Brazilian uncertainty context and its effect on the companies' financial decisions.

In a context where there is a possibility of the firms' cash being allocated based on economic policy, the following question guides this study: **What are the effects of economic policy uncertainty on the cash level and financial slack of companies in the Brazilian context?** Therefore, this study's objective is to investigate the effects of economic policy uncertainty on the cash level and financial slack of companies publicly traded listed in the Brazilian stock market.

The structure proposed for this investigation differentiates this study from others analyzing the Brazilian context (Demir & Esran, 2017) because it focuses on the immediate availability of cash and on alternative uncertainty metrics, which ensures greater robustness of inferences, in addition to modeling the endogenous problem inherent to economic and financial data (Barros et al., 2020), not considered by the remaining studies.

This study has the potential to show the role cash reserves play in Brazilian companies in mitigating the adverse effect of economic policy uncertainty. Additionally, there may be a relationship between available cash and uncertainty not as a manifestation of delayed investments. Hence, other specific information about firms and the macroeconomic environment is analyzed (Duong *et al.,* 2020). A better understanding of the companies' cash policy and its influence can also improve knowledge regarding the companies' value, corporate investments, financing options, profitability, risk, and economic growth (Cruz, Kimura, & Sobreiro, 2019).

The analysis of financial slack can also support managers regarding the most appropriate equity and financial structure for a given uncertain context. Additionally, the application of the System GMM estimator to verify the relationship between cash level and uncertainty guides future studies to use this method, which is more appropriate, considering the dynamic/recursive behavior of financial variables that typically cause endogeneity problems, discussed in many of the existing studies.

2. Theoretical Framework

2.1 Theories regarding Firms' Cash Policy

Many studies investigate the behavior of firms when dealing with the resources composing cash reserves. According to Keynesian economics and based on the liquidity preference theory, there are three motives to retain cash: transactional, speculative, and precautionary (Keynes, 1936). The transactional motive assumes that economic agents need to have sufficient cash reserves to cover daily expenses; the speculative motive considers that companies need to have the cash to seize potential business opportunities; and the precautionary considers that cash is supposed to cover unpredictable future cash flows, ensuring the company will be able to cover unexpected disbursements. In addition to these three motives, Bates, Kahle, and Stulz (2009) note that the theory and evidence suggest four motives: transactional, precautionary, taxes, and agency. Regarding taxes, the authors note that the motivation is to alleviate the tax burden of the repatriation of interregional operations and the motive behind the agency is related to a preference to keep cash instead of paying more dividends to shareholders.

Other theories can be considered in the current scenario of modern finance theory to explain corporate cash holdings: Static Trade-off Theory – STT (Myers, 1984), Pecking Order Theory – POT (Myers, 1984; Myers & Majluf, 1984); Agency Theory (Jensen & Meckling, 1976), and Free Cash-Flow (Jensen, 1986).

From the perspective of cash liquidity, the Static Trade-off Theory (STT) proposes that companies must keep an ideal or target level of cash, considering the cost of cash shortages and the opportunity to hold these liquid assets (Hu, Li, & Zeng, 2019).

Opposed to the STT, the Pecking Order Theory (POT) establishes that there would be a hierarchal order of preference for financing resources, in which companies would prioritize internal sources by holding cash, and later, use external funding through debt and, finally, increase capital by issuing new shares (Myers, 1984; Myers & Majluf, 1984).

The Agency Theory, proposed by Jensen and Meckling (1976), addresses the existing relationship regarding conflict of interests between the companies' economic agents: capital holders are represented by the principal figure, and the agent figure represents managers. Therefore, the Agency Theory emphasizes that managers may withhold cash to achieve personal benefits (Jensen & Meckling, 1976). Managers are risk-averse because lack of cash may destabilize their well-being; thus, they keep high levels of cash motivated by precaution (Opler, Pinkowitz, Stulz, & Williamson, 1999).

The Free Cash-Flow Theory proposed by Jensen (1986) proposes the notion that managers have an incentive to increase the firms' cash holdings to increase their discretionary power in decision-making. Therefore, this approach suggests that shareholders may try to decrease the managers' access to available cash, seeking to decrease agency conflicts.

There are studies addressing firms' cash policy determinants based on the theoretical frameworks on corporate decisions to keep cash reserves. For example, in one seminal paper, Opler *et al.* (1999) examined the determinants of cash reserves in the US market and found evidence that those companies with more growth opportunities or risky activities, or yet small companies, withhold higher cash levels. Hence, the authors note that managers tend to accumulate more cash if they have the opportunity, attributing this behavior to precautionary reasons since withholding cash can decrease a company's risk and increase its manager's discretion (Opler *et al.*, 1999).

More recently, Cruz, Kimura, and Sobreiro (2019) analyzed the literature addressing cash holdings, reporting that the determinants of cash levels are investigated, and the studies usually analyze variations and the factors driving the recent and persistent increase in the firms' cash levels; the companies' characteristics to explain this corporate behavior; and other factors like financial crisis, creditor rights, cultural factors, and governmental aspects, among others. Additionally, the firms' cash levels have also been considered an antecedent of other corporate decisions, such as level of investments, social responsibility, acquisitions, share repurchase, and payment policies (Cruz, Kimura, & Sobreiro, 2019).

In this context, based on an analysis of corporate cash policy, this study fits into the literature that addresses the determinants of cash levels and the relationship between the companies' cash levels and economic policy uncertainty at the country level.

2.2 Economic Policy Uncertainty and Cash Policy

Economic policy uncertainty is related to the inability of those participating in the market to accurately foresee when, how, and whether the government will change its economic policy, in addition to monetary and fiscal policies (Gulen & Ion, 2016; Li, 2021). Changes in the economic policy generally intend to prevent economic recession arising from external shocks, like financial crises, for instance (Bloom, 2009). Hence, during a recession, economic policy uncertainty may increase considerably, considering that policymakers attempt to stabilize the economy and support growth, while times of economic expansion do not seem to require many adjustments or economic interventions (Pástor & Veronesi, 2013).

Nonetheless, economic policy uncertainty is an intrinsically unobservable concept that cannot be directly measured (Solarin & Gil-Alana, 2021). However, significant advancements have been achieved in measuring economic policy uncertainty primarily based on textual analysis (Kaya, 2018). Therefore, this study is restricted to two measures: the Economic Policy Uncertainty Index (EPU) and the Brazilian Economic Uncertainty Index (IIEBr).

First, the EPU was developed by Baker, Bloom, and Davis (2016) to analyze the US market by verifying the frequency of economic uncertainty-related terms in the top ten newspapers in the country. Hence, this index was created to capture the news coverage of economic policy uncertainty, tax code provisions to expire in the future and disagreements between economic analysts as a measure of uncertainty in the United States.

The EPU robustness was evidenced after compared with other political and economic uncertainty metrics. This index presented similarities when compared between right- and left-wing newspapers, validating its use in the market and the terms composing this metric (Baker, Bloom, & Davis, 2016).

Besides creating the index for the US context, the authors extended it to other three dimensions: past measure, measure between countries, and measure for specific political categories (Baker, Bloom, & Davis, 2016). Hence, using the same method, the index of other 25 countries was calculated, including Brazil and a global index. Brazil's economic policy uncertainty index is available from 1991 to the present and is based on the frequency of terms that appear in the *Folha de São Paulo* newspaper.

Ferreira *et al.* (2019) created another metric for the Brazilian context, the IIEBr with series available since 2000, expanding the number of newspapers adopted by Baker, Bloom, and Davis (2016). Note the importance of expanding media sources, proposed by IIEBr, to minimize bias, emphases, and perspectives, considering that using a single source may lead to biases that depend on the perspective adopted (Schymura, 2019). The IIEBr uses two components, media uncertainty and uncertainty arising from disagreements between analysts. The uncertainty captured in the media comes from six of the largest newspapers circulating in Brazil (*Valor Econômico, Folha de São Paulo, Correio Braziliense, Estadão, O Globo,* and *Zero Hora*). Disagreements concerning predictions refer to the Selic interest rate, IPCA Index [Broad National Consumer Price Index], and exchange rates. This indicator is considered efficient to capture recent events in the Brazilian context, such as corruption scandals, fiscal and economic crisis, and the impeachment of the former president in 2016, among others (Ferreira *et al.*, 2019).

In this conjuncture of crises and uncertainty regarding political and economic prospects, companies may withhold higher cash levels to buffer against potential losses or harmful prospects (Demir & Ersan, 2017; Cheng & Geng, 2021). Some studies tested this hypothesis empirically, for instance, Xu, Chen, Xu, and Chan (2016), Demir and Ersan (2017); Feng, Lo and Chan (2019), Li (2019); Phan *et al.* (2019), and Duong *et al.* (2020).

In analyzing Chinese companies, Xu *et al.* (2016) used political uncertainty, created by political turnover in the municipality where the companies were located, to analyze the relationship of this factor with the companies' cash levels between 1998 and 2014. The results indicated that the companies withheld more cash during the first year of a new politician in the municipality, i.e., a period of more significant uncertainty.

Demir and Ersan (2017) used the EPU proposed by Baker *et al.* (2016) as a proxy to examine the effect of uncertainty in decisions concerning cash holdings among the companies in BRIC countries (Brazil, Russia, India, and China) between 2006 and 2015. The analysis showed a positive relationship with cash holdings per country and the aggregate result for all the countries. Moreover, for the specific result in Brazil, the study verified that, according to the EPU, Brazilian companies are those with the lowest cash adjustment (Demir & Ersan, 2017). Note, however, that this study differs from Demir and Ersan (2017), as it advances in testing alternative proxies for the uncertainty variable, including the economic uncertainty element. Another factor is that here we sought to understand the effect of financial slack on Brazilian companies, while this is the only study known to date to verify this relationship considering the immediate availability of cash.

Feng, Lo, and Chan (2019) investigated Chinese companies from 2003 to 2015 and verified that the companies increased their cash reserves in times of economic policy uncertainty, using cash holdings as a safety net (Feng, Lo, & Chan, 2019). Additionally, according to the EPU, the study confirms that the companies increasing their cash reserves when in the face of increased uncertainty were considered more valuable companies.

Duong *et al.* (2020) addressed a sample in the United States between 1985 and 2014 to analyze whether the companies increased cash holdings in response to greater economic policy uncertainty. They used the EPU and also the firms' political connections. The results showed strong positive associations between economic policy uncertainty and corporate liquidity, which was even more pronounced among companies that highly depended on the government, whose main client was the government, which were highly exposed to political risk, or whose returns were susceptible to changes caused by uncertainty (Duong *et al.* 2020). Based on these discussions, the following hypothesis is proposed:

H_1: There is a positive relationship between economic policy uncertainty and present and future cash policy of companies listed in the Brazilian stock market.

In this context, one of the implications of this relationship for the Brazilian business context is a potential impetus of an economic recession. Generalized decisions of Brazilian companies to withhold cash in a time of uncertainty restrict the application of such resources in more profitable assets (in the long-term). It may stagnate the companies' growth, restrict economies of scale, and harm the supply of goods. In the specific Brazilian context, the recession caused by this relationship is intensified because Brazil has endured negative accumulations of net investment in capital stock (Souza Jr & Cornélio, 2020). That is, aggregate investment levels are insufficient to replace the depreciation of the productive structure, and the country is no longer able to accumulate capital stock.

Cash holdings may also emerge from decreasing costs arising from cuts in the productive structure and layoffs, which may generate a slowdown on the demand side, increasing unemployment, which is already a severe problem in Brazil.

Specifically for the Brazilian capital market, there are no studies addressing how the EPU influences the companies' cash levels, nor studies using the IIEBr for this type of investigation. Therefore, this study is expected to contribute to the literature, showing the relationship between the EPU and corporate cash policy, improving current knowledge regarding the Brazilian capital market in times of economic policy uncertainty.

3. Methodological Considerations

3.1 Sample and data source

After applying a few criteria, the final sample comprised 152 publicly traded companies listed on B3. Hence, financial companies were excluded due to the particularities inherent to the sector, which would affect the measurements of this study's variables. Companies with negative equity or missing data were also excluded. Quarterly data concerning 2010 (when international accounting standards became mandatory and affected the structure of financial statements) up to September 2020 (last quarter with data available at the time of data collection) were collected from the companies in the final sample.

Financial information was collected from the following databases: Economatica© (economatica.com) and Comdinheiro© (comdinheiro.com.br). In addition, data concerning uncertainty concerning both the EPU and IIEBr were collected from the Economic Policy Uncertainty website (policyuncertainty.com). Information was also collected from the Brazilian Institute of Geography and Statistics (IBGE – ibge.gov.br) website.

3.2 Measurement of variables, model, and econometric procedures

According to previous literature, cash level and cash equivalents deflated by each company's total assets were used (Equation 1) to represent the companies' cash policy (Xu *et al.*, 2016; Demir & Ersan, 2017; Feng, Lo & Chan, 2019; Li, 2019; Phan *et al.*, 2019; Duong *et al.*, 2020). An alternative that was used to capture corporate cash policy was the companies' financial slack, acknowledging that cash level and equivalents may not represent the effective availability of cash in times of uncertainty (Wiengarten *et al.*, 2017; Shaikh, O'Brien, & Peters, 2018). For this reason, we used the difference between current financial assets and current financial liabilities deflated by total assets (Equation 2), called by the Fleuriet© Model of "treasury balance" (Fleuriet, 2021).

$$CaixaEq_{i,t} = {Cash\ and\ Cash\ Equivalents_{i,t}}/{Total\ Assets_{i,t}} \quad (1)$$

$$FolgaFin_{i,t} = {(Financial\ Current\ Assets - Financial\ Current\ Liabilities)}/{Total\ Assets_{i,t}} \quad (2)$$

The proxies from the Economic Policy Uncertainty Index (EPU) and Brazilian Economy Uncertainty Index (IIEBr) were used for the variables of economic policy uncertainty. Since both measures of economic policy uncertainty concern monthly data and this study consists of quarterly periods, the variables were tested in three different manners found in the literature, all on a logarithmic basis (Demir & Ersan, 2017; Nguyen & Phan, 2017; Feng, Lo & Chan, 2019; Li, 2019; Phan *et al.*, 2019; Duong *et al.*, 2020). The first concerns the score of the last month of each quarter (*tEPU* or *tIIE*) (Equation 3.1). The second concerns the average of the monthly indexes over each quarter (*mEPU* or *mIIE*) (Equation 3.2). Finally, the third refers to a weighted average, in which the value of the most recent month has a greater weight (*wEPU* or *wIIE*) (Equation 3.3).

$$tIncerteza_t = \ln EPU_m \quad or \quad \ln IIEBr_m \quad (3.1)$$

$$mIncerteza_t = \ln\left({\sum_{m=1}^{3} EPU_m}/{3}\right) \quad or \quad \ln\left({\sum_{m=1}^{3} IIEBr_m}/{3}\right) \quad (3.2)$$

$$wIncerteza_t = \ln\left({3.EPU_m + 2.EPU_{m-1} + EPU_{m-2}}/{6}\right) \quad or \quad \ln\left({3.IIEBr_m + 2.IIEBr_{m-1} + IIEBr_{m-2}}/{6}\right) \quad (3.3)$$

According to the literature, we identified and used determinants of corporate cash holdings, applied as control variables (Xu *et al.*, 2016; Demir & Ersan, 2017; Feng, Lo & Chan, 2019; Li, 2019; Phan *et al.*, 2019; Duong *et al.*, 2020). These control variables and their specification and operationalization are presented in Figure 1.

Variable	Description	Operationalization	Previous Evidence
Tam	Company size	Logarithmic transformation of total assets	Xu, Chen, Xu, and Chan (2016); Demir and Ersan (2017); Feng, Lo and Chan (2019); Li (2019); Phan, Nguyen, Nguyen, and Hegde (2019); Duong, Nguyen, Nguyen, and Rhee (2020)
MTB	Market-to-book	Ratio between market value and book value of equity	
FC	Cash flow	Earnings after interest, dividends, and taxes, but before depreciation, deflated by total assets	
CGL	Net Working Capital	Net working capital of net assets, deflated by total assets	
DC	Capital Expenses	Capital investment, deflated by total assets	
Alav	Leverage	Proportion of total debt (long-term and short-term debt), deflated by total assets	
Divid	Payment of Dividends	Dummy variable that indicates whether a company pays dividends in a given year	
ΔRec	Variation in Sales Revenue	Sales revenue at time t minus sales revenue at time t-1, deflated by revenue at t	
ΔPIB	Variation in Gross Domestic Product (GDP)	GDP variation in quarter t in relation to quarter t-1	

Figure 1. Study's control variables.

Due to recursive or dynamic cash behavior, the lagged dependent variable was adopted as the explanatory variable in this study. Hence, the estimators of the Generalized Moments Method (GMM-System), by Arellano and Bover (1995) and Blundell and Bond (1998), were used. The GMM-System Estimator distinguishes this study's approach from other studies addressing the relationship between cash holdings and economic policy uncertainty, which used a fixed-effects estimator: Xu, Chen, Xu and Chan (2016); Demir and Ersan (2017); Feng, Lo, and Chan (2019); Li (2019); Phan, Nguyen, Nguyen and Hegde (2019) and Duong, Nguyen, Nguyen and Rhee (2020).

Comparing the fixed effects estimator to the GMM-System, Gupta, and Bedi (2020) emphasize that the GMM-System offers two advantages in this type of study: 1) it considers the dynamic nature of cash adjustments and enables including the lagged cash value as an independent variable in the modeling; and 2) controls, through the use of instruments, the potential simultaneity between cash holdings and their determinants. However, the fixed effects estimator results in biased and inconsistent estimates when using the lagged dependent variable (Nickell, 1981) and in the presence of endogenous repressors (Antonakis, Bendahan, Jacquart, & Lalive, 2010; Gippel, Smith, & Zhu, 2015).

Hence, two models were estimated in this study: the first considers that the determinants and economic policy uncertainty influence cash levels at the same point in time (Equation 4), and the second assumes that cash holdings in the future (t+1) are affected by determinants and uncertainty in the present time (t) (Equation 5).

$$Caixa_{i,t} = \alpha_0 + \beta_1 Caixa_{i,t-1} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \text{PIB}_t + \varepsilon_{i,t} \quad (4)$$

$$CaixaEq_{i,t+1} = \alpha_0 + \beta_1 Caixa_{i,t} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \text{PIB}_t + \varepsilon_{i,t} \quad (5)$$

Where:

i = 1, ..., N publicly traded companies listed on B3; t = 1, ..., T quarterly periods from 2010 to September 2020; a_0: model intercept; β_k: angular coefficient of the k-th explanatory variables; *Caixa:* proxy for corporate cash policy, which assumes the variables *CaixaEq* (Eq. 1) and *FolgaFin* (Eq. 2); *Incerteza:* economic policy uncertainty variable, which assumes EPU and IIEBr in three different calculations (Eq. 3.1, 3.2 and 3.3); *Tam:* company size, represented by the natural logarithm of total assets; *MTB:* Market-to-book indicator; *FC:* Cash Flows; *CGL:* Net Working Capital; *DC:* Capital Expenses; *Alav:* Leverage; *Divid:* Dummy for payment of dividends; Δ*Rec:* Change in Sales Revenue; Δ*PIB*: GDP variation; and ε: usual error of the regression model.

For the modeling adequacy adjustment, as noted by Barros, Bergmann, Castro, and Silveira (2020), including a lag of the dependent variable between the regressors, might be sufficient. Other lags may be important to capture the dynamic behavior of the dependent variable though. Hence, two lags of the dependent variables were used as regressors in the models, following what Barros *et al.* (2020) recommend regarding the endogenous dynamic behavior of the response variable.

The validity of the estimates obtained with the GMM-System estimator for the models depends on diagnostic tests (Gupta & Bedi, 2020). Hence, multicollinearity tests (VIF), stationary of variables (Fisher's unit root test), error term autocorrelation (Arellano and Bond autocorrelation test), instrument endogeneity (Sargan/Hansen), and Difference-in-Hansen test (DIF-Hansen) were performed for the validation, and the results are presented in Tables. Furthermore, note that the firm-level regressors were winsorized by 1% for both tails of the data distribution to mitigate the potential effects of extreme values.

Regarding the GMM-System adequacy, first and second-order autocorrelation tests, AR(1) and AR(2) were applied in the Arellano and Bond idiosyncratic error term, evidencing the presence of significant first-order autocorrelation and non-significant second-order autocorrelation. The Hansen test failed to reject the null hypothesis of the instruments' validity. Furthermore, the Dif-Hansen test failed to reject the null hypothesis for the GMM-System's validity compared to Dif-GMM, attesting that the estimator is adequate. It is worth noting that the models did not show evidence of multicollinearity of the values of the variance inflation factor and that the data series of the variables were considered stationary, which allows for the application of the GMM-System Estimator.

4. Analysis and Presentation of Results

4.1 Descriptive Statistics of Data

The series of the economic policy uncertainty indicators were initially analyzed (Figure 2), showing that, over time, the EPU is more volatile than the IIEBr. Although the IIEBr presents smoother changes, it behaves similarly to the EPU. This difference in the variability of the indicators may result from differences in the sources of information that support the construction of the indicators, considering the EPU is based on a single newspaper, while IIEBr is based on six newspapers (Quinteiro, Medeiros & Niyama, 2020).

Additionally, the indicators signal the uncertainty times experienced in the Brazilian context. Hence, there are peaks around corruption scandals, impeachment process, and elections (2015-2018), reporting Brazil's unstable economic and political context.

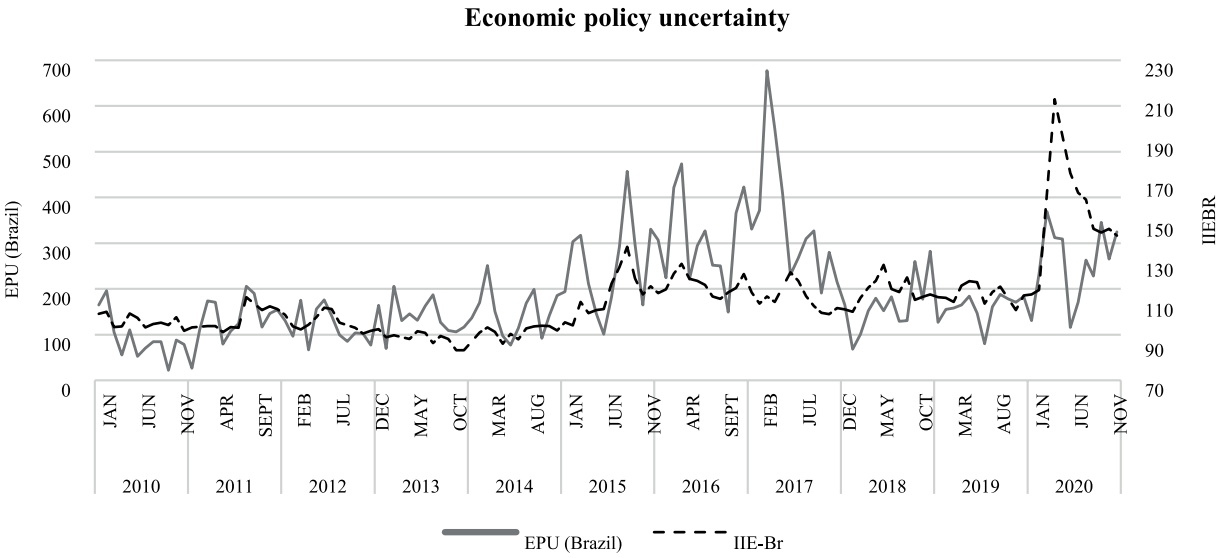

Figure 2. Progression of the Economic Policy Uncertainty Variables from 2010 to 2020

Source: data from Economic Policy Uncertainty website.

The summary of the variables' descriptive statistics suggests that the companies in the sample are heterogeneous (Table 1). For example, some companies are working with zero cash (CaixaEq), companies that do not have capital expenditures (DC) in some of the periods, companies that do not use onerous debts (Alav). Additionally, there are companies with a negative financial slack (FolgaFin). This indicates that current financial liabilities exceed the resources available to pay these debts. Furthermore, note that cash and cash equivalents represent approximately 8.6% of the companies' total assets.

Table 1
Descriptive Statistics of Variables

Variable	Mean	Standard Deviation	Coef. Var.	Minimum	Maximum
CaixaEq	0.086	0.095	1.113	0.000	0.842
FolgaFin	0.048	0.141	2.933	-0.602	0.930
EPU	5.232	0.521	0.100	4.341	6.518
IIE	4.700	0.154	0.033	4.444	5.157
Tam	15.313	1.737	0.113	11.368	19.754
MTB	1.964	2.030	1.033	0.161	11.509
FC	0.026	0.024	0.921	-0.041	0.118
CGL	0.174	0.187	1.070	-0.231	0.752
DC	0.015	0.018	1.187	0.000	0.112
Alav	0.277	0.170	0.616	0.000	0.687
ΔRec	0.034	0.284	8.369	-0.670	1.628
ΔPIB	0.003	0.037	1.375	-0.070	0.093

Table 2 presents the correlation coefficients between the variables included in the models.

Table 2
Variables Correlation Matrix

	CaixaEq	FolgaFin	EPU	IIE	Tam	MTB	FC	CGL	DC	Alav	ΔREC	Divid
FolgaFin	**0.571**											
EPU	0.000	-0.015										
IIE	0.012	0.008	**0.412**									
Tam	**-0.093**	**-0.146**	-0.001	0.020								
MTB	**0.091**	**0.152**	**-0.079**	-0.011	**0.040**							
FC	**0.039**	**0.049**	**-0.067**	**-0.079**	**0.090**	**0.390**						
CGL	**0.385**	**0.595**	**-0.026**	**-0.041**	**-0.301**	**-0.032**	**-0.079**					
DC	-0.020	-0.015	**-0.076**	**-0.131**	**0.080**	**0.119**	**0.183**	**-0.167**				
Alav	-0.006	**-0.340**	0.024	**0.039**	**0.441**	**0.105**	**0.052**	**-0.254**	**0.092**			
ΔRec	-0.004	0.022	**-0.072**	0.010	-0.016	0.001	**0.117**	**-0.004**	**0.063**	-0.022		
Divid	**0.057**	**0.094**	**-0.127**	-0.031	**0.144**	**0.199**	**0.209**	**0.046**	0.024	-0.016	-0.002	
ΔPIB	0.006	0.014	**-0.250**	**-0.144**	-0.001	**0.016**	**0.060**	0.007	**0.082**	-0.014	**0.251**	**0.150**

Note: correlations significant at 5% in bold.

Table 2 presents a preliminary relationship between the variables included in the model. The interest variables stand out. Note that there is no significant correlation between the cash and uncertainty variables. There is a low correlation between the models' independent variables, which is desirable for the assumptions of the econometric modeling. The VIF statistics corroborate this condition, with a mean of 1.18 with the models for both dependent variables, indicating no multicollinearity problems, according to the tolerance limit for this statistic in applied social sciences (Wooldridge, 2019).

4.2 Effects of Economic Policy Uncertainty on Cash Policy

The results of the estimation in Equation (4) are presented in Tables 3 (CaixaEq) and 4 (FolgaFin). Remember that 12 empirical models were used in this stage to investigate the effects of economic policy uncertainty on the companies' cash policy. Uncertainty was measured in six ways (mEPU, tEPU, wEPU, mIIE, tIIE, and wIIE) and cash was measured in two ways (CaixaEq e FolgaFin).

The results of the model in which the dependent variable was cash holdings and cash equivalents (CaixaEq) are consistent for the different measures of economic policy uncertainty. Only the EPU (EPU index of the last month in the quarter) was not significant. As expected, the relationships were positive, indicating that increased economic policy uncertainty influences the companies' cash level. The fact that tEPU was not significant might indicate that, differently from the remaining variables, this metric might not reflect uncertainty capable of affecting cash holdings and cash equivalents within the same quarter.

Therefore, given the possibility of economic policy uncertainty affecting companies, this result may indicate that companies tend to save more cash resources generated internally and make more conservative decisions in times of increased uncertainty, decreasing payment of dividends or repurchase of shares, for instance (Li, 2019).

Note that the IIE presents significant and higher coefficients (between 0.010 and 0.018) than the EPU, which may be consistent with this metric, which includes weighting factors for macroeconomic variables determinants of corporate decisions. Furthermore, analyzing the US market, Phan *et al.* (2019) also found positive and significant coefficients, ranging from 0.011 and 0.016 for economic policy uncertainty (EPU measure) regarding the firms' cash levels. Hence, the pronounced relationship between economic policy uncertainty and cash and cash equivalents of companies listed in the Brazilian stock market provides a new perspective for the literature in the economic-financial field. Therefore, given the highly uncertain Brazilian context in terms of economic policy, the companies keep higher volumes of cash and equivalents to protect themselves from potential problems in the future.

Additionally, a company's size, Market-to-book, and net working capital positively influence cash and equivalents at some level, while the payment of dividends presents a negative relationship. The signs of the coefficients in these control variables are consistent with the literature (Li, 2019; Phan et al., 2019; Duong et al., 2020). Companies with more opportunities to grow, greater potential to generate cash flow, and positive net working capital, will probably have more cash and equivalents reserves. On the other hand, companies that pay dividends simultaneously deplete their cash. Managers, however, may opt to decrease their dividends, retain more profits, and increase their cash holdings when facing uncertainty and unpredictable future earnings (Duong et al., 2020).

Table 3

Estimations of Model 1 (Eq. 4) for Cash and Equivalents

$$CaixaEq_{i,t} = \alpha_0 + \beta_1 Caixa_{i,t-1} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \text{PIB}_t + \varepsilon_{i,t}$$

	mEPU	tEPU	wEPU	mIIE	tIIE	wIIE
CaixaEq(t-1)	0.638***	0.640***	0.639***	0.641***	0.639***	0.642***
CaixaEq(t-2)	0.246***	0.248***	0.246***	0.242***	0.245***	0.244***
Incerteza	0.003*	0.001	0.002**	0.018***	0.012**	0.010**
Tam	0.002**	0.002**	0.002**	0.001	0.001*	0.001*
MTB	0.001*	0.001*	0.001*	0.001	0.001	0.001
FC	0.003	0.004	0.003	0.014	0.010	0.009
CGL	0.035***	0.034***	0.035***	0.036***	0.036***	0.035***
DC	0.122	0.102	0.114	0.131	0.123	0.119
Alav	-0.010	-0.009	-0.010	-0.002	-0.005	-0.005
ΔRec	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
Divid	-0.002*	-0.002	-0.002	-0.002*	-0.002*	-0.002*
ΔPIB	0.014	0.011	0.013	0.016	0.014	0.012
Constante	-0.036**	-0.025**	-0.033***	-0.105***	-0.077***	-0.067**
AR(1)	-3.81***	-3.81***	-3.81***	-3.81***	-3.81***	-3.83***
AR(2)	-1.31	-1.34	-1.31	-1.22	-1.27	-1.25
Hansen	99.96	100.91	92.00	-99.20	91.77	91.43
Dif-Hansen	8.05	8.97	8.25	-9.01	9.43	9.33

Note. The variables CaixaEq, FC, and DC, were considered dynamic variables. The other regressors were assumed to be sequentially exogenous instruments. AR(1) and AR(2) indicate the absence of order 2 autocorrelation. The Hansen test indicates the exogeneity of the instruments. Dif-Hansen attests to the validity of the subset of instruments.
***for 1% significance level; **5%; *10%

The model with the variable financial slack as the response variable (Table 4) shows that the results concerning the relationship with economic policy uncertainty, measured by the IIEBr, are qualitatively similar, and the coefficients are significant and consistent with the different measurements, which does not occur for the different EPU proxies. Therefore, it enables inferences and more robust contributions, as it suggests a better adjustment of the IIEBr measure to analyze the reflexes on the companies' cash policy in the Brazilian context.

Hence, we can infer that Brazil's politically and economically unstable environment increases external risk in the financial market. This increased external risk prevents companies from making stable forecasts regarding financial conditions such as the company's cash flow or investment returns or the external environment, which can affect growth opportunities and impose financing costs (Demir & Ersan, 2017; Li, 2019).

Among the control variables, size and net working capital presented positive coefficients. Hence, large companies with high levels of net working capital have larger financial reserves available, which may be a characteristic of the country, considering issues concerning the way the local credit market works in case of external financing, or a managerial preference, in which managers opt for keeping higher levels of financial slack. The literature addresses the effect of a company's size on its cash holdings differently though. Companies with excess cash are more likely to be large with low market value. Additionally, large companies tend to generate large cash flows and have more potential to convert profits into cash (Opler *et al.*, 1999; Demir & Ersan, 2017). On the other hand, the variable dividends remained negative, indicating that companies paying dividends have a higher financial slack, though it is also possible that this higher financial slack is due to economic policy uncertainty.

Table 4

Models 1 (Eq. 4) Estimates for Financial Sack

$$FolgaFin_{i,t} = \alpha_0 + \beta_1 Caixa_{i,t-1} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \text{PIB}_t + \varepsilon_{i,t}$$

	mEPU	tEPU	wEPU	mIIE	tIIE	wIIE
FolgaFin(t-1)	0.756***	0.764***	0.762***	0.753***	0.757***	0.746***
FolgaFin(t-2)	0.017	0.011	0.013	0.016	0.015	0.024
Incerteza	0.002	-0.001	0.000	0.023***	0.010*	0.005***
Tam	0.006***	0.005***	0.006***	0.006***	0.006***	0.002***
MTB	0.002	0.002	0.002	0.002	0.002	0.001
FC	0.118*	0.117*	0.117	0.123*	0.118*	0.072*
CGL	0.176***	0.175***	0.175***	0.181***	0.178***	0.035***
DC	0.339	0.332	0.328	0.348	0.335	0.251
Alav	-0.019	-0.016	-0.017	-0.014	-0.015	0.032
ΔRec	0.003	0.003	0.003	0.002	0.003	0.005
Divid	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	0.002***
ΔPIB	0.041	0.035	0.038	0.044	0.039	0.026
Constante	-0.120***	-0.103***	-0.111***	-0.221***	-0.159***	0.040***
AR(1)	-3.72***	-3.74***	-3.74***	-3.74***	-3.69***	-3.74***
AR(2)	1.09	1.14	1.13	1.1	1.10	1.04
Hansen	101.85	101	101.35	105.23	103.81	105.42
Dif-Hansen	2.74	3.12	2.8	2.69	3.85	3.50

Note. The variables FolgaFin, FC, and DC, were considered dynamic. The other regressors were assumed to be sequentially exogenous instruments. AR(1) and AR(2) indicate the absence of order 2 autocorrelation. The Hansen test indicates the exogeneity of the instruments. Dif-Hansen attests to the validity of the subset of instruments.
***for 1% significance level; **5%; *10%

An additional analysis was performed to estimate whether increased economic policy uncertainty in a given quarter would be associated with larger cash reserves in the next quarter. Therefore, an empirical model was estimated in Equation (5) for the two dependent cash variables *Caixa*, *CaixaEq* (Table 5), and FolgaFin (Table 6).

Table 5

Model 2 (Eq. 5) Estimates for Cash and Equivalents

$$CaixaEq_{i,t+1} = \alpha_0 + \beta_1 Caixa_{i,t} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \text{PIB}_t + \varepsilon_{i,t}$$

	mEPU	tEPU	wEPU	mIIE	tIIE	wIIE
CaixaEq(t)	0.727***	0.727***	0.726***	0.715***	0.717***	0.715***
CaixaEq(t-1)	0.233***	0.235***	0.234***	0.231***	0.232***	0.231***
Incerteza	0.000	0.000	0.000	0.017***	0.017***	0.018***
Tam	0.000	0.000	0.000	0.000	0.000	0.000
MTB	0.000	0.000	0.000	0.000	0.000	0.000
FC	0.042	0.041	0.042	0.049	0.048	0.049
CGL	-0.014	-0.014	-0.014	-0.011	-0.011	-0.011
DC	-0.011	-0.017	-0.014	0.022	0.016	0.022
Alav	-0.014	-0.012	-0.013	-0.018	-0.016	-0.017
ΔRec	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
Divid	0.001	0.001	0.001	0.001	0.001	0.001
ΔPIB	0.008	0.007	0.009	0.014	0.014	0.014
Constante	0.008	0.011	0.007	-0.070***	-0.072***	-0.075****
AR(1)	-4.64***	-4.65***	-4.64***	-4.62***	-4.63***	-4.62***
AR(2)	-1.18	-1.2	-1.19	-1.16	-1.17	-1.16
Hansen	114.37	113.72	114.2	113.08	113.17	106.37
Dif-Hansen	8.28	7.83	7.85	6.53	7.25	6.65

Note. The variables CaixaEq(t+1), FC, and DC, were considered dynamic. The other regressors were assumed to be sequentially exogenous instruments. AR(1) and AR(2) indicate the absence of order 2 autocorrelation. The Hansen test indicates the exogeneity of the instruments. Dif-Hansen attests to the validity of the subset of instruments.
***for 1% significance level; **5%; *10%

Analysis of the estimation results considering the cash and cash equivalents variables (Table 5) shows that only the IIE presented significant results to explain cash holdings in the next quarter, a finding also reported by Duong *et al.* (2020).

The same happens with the model where financial slack is the dependent variable (6). A positive relationship was found between economic policy uncertainty, measured by IIE, from one quarter with the financial slack of the following quarter, regardless of how the variable was calculated (mIIE, tIIE, or wIIE).

We note that the control variables for the estimations in Tables 5 and 6 were not significant, except for variable CGL, which had a negative and significant effect on the model for financial slack (Table 6). Financial slack may represent a seasonal resource, presenting great variation in the short term, which may justify the negative relationship with the CGL from the previous quarter.

Table 6
Model 2 (Eq. 5) Estimates for Financial Slack

$$FolgaFin_{i,t+1} = \alpha_0 + \beta_1 Caixa_{i,t} + \beta_2 Incerteza_t + \beta_3 Tam_{i,t} + \beta_4 MTB_{i,t} + \beta_5 FC_{i,t} + \beta_6 CGL_{i,t} + \beta_7 DC_{i,t} + \beta_8 Alav_{i,t} + \beta_9 Divid_{i,t} + \beta_{10} \Delta Rec_{i,t} + \beta_{11} \Delta \mathrm{PIB}_t + \varepsilon_{i,t}$$

	mEPU	**tEPU**	**wEPU**	**mIIE**	**tIIE**	**wIIE**
FolgaFin(t)	0.908***	0.913***	0.910***	0.909***	0.907***	0.90***
FolgaFin(t-1)	0.030	0.024	0.028	0.030	0.028	0.029
Incerteza	0.001	-0.001	0.001	0.029***	0.027***	0.030***
Tam	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
MTB	0.001	0.001	0.001	0.001	0.001	0.001
FC	-0.001	0.005	0.000	0.014	0.010	0.013
CGL	-0.065*	-0.064*	-0.065*	-0.064*	-0.062*	-0.063*
DC	-0.005	-0.029	-0.009	0.009	0.018	0.014
Alav	-0.049	-0.047	-0.048	-0.045	-0.045	-0.045
ΔRec	0.004	0.004	0.004	0.003	0.004	0.004
Divid	0.003	0.003	0.003	0.003	0.003	0.003
ΔPIB	-0.010	-0.016	-0.010	-0.001	-0.001	-0.001
Constante	0.046	0.058**	0.048	-0.082*	-0.075	-0.088*
AR(1)	-4.91***	-4.99***	-4.92***	-4.98***	-4.92***	-4.97***
AR(2)	1	1.1	1.02	1.11	1.07	1.11
Hansen	107.92	107.04	107.09	107.05	107.36	107.52
Dif-Hansen	3.71	4.28	3.93	3.52	3.92	3.70

Note. The variables FolgaFin(t+1), FC, and DC were considered dynamic. The other regressors were assumed to be sequentially exogenous instruments. AR(1) and AR(2) indicate the absence of order 2 autocorrelation. The Hansen test indicates the exogeneity of the instruments. Dif-Hansen attests to the validity of the subset of instruments.
***for 1% significance level; **5%; *10%

Therefore, these results suggest that increased economic policy uncertainty is related to larger cash reserves (cash and equivalents or financial slack) in the following period, verified by the positive and statistically significant IIE. Furthermore, instability in the Brazilian economic and political environment (Barboza & Zilberman, 2018; Schwarz & Dalmácio, 2020) prevents managers from successfully forecasting the companies' specific characteristics, forcing them to behave more homogeneously when responding to this unpredictability (Demir & Ersan, 2017).

Additionally, the fact that Brazil is a developing and emergent economy suggests different dynamics among the companies listed in the Brazilian stock market than those in other economic environments. The reason is that emergent economies deal with different agency problems due to legal origin, the rigidity of financial systems, political culture, corporate governance, and the structure of ownership concentration, among others, which might influence corporate decisions that reflect on cash policy. In this sense, the analysis with a focus on the Brazilian market reinforces the literature indicating that economic policy uncertainty influences the behavior of managers so that they anticipate potential deficiencies in cash flow and, consequently, hold more cash. These results also expand knowledge of diverse agents on the factors that affect cash flow among Brazilian companies. In the context of this study, the conclusion is that economic policy uncertainty influences the companies' present and future cash levels and, for this reason, can support predictions.

5. Final Considerations

By analyzing the determinants of the cash policy of companies listed on the Brazilian stock market, this study was intended to investigate the effects of economic policy uncertainty on the companies' cash holdings and financial slack. Two uncertainty measures were used and empirically corroborated the study's hypothesis, that there is a positive relationship between economic policy uncertainty and the cash policy of companies listed in the Brazilian stock market, considering that no sufficient evidence was found to reject it. In addition, we verified that the Brazilian Economic Uncertainty Indicator showed a stronger relationship with cash and cash equivalents and financial slack, as its components are based on a broader range of information sources.

Given the IIEBr's greater specificity and the results found here, we suggest that future studies analyzing the characteristics of economic policy uncertainty in the Brazilian context adopt this metric. Also, we stress that the coefficient of the variable that corresponds to the IIEBr was significant, regardless of the calculations chosen, showing that this study's results are not affected by the quarter calculation of IIEBr. In any case, the results concerning the EPU were not consistent across the different forms of calculation.

The metric of financial slack stands out. It appears to be the most responsive to economic policy uncertainty, indicating that firms constitute liquidity to be an aegis for more uncertain times beyond the relative increase of cash and equivalents. Therefore, the concern of managers with economic policy uncertainty suggests that the companies adjust their financial position for a condition in which net working capital is sufficient to meet operational needs in the short term to mitigate the financial risk arising from an uncertain environment. Additionally, the results suggest that the companies may not increase their cash resources due to deferring investments but due to the uncertainty in the market in which they operate.

In any case, this conservative behavior of managers, which results in higher cash reserves, may become a cost for the companies, considering profitable activities that could be pursued with such resources. In this sense, economic policy uncertainty can harm the companies' opportunities to grow, harming the country's growth in the process. This fact is directly linked to delayed investments. The companies may opt to wait for further information, which leads to an economic slowdown in the short run. Government agencies and regulators could minimize uncertainties regarding future economic policies to protect the development of the market and country.

In this context, this study contributes to the literature addressing the effect of economic policy uncertainty on the companies' cash policy. The results show that uncertainties at a macroeconomic level influence corporate decisions. Additionally, as previously noted, this study presents to market agents, regulators, and policymakers the potential effects of market uncertainty on the Brazilian business context.

Finally, we suggest that future studies address the implications of elections, normative changes, legal applications, and political connections for corporate cash holdings decision-making. The use of other metrics or modelings to assess the effects of economic policy uncertainty on the companies' cash holdings is also welcome to contribute to the literature in the field.

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