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The impact of economic policy uncertainty on corporate diversification: evidence from Latin american emerging economies

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Abstract

Recently a fast-growing strand of literature has focused on economic policy uncertainty (EPU) that has prominent impacts on the firms' decisions. Diversification is one of the important strategies to cope with an unpredictable environment. This study investigates the impact of EPU on corporate diversification. By using 4,253 firm-year observations from 3 Latin American emerging countries through the period of 2010-2016, the results show an inverse U-shaped relationship between EPU and diversification. The findings demonstrate that after reaching a certain level of EPU, further increases in EPU trigger firms to behave prudently and diversify less. This study contributes to the literature by exploring the possible nonlinear nature of EPU-diversification nexus on emerging countries.

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1. Introduction

Firms may face external shocks and unpredictable changes that potentially affect the firm-level outcomes such as investment and performance (Bloom, 2009). Firms operating in a highly uncertain environment need to develop strategies to refrain from possible negative effects of an uncertain environment. The management of volatility and firms' operational behaviour in response to uncertainty plays a crucial role in the firms' performance. Thus the relationship between uncertainty and firms' practices is of great interest to researchers.

Although various proxies of uncertainty such as stock market return volatility, the cross-sectional dispersion of firm outcomes including performance and productivity are used in the empirical literature, this study focuses on macroeconomic uncertainty to provide a broader view. Needless to say that the macroeconomic environment shapes the firm-level decisions through the expectations of the firms that interpret macroeconomic variables and changes in the policies. Changes in policies and regulations, and new decisions associated with macroeconomic shocks create macroeconomic uncertainty and affect significantly the financial and operational decisions of the firms. The economic policy uncertainty (EPU, hereafter) has received increased attention in the literature. The EPU index developed by Baker et al. (2016) includes government regulations, future tax code changes and economic forecasts of the consumer price index and government spending.

It is well established in the existing literature that EPU reflecting unpredictable changes in the economic environment has some important impacts on the firms. There is a large body of literature examining the impact of EPU on the firms' performance and firm-level outcomes such as investment, cash holdings and innovation activities (e.g. Chen et al., 2019; Duong et al., 2020; Demir and Ersan, 2017; Gulen and Ion, 2016; Iqbal et al., 2020; Kang et al., 2014; Li, 2019; Xu, 2020; Yung and Root, 2019). Besides the firm-level outcomes, managerial and operational strategies are formed in response to changes in the macroeconomic environment. One of the strategies to manage the fluctuations and shocks is operating in different industry segments namely, diversification. Diversification has some prominent benefits for the companies. It helps to increase profitability, market share and debt capacity of the firms and also provides opportunities for corporate growth and better exploitation of resources (Afza and Mian, 2008).

This paper aims to analyse to what extent is firm-level diversification linked to EPU. It fills the gap in the existing literature by investigating the impact of uncertainty on the managerial decision of the firms operating in emerging markets. To the best of our knowledge, Hoang et al. (2021) that investigates the impact of EPU on corporate diversification for a single emerging country, namely China, is only one empirical study in the literature that has addressed the issue of whether the firms diversify more in response to EPU. They implicitly assume that the diversification-EPU relationship is linear and the effect of uncertainty on diversification is found to be positive. Our cross-national study extends the study of Hoang et al. (2021) in two ways. First, it contributes to the literature by exploring the nonlinear nature of the relationship between EPU and diversification. Second, rather than focusing on a single one, three emerging countries including Brazil, Chile and Mexico were analysed. Our results suggest that the effect of EPU on corporate diversification is indeed approximated by an inverted-U shaped relationship: at low levels of EPU the impact is positive, but it becomes negative at high levels of EPU. This result represents the first empirical verification of the hypothesis including nonlinear relation for the diversification-EPU nexus.

The rest of the paper is organised as follows. Section 2 provides a brief literature review and develops hypotheses to be tested. Section 3 delineates the methodology of this paper and discusses data and variables. Section 4 presents summary statistics and estimation results of the analyses, and finally, Section 5 concludes.

2. Literature Review and Hypotheses

Changes in macroeconomic policies such as monetary, fiscal and regulatory policies determine the economic environment in which firms operate. The external macro environment is fundamental for the behaviour of the economic agents, namely consumers and firms (Lubatkin and Chatterjee, 1991). Environmental uncertainty resulting from unexpected policy changes is one of the prime factors that shape corporate decisions and strategies. In response to impacts of instability such as financial frictions, an increase in the difficulty of capital raising and risk aversion, firms increase their cash holdings and decrease investment (Almeida and Campello, 2007; Dejuan and Ghirelli, 2021; Li et al., 2016; Gulen and Ion, 2016; Nguyen and Phan, 2017). For instance; Opler et al. (1999) reveal that a higher level of EPU is associated with higher cash holdings to lessen the negative uncertainty effect on corporate investment.

Some of the existing studies in the literature show that corporate strategies are dependent on the level of uncertainty that firms face and suggest a nonlinear relationship between EPU and corporate decisions. They suggest a U-shaped relationship between EPU and corporate cash holdings and an inverse U-shaped EPU-investment nexus. Firms improve their investment and operational activities using their cash savings to exploit new opportunities arising during low uncertainty times. However, they will tend to increase precautionary cash holdings rather than increasing investment because of financing constraints and the difficulty of evaluating the firm prospect associated with high uncertainty (Su et al., 2020; Dejuan and Ghirelli, 2021). Bo and Lensin (2005) attribute the nonlinear relationship between investment and uncertainty to the risk behaviour. They suggest that firms that take some risk over the range of small losses resulting from uncertainty increase investment up to a threshold level and decrease thereafter.

Diversification is one of the conventional managerial strategies to refrain from possible negative effects of an unpredictable environment. Existing studies mainly explore the cost and benefits of diversification and analyze the performance effect of diversification. Montgomery (1994) mentions agency theory and resource-based theory to explain why a firm may choose to diversify. From an agency theory perspective, diversification results from the managerial self-interest to increase compensation, power and prestige and decrease personal investment portfolio risk through decreasing firm risk (Jensen and Murphy, 1990; Jensen, 1986). So, firms' managers use diversification as a tool for risk reduction (Aivazian et al., 2019, Savitz et al., 2016). According to resource-based theory, firms can transfer their excess resources and capabilities to different industries and create economies of scale.

Phung and Mishra (2016) also use internal capital market theory to explain the diversification tendency of the companies. Firms that are able to allocate their capital across different business units can operate efficiently and avoid the cost of financing from the external capital market. Moreover, some studies suggest that diversified firms reallocate their resources efficiently and make better investment decisions in response to an exogenous threat (Khanna and Tice, 2001, Matvos and Seru, 2014). Thus diversification creates value enhancement effects (Hoang et al.2021) on firm performance and growth opportunities. In a nutshell, firms diversify to cope with an uncertain economic environment and grow, thus EPU is positively associated with corporate diversification.

Given the fact that managers may not be able to accurately evaluate the firms' abilities to cope with the risks (Baum et al., 2006), they may be cautious about diversification to avoid possible negative outcomes associated with a highly uncertain environment. In their study, Keats and Hitt (1988) show that firms react to the unstable environment by retreating to a better-understood environment and creating a simpler organization rather than risk reduction through diversification. They suggest that firms prefer to have low diversity and believe that managing a more focused organization is easier in an uncertain environment. This is, because economy-wide shocks may decrease the internal market benefits of diversification and increase

the management and organizational costs (Chakrabarti et al., 2007). As some of the existing studies aforementioned suggest a nonlinear relationship between corporate decisions and uncertainty, the impact of EPU on corporate diversification might be nonlinear. Considering the above discussions it is reasonable to argue that a moderate level of EPU brings about opportunities for the firms. When firms operate in an environment with moderate uncertainty, firms can benefit from the growth and risk reduction effect of diversification. On the other hand, when EPU soars up, managers' evaluation of the firms' prospects and the financing constraints becomes more difficult. Firms may not be willing to exploit growth opportunities through diversification (Lubatkin, M. and Chatterjee, 1991).

Moreover, since different industries have different sensitivity to changes in the macroeconomic environment, operating in different industry segments alleviates the risk. However, due to the very high level of EPU, macroeconomic risks are more likely to affect most of the sectors deeply. Diversified firms may suffer from unexpected changes in multiple industries at the same time. Also, since diversification requires some degree of complexity to operate in multiple industries, it may reduce flexibility to respond to changes in the macroeconomic environment (Chakrabarti et al., 2007). Thus, diversification ceases to be a risk reduction strategy.

Given the cost of diversification in a time of high uncertainty, diversification may have a prudence effect and firms may tend to diversify less (Hoang et al. 2021). Chen et al. (2019) mention that under tolerant losses, firms act in a risk-seeking manner, but they become risk-averse for unacceptable uncertainty levels. For an EPU above a threshold level, managers may become more conservative and follow wait and see strategy (Stokey, 2016). Therefore we expect that EPU is positively associated with corporate diversification during times of relatively lower uncertainty, it is negatively associated with corporate diversification above a certain level. Hence, we propose an inverse U-shaped relationship between diversification and EPU.

3. Methodology

3.1. Sample and Data

The sample consists of 654 publicly listed firms with 4,253 firm-year observations from 3 emerging market economies which are Brazil, Chile and Mexico. The period of analysis covers the years between 2010 and 2016. The sample excludes financial firms because of their unique accounting standards.

The firm-level data were downloaded from Bloomberg. EPU indexes were from Baker et al. (2016). All variables were winsorized at the 1% and 99% levels to minimize the effect of outliers (Campbell et al., 2008).

Dependent Variables

Two different proxies of corporate diversification were used as the dependent variable. First, a dummy variable that takes the value of 1 if a given firm operates in more than one unrelated industry segment defined by two digits Global Industry Classification Standard codes was used. Second, Jacquemin and Berry's Entropy Index (1979) was employed to measure the degree to which a firm's sales are allocated across unrelated industry segments (Clarke et al. 2004). The index was calculated as follows:

$$UD_t = \sum_{i=1}^{n} P_i * \ln\left(\frac{1}{P_i}\right)$$

where UD_t refers to unrelated diversification in year *t,* P_i is the percentage of a firm's total sales in the i^{th} industry and *n* is the number of industries in which the firm is operating.

EPU measure

The EPU index constructed by Baker et al. (2016) was used to proxy economic policy uncertainty. The index reflects the economic effects of current and future policy actions by including three uncertainty components: news-based uncertainty, uncertainty about future tax code changes, and disagreement among forecasters on future levels of various economic variables such as government spending or consumer price index (Demir and Ersan, 2017; Duong et al., 2020). Higher values of the index indicate higher levels of EPU. The index is collected monthly, and to get the same frequency with the sample's yearly firm-level data, the arithmetic average of all monthly EPU values in the year was calculated (Demir and Ersan, 2017; Avsar and Hudgins, 2020).

Control variables

Following prior research on corporate diversification, several firm-level relevant control variables were used in this study. Profitability was calculated by the ratio of net income to total equity. Firm size was measured as the natural logarithm of total assets. Leverage was calculated as the ratio of total debt to total assets. Prior research has also suggested that governance mechanisms may influence diversification (Goranova et al., 2007; Chen et al., 2009). Therefore, board independence and CEO duality were also involved in the model. CEO duality is a dummy variable that takes the value of 1 if the CEO is also the chairman of the board of directors. Board independence was calculated by dividing the number of independent directors by the total number of board members. Finally, industry dummies were also controlled.

3.2. Estimation

We examine the impact of EPU on corporate diversification by estimating the following regression:

$$UD_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 EPU^2_{it} + \beta_3 X_{it} + \varepsilon_{it}$$

where UD_{it} refers to unrelated diversification for firm *i* in year *t, EPU* represents the proposed measure of economic policy uncertainty. X_{it} is a vector of control variables for firm *i* in year *t,* β_0, β_1, β_2 and β_3, are vectors of parameters to be estimated, and ε_{it} is the error term. Industry dummies were also included in the estimation. For the first dependent variable, logit estimation was used and for the second dependent variable, pooled OLS was used to conduct multivariate analyses. Robust standard errors were estimated in all cases.

4. Results

4.1. Descriptive Statistics

Table I shows the descriptive statistics and the correlation matrix among variables. The mean value of the first dependent variable is 49.8, indicating that 49.8% of the firms are

diversified in the sample. The mean value for EPU is 135.243. ROE registers a mean value of 0.147%. A preliminary investigation of the correlation matrix indicates a positive correlation between EPU and diversification dummy and a positive but insignificant correlation between EPU and Entropy Index. All correlations are below 0.7, indicating that multicollinearity is not a concern (Lehman et al., 1988).

4.2. Regression Results

In Table II, we examine the impact of EPU on corporate diversification. Columns 1 and 2 report the results of logistic regressions, while columns 3 and 4 show the findings of pooled OLS regressions. In column 1, consistent with the finding of Hoang et al. (2021) the coefficient of EPU is positive and significant at 1% level, suggesting that firms are more likely to diversify during a period of uncertainty. On the other hand, in column 2, the coefficient of the squared term (EPU^2) is negative and significant. When the entropy index is used as a dependent variable, similar results are found. In column 3, the coefficient of EPU is positive and significant, while in column 4 the coefficient of the squared term (EPU^2) is negative and significant. In other words, the relationship between EPU and corporate diversification takes the form of a quadratic function with a positive linear term and a negative squared term. These results indicate that EPU has a positive impact on corporate diversification, but this effect gradually decreases in magnitude with increasing EPU.

The negative coefficients on quadratic terms do not guarantee an inverse U-shaped relationship between EPU and diversification. In order to conclude the existence of an inverse U-shaped relationship, the inflection point after which the curve becomes downward sloping should lie within the data range. The inflection point for the logistic model is 231 for EPU and this point is within the data range since min and max values for EPU are respectively 27.00 and 308.93; indicating an inverse U-shaped relationship between EPU and diversification. This finding also holds for pooled OLS estimation with an inflection point of 194 which lies within the data range.

These findings support that after a threshold level of EPU, further increases in EPU discourage the diversification of firms. Consistent with the finding of Bo and Lensin (2005) for corporate investment, when the uncertainty level becomes excessive it is difficult to evaluate firms' abilities to deal with the risks, as a result, firms behave prudently and diversify less. Also, high EPU might affect most of the sectors in the economy at the same time and this might discourage managers to engage in diversification.

Figure 1 presents the estimated relationship between the EPU on the x-axis and diversification measured by Entropy Index on the y-axis for the analyzed data range. It shows that diversification has mostly a positive correlation with EPU over the range of the EPU index data used in the analysis. As is seen from the figure, the response of the diversification variable to changes in EPU, namely the slope of the estimated function, gets smaller as EPU approaches the threshold level. At very low and very high uncertainty levels far from the inflection point, firms respond much more to an increase in uncertainty. Thus the direction and the magnitude of the relationship vary as EPU varies.

Table I. Descriptive Statistics and Correlation Matrix

Variables	Obs	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Diversification dummy	4253	.498	.5	1.000							
(2) Entropy index	4253	.256	.327	0.786*	1.000						
(3) EPU	4253	135.243	70.513	0.038*	0.019	1.000					
(4) ROE	3689	.147	.075	0.065*	0.040*	0.106*	1.000				
(5) Firm size	3812	1.624	.818	0.005	0.007	-0.094*	-0.294*	1.000			
(6) Leverage	3836	.627	1.036	-0.011	-0.018	-0.083*	0.013	-0.085*	1.000		
(7) Board independence	4112	.151	.154	-0.056*	-0.048*	0.346*	0.068*	-0.172*	-0.087*	1.000	
(8) CEO duality	4253	.486	.5	0.057*	0.064*	0.015	-0.015	0.010	-0.011	0.041*	1.000

* shows significance at the .05 level

Table II. The Effects of EPU on Diversification

Dependent variable	Diversification dummy	Diversification dummy	Entropy Index	Entropy Index
	Column 1	Column 2	Column 3	Column 4
VARIABLES				
EPU	0.001593***	0.006474***	0.000146*	0.000776**
	(0.001)	(0.002)	(0.000)	(0.000)
EPU^2		-0.000014**		-0.000002*
		(0.000)		(0.000)
ROE	2.028707***	2.172756***	0.227453***	0.244878***
	(0.542)	(0.550)	(0.082)	(0.083)
Firm size	0.080661*	0.054805	0.011196	0.007833
	(0.048)	(0.049)	(0.008)	(0.008)
Leverage	-0.035211	-0.039452	-0.009285*	-0.009866*
	(0.036)	(0.036)	(0.005)	(0.005)
Board independence	-1.234597***	-1.147163***	-0.151958***	-0.140461***
	(0.251)	(0.255)	(0.039)	(0.040)
CEO duality	0.284529***	0.281014***	0.046201***	0.045660***
	(0.071)	(0.071)	(0.011)	(0.011)
Constant	0.152408	-0.174976	0.231576**	0.189974**
	(0.602)	(0.620)	(0.092)	(0.094)
Observations	3,346	3,346	3,363	3,363
Chi-squared	102.50***	107.79***		
R-squared			0.030	0.031

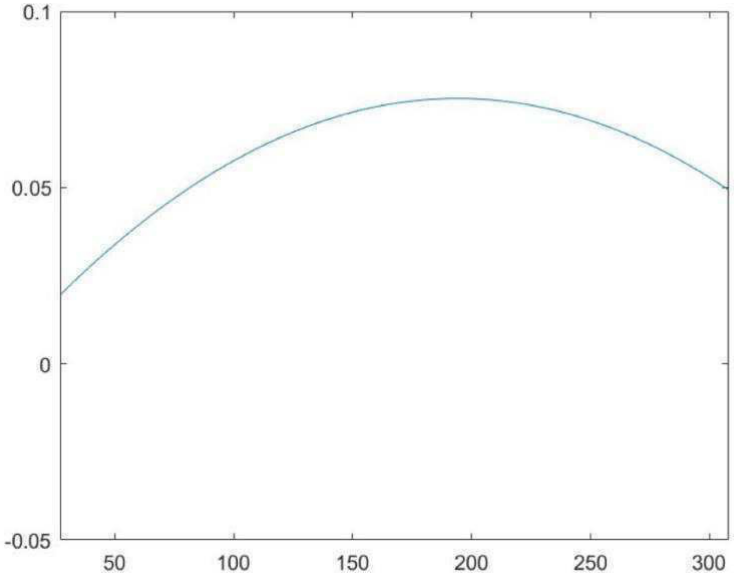
***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses. Industry dummies are included but not reported.

Table III. Robustness Tests with Alternative Measures of EPU

Dependent variable	Diversification dummy	Diversification dummy	Entropy Index	Entropy Index
	Column 1	Column 2	Column 3	Column 4
VARIABLES				
Weighted EPU	0.006169***		0.000770**	
	(0.002)		(0.000)	
Weighted EPU^2	-0.000013**		-0.000002*	
	(0.000)		(0.000)	
Lag1EPU		0.007837**		0.001058**
		(0.003)		(0.000)
Lag1EPU^2		-0.000019*		-0.000003*
		(0.000)		(0.000)
ROE	2.134454***	2.107352***	0.240866***	0.277350***
	(0.547)	(0.620)	(0.082)	(0.097)
Firm size	0.051137	0.097536	0.007359	0.014955
	(0.049)	(0.064)	(0.008)	(0.010)
Leverage	-0.040393	-0.044630	-0.010031*	-0.008789
	(0.036)	(0.039)	(0.005)	(0.006)
Board independence	-1.160434***	-1.118800***	-0.140600***	-0.120399***
	(0.257)	(0.275)	(0.040)	(0.042)
CEO duality	0.280770***	0.260093***	0.045615***	0.044415***
	(0.071)	(0.078)	(0.011)	(0.012)
Constant	-0.138911	-0.258728	0.192304**	0.142247
	(0.618)	(0.689)	(0.094)	(0.104)
Observations	3,346	2,743	3,363	2,757
Chi-squared	107.22***	87.68***		
R-squared			0.031	0.034

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses. Industry dummies are included but not reported.

Figure 1. Estimated Relationship Between Entropy Index and EPU Index[1]



Regarding control variables, the coefficients of profitability and CEO duality are positive and significant at a 1% level, indicating that profitability and combined leadership structure motivate firms to diversify. However, the negative coefficients of the board independence variable indicate that firms with more independent directors on the board engage less in diversification.

4.3. Robustness Checks

To confirm the robustness of our primary results, we perform the tests using two alternative measures of EPU. Table III presents the results of robustness checks. The results of logistic regressions are shown in columns 1 and 2 whereas, the findings of pooled OLS regressions are displayed in columns 3 and 4. The EPU variable which was constructed by taking the average of monthly EPU levels each year was replaced with weighted EPU in columns 1 and 3. Weighted EPU was calculated by assigning a higher weight to the EPU levels that are closer to the year-end (one for the first six months, and two for the last six months). On the other hand, the EPU variable was replaced with one period lagged value of EPU in columns 2 and 4. The signs of the coefficients for all alternative measures of EPU and EPU2 remain unchanged.

The inflection points calculated for logistic regression estimations are respectively 237 and 206 for columns 1 and 2, while for the pooled OLS estimations in columns 3 and 4, the inflection points are 193 and 176. Since all inflection points are within the data range, the results indicate an inverse U-shaped relationship between EPU and corporate diversification, irrespective of the EPU measure employed.

[1] Since both logistic regression and robustness check estimations demonstrating inverse U-shaped relationship have a very similar pattern, only estimation given in column 4 in Table II was plotted as an example.

5. Conclusion

EPU associated with changes in policies and regulations shapes the macroeconomic environment in which firms operate and has fundamental impacts on firms' performance and decisions. Corporate strategies and practices in response to EPU are of considerable interest to researchers. As a traditional strategy managers use diversification to cope with an unpredictable environment. Therefore, the primary purpose of our work is to scrutinize to what extent is firm-level diversification linked to EPU for Latin American emerging economies. Hoang et al., (2021) investigate the EPU and diversification nexus and their results suggest a positive linear relationship for China. To the best of our knowledge, our study is the first study that attempts to test the nonlinear nature of the relationship between EPU and diversification.

Using logit and pooled OLS estimation, the analysis demonstrates an inverted U-shaped relationship between diversification and EPU. Thus our results support the idea that the level of risk has an impact on the diversification strategy and risk attitude of the firms. During a period of low uncertainty, firms are more likely to see diversification as a means of growth and risk reduction and tend to diversify more. On the other hand, since very high uncertainty decreases benefits and increases the cost of diversification, firms might be inclined to diversify less and be more focused. In other words, when the uncertainty is excessive, the prudence effect of diversification dominates the value enhancement effect. Moreover, firms may take a moderate risk over the range of small losses up to a certain level and thus increase diversification and decreases thereafter. In short, the level of EPU fundamentally affects the managerial decisions and coping behaviour of the firms. Our findings illustrate the first empirical verification of the hypothesis of nonlinear relation for the diversification-EPU nexus and enrich the literature on emerging economies. It provides valuable insights for researchers and managers to understand better the overall mechanism in risk reduction.

It is important to note that our study is subject to two main limitations that should be addressed in future research. First, it covers only emerging market economies. However, Carriere-Swallow and Cespedes (2013) point out the heterogeneity in reactions of emerging and developed economies to an exogenous shock and indicate that emerging economies suffer much more than developed economies. Thus it is not possible to generalize our results for developed economies. Future research should test the existence of inverse U-shaped relationship for them. Second, our analysis focuses only on Latin American emerging economies, further research can cover a large set of emerging countries.

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