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EPU and SMEs' financial performance: Industry vs. service sector

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ABSTRACT

The objective of this paper is to analyze the Economic Policy Uncertainty impact on Small and Medium Enterprises' financial performance, considering the role that sector plays and firm characteristics. Thus, a data sample of 80,620 Spanish SMEs was selected for 2012–2020. Using system Generalized Method of Moments estimators, the results show a negative impact, especially in the service sector. Industrial Spanish SMEs that are larger, younger, more indebted, with more growth opportunities and with higher asset turnover are the most resilient to EPU. The findings can help SMEs design better management strategies to deal with this uncertainty.

1. Introduction

Small and medium-sized enterprises (SMEs) vertebrae the most of economies. They are essential contributors to global economic development and job creation (World Bank, 2021). In particular, in the European Union, 99 % of all enterprises are SMEs, 100 million people work for them, and they provide more than 50 % of GDP (European Commission, 2021). Therefore, the health and progress of these firms is of vital interest to countries and to policy makers.

SMEs are affected by external shocks but also by an uncertain environment. One source of uncertainty is when policymakers cannot foresee the consequences of their policy actions becoming particularly evident during periods of crisis or external shocks. This appreciation of uncertainty has become particularly evident since the financial crisis of 2008 followed by COVID-19 outbreak and, more recently, the war conflicts in Ukraine and Middle East. Over the last decade, Economic Policy Uncertainty (EPU) has served as the reference for measuring this uncertainty representing the non-zero probability of changes in existing economic policies (Baker et al., 2016). A wide body of literature has shown the EPU impact on the economy (Baker et al., 2016) and business (Guo et al., 2020; He et al., 2020). Moreover, EPU increases the information asymmetry (Nagar et al., 2019), affecting corporate finance (Myers and Majluf, 1984; Leary and Roberts, 2010).

In this context, the negative EPU effect on financial performance has been observed worldwide, mostly in large and publicly traded firms using different methodologies. Iqbal et al. (2020) demonstrated how US-listed non-financial firms were negatively affected by EPU when applying the System-GMM estimator, and Singh et al. (2019) showed a high adverse impact on agriculture cooperatives using a regression analysis. These findings were consistent in Europe where an analysis of 702 firms across nine countries (Ahsan and Qureshi, 2021), and financial intermediaries taken from twenty-eight countries using a panel data regression (Athari, 2020; Barbu and Boitan, 2020) showed similar results. Finally, Guo et al. (2020) showed an inhibitory relation between EPU and investment and profitability of Chinese listed companies using a panel vector autoregressive model. More recently, Feng et al. (2023)

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found that the negative relationship is weakened in state-owned enterprises compared to that of non-state-owned enterprises.

The adverse impact on SMEs' performance is evident albeit with much lesser evidence. The early work of Ballantine et al. (1993) revealed that the variation of profit earnings generated by uncertainty were particularly great for small firms in relation to large ones. To our knowledge, only García-Gómez et al. (2021) have researched this impact on SMEs specifically focusing on publicly traded tourism enterprises. Other EPU effects have been analysed considering other SME's magnitudes, such as employment (Ghosal and Ye, 2015), growth capacity (Schweitzer and Shane, 2011), or operating performance (Madanoglu and Ozdemir, 2018). However, the impact of EPU on SME performance remains relatively unexplored in relation to large enterprises.

Furthermore, when considering the sector factor, the literature has also studied large and listed companies. In this case, the evidence shows how uncertainty affects the industrial and services sector in a different way. Si et al. (2021) found that sectors such as energy, financial and Information Technology services were the most vulnerable to policy uncertainties as they present higher betas driven by EPU (Yu et al., 2017). However, consumer staples, energy, and utility sectors showed the lowest betas to EPU (Yu et al., 2017). Even, Rehman et al. (2019) proven that some sectors (utilities, industrial, and telecommunication) stay indifferent to changes to EPU. The profile of the firm also plays a key role. Those that are more related on trade, labour, and contract enforcement (Boutchkova et al., 2012) or are more energy intensive (Yu and Jin, 2022) show more sensitivity to uncertainty. Moreover, as investment decisions are crucial for future financial performance. Uncertainty principally affects those firms where decisions are irreversible such as R&D (Bhattacharya et al., 2015). In uncertainty times, firms opt for a wait and see strategy when trying to find greater opportunities for future growth (Bhattacharya et al., 2015; Dejuan-Bitria & Ghirelli, 2021). In this sense, Jenter and Kanaan (2015) pointed out that the magnitude of uncertainty impacts is dependent on the type of industry. During uncertain times, industrial firms face more risks and need to take strategic decisions to survive. Phan et al. (2018) confirms that changes in uncertainty may affect investment decisions in different ways and influence some sectors more than others, recently corroborated by Kong et al. (2022).

Considering the aforementioned points, it has been observed that most of the literature on the impact of EPU on firm performance focuses on large and listed companies, often differentiating by sector. Therefore, to our knowledge, this paper is the first that researches the role that sectors and firm characteristics play in influencing EPU's impact on SMEs' performance.

This manuscript takes a broader approach compared to previous research in four aspects, reinforcing the importance of this research for SME literature. First, it examines financial performance as one of the best indicators of a firm's progress (Guo et al., 2020; Iqbal et al., 2020) and, specifically investigating how sectors and firm characteristics affect the impact of EPU on financial performance. Second, GMM methodology (Generalized Method of Moments) was employed to resolve the modeling problems of potential endogeneity of regressors, dynamic panel bias and fixed effects. Third, a data sample of Spanish SMEs was selected as the appropriate sample for this research because, with a similar weight to other European countries, they play an even more significant role in Spain than in the European Union as a whole. Their contributions to employment and business gross value added (GVA) is five percentage points above the respective EU averages and represent 99.83 % of the Spanish business sector (Gobierno de España, 2021). Fourth, the period considered is broad encompassing both low and high levels of EPU including significant events such as the European bail-out in 2012, the post-financial crisis period, the Brexit poll in 2016, and the outbreak of COVID-19. These moments were critical for all economies but especially for Spain.

The contributions of this paper to the literature are as follows: (1) the study demonstrates the negative impact of EPU on SME financial performance; (2) the research shows how the industry sector is less affected and highlighting the importance of the sector in the impact of EPU on the SME performance; and (3) the results show that SMEs that are larger, younger, higher indebted, with more growth opportunities and with higher asset turnover are more resilient to EPU in terms of ROE. These findings provide more knowledge about the design of managerial strategies and policy-making decisions for dealing with EPU, one of the most important challenges for SMEs.

After the Introduction, Section 2 introduces the data obtained from the Orbis database. Section 3 justifies the methodology employed in this study. Section 4 shows the results, including the discussion. Finally, Section 5 exhibits the conclusions, the implications, and the limitations of the research.

2. Data

To study the impact of EPU on firm performance, a sample of 80,620 SMEs for the period 2012–2020 was selected. Data was obtained from the Orbis database of Bureau van Dijk (BvD). The sample of SMEs represent approximately 3 % of the total population of SMEs as Spain had 2,879,343 SMEs in December 2020 (Gobierno de España, 2020).

Medium-sized firms are classified by Orbis database considering those firms that meet at least one of the following features between these ranges: (1) operating income: 1–10 million euros; (2) total assets: 2–20 million euros; and (3) number of employees:15–150. Considering small firms, the maximum levels are as follows: (1) operating income: 1 million euros; (2) total assets: 2 million euros; (3) number of employees: 15; and (4) ratios of operating income per employee or total assets per employee: 100 euros. This classification has been followed by previous literature to represent Spanish SMEs such as Muñoz-García and Vila (2019).

Table 1 shows the distribution of the sample by sector and classification by size (medium or small enterprise).

Among other issues, the distribution between small and medium-sized enterprises is very similar, with small companies accounting for 51.55 % and medium-sized companies for 48.45 %. In terms of sectors, Wholesale (13,933), Business Services (11,608), Construction (9,351) and Retail (7,272) have the highest weight in the sample. This distribution is in line with the composition of SMEs in Spain, with the majority of SMEs being in commerce (21.34 %), followed by construction (12.3 %) (Instituto Nacional de Estadística, 2020). Therefore, the sample used is representative of the universe of SMEs in the Spanish economy.

The ROE (Return on Equity) was the proxy selected to represent the financial performance of SMEs. It is one of the most used ratios to measure financial performance (Rivera-Godoy, 2020) and represents the accounting profit obtained by shareholders.

To measure EPU, in this study, the index elaborated by Ghirelli et al. (2019) was used. This index is created using the frequency of coverage achieved by seven relevant newspapers in Spain: El Mundo, El País, ABC, La Vanguardia, Cinco Días, Expansión and El Economista. This index exhibits the articles frequency which, in these newspapers, appears at least one keyword associated to the classes of "uncertainty", "economics", and "politics". This index has been used, among others, by Shaikh (2020). Figure 1 shows the evolution of EPU in Spain over the study period. As can be seen, this uncertainty is dynamic, reaching peak values at significant moments such as: Spanish financial aid sought to reduce debt default risk, Brexit, and the COVID-19 outbreak.

The control variables used were financial and economic variables that are associated with financial performance. The firm's variables employed were size and age (Pacheco et al., 2020), capital structure (Pacheco et al., 2020), growth opportunities (Prsa, 2020), asset turnover (Prsa, 2020), the liquidity level (Yazdanfar and Öhman, 2016) and the nondebt tax shield (Caskey et al., 2012; Chandra et al., 2020).

Table 2 shows a brief description of the target variables.

Table 1
Sample distribution by sector and size.

Sector	Small-sized	Medium-sized	Total	Sector(1: Services, 2: Industries)
Agriculture, Horticulture & Livestock	1614	1526	3140	2
Banking, Insurance & Financial Services	516	100	616	1
Biotechnology and Life Sciences	27	44	71	1
Business Services	7968	3640	11,608	1
Chemicals, Petroleum, Rubber & Plastic	401	951	1352	2
Communications	113	128	241	1
Computer Hardware	5	10	15	2
Computer Software	280	291	571	1
Construction	5215	4136	9351	2
Food & Tobacco Manufacturing	1145	1756	2901	2
Industrial, Electric & Electronic Machinery	647	1050	1697	2
Information Services	2	4	6	1
Leather, Stone, Clay & Glass products	360	491	851	2
Media & Broadcasting	183	120	303	1
Metals & Metal Products	1821	1857	3678	2
Mining & Extraction	122	227	349	2
Miscellaneous Manufacturing	144	129	273	2
Printing & Publishing	757	487	1244	1
Property Services	2008	2294	4302	1
Public Administration, Education, Health Social Services	1571	1011	2582	1
Retail	4207	3065	7272	1
Textiles & Clothing Manufacturing	518	665	1183	2
Transport Manufacturing	97	228	325	1
Transport, Freight & Storage	1823	2403	4226	1
Travel, Personal & Leisure	3385	2144	5529	1
Utilities	691	290	981	1
Waste Management & Treatment	92	182	274	2
Wholesale	4999	8934	13,933	1
Wood, Furniture & Paper Manufacturing	851	895	1746	2
Total	41,562	39,058	80,620	

Note: The classification in Industry and Services was carried out according to the Instituto Nacional de Estadística (2017).

3. Methodology

Since the sample is a set of economic-financial data of 80,620 SMEs from 2012 to 2020, the panel data analysis approach was chosen, specifically the GMM system estimator. This method was selected for the following reasons: (1) it considers firm-specific factors; (2) it overcomes the modelling problem such as the potential endogeneity of the regressors; (3) it solves the dynamic panel bias problem and finite sample bias associated with fixed panel data; (4) it solves the dynamic panel bias problem and the finite sample bias associated with fixed panel data; and (5) it solves the dynamic panel bias problem and the finite sample bias associated with fixed panel data according to Arellano and Bover (1995) and Blundell and Bond (1998). However, the estimator system GMM uses as an instrument, the lagged dependent variable and/or any other endogenous variables with variables, thought to be uncorrelated with the fixed effects (Roodman, 2009b, p. 102). Therefore, the system GMM is a solution for the endogeneity issue (Roodman, 2009b). Moreover, the validity or not of the assumptions of the system GMM estimator is necessary to verify.

The issue of heteroscedasticity is a common challenge encountered by researchers, necessitating effective handling strategies. Currently, a prevalent approach to address heteroskedasticity of unknown form is the utilization of the GMM as outlined by (Baum et al., 2003). This method relies on orthogonality conditions, enabling efficient estimation in the presence of such heteroskedasticity. Moreover, GMM estimation is widely employed for models with endogenous variables, particularly lagged dependent variables, especially in situations with limited time horizons (Kripfganz, 2021).

The efficiency of GMM is advantageous for ensuring consistency even in the presence of arbitrary heteroskedasticity. However, this advantage is counterbalanced by the potential for suboptimal performance in finite sample sizes (Baum et al., 2003). Given the trade-off involving the risk of consistency loss. The principle of GMM lies in the assumption that the instruments Z are exogenous, denoted by $E(Z_i u_i) =$

Table 2
Variables description.

Variable	Definition	Calculation	Sources
EPU	Economic Policy Uncertainty	Economic Policy Uncertainty index average	Ghirelli et al. (2019)
ROE	Return on Equity	Net Income to equity	Orbis
SIZE	Firm Size	Natural logarithm of total assets	Database
AGE	Firm Age	Natural logarithm of the number of years in operation	
DR	Capital structure (totaldebt ratio)	Total debt to total assets	
GROW	Growth opportunities	Rate of change in sales revenue	
TURN	Asset turnover	Sales revenue to total assets	
LIQ	Liquidity	Current assets to short-term liabilities	
NDTS	Nondebt tax shield	Depreciation to total assets to total assets	

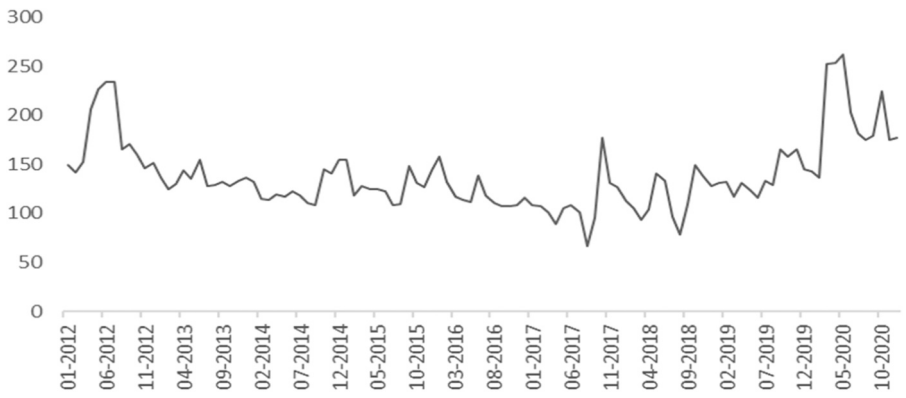

Fig. 1. EPU Spain evolution from 2012 to 2020.

0. The set of L instruments provides L moments, forming the basis for the estimation within the GMM framework (Kripfganz, 2019).

$$g_i(\widehat{\beta}) = Z_i'\widehat{u}_i = Z_i'(y_i - X_i\widehat{\beta}) \quad (1)$$

$L \quad x \quad 1$ is g_i. The exogenity shows the existence of L moments conditions, this condition is satisfied by the function, $E\{g_i(\beta)\} = 0$, the actual value of β (Baum et al., 2003). A sample moment corresponds to each of the L moment equations (Baum et al., 2003), and can be written as follows:

$$\overline{g}(\widehat{\beta}) = \frac{1}{n}\sum_{i=1}^{n}\overline{g}(\widehat{\beta}) = \frac{1}{n}\sum_{i=1}^{n}Z_i'(y_i - X_i\widehat{\beta}) = \frac{1}{n}Z'\widehat{u} \quad (2)$$

The idea behind GMM is to select an estimator for β by finding a solution to the equation $\overline{g}(\widehat{\beta}) = 0$ (Baum et al., 2003). If in the equation that will be estimated $L = K$, it is possible to assume that many equations exist (L moments conditions) as the K coefficients in $(\widehat{\beta})$. If $\overline{g}(\widehat{\beta}) = 0$ can be solved in this scenario. The resulting GMM method estimator is essentially the same as the IV estimator (Baum et al., 2003). If $L > K$ there are more equations than unknowns, in this scenario is not possible to find a $\widehat{\beta}$ that will ensure that all L sample moment conditions are precisely zero. Typically, the model is characterized by a high degree of overidentification, where the number of moment conditions (L) greatly exceeds the number of parameters to be estimated (K) (Kripfganz, 2019). A large number of instruments compared to the size of the cross-sectional sample can lead to biased estimates of coefficients and standard errors and reduce the power of specification tests (Roodman, 2009b). To solve this problem, it is applied an $L \quad x \quad L$ weighting matrix W and utilize for building a quadratic form within the moment conditions (Baum et al., 2003). An asymptotically efficient estimator necessitates the use of an optimal weighting matrix, which is essentially a consistent estimate of the inverse of the asymptotic covariance matrix $m(\widehat{\theta})$ (Kripfganz, 2019).

To determine the correlation between the independent and dependent variables, the second-order correlation in differences was taken to evaluate the first-order serial correlation in levels. Hansen (1982) test allowed to verify the instruments' validity that should not be correlated with the error term. At the same time, there was a second condition to guarantee the consistency of the system GMM estimation. The number of instruments should be equal or smaller to the number of groups in a regression to prevent finite sample bias. Finally, the p-values for the null hypothesis of additional moment conditions validity were evaluated by the Difference-in-Hansen test reports.

Additionally, Hansen J over-identification test was considered with a χ^2 distribution under the validity hypothesis of the instruments (Hansen and Singleton, 1982). The Hansen difference test was performed to evaluate the instruments' exogeneity (Wooldridge, 2002). Generally, the number of instruments tends to increase due to system GMM, which can affect the results in negative sense. Therefore, the dependent variable was lagged one period, and Roodman's (2009b) routine was taken to collapse the instrument matrix. Typically, the model is characterized by a high degree of overidentification, where the number of moment conditions (L) greatly exceeds the number of parameters to be estimated (K) (Kripfganz, 2019). A large number of instruments compared to the size of the cross-sectional sample can lead to biased estimates of coefficients and standard errors and reduce the power of specification tests (Roodman, 2009b). To solve this problem, it is applied an $L \quad x \quad L$ weighting matrix W and utilize for building a quadratic form within the moment conditions (Baum et al., 2003). An asymptotically efficient estimator necessitates the use of an optimal weighting matrix, which is essentially a consistent estimate of the inverse of the asymptotic covariance matrix $m(\widehat{\theta})$ (Kripfganz, 2019).

$$W(\widehat{\theta}) = \left(\frac{1}{N}\sum_{i=1}^{N}m_i(\widehat{\theta})m_i(\widehat{\theta})'\right)^{-1} \quad (3)$$

The weight matrix, $W(\widehat{\theta})$, can be derived from an inefficient initial GMM estimator, which results from selecting a suboptimal W during the estimation process (Kripfganz, 2019). Thus, give the GMM function: $J(\widehat{\beta}) = n\overline{g}(\widehat{\beta})'W\overline{g}(\widehat{\beta})$. The optimal value for $\widehat{\beta}$, which minimizes $J(\widehat{\beta})$, can be estimated using a GMM estimator. The GMM estimator that achieves maximum efficiency is the one that employs an optimal weighting matrix W, which minimizes the estimator's asymptotic variance (Baum et al., 2003).

The system GMM estimators are commonly used techniques for estimating parameters in panel data settings with "small T, large N" dimensions, where the number of time periods is limited, and there are many individuals. This method proves particularly useful when the independent variables are not strictly exogenous, and when they are correlated with past and current error terms. Moreover, they have the capability to handle fixed effects, heteroskedasticity, and autocorrelation within individuals (Roodman, 2009a), it accomplishes this by exploiting both the moment conditions from the first-differenced equations and the moment conditions from the levels equations.

The GMM estimator system relies on instrumental variables (IV) derived from lagged levels of the endogenous variables to address the potential endogeneity of these variables. These instruments help control for unobserved individual heterogeneity and improve the efficiency of the estimates. By combining moment conditions from both the first-difference and levels equations, System GMM takes advantage of the orthogonality between the differenced and undifferenced error terms to obtain consistent estimates of the parameters. The estimates of the System GMM model are considered efficient and unbiased, if, for example, the validity of the instruments and the absence of model misspecification. That said, the tests described briefly below are necessary.

Initially, to confirm that the term of the error does not have a problem of serial correlation, it was used the Arellano and Bond (1991) test. The test involves estimating a dynamic panel data model using a method such as the GMM. The estimator accounts for both serial correlation and heteroscedasticity by using appropriate moment conditions. If there is evidence to reject the null hypothesis. This suggests that the moment conditions are misspecified, and serial correlation or heteroscedasticity is present in the residuals.

Secondly, in the first-difference residuals, Nickell (1981) test allowed us to see the first and second-order serial correlations. This test aims to detect the presence of serial correlation resulting from the inclusion of fixed effects in dynamic panel data models; the serial correlation violates the assumption of independence among the error terms. Like the Arellano and Bond test, it is necessary to estimate a dynamic model, such as the GMM, so from the estimated model are then tested for serial correlation using standard diagnostic tests. It should be noted that this test focuses specifically on evaluating whether the inclusion of lagged dependent variables as regressors induces serial correlation in the model residuals.

Lastly, we test for first and second-order autocorrelation. Thus, it can be concluded that there are first and second-order autocorrelation. For this reason, it was applied the test AR (3) to estimate the regressions considered, allowing for more reliable inference and interpretation of regression results.

4. Results and discussion

4.1. Basic descriptive statistics

The description of the statistics (Table 3) reveals that medium-sized companies have, on average, a higher ROE, larger size, older age, lower indebtedness, more opportunities for growth, higher turnover, lower liquidity, and lower nondebt tax shield compared to small companies. Distinguishing by sector, on average, companies in the industrial sector have a lower ROE, larger size, older age, higher indebtedness, more

Table 3
Description of the statistics of the variables.

Variable	Mean					Standard Deviation				
	Full Sample	Small	Medium	Services	Industries	Full Sample	Small	Medium	Services	Industries
ROE	4.529	2.418	6.774	4.775	4.061	26.903	30.505	22.224	27.131	26.457
EPU	138.250	138.250	138.250	138.250	138.250	27.821	27.821	27.821	27.821	27.821
SIZE	6.885	6.079	7.743	6.822	7.005	1.243	0.909	0.939	1.255	1.211
AGE	2.862	2.779	2.951	2.845	2.895	0.549	0.531	0.555	0.546	0.554
DR	78.795	81.908	75.483	78.367	79.609	119.233	125.136	112.518	118.365	120.861
GROW	5.111	3.446	6.882	3.898	7.416	43.883	43.359	44.366	41.266	48.386
TURN	2.720	2.493	2.962	2.913	2.353	5.636	5.490	5.777	6.302	4.054
LIQ	2.411	2.508	2.307	2.538	2.168	4.741	5.008	4.437	5.122	3.904
NDTS	3.427	3.689	3.148	3.446	3.392	4.148	4.378	3.869	4.503	3.371

growth opportunities, lower turnover, less liquidity, and a higher non-debt tax shield than companies that belong to the service sector.

Table 4 shows the variables bivariate correlations used with most of them being significant at the level of 5 % or less. As suggested by Hair et al. (2010), the correlation coefficient between all the explanatory variables among themselves and the dependent variables is below the maximum threshold of 0.90. Thus, there is no problem of multicollinearity.

4.2. Results of the dynamic panel regression analysis using GMM models

Table 5 presents the results of the EPU influence on ROE considering the SME sector. The results evidence a negative and significant EPU impact, being the significance level below 1 %, on the ROE, mainly in service sector companies. This result confirms the scarce evidence for SMEs (Ballantine et al., 1993; García-Gómez et al., 2021). Regarding control variables, the results corroborate the previous literature. It is observed that better ROE gets with larger SIZE (Amoroso et al., 2017; Nie et al., 2020), lower AGE (Coad et al., 2018), higher DR (López-Valeiras et al., 2016; Kudlyak & Sánchez, 2017), and higher LIQ (Nunes et al., 2010; La Rocca et al., 2019). Likewise, in the case of service sector firms, a higher TURN also favors a better ROE (Christina, 2019).

However, the most interesting to analyze is whether firm characteristics can moderate the EPU impact on financial performance. For this purpose, the explanatory variables have been replaced by these interaction terms with EPU.

The results in Table 5 and Table 6 show the dynamic panel estimators that can only be used once two conditions have been verified. On the one hand, the Hansen test on the overidentification of restrictions, given by the J statistic, whereby if it is rejected the null hypothesis, this shows the absence of correlation between the instruments and the error term, which enables the instruments used to be accepted. In both estimations (Table 5 and Table 6), the null hypothesis of Hansen's test was rejected. The Arellano-Bond autocorrelation test of first and second-order differences was performed with the following hypothesis tests: null hypothesis equal to the non-existence of first and/or second-order autocorrelation, against the alternative hypothesis equal to the existence of first/second-order autocorrelation. In both of the two estimations, there is statistical evidence to support the hypothesis that there is a 2nd order autocorrelation, so it was considered necessary to carry out the 3rd order autocorrelation test. In this case, the results present significant statistical evidence for not rejecting the null hypothesis of the 3rd-order autocorrelation.

According to Table 6 the results show that the higher SIZE, DR, and LIQ led to a better ROE in both sectors. The first is additional evidence that uncertainty affects the performance of smaller firms to a greater extent (Ballantine et al., 1993; Singh et al., 2019; García-Gómez et al., 2021). Generally, SMEs are lesser willing to modernize proactively (Nie et al., 2020), and they are lesser stable in responding to uncertainties (Ang et al., 1982; Pettit and Singer, 1985).

The result about DR and LIQ would align with the Flexibility Theory, where firms try to hold excess capacity of debt or larger cash balances to meet unexpected future requirements (Diamond, 1991). The DR findings reinforce Kudlyak and Sánchez's (2017) results, who demonstrate how those SMEs that were lower financially dependent suffered more during the 2007–2009 financial crisis. Debt could be a restrictive factor and could have a higher adverse impact on the SMEs growth in crisis times (Serrasqueiro et al., 2018). It would be explained by the Information-asymmetry Theory, where the greater uncertainty aggravates the asymmetries of the information between lenders and borrowers and increases the problems of financing (Greenwald and Stiglitz, 1990). Whatever, the need for more research is necessary. Botta (2020) demonstrates that an inadequate capital structure (too little or too much debt) produces poorer hotel SMEs' financial performance.

Considering LIQ, the findings are aligned with the evidence that high liquidity is a precautionary measure in uncertain times (Bhaduri and Kanti, 2011), especially for SMEs (Baum et al., 2012). Analyzing SMEs Portuguese, Nunes et al. (2010) defended that liquidity catalyzes SME profitability in the upper quantiles of the profitability distribution service SMEs, especially for younger ones (Nunes et al., 2012). Gao et al. (2017) showed how high liquidity levels are associated with high uncertainty to reduce the negative impact. Firms that work in uncertain environments generally prefer high levels of cash (Demir and Ersan, 2017), although U-shaped is possible (Su et al., 2020). Traditionally, the reasons given for this positive association is that higher levels of cash in SMEs permit them to increase profitability through mitigating the risk of higher cost short-term financing (Fagiolo and Luzzi, 2006) or capitalizing investment opportunities (Honjo and Harada, 2006).

On the contrary, lower AGE lead a better ROE. This finding matches with Nunes et al. (2010). Their higher flexibility (Loderer and Waelchli, 2010; Bartz and Winkler, 2016) and ability to quickly respond to adversity (Cioppi et al., 2014; Tubagus, 2018) are critical for obtaining better performance. This reason could be made possible the structural change in Spain during the financial crisis when SMEs significantly increased their exports, the so-called "Spanish miracle" as Aparicio-Pérez et al. (2022) pointed. Therefore, this paper is contributing to shedding more light on this topic. A recent literature review by Coad et al. (2018) pointed to the necessity for more in-depth research to explain the opposing influences of the age ("more experience, however more rigidities") because the combined effect on performance is uncertain.

Finally, in the case of service sector SMEs, a higher TURN also favors a better ROE in the company. This finding could explain the results of García-Gómez et al. (2021) with tourism SMEs. An earlier study already noted how an adequate policy improves the service sector's performance (Duggan et al., 2013).

5. Conclusions

Every day, firms face multiple uncertainties, one of which stems from economic policy. A growing literature has explored EPU on different aspects of firms, with business performance being the indicator that may be one of the best measures reflecting this impact. This study contributes to the literature by exploring the performance of Spanish SMEs and

Table 4
Variables bivariate correlations.

Variable	ROE	EPU	SIZE	AGE	DR	GROW	TURN	LIQ	NDTS
ROE	1.000								
EPU	-0.074***(0.000)	1.000							
SIZE	0.042***(0.000)	-0.033***(0.000)	1.000						
AGE	-0.077***(0.000)	-0.007***(0.000)	0.302***(0.000)	1.000					
DR	-0.122***(0.000)	0.048***(0.000)	0.008***(0.000)	-0.147***(0.000)	1.000				
GROW	0.144***(0.000)	-0.070***(0.000)	0.016***(0.000)	-0.082***(0.010)	0.004***(0.002)	1.000			
TURN	-0.032***(0.000)	-0.016***(0.000)	-0.182***(0.000)	-0.148***(0.000)	0.018***(0.000)	0.053***(0.000)	1.000		
LIQ	0.011***(0.000)	-0.039***(0.000)	0.057**(0.000)	-0.056***(0.000)	-0.137***(0.000)	-0.031***(0.000)	-0.108***(0.000)	1.000	
NDTS	-0.022***(0.000)	-0.017***(0.000)	-0.150***(0.000)	-0.103***(0.000)	-0.063***(0.000)	-0.018***(0.000)	0.014***(0.000)	-0.049***(0.000)	1.000

Note: ***, ** and * indicate the significance at 1 %, 5 % and 10 % levels, respectively.

analyzing the role that sector and firm characteristics play in this relationship. Considering the weight of SMEs in other European countries, Spanish SMEs are taken as a sample because they play a more significant role in Spain than in the European Union as a whole (Gobierno de España, 2021).

Among the main findings, it is first noted that the impact of EPU on SME financial performance is negative and significant, especially in the service sector revealing the risk of this uncertainty for Spanish SMEs. Secondly, firm size plays a moderating role in this impact. Small firms are the most vulnerable to high EPU due to their limitations in terms of capabilities and resources. Thirdly being young could be an advantage as younger Spanish SMEs more aggressive in facing uncertainty than older ones. Fourthly, a high level of debt provides flexibility to respond to adversities. Fifthly and combined with the prior conclusion, a high liquidity level supports responding to challenges posed by higher uncertainty. Those Spanish SMEs that maintain high liquidity levels permit greater flexibility for asset and liability management. While times of uncertainty can provide an abundance of investment opportunities, they are also typically times of financing constraints. Sixthly, Spanish SMEs with higher growth opportunities are lesser affected by EPU probably due to their capacity to take of advantage of this characteristic. And seventhly, higher asset turnover reduces the impact of EPU on the SMEs dedicated to the service sector. These results differ from other research show that some sectors (utilities, industrial, telecommunications) remain indifferent to changes in EPU (Rehman et al., 2019). Differences are also observed across countries or regions where high EPU affects investment decisions in different ways (Phan et al., 2018; Kong et al., 2022), and even discourage firms in their organizational performance (Razumovskaia et al., 2020; Tabash et al., 2023).

Therefore, the profile of a Spanish SME best suited to meet the challenges of EPU are those firms dedicated to the industrial sector that are medium size and young and that have high indebtedness, high liquidity, with more growth opportunities, and higher asset turnover. These characteristics make them more conducive to facing uncertainty. Small Spanish enterprises, compared to medium-sized firms, are younger, more indebted, and have more liquidity, but they have lesser growth opportunities and lower asset turnover. Thus, given the key role played by size, the current handicaps of the Spanish medium-sized firms are age and liquidity levels. By extension, the weaknesses of SMEs in other countries can be deduced by checking whether their characteristics are similar to those in Spain. These weaknesses can be counteracted if open innovation measures are adopted among firms from different sectors (Guede-Cid et al., 2021). As has been shown, in times of crisis, the ability to reduce costs and introduce technologies in SMEs are the main driver of innovation (Razumovskaia et al., 2020).

These findings have managerial and policy-making implications. SME managers could gain size for supporting their performance and increasing their indebtedness could spur it on. Open innovation also could be an important aspect of improving organizational performance to create opportunities for companies to compete with partners, customers, and suppliers (Rumanti et al., 2023). Maintaining high levels of liquidity could take advantage of uncertain times, allowing making profitable investments. Concerning the more mature firms, their greater vulnerability of the financial performance to EPU shows the need to be more flexible to cope better with uncertainty. Furthermore, public authorities could make more effort to establish policies that enable SMEs better face uncertainty, such as financial aid, fiscal subsidies, direct aid for exporting abroad, or facilities for digitalization, including the application of technologies such as machine learning and artificial intelligence (AI). These technologies could predict sector-specific growth trajectories and identify emerging trends, as well as the exploration of causal relationships and a deeper understanding of the drivers of SME growth and resilience (Al-Karkhi, 2024).

However, it is worth mentioning that this study is not exempt from limitations, as it is a study of a single country. The characteristics of Spanish SMEs and the environment in which they operate are not

Table 5
Results of the EPU impact on SME financial performance considering the sector.

Variable	Services			Industries		
	Coef.	Corrected Std. Err.	t(P>|t|)	Coef.	Corrected Std. Err.	t(P>|t|)
ROE_{t-1}	0.285	0.010	28.45***(0.000)	0.283	0.011	25.24***(0.000)
EPU_t	-0.106	0.014	-7.48***(0.000)	-0.056	0.013	-4.21***(0.000)
SIZE $_{t-1}$	3.025	0.237	12.76***(0.000)	3.015	0.294	10.24***(0.000)
AGE t-1	-3.209	0.264	-12.16***(0.000)	-3.891	0.361	-10.77***(0.000)
DR $_{t-1}$	0.016	0.001	12.03***(0.000)	0.017	0.002	9.29***(0.000)
GROW $_{t-1}$	-0.000	0.009	-0.04(0.969)	0.026	0.017	1.55(0.121)
TURN $_{t-1}$	0.002	0.001	2.11**(0.034)	-0.002	0.001	-1.58(0.115)
LIQ $_{t-1}$	0.655	0.079	8.34***(0.000)	0.839	0.099	8.49***(0.000)
NDTS $_{t-1}$	-0.035	0.019	-1.85*(0.064)	-0.072	0.055	-1.30(0.194)
Nº Observations	376,670			187,670		
Nº Groups	53,810			26,810		
Nº Instruments	290			287		
Test AR (3)	-0.67			-0.55		
Test Hansen of over –identification	1432.04***			2029.93***		
Test Diff-in Hansen of exogeneity	711.67***			532.13***		

Note: ***, ** and * indicate the significance at 1 %, 5 % and 10 % levels, respectively.

Table 6
Results of the EPU impact on SME financial performance working in the service and industrial sectors considering the role of the firm characteristics.

Variable	Services			Industries		
	Coef.	Corrected Std. Err.	t(P>|t|)	Coef.	Corrected Std. Err.	t(P>|t|)
ROE_{t-1}	0.3051	0.0100	30.61***(0.000)	0.3000	0.0113	26.47***(0.000)
EPUt*SIZE $_{t-1}$	0.0054	0.0005	11.08***(0.000)	0.0056	0.0007	8.15***(0.000)
EPUt*AGE t-1	-0.0147	0.0009	-15.93***(0.000)	-0.0171	0.0013	-13.48***(0.000)
EPUt*DR $_{t-1}$	0.0001	7.15e-06	12.71***(0.000)	0.0001	0.0000	7.47***(0.000)
EPUt*GROW $_{t-1}$	0.0002	0.0001	3.30***(0.001)	0.0004	0.0001	3.74***(0.000)
EPUt*TURN $_{t-1}$	0.00002	8.84e-06	2.26**(0.024)	-8.84e-06	0.0000	-0.88***(0.380)
EPUt*LIQ $_{t-1}$	0.0038	0.0003	11.04***(0.000)	0.0062	0.0007	8.76***(0.000)
EPUt*NDTS $_{t-1}$	-0.0002	0.0001	-1.51(0.131)	-0.0001	0.0003	-0.28(0.781)
Nº Observations	376,670			187,670		
Nº Groups	53.810			26,810		
Nº Instruments	291			288		
Test AR (3)	-0.61			-0.53		
Test Hansen of over –identification	1955.00***			2681.56 ***		
Test Diff-in Hansen of exogeneity	827.85***			711.61***		

Note: ***, ** and * indicate the significance at 1 %, 5 % and 10 % levels, respectively.

necessarily similar to those of SMEs that work in other countries. These facts suggest further research to extend the study to SMEs in different countries and continents. This could lead to the identification of country-specific social, political, or economic factors that could influence the relationship between EPU and SME performance. Another limitation of the study is that, in the large sample of 80,620 SMEs classified in the service or industry sector, there are companies from a multitude of very different sub-sectors. Thus, a replication of this study focussing on the impact of EPU on specific sectors could be explored. Such a distinction could provide results revealing how EPU affects SME performance based on their activities enabling specific recommendations for these enterprises to better navigate EPU variations.

Ethical statement for solid state ionics

Hereby, I Carmen Orden-Cruz consciously assure that for the manuscript *Economic Policy Uncertainty and SMEs' Financial Performance: industry vs. service sector* the following is fulfilled:

1) This material is the authors' own original work, which has not been previously published elsewhere.

2) The paper is not currently being considered for publication elsewhere.

3) The paper reflects the authors' own research and analysis in a truthful and complete manner.

4) The paper properly credits the meaningful contributions of co-authors and co-researchers.

5) The results are appropriately placed in the context of prior and existing research.

6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.

7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

CRediT authorship contribution statement

Mari Cruz Sánchez-Escobedo: Writing – review & editing, Writing

– original draft, Supervision, Conceptualization. **Victor Moutinho:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Carmen Orden-Cruz:** Writing – review & editing, Writing – original draft, Project administration, Investigation, Formal analysis, Conceptualization. **Jessica Paule-Vianez:** Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare not conflicts of interest o competing interest.

The authors declare don`t have any patents or copyrights that are relevant to the work in the manuscript.

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