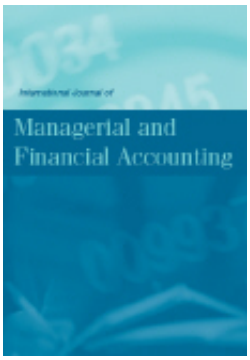

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Firms' operating leverage and external shocks: does economic policy uncertainty matter?

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Firms' operating leverage and external shocks: does economic policy uncertainty matter?

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Abstract: This paper investigates the association between operating leverage and economic policy uncertainty based on a sample of French listed firms over 2002–2021. We provide robust evidence that firms tend to lower their operating leverage when economic policy uncertainty increases. This result continues to hold after controlling for endogeneity and conducting a series of robustness tests. Based on the real options theory framework, our results imply that, in an uncertain economic environment, firms may be inclined to cancel or defer their risky investment projects to avoid sunk costs. Our cross-sectional tests further demonstrate that the influence of economic policy uncertainty on operating leverage is less prominent in firms with high profitability and investment intensity. These pieces of evidence contribute to the scarce literature on the exogenous determinants of operating leverage and have practical implications for both investors and regulators.

Keywords: economic policy uncertainty; operating leverage; firms profitability; investment intensity.

JEL codes: G30; G32; D21.

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1 Introduction

Since the seminal work of Bloom (2009), the importance of Economic policy uncertainty (hereafter EPU) has risen significantly in today's interconnected world (Al-Thaqeb and Algharabali, 2019). As the world is evolving swiftly, events such as political instability, financial crises (Pastor and Veronesi, 2012; Husted and Saffar, 2022), global summits (Kelly et al., 2016) and regulatory changes (Baker et al., 2016) creates an unpredictable environment, that can affect the economic atmosphere in which a company operates (Gulen and Ion, 2016).

Economic policy uncertainty is mainly manifested in the uncertainty surrounding government policies and regulations including fiscal, regulatory and monetary policies (Baker et al., 2016). EPU has been a prevalent phenomenon in the recent years, as excessive uncertainty can deter investment, increase stock market volatility and slow economic growth (Baker et al., 2016; Pastor and Veronesi, 2012; Bloom, 2009). Alam et al. (2023) further show that rising economic policy uncertainty is detrimental to financial stability. A situation where investors find it difficult to assess current and future market conditions, which makes asset management complex.

Numerous studies have shown how macroeconomic uncertainties affect firm risk-taking and investment decisions (Panousi and Papanikolaou, 2012; Tran, 2019). For example, during periods of high economic policy uncertainty, firms hold more cash (Phan, et al., 2019), launch fewer initial public offerings (Colak et al., 2017), implement more conservative payout policies (Walkup, 2016), engage in fewer merger and acquisition activities (Bonaime et al., 2018; Nguyen and Phan, 2017), reduce capital expenditure (Julio and Yook, 2012; Gulen and Ion, 2016; Xu, 2020). Similarly, the negative effect of EPU applies to firms' capital structure as well. Prior theoretical research demonstrate that firms tend to lower their leverage ratio in face of increasing economic policy uncertainty (Zhang et al., 2015). Compared to financial leverage, the effect of EPU on firm's operating leverage has received less attention in the empirical literature. This study endeavours to fill this gap by investigating the relationship between economic policy uncertainty and operating leverage in France covering the period 2002–2021.

The choice of firm-level operating leverage is one of the fundamental issues in cost accounting because it impacts the company's risk level, operating flexibility, firm performance cyclicality and value (McDaniel, 1984). Despite its importance, there is surprisingly little research on how a company should decide on its operating leverage in

the event of uncertainty. Operating leverage is a measure of the volatility of the company's operating income following a variation in revenue (endogenous, exogenous or mixed). This leverage is an increasing function of fixed operating costs. It is widely understood that having high operating leverage or high fixed-to-variable cost ratios contributes to firm risk. The higher the fixed-to-variable cost ratio, the more sensitive the firm's profit to uncertain market demand (Kulchania, 2016). Lev (1974) posit that higher operating leverage makes the company unable to cut costs quickly in response to a demand shock, which lead to higher systematic risk for the firm. Novy-Marx (2011) confirms this relation by showing that higher operating leverage is compensated with a higher risk premium. Recently, Kahl et al. (2019) relate operating leverage to financial policies and show that high fixed cost follows conservative financial policies to sustain investment when sales forecasts are uncertain. In this study, we try to shed light on whether and how uncertainty introduced by economic policy influences the operating leverage management.

This research question is important for two reasons. First, as EPU influences firm's investment behaviour and hence the broader economy, investors and policymakers should be aware of how businesses respond to uncertainty in terms of operating leverage. Examining this issue is fundamental to effective financial management, risk mitigation and informed decision-making. Moreover, investigating this research question in the French market could add significant value to the literature. The French economy has experienced significant levels of economic uncertainty. Events such as the Iraq war (2003), the subprime crisis (2007–2009), the Euro crisis (2010–2012); the Brexit vote (June 2016); the presidential election run-off between Macron and Le Pen (April-May in 2017) and the COVID-19 pandemic (2020–2021), among others, aroused the interest of academics and all market participants alike. We plot the monthly trends of the French EPU index in Figure 1 (page 10).

A long stream of literature analyses the relationship between uncertainty, corporate investment decision, and its operating leverage through the lens of the real options approach. The conceptual framework of real options was developed by Myers (1977) who was the first to recognise the potential value of applying the financial options to real investment projects. It refers to options embedded in investment opportunities such as abandonment, deferment, expansion and growth options. Focusing on irreversible investments, which are particularly sensitive to high uncertainty, McDonald and Siegel (1986) and Dixit and Pindyck (1994) show that uncertainty increase real option values and that firms tend to defer investment with high sunk costs, to a period where the economic policies are relatively more stable. Wong (2009) shows that the presence of abandonment options leads to deferred investment and consequently lower firm's operating leverage. Likewise, Shrieves (1981) reports that high uncertainty coupled with risk aversion leads to lower levels in expected output, a decline in employment of the fixed factor, and ultimately lower value for the firm accompanied by lower operating leverage. Drawing on the real options investment theory, Kallapur and Eldenburg (2005) argue that increased demand uncertainty drives managers to choose technologies that have lower fixed costs. This is because a more rigid or less flexible cost structure increases firm risk and are more affected by uncertainty shocks. He et al. (2022) further aver that uncertainty shock affects adversely investment when managers are less optimistic about firm's business prospects. Indeed, firms in highly uncertain business environments do not invest aggressively even if investment opportunities are high.

Recent empirical work supports the wait-and-see effect using different sources of uncertainty and form of investments. Gulen and Ion (2016) find that an increase in EPU is accompanied by reduced capital investment in the US. Furthermore, Julio and Yook (2012) document that an increase in political uncertainty surrounding national elections induces firms to reduce investment expenditures by 4.8%. Wang et al. (2017) show that corporate R&D investment declines in the face of political uncertainty. According to Xu (2020), firms with more exposure to EPU have a lower propensity to issue equity and debt and face higher cost of capital, which in turn hinder corporate innovation. Liu and Zhang (2020) suggest that EPU leads to a decline in firms' investment and net debt issuance for private firms. Iqbal et al. (2020) find evidence that economic policy uncertainty reduces firm performance. Li (2020) shows that insider trades increase significantly during high uncertainty period, negatively affecting firm performance and increasing risks. Kong et al. (2022) find that EPU influences firms' investment decisions by exacerbating the risk of overinvestment or underinvestment. Zhang et al. (2015) further report that economic policy uncertainty worsens the external financing environment and affects negatively firms' capital structures through both supply and demand. Indeed, as economic policy uncertainty increases, the information asymmetry between borrowers and creditors becomes greater and, at the same time, corporate future cash flows become more volatile, which in turn implies a higher cost of debt and ultimately lower leverage. In addition, Tran (2019) suggests that uncertainty surrounding economic policy reduces corporate risk taking propensities and pressure managers for more conservative decisions (Gulen and Ion, 2016). The negative effect is more pronounced in countries with higher uncertainty avoidance culture and lower individualistic culture. Jing et al. (2023) provide strong evidence that stock price crash risk increases in the face of prevalent uncertainty. That is, companies are more likely to be cautious in their investments when EPU is high, which in turn reduces the risk of a crash. Going along with this line, Lu et al. (2023) argue that increased economic policy uncertainty leads firms to choose to wait-and-see, which in turn increases financial pressure and default risk. Based on the above analysis, it is reasonable to predict a negative relation between EPU and operating leverage.

On the empirical front, we use a panel data of 565 French companies over 2002–2021. Our paper figured out that higher economic policy uncertainty reduces operating leverage. This result continues to hold after controlling for endogeneity and conducting a series of robustness tests. In line with the real options theory, our results imply that in an uncertain economic environment, firms are more inclined to cut back on production and administrative overhead, but above all, to postpone their risky investment projects to avoid sunk costs. Our cross-sectional tests further demonstrate that the negative effect of EPU on operating leverage is less pronounced in firms with high profitability and investment intensity.

This study contributes to the literature in two significant ways. First, a large body of literature has studied the effect of EPU on corporate investment (Chen et al., 2019; Julio and Yook, 2012; Gulen and Ion, 2016), stock returns (Pastor and Veronesi, 2012) and financing decisions (Phan et al., 2019; Zhang et al., 2015), but no research to our knowledge has investigated the influence of EPU on operating leverage. The negative relationship between operating leverage and EPU supports the real options theory and highlights the operating risk management by firms when facing EPU. Such operating risk management impacts, via systematic risk channel, the firm cost of equity. Second, we support additional evidence on the exogenous determinants of the firm's operating

leverage. Previous research focused on the effect of price regulations (Holzhacker et al., 2015), risk-taking (Aboody et al., 2018), product market competition (Babar and Habib, 2022) and corporate social responsibility activities (Harjoto, 2017; Hamza et al., 2023) on cost structure. Our work adds to this growing literature by determining how, during uncertain times, companies in the French market make investment decisions that may have an impact on operating leverage.

The remainder of the paper proceeds as follows. Section 2 presents the sample and methodology. Section 3 reports the empirical findings, Section 4 discuss the robustness tests, the penultimate section presents additional analysis and Section 6 concludes the paper.

2 Data and methodology

2.1 Data

We start our sample with all French listed firms included in Worldscope. Following previous studies, we exclude financial firms (SIC codes between 6000 and 6999), and firms that have missing or incomplete financial data. The final sample includes 565 French listed firms from 2002 to 2021. Accounting and financial data were collected from the Worldscope database. The EPU index data were extracted from the website developed by Baker et al. (2016)[1]. Country-level data is sourced mainly from the international monetary fund (IMF) and the World Bank. Recession indicators were collected from the OECD website. Appendix presents the definitions and data sources for all the variables used in the analysis.

2.2 Variables description

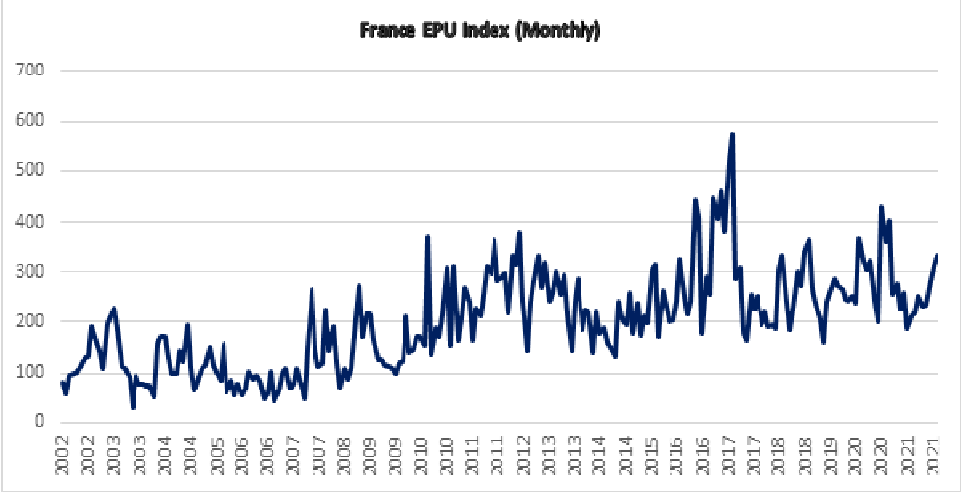
In this study, we focus on firm's operating leverage, which captures the balance between fixed and variable costs employed. Our measure of operating leverage (OPLEV) is the costs-to assets ratio (Novy-Marx, 2011). We follow Chen et al. (2019) and calculate it as selling, general, and administrative (SGA) expenses divided by total assets at the end of the previous year.

Our key explanatory variable is the EPU index proposed by Baker et al. (2016), which captures the degree of EPU in France, based on newspaper coverage frequency. The detailed EPU indexes can be obtained from the EPU Website. This indicator is constructed from a count of articles in major French newspapers such as 'Le Monde' and 'Le Figaro' that contain the terms: 'uncertainty' or 'uncertain', 'economic' or 'economy' and at least one key term related to policy making such as 'congress', 'parliament', 'legislation', 'regulation', 'budget' and 'deficit'. The EPU index is updated at the monthly frequency. Thus, we use the natural logarithm of the average monthly EPU index as a proxy for uncertainty in France.

Figure 1 displays the time trend of the French economic policy uncertainty index over January 2002–December 2021. The EPU index in France seems to fluctuate often with large amplitudes during our study period. Most peaks mark major world and national events. For example, there are significant spikes around the dates of the Iraq war (2003), the Euro crisis (2010–2012); the Brexit vote (June 2016); the presidential election run-off between Macron and Le Pen (April-May in 2017) and most recently, the COVID-19

pandemic. The first peak occurred in the first quarter of 2003 with the Iraq war invasion due to rising oil price concerns. The second peak coincided with the European sovereign debt crisis between 2010 and 2012 as risk premiums for several EU countries attained historically high levels. Furthermore, the third peak occurred around the Brexit vote in the third quarter of 2016 given the closer trade ties with the UK[2]. Finally, we see high peaks of uncertainty about future economic policies during the France's 2017 election and the outbreak of the COVID-19 pandemic in the last quarter of 2019.

Figure 1 French Economic Policy Uncertainty Index charted over January 2002–December 2021 (see online version for colours)



Consistent with prior literature (e.g., Babar, and Habib, 2022; Chen et al., 2019; Harjoto, 2017; Kulchania, 2016), we control for the following firm-specific characteristics in our regression analysis.

1 Size (SIZE) defined as the natural logarithm of total assets. Larger firms are usually able to capitalise their economies of scale. Therefore, we expect that larger firms to have lower operating leverage.

2 Market-to book ratio (MTB) to control for investment opportunities, defined as the ratio of market value of equity to the book value of equity. High-growth firms have more flexibility to raise capital and, hence, can have a high operating leverage.

3 Tangibility (TANG) calculated as the ratio of net property, plant, and equipment to total assets. Tangible assets are expected to be positively related to operating leverage.

4 Liquidity (LIQ) measured by firm's current assets divided by current liability: LIQ is expected to be negatively related to operating leverage because firms with greater liquidity ratio have lower investment in fixed assets.

5 Cash flow volatility (CFV) defined as the standard deviation of EBITDA over total assets is also expected to be negatively related to operating leverage.

Table 1 Descriptive statistics and correlation

Panel A: Summary statistics

Variable	*Obs.*	*Mean*	*Standard deviation*	*Min*	*Max*
OPLEV	2796	0.311	0.236	0.034	0.897
EPU	2796	231.797	68.061	74.587	317.118
SIZE	2795	12.081	3.726	4.204	17.539
MTB	2499	2.754	2.542	–0.36	10.07
TANG	2772	0.147	0.129	0.005	0.472
LIQ	2769	1.931	1.222	0.685	5.361
CFV	2783	0.063	0.072	0.004	0.272
LEV	2771	0.247	0.175	0.005	0.623
ROA%	2750	–6.240	19.455	–59.33	12.61
SALES_GR	2728	0.087	0.252	–0.312	0.798

Panel B: Correlation matrix and VIF

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
EPU (1)	1								
SIZE (2)	–0.223***	1							
MTB (3)	0.067***	–0.244***	1						
TANG (4)	–0.077***	0.275***	–0.137***	1					
LIQ (5)	0.054***	–0.466***	0.161***	–0.202	1				
CFV (6)	0.092***	–0.530***	0.170***	–0.193***	0.142***	1			
LEV (7)	0.078***	0.081***	–0.149***	0.282***	–0.371***	0.034	1		
ROA% (8)	–0.171***	0.664***	–0.238***	0.212***	–0.259***	–0.574***	–0.091	1	
SALES_GR (9)	0.009	–0.007	0.088***	–0.006	0.001	0.018	0.001	0.021	1
VIF	1.07	2.67	1.11	1.19	1.60	1.61	1.32	2.22	1.03

Notes: This table provides summary statistics and correlation matrix. The sample period from 2002 to 2021. Appendix A presents the definitions and data sources for all the variables used in the analysis. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

6 Leverage ratio (LEV) defined as the ratio of total debts to total assets; The relationship between financial leverage and operating leverage is ambiguous. On one hand, in line with the trade-off theory, higher leverage increases financial risk and, hence, a negative relation is expected with operating leverage. On the other hand, firms with high leverage will invest more in future projects, thereby increasing operating leverage (Harjoto, 2017).

7 Return on assets (ROA) is a proxy for firm profitability, calculated as net income divided by total assets. Profitable businesses increase operating leverage by boosting future project investments. On the other hand, risk-averse managers can choose to distribute dividends from profits rather than make new investments, resulting in lower operating leverage

8 Sales growth (SALE_GR), measured as the percentage change in sales. Firms invest more during periods of high sales growth, thereby increasing operating leverage

2.3 Summary statistics and correlation

For a preliminary understanding of the variables, the statistical information and the correlation matrix of the variables used in our empirical analysis are presented in Panel A and Panel B of Table 1, respectively. All continuous variables are winsorised at the 1% and 99% levels to mitigate potential outliers. The mean value of OPLEV is 0.311 which seems to be quite close with those of Chen et al. (2019) (0.322). The mean value of yearly EPU in France is 231.797, with a minimum and maximum value of 74.587 and 317.118 respectively, indicating that the uncertainty varies greatly during the sample period. Furthermore, Panel B of Table 1 indicates that multicollinearity is not a concern in our regressions.

3 Empirical analysis

3.1 Model specification

We estimate the relation between EPU and firm's operating leverage using the following model:

$$\begin{aligned} OPLEV_{it} = {} & \beta_0 + \beta_1 LnEPU_{it} + \beta_2 SIZE_{it} + \beta_3 MTB_{it} \\ & + \beta_4 TANG_{it} + \beta_5 LIQ_{it} + \beta_6 CFV_{it} + \beta_7 LEV_{it} \\ & + \beta_8 ROA_{it} + \beta_9 SALES_G R_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where $OPLEV_{it}$ is the firm's operating leverage at year t. $LnEPU_t$ is the annualised EPU index in year t. Controls variables include firm size, market to book ratio, tangibility, liquidity, CFV, leverage ratio, ROA, and sales growth. ε_{it} is the error term.

3.2 Main results

The panel data structure allows to apply a fixed effect regressions[3]. model to examine the relationship between the EPU index and firm's OPLEV. The empirical results are reported in Table 2. Columns 1 of Table 2 shows that economic policy uncertainty has

significantly negative effect on the firm's operating leverage. A rise in EPU index by one standard deviation leads to a decrease of 0.01% of the standard deviation in a firm's OPLEV, which is economically significant. Consistent with our hypothesis, firms lower their operating risk, when they face a high uncertainty due to the precautionary motives and investment delays in perspective. The signs of the coefficients on the control variables are consistent with those in prior literature (Babar and Habib, 2022; Chen et al., 2019; Harjoto, 2017). Operating leverage is positively and significantly related to sales growth and negatively related to size, liquidity and ROA.

Table 2 Economic policy uncertainty and operating leverage

Variables	*Fixed effects (1)*	*Double clustering by firm and year (2)*	*Newey-West (3)*	*Prais-Winsten (4)*
LnEPU	–0.049***	–0.049***	–0.047***	–0.022*
	(–6.13)	(–6.69)	(–3.45)	(–1.83)
SIZE	–0.007*	–0.007	–0.016***	–0.017***
	(–1.68)	(–1.12)	(–6.87)	(–6.74)
MTB	0.001	0.001	0.009***	0.002**
	(0.97)	(0.66)	(4.49)	(2.13)
TANG	–0.124**	–0.124*	–0.327***	–0.370***
	(–2.07)	(–1.95)	(–7.99)	(–7.10)
LIQ	–0.011***	–0.011*	–0.027***	0.000
	(–2.83)	(–1.86)	(–5.14)	(0.06)
CFV	–0.006	–0.006	0.150	–0.082
	(–0.12)	(–0.09)	(1.51)	(–1.45)
LEV	–0.033	–0.033	–0.135***	0.037
	(–1.21)	(–0.87)	(3.51)	(1.27)
ROA	–0.0008**	–0.0008*	–0.001***	–0.0006**
	(–2.70)	(–1.73)	(–4.17)	(–2.20)
SALES_GR	0.015***	0.015**	0.014**	0.017***
	(6.49)	(2.42)	(2.25)	(8.84)
Intercept	0.704***	0.704***	0.846***	0.674***
	(9.51)	(7.53)	(9.37)	(8.69)
Firm_FE	Yes	No	No	No
Sample size	2389	2,368	2389	2389
Adj Rsq		0.701		0.234
F-value	11.31***	7.38***	45.54***	82.20***

Notes: This table presents the panel data regression results. In each specification, the dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

Table 2 also tabulates results using alternative econometric models. In particular, we use OLS regression with two-dimensional cluster effects at the firm and year levels (Petersen, 2009). Column 2 of Table 2 indicates that the coefficient of LnEPU index (–0.049) remains negative and statistically significant at the 1% level. Identical results are obtained with Newey-West (Column 3) and Prais-Winsten (Column 4) regressions to account for serial correlation of the standard errors. Overall, these results highlight that uncertainty shocks motivate managers to be extra cautious during uncertain times, resulting in lower firm's operating risk.

Table 3 Robustness checks

Variables	*Additional control variables*
LnEPU	–0.046***
	(–3.65)
SIZE	–0.010**
	(–2.09)
MTB	0.002
	(1.36)
TANG	–0.091
	(–1.41)
LIQ	–0.012***
	(–2.80)
CFV	–0.011
	(–0.19)
LEV	–0.016
	(–0.55)
ROA	–0.000**
	(–2.60)
SALES_GR	0.015***
	(6.44)
GDP	–0.032
	(–0.64)
INFL	–0.009**
	(–2.18)
Intercept	1.197*
	(1.75)
Sample size	2,203
F-value	9.26***

Notes: This table presents the results of robustness checks with Additional control variables. The dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

4 Robustness tests

4.1 Controlling for macroeconomic conditions

To enhance the reliability of our main results, we conduct several robustness checks. First, uncertainty measure may be the facade of some macro-level variation, which explain away the negative effect on operating leverage. To alleviate this concern, we follow Babar and Habib (2022) and add several variables to control for macroeconomic conditions, such as gross domestic product (GDP), measured as the natural logarithm of GDP per capital. Firms operating in high GDP countries experience higher investment levels, leading to higher operating leverage. But the business environment may be better for companies in high GDP counties, which could enable them to gain economies of scale and lower operational leverage. We, therefore, do not predict the sign on GDP. We also include Inflation (INFL) to capture the state of the economy (Babar and Habib, 2022). A negative association is expected as firms may prefer to have flexible cost structures, given the pressure of high inflation on the economy. Panel regression was re-run with the additional control variables, and the results are presented in Table 3. After controlling for macroeconomic conditions, the coefficient of LnEPU index remains negative and significant, indicating that our results are robust to omitted-variable-bias concerns.

4.2 Controlling for endogeneity

4.2.1 Generalised method of moments (GMM) regression

We apply the dynamic GMM estimations to control for potential endogeneity problems. According to Novy-Marx (2011), the degree of operating leverage is highly persistence over time. Therefore, we include the one year lagged value of the dependent variable as additional variable into the regression model to take the time structure of OPLEV into account: The results are reported in Table 4. As can be seen, our variable of interest LnEPU reveals a significantly negative effect on operating leverage and hence underlines our prior finding. With regards to the Arellano-Bond (second order autocorrelation) and the Hansen tests of the over identifying restrictions, we can further confirm that the model is not overidentified and the instruments used are valid. In conclusion, our findings hold after controlling for the endogeneity issue. This result is consistent with our hypothesis that high EPU negatively influences operating leverage.

4.3 Sub-periods test: recessionary Vs expansionary period

Additionally, we test the robustness of our findings by examining how the effect of EPU on operating leverage differs on average in weak economic conditions during which, uncertainty is extremely high (Pástor and Veronesi, 2012). Specifically, we split our sample based on Recession identified by the Organisation of Economic Development (OECD) to reflect economic conditions and estimate our empirical model in each of these sub-samples, respectively. Recession is a dummy variable that equals one for the recessionary period, and zero for expansionary period. Columns (1 and 2) of Table 5 indicate that the negative effect of EPU on operating leverage applies to both good and poor economic conditions. However, the effect is stronger when the economic state is poorer.

Table 4 Endogeneity issue

Variables	*GMM*
L.Dep.Var	0.443***
	(11.30)
LnEPU	–0.022**
	(–2.36)
SIZE	–0.008**
	(–2.36)
MTB	0.006***
	(2.76)
TANG	–0.250***
	(–3.33)
LIQ	–0.015**
	(–2.40)
CFV	–0.002
	(–0.03)
LEV	–0.018
	(–0.39)
ROA	–0.000*
	(–1.81)
SALES_GR	0.028***
	(4.46)
Intercept	0.428***
	(5.01)
AR (2) test	0.322
Hansen test	1.000
Sample size	2,310
F-value	437.51***

Notes: This table presents the results of generalised method of moments (GMM) regression. The dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

4.4 Alternative EPU measures

We further check whether our results hold if we consider alternative measure for the country-level EPU index. We rerun our regressions using the World Uncertainty Index (WUI) developed by Ahir et al. (2022) to measure EPU (Table 6, Columns 1). Ahir et al. (2022) construct quarterly indices of EPU by using the frequency of the word 'uncertainty' in the quarterly Economist Intelligent Unit country reports. Since the EPU data are year-frequency, we take the mean value of quarterly WUI to measure EPU on year-frequency (Atsu and Adams, 2021). A higher value of WUI usually stands for a higher level of uncertainty and vice versa. We also employ a dummy variable (D_EPU)

instead of the continuous variable (Table 6, Columns 2). D_EPU is a dummy variable that takes a value of 1 if EPU is equal to or greater than the median EPU, and 0 otherwise. In addition, we re-estimate our baseline regression model using the Global EPU index developed by Baker et al. (2016), which is a GDP-weighted average of national EPU indices for 20 countries (Table 6, Columns 3). Overall, the results remain qualitatively unchanged and show a negative relationship between EPU and operating leverage.

Table 5 Robustness checks: economic conditions

Variables	*Economic conditions*	
	Poor (1)	*Good (2)*
LnEPU	–0.055***	–0.045***
	(–3.90)	(–4.44)
SIZE	–0.010	0.006
	(–1.63)	(0.88)
MTB	–0.000	0.006***
	(–0.04)	(2.64)
TANG	–0.068	–0.177*
	(–0.81)	(–1.91)
LIQ	–0.012**	–0.015**
	(–2.19)	(–2.13)
CFV	0.014	0.009
	(0.19)	(0.11)
LEV	0.018	–0.104**
	(0.48)	(–2.39)
ROA	–0.001**	–0.001*
	(–2.46)	(–1.78)
SALES_GR	0.014***	0.031***
	(5.04)	(4.00)
Intercept	0.754***	0.521***
	(6.43)	(4.66)
Sample size	1328	1061
F-value	5.87***	7.73***

Notes: This table presents the results of the role of Economic conditions on the relationship between EPU and operating leverage. In each specification, the dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

Table 6 Robustness checks: alternative EPU measure

Variables	*Alternative EPU measure*		
	LnWUI (1)	*D_EPU (2)*	*Global_EPU (3)*
LnWUI	–0.017***		
	(–2.86)		
D_EPU		–0.032***	
		(–5.71)	
Global_EPU			–0.057***
			(–8.18)
SIZE	–0.009*	–0.008*	–0.006
	(–1.97)	(–1.84)	(–1.34)
MTB	0.001	0.002	0.001
	(1.18)	(1.46)	(0.83)
TANG	–0.076	–0.083	–0.089
	(–1.26)	(–1.39)	(–1.50)
LIQ	–0.011***	–0.011***	–0.012***
	(–2.67)	(–2.77)	(–3.03)
CFV	–0.009	–0.004	–0.002
	(–0.16)	(–0.08)	(–0.04)
LEV	–0.042	–0.015	0.002
	(–1.52)	(–0.57)	(0.08)
ROA	–0.000***	–0.000**	–0.000**
	(–2.66)	(–2.43)	(–2.47)
SALES_GR	0.015***	0.015***	0.015***
	(6.62)	(6.49)	(6.39)
Intercept	0.419***	0.449***	0.695***
	(6.63)	(7.26)	(10.21)
Sample size	2,389	2,389	2,389
F-value	7.95***	10.75***	14.67***

Notes: This table presents the results of robustness checks with the alternative measures for EPU. In each specification. In each specification, the dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

4.5 The lagged effect of economic policy uncertainty on corporate operating leverage

Given that some investment plans are made in advance and are difficult to postpone or cancel, the negative effect of EPU on operating leverage should be also observed with a lag. In order to explore this relationship, we replace LnEPU by the one-period lagged LnEPU variable. Column (1) of Table 7 indicate that, ceteris paribus, an increase in economic policy uncertainty leads to higher operating leverage one year ahead.

We further examine the influence of EPU on firms' operating leverage in the long run. We analyse firm operating leverage two and three years ahead in our baseline model. The results are presented in Columns (2 and 3) of Table 7. Our findings show that EPU is still significantly and negatively related to firms' future operating leverage across all models at the 1% level. The results suggest that EPU decrease corporate operating leverage and the negative effect persists up to three years ahead.

Table 7 The lagged effect of economic policy uncertainty on corporate operating leverage

Variables	*Dependent variables*		
	OPLEVt+1	*OPLEVt+2*	*OPLEVt+3*
LnEPU	–0.029***	–0.028***	–0.020***
	(–4.00)	(–4.01)	(–2.99)
SIZE	–0.017***	–0.019***	–0.019***
	(–3.82)	(–4.10)	(–4.14)
MTB	0.006***	0.007***	0.007***
	(4.96)	(5.22)	(5.18)
TANG	0.051	0.047	0.046
	(0.86)	(0.81)	(0.79)
LIQ	–0.037***	–0.038***	–0.041***
	(–9.54)	(–9.78)	(–10.25)
CFV	0.142***	0.098*	0.084
	(2.60)	(1.82)	(1.57)
LEV	–0.076***	–0.089***	–0.088***
	(–2.79)	(–3.31)	(–3.24)
ROA	–0.001***	–0.001***	–0.001***
	(–4.27)	(–4.45)	(–3.53)
SALES_GR	0.000	–0.001	–0.000
	(0.16)	(–0.52)	(–0.19)
Intercept	0.723***	0.741***	0.706***
	(9.99)	(10.28)	(9.78)
Sample size	2,146	2,073	1,919
F-Value	23.62***	24.12***	21.27***

Notes: This table presents results of the lagged effect of economic policy uncertainty on corporate operating leverage. In each specification, the dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

5 Economic policy uncertainty and operating leverage: cross sectional analyses

The analysis in Section 3 reveals that firm's operating leverage decreases with EPU. However, this effect might not be constant across firms. We next turn to examine the

cross-sectional variation in the relation between economic policy uncertainty and operating leverage:

Table 8 Additional analyses: the moderating role of profitability and investment intensity

Variables	*Firm profitability (1)*	*Investment intensity (2)*
LnEPU	–0.049***	–0.061***
	(–6.17)	(–5.91)
ROA	–0.006**	–0.001***
	(–2.03)	(–3.49)
LnEPU*ROA	0.0009*	
	(1.76)	
INV_INT		–1.641*
		(–1.76)
LnEPU*INV_INT		0.374**
		(2.16)
SIZE	–0.009*	–0.007
	(–1.92)	(–1.55)
MTB	0.001	0.001
	(0.90)	(0.81)
TANG	–0.124**	–0.147**
	(–2.06)	(–2.38)
LIQ	–0.012***	–0.012***
	(–2.99)	(–2.90)
CFV	–0.007	0.020
	(–0.14)	(0.35)
LEV	–0.032	–0.038
	(–1.17)	(–1.34)
SALES_GR	0.015***	0.015***
	(6.50)	(6.27)
Intercept	0.724***	0.757***
	(9.67)	(8.94)
Sample size	2,389	2,248
F-value	10.50***	13.04***

Notes: This table presents results of cross sectional variations in the relationship between EPU and operating leverage. In each specification, the dependent variable is OPLEV. The sample includes 565 French listed firms over the period from 2002 to 2021. *, **, *** denote significance at 10%, 5% and 1% level respectively. The T-statistics are given in brackets.

First, we examine whether firm's profitability affect our main findings. Prior evidence reports that uncertainty about government economic policy or EPU leads firms to cancel or postpone projects to avoid future risks (e.g., Pastor and Veronesi, 2012; Baker et al., 2016). Accordingly, we would expect highly profitable firms be less vulnerable to EPU shock, because they enjoy better access to credit. In other words, the magnitude of the

negative relation between the EPU index and operating leverage would be less pronounced for firms with higher profitability. To investigate the moderating effect of firm profitability in this context, we use ROA that indicates how well a company uses its assets to generate earnings. To this end, we include an interaction term between ROA and the EPU index. Results displayed in Table 8 Column (1) show that the estimated coefficient on ln(EPU) is negatively significant, and the estimates on the interaction term is positively significant in the whole-period regression. This implicates that the adverse effect of uncertainty shocks on operating leverage is less severe for firms with high profitability.

Our second cross-sectional effect relates to investment intensity. In line with the wait-and-see channel, studies suggest that uncertainty about economic policy drives up the cost of finance, lowering investment and deepening economic contraction (Colak et al., 2017; Pastor and Veronesi, 2012). The same negative effect applies to capital expenditures (Gulen and Ion, 2016), M&A activities (Nguyen and Phan, 2017) and innovation (Bhattacharya et al., 2017). As EPU increases, economic activity would experience a decrease, thus reducing investment and operating leverage. Consequently, we posit that the negative association between EPU and operating leverage would be less pronounced for firms with high investment intensity. We define investment intensity (INV_INT) as capital expenditures scaled by beginning-of-year total assets. We add the interaction term between INV_INT and LnEPU in Column (2) of Table 8. The result shows that the coefficient of the interaction term is significantly positive at the 1% level, which indicates that investment intensity weakens the negative impact of EPU on operating leverage.

6 Conclusions

EPU has become a key issue around the world in recent years. Baker et al. (2016) indicate that EPU affects adversely both macro- and micro-level economic activities, driving different market participant behaviour. Frequent changes in economic policies can deter Firms' investment decisions, increase stock market volatility and slow economic growth (Pastor and Veronesi, 2012; Gulen and Ion, 2016; Baker et al., 2016; Bloom, 2009). For precautionary reasons, when economic policy uncertainty is high, firms choose to wait in place and postpone investment in fixed assets (Kang et al., 2014; Caixe, 2022), corporate R&D investment (Wang et al., 2017; Xu, 2020), mergers and acquisitions (Nguyen and Phan,2017; Bonaime et al., 2018) and hold greater cash balances (Demir and Ersan, 2017; Phan et al., 2019).

In this paper, we examine the effect of economic policy uncertainty on operating leverage in the French context over the sample period from 2002 to 2021. First, we figure out a significant and negative relationship between EPU and OPLEV. This result is consistent with our hypothesis that Firms tend to lower their operating leverage when economic policy uncertainty increases. Our main results survive in several endogeneity tests and other robustness tests. The real options theory provides a support to these findings, suggesting that firms prefer to cancel or defer their risky investment projects during episodes of high uncertainty to avoid sunk costs. Furthermore, we show that the effects of EPU on operating leverage is less pronounced in firms with high profitability and high investment intensity.

Our study contributes to the scarce literature on the exogenous determinants of operating leverage and provides new insight into how and to what extent EPU affects cost structure decisions. In particular, it highlights the operating risk management by firms when facing economic policy uncertainty. Such operating risk management impacts, via systematic risk channel, the firm cost of equity. In the area of corporate policy and performance, operating leverage is of vital importance because of its significant effect on the company's intrinsic business/economic risk, and thereby its equity value and expected rate of return (McDaniel, 1984).

These findings have important practical implications for decision makers. In terms of financial risk management, our findings suggest the need for more cost structure adaptability and flexibility in adjusting to changing economic and political conditions. In addition, market investors should reconsider their portfolio management in terms of sensitivity of firm's OPLEV to EPU.

The present study also has certain limitations. Our evidence on the relationship between EPU and operating leverage in the French economy offers new questions that may warrant additional research, such as the sensitivity of French equity returns to EPU shocks and the role of investor sentiment in the stock market. Furthermore, our study could be extended to the European or even international context. Finally, the use of alternative uncertainty indices in different European countries could be more advantageous in future studies.

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Notes

1 See www.policyuncertainty.com.

2 See https://www.ons.gov.uk/ business industry and trade/ international trade/ articles/ who does the uk trade with /2017- 02-21.

3 We run the Hausman (1978) test to choose between fixed effect and random effect model. The results of the Hausman (1978) Specification-Test, show that the fixed effect model, is more appropriate.

Appendix

Definitions and sources of variables

Variable	*Definition*	*Source*
OPLEV	The ratio of selling, general, and administrative (SGA) expenses to total assets at the end of the previous year	Authors' calculation based on data from Worldscope
LnEPU	The natural logarithm of the average monthly EPU index in a given year from Baker et al. (2016)	Baker et al. (2016)
SIZE	The natural logarithm of total assets	Authors' calculation based on data from Worldscope
MTB	The ratio of market value of equity to the book value of equity	As above
LEV	The ratio of total debt to total assets;	As above
TANG	The ratio of Net property, plant, and equipment to total assets	As above
LIQ	Firm's current assets divided by current liability	As above
CFV	The standard deviation of EBITDA over Total assets	As above
SALE_GR	The percentage change in sales	As above
ROA	Firm's profitability calculated as net income divided by total assets.	
	Variables used in robustness tests	
GDP	The natural logarithm of GDP per capital	World Bank
INFL	Inflation rate	International monetary fund (IMF)
Recession	Recession is a dummy variable that equals one for the recessionary period, and zero for expansionary period, identified by the Organisation of Economic Development (OECD) to reflect economic condition	The organisation of economic development (OECD)
LnWUI	Natural logarithm of the World Uncertainty Index (WUI) from Ahir et al. (2022) constructed using the frequency of the word 'uncertainty' in the quarterly Economist Intelligent Unit country reports. Since the EPU data are year-frequency, we take the mean value of quarterly WUI to measure EPU	Ahir et al. (2022)
D_EPU	Dummy variable that takes a value of 1 if EPU is equal to or greater than the median EPU, and 0 otherwise	Baker et al. (2016)
Global_EPU	Natural logarithm of the global economic policy uncertainty index from Baker et al. (2016)	Baker et al. (2016)
INV_INT	Investment intensity defined as capital expenditures scaled by beginning-of-year total assets	Worldscope