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International diversification and corporate cash holding behavior: What happens during economic downturns?

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ABSTRACT

This study uses fixed-effect regressions estimated with heteroskedasticity-consistent standard errors to investigate the effect of international diversification on corporate cash holding behavior of French-listed firms during economic downturns. The findings show that internationally diversified firms are less inclined to save cash out of their cash flows than their undiversified counterparts. However, during economic downturns, the relationship shifts and shows that international diversification is positively associated with the propensity of firms to save cash out of their cash flows. The negative relationship between international diversification and the propensity of firms to save cash out of their cash flows suggests that risk-reducing effects coupled with easy access to external finance prevail over the high agency costs and information asymmetry associated with international companies. However, during economic slumps, this relationship becomes positive, highlighting a significant influence of the financial crisis on internationally diversified firms relative to their stand-alone counterparts. Thus, this study should provide useful insights for academics, practitioners as well as financial regulators.

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Introduction

International diversification has attracted increasing interest in recent decades. Previous research has extensively investigated the relationship between international diversification and firm value and is at best inconclusive (Thomas and Eden, 2004; Glaum and Oesterle, 2007; Rugman et al., 2011 and Lawrey and Morris, 2019). A recent trend of literature has studied the effect of international diversification on another important feature of corporate policies: cash holdings (Pinkowitz et al., 2015; Wu et al., 2016 and Atanasova and Li, 2019).

Companies around the world are generating more cash. Bates et al. (2009) report that the average cash holding ratio for US industrial firms more than doubled between 1980 and 2006. More recently and according to S&P Global, US non-financial companies hold more cash on their balance sheets than ever, moving from \$1.64 trillion in cash at the end of 2013 to \$2.7 trillion at the end of 2017. Moreover and according to Moody's, non-financial firms in Europe, the Middle East and Africa recorded \$1 trillion in cash in 2017. The increase in the amount of generated cash worldwide raises the issue of why firms save more cash out of their cash flows. Therefore, the purpose of this study is to examine the relationship between international diversification and the propensity of firms to save cash out of their cash flows.

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Almeida et al. (2004) are the first to investigate the issue of corporate cash policy by focusing on the cash flow sensitivity of cash. The authors develop a model that links financial constraints to a firm propensity to save cash out of their cash flows and use the cash flow sensitivity of cash as a proxy for financial constraints. A high amount of cash flow signals high firm investment opportunities. Hoarding cash by reducing the amount of cash flows implies a decrease in valuable investments. Then, holding cash becomes costly. The authors prove that only financially constrained firms have a positive cash flow sensitivity of cash, suggesting that financing frictions affect the corporate cash policies of a firm. However, financially unconstrained firms have no use of cash. Accordingly, the sensitivity of cash holdings in Almeida et al. (2004) is only driven by firm financial constraints.

The present study extends previous research and investigates the effect of international diversification on corporate cash holding behavior. Moreover, insights are obtained on the characteristics of international firms that affect their cash holding behavior. The potential benefits of international diversification have been widely examined by previous literature. They include a decrease in risk exposure (Khanna and Yafeh, 2005) and increased access to international capital markets (Doukas and Pantzalis, 2003). However, costs of international diversification may stem from the agency theory perspective, which suggests that managers have higher discretion to extract private benefits from internationally diversified corporations (Rajan et al., 2000).

Hence, there are claims that international diversification is beneficial for firms and counter-claims that diversification is costly. Relying on these arguments, international diversification could be either positively or negatively associated with the propensity of firms to save cash out of their cash flows. The relationship between international diversification and corporate cash holding behavior is therefore ambiguous and remains an interesting theoretical and empirical issue.

Very few studies have analyzed the relationship between international diversification and cash holdings (Pinkowitz et al., 2015; Wu et al., 2016 and Atanasova and Li, 2019). The present research complements and deepens these studies by focusing on the effect of international diversification on corporate cash holding behavior during the financial crisis in a continental European context, i.e., France. The impact of the recent crisis on capital markets around the globe is striking. This crisis is at the origin of the high cash holding records of American firms. For instance, an article in the New York Times in 2013 argues that "higher cash holdings are due to the uncertainty of the economic environment in the aftermath of the financial crisis. Firms may also face greater difficulty in getting credit on short notice and need to hold more cash as a precaution".¹ The effect of the financial crisis on the value of diversified firms has attracted attention in the recent literature. For instance, Volkov and Smith (2015) show that during recessions, there is an improvement in the valuation of diversified firms. Kuppuswamy and Villalonga (2015) show that the value of corporate diversification has increased during the global financial crisis. Recently, Garrido-Prada et al. (2019) show that geographic diversification is a valuable strategy during economic downturns in Spain. This line of research is extended to investigate the link between international diversification and corporate cash holding behavior in periods of economic downturns. Han and Qiu (2007) and Denis and Sibilkov (2010) emphasize that, in response to an increase in uncertainty, firms hoard cash for precautionary purposes, supporting the theoretical prediction of the motive of precautionary savings.

The contributions of this paper are twofold. First, the issue of cash holdings of diversified firms and, in particular, the propensity of firms to save cash out of their cash flows has received little attention in the literature (Teclezion, 2012). The present research extends such studies by focusing on the effect of international diversification on corporate cash holding behavior in the French context. To the best of our knowledge, no previous study has investigated this relationship in France. French firms have increased the amount of cash they hold in the last decade. Carlino et al. (2014) highlight the high level of cash for CAC 40 firms from 2009 to 2014. These firms rank third after US and Japanese companies in terms of the amount of liquidity held. Regarding international diversification, the French government stresses the importance of internationalization for French firms and is implementing incentives to increase their internationalization.² Currently, more than 80% of French exports are by multinational firms. Second, this paper adds to the academic literature by shedding new light on the effect of the recent crisis on the cash holding behavior of internationally diversified firms. The relationship between international diversification and corporate cash holding behavior may differ in periods of economic downturns.

The empirical findings show that French firms save cash out of their cash flows and that international diversification is negatively associated with the propensity of firms to save cash out of their cash flows. This result suggests that risk-reducing effects coupled with easy access to external finance prevail over high agency costs and information asymmetry. However, during the financial crisis, the results show that the relationship between international diversification and the propensity of firms to save cash out of their cash flows becomes positive, highlighting the significant moderating effect of the financial crisis. Hence, internationally diversified firms are more inclined to save cash out of their cash flow than domestic firms, suggesting that, during economic downturn periods, French internationally diversified firms adopt precautionary savings behavior because they face exacerbated information asymmetry and high financial external costs.

The remainder of the paper is organized as follows. Section 2 presents the literature review and hypothesis development. Section 3 describes the sample and research design. Section 4 discusses the empirical findings, and Section 5 concludes the paper.

¹ Bruce Bartlett, The New York Times, February 12, 2013

² https://www.insee.fr/fr/statistiques.

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2. Literature review and hypothesis development

2.1. International diversification and the propensity of firms to save cash out of their cash flows

Theoretical arguments suggest that international diversification has both cash-enhancing and cash-reducing effects. Implications of agency theory could provide support to how international diversification positively affects the propensity of firms to save cash out of their cash flows. Jensen (1986) suggests that internal funds at the free disposal of managers may provide considerable opportunities for managers to extract private benefits and maintain high cash balances. Hence, agency costs (Denis et al., 1997 and Rajan et al., 2000) and information asymmetry (Duru and Reeb, 2002; Harris et al. 1982) may underlie the relationship between international diversification and the propensity of firms to save cash out of their cash flows.

Agency costs may be higher for international companies due to information asymmetries and monitoring costs (Wright et al., 2002). Under the monitoring cost hypothesis, Chung et al. (2005) argue that companies operating in opaque information environments hold less cash. In such environments, shareholders support high agency costs due to the difficulty of monitoring managers. Harris et al. (1982) also document that information is less transparent and managerial monitoring is costlier in diversified firms. The information asymmetry and agency costs incurred by international companies lead them to increase the amount of their cash holdings (Ozkan and Ozkan, 2004). The complexity of international firms' operations may further increase agency problems by decreasing the ability of shareholders to monitor managers (Kim and Mathur, 2008; Edwards and Weichenrieder, 2009).

Doukas and Pantzalis (2003) document that information asymmetry in internationally diversified firms is high, which may increase the agency cost of debt. These firms are less inclined to access the debt market and instead stockpile large cash savings. As reported by Tong (2011), firm diversification reduces the value of corporate cash holdings because investors perceive the inefficient use of cash. These findings are consistent with the agency monitoring hypothesis.

Under agency theory, internationally diversified firms incur high agency costs and information asymmetry, which may cause a positive shift in the propensity of firms to save cash out of their cash flows relative to their undiversified counterparts. Moreover, international firms are exposed to additional risks, such as political and exchange rate risks, compared with those operating in the domestic market (Chen et al., 1997; Reeb et al., 1998). The preceding discussion leads to the following hypothesis:

 H_{1a} : There is a positive relationship between international diversification and the propensity of firms to save cash out of their cash flows.

Conversely, alternative motives favor a lower propensity of firms to save cash out of their cash flows for international firms. From a portfolio theory perspective (Markowitz, 1959), diversified firms are less risky. Hughes et al. (1975) find that internationally diversified firms have lower systematic, idiosyncratic, and total risks. Galai and Masulis (1976) document that diversification leads to a decrease in corporate and bankruptcy risks (Amihud and Lev, 1981). Risk-reducing effects are also documented by Khanna and Yafeh (2005) and Hann et al. (2013). A portfolio of multinational firms is associated with less total and systematic risk than a portfolio of domestic firms (Fatemi, 1984). Mansi and Reeb (2002) show that diversified firms are likely to be less exposed to default risk than their stand-alone counterparts.

Internationally diversified firms also have better access to external financial markets (Volkov and Smith, 2015; Doukas and Pantzalis, 2003). According to the debt co-insurance effect, diversified firms are more leveraged than domestic firms because the former can easily access global financial markets. As discussed by Lewellen (1971), the aggregation of imperfectly correlated segment cash flows reduces default risk and thus increases firm debt capacity compared with undiversified firms. Empirically, Eiteman et al. (2001) suggest that diversification is linked to an increase in debt capacity. Hence, easy access to capital markets leads internationally diversified firms to reduce the amount of cash they save out of their cash flows.

Internationally diversified firms operate in different markets and may have access to several external sources of funds. In addition, these firms are associated with risk-reducing effects. As a result, international diversification may mitigate the propensity of these firms to save cash out of their cash flows. The former debate leads to the following alternative hypothesis:

 H_{1b} : There is a negative relationship between international diversification and the propensity of firms to save cash out of their cash flows.

2.2. The effect of the global financial crisis on the propensity of firms to save cash out of their cash flows

The recent financial crisis has substantially affected external finance conditions around the world. The effect of this crisis on diversified firms has recently attracted the attention of numerous researchers. Most of these studies examine the influence of the recent crisis on firm value (Caulkins et al., 2015; Kuppuswamy and Villalonga, 2015; Volkov and Smith, 2015 and Bucci and Russo, 2019). The relationship between international diversification and the propensity of firms to save cash out of their cash flows in periods of economic downturns remains an open and interesting empirical question.

Keynesian theory posits a precautionary motive for cash holdings. According to Keynes (1936), firms hoard cash to hedge against the risk of future cash shortfalls. The precautionary motive is also highlighted by Duchin (2010), who argues that during uncertainty, firms accumulate cash for precautionary incentives, particularly those related to external finance.

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Table 1Sampling procedure.	
Sample selection	Firm-year observations
Non-finance-related listed firms - firms with missing data Final sample	5824 <u>- 845</u> 4979

Lins et al. (2010) suggest that internally generated funds are likely to act as a buffer against economic downturns. Han and Qiu (2007) and Denis and Sibilkov (2010) argue that cash provides firms with liquidity during periods of uncertainty.

Furthermore, Minsky (1982) documents that economic downturns exacerbate information asymmetry, particularly for international firms. The financial crisis would accentuate the problem of adverse selection among international firms, leading them to hoard cash to hedge against cash flow uncertainty (Mikkelson and Partch, 2003 and Pathak, 2019).

As the financial crisis was associated with a high level of uncertainty, Kuppuswamy and Villalonga (2015) document that external capital markets became costlier during the crisis period. As a consequence, international firms decrease their leverage levels during recession and increase reliance on their asset liquidity. Volkov and Smith (2015) investigate the effect of diversification on firm value during periods of economic downturns. They find an 8.8% increase in the relative value of globally and industrially diversified firms but a decrease in diversified firms' leverage during recessionary periods. Recently, Garrido-Prada et al. (2019) show that geographic diversification is a valuable strategy during economic downturns in Spain. A material change in firm financing policy during the recent financial crisis is expected due to higher information asymmetry in international firms and costly external capital markets. The precautionary motive may then increase the propensity of diversified firms to hold cash out of their cash flows. The above consideration leads to the following hypothesis:

 H_2 : There is a positive relationship between international diversification and the propensity of firms to save cash out of their cash flows during the financial crisis.

3. Data and research design

3.1. Sample and data

The initial sample includes all non-financial French listed firms available in the DIANE database. The sample time period goes from 2004 to 2011 and enables us to study the effect of the recent financial crisis specifically, which is the purpose of our study. Financial companies (65.00–70.99 and 74.15 NACE codes³) are excluded due to their specific accounting rules. The initial sample includes 5824 firm-year observations. A total of 845 observations are removed due to data unavailability. The final sample consists of 4979 observations (see Table 1 above). Financial and accounting data are extracted from the DIANE database.⁴

3.2. Empirical model specification

The first regression model (Eq. (1)) is derived from Almeida et al. (2004) and examines the effect of international diversification on the propensity of firms to save cash out of their cash flows. The second model (Eq. (2)) includes an interaction term to assess the effect of international diversification on the relationship between cash flow and cash holdings. The third regression model (Eq. (3)) adds an additional interaction term to investigate whether the global financial crisis affects the relationship between international diversification and the propensity of firms to save cash out of their cash flows.

Regarding the regression technique, nullity of firm and time effects is assumed to be inappropriate given the heterogeneity across the sampled firms and the contextual changes in firm cash conditions and the effects of the global crisis. As a consequence, our three regression models are run controlling for time and individual firm fixed effects. These models are estimated with heteroskedasticity-consistent standard errors clustered at the firm level.

$$\begin{aligned} \text{Cash holdings}_{it} &= \alpha_0 + \alpha_1 \text{Cash flow}_t + \alpha_2 \text{Diversification}_t + \alpha_3 \text{Size}_{t-1} \\ &+ \alpha_4 \text{M/B} \text{Ratio}_{t-1} + \alpha_5 \text{Tangibility}_{t-1} + \alpha_6 \text{Volatility}_{t-1} + \alpha_7 \text{Sales}_{t-1} \\ &+ \alpha_8 \text{ST} \text{Debt}_{t-1} + \lambda_i + \mu_t + \varepsilon_{it} \end{aligned}$$
(1)

Cash holdings_{*it*} = $\alpha_0 + \alpha_1$ Cash flow_{*it*} + α_2 Diversification_{*it*}

$$+ \alpha_{3} (\text{Cash flow } * \text{ Diversification})_{it} + \alpha_{4} \text{Size}_{it-1} + \alpha_{5} \text{M/B Ratio} + \alpha_{6} \text{Tangibility}_{it-1} + \alpha_{7} \text{Volatility}_{it-1} + \alpha_{8} \text{Sales}_{it-1} + \alpha_{9} \text{ST Debt}_{it-1} + \lambda_{i} + \mu_{t} + \varepsilon_{it}$$
(2)

³ The NACE code is a European industry classification chart that is comparable to the US or UK SIC.

⁴ Diane is managed by Van Dijk Electronic Publishing Office. https://diane.bvdep.com.

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Table	2
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Variable definitions.

Variable name	Description
Dependent vario	able
Cash holdings	The amount of cash and cash equivalents scaled by total assets.
Variables of int	erest
Cash flow	Operating cash flow scaled by total assets.
Diversification	The percentage of foreign sales to total sales.
Crisis	A dummy variable coded as 1 if the firm is in a crisis period and 0 otherwise.
Control variable	25
Size	The natural logarithm of total assets.
M/B Ratio	The market-to-book ratio.
Tangibility	The ratio of non-current fixed assets scaled by total assets.
Volatility	The variation coefficient of net income.
Sales	Total sales scaled by total assets.
ST Debt	Short-term debt scaled by total assets.

Cash holdings_{*it*} = $\alpha_0 + \alpha_1$ Cash flow_{*it*} + α_2 Diversification_{*it*}

$$+\alpha_{3}(\text{Cash flow * Diversification})_{it} + \alpha_{4}(\text{Cash flow * Diversification * Crisis})_{it} +\alpha_{5}\text{Size}_{it-1} + \alpha_{6}\text{M/B}\text{Ratio}_{it-1} + \alpha_{7}\text{Tangibility}_{it-1} + \alpha_{8}\text{Volatility}_{it-1} + \alpha_{9}\text{Sales}_{it-1} + \alpha_{10}\text{ST}\text{Debt}_{it-1} + \lambda_{i} + \mu_{t} + \varepsilon_{it}$$
(3)

Where: Cash holding is the amount of cash and cash equivalents scaled by total assets; Cash flow is the operating cash flow (i.e., the amount of cash generated by a company's normal business operations) scaled by total assets; Diversification is the percentage of foreign sales relative to total sales; Crisis is a dummy variable coded as 1 for the crisis period between 2008 and 2011 and 0 otherwise; Size is firm size measured by the natural logarithm of total assets; M/B Ratio is the market-to-book ratio (i.e., market value of the company divided by its book value); Tangibility is the ratio of non-current fixed assets scaled by total assets; Volatility is the relative change in net income (i.e., variation in net income $_{t,t-1}$ divided by net income $_{t-1}$); Sales is total sales scaled by total assets; ST Debt is short-term debts scaled by total assets; λ and μ are time and individual firm dummies. Table 2 summarizes the variable definitions.

3.3. Control variables

Firm size: Some previous studies provide evidence of a negative relationship between firm size and cash holdings. Large firms are likely to invest rather than hoard cash (Ferreira and Vilela, 2004 and Bigelli and Sanchez-Vidal, 2012). However, Opler et al. (1999) and Kim et al. (2011) find a positive relationship as large firms have better performance and are thus likely to hold large amounts of cash. As the relationship between firm size and cash holdings is ambiguous, a direction of this relationship is not anticipated.

M/B Ratio (growth opportunities): Bigelli and Sanchez-Vidal (2012) show that high-growth firms hold more cash. Kim et al. (2011) argue that high growth opportunities lead to an increase in cash holdings. This finding is consistent with Opler et al. (1999). Accordingly, a positive relationship between growth opportunities and cash holdings is expected.

Tangibility: Drobetz and Gruninger (2007) investigate the determinants of cash holdings for a comprehensive sample of 156 Swiss companies. They find that asset tangibility is negatively related to corporate cash holdings since tangible assets can be sold in case of cash shortfalls. This finding is similar to Uyar and Kuzey (2014) in Turkey. Consequently, a negative relationship between tangibility and cash holdings is expected.

Volatility: Hofmann (2006) shows that high cash flow volatility increases cash stockpiles. Opler et al. (1999) and Benkraiem and Gurau (2013) report similar results. Therefore, a positive relationship between volatility and cash holdings is predicted.

Cash flow: Almeida et al. (2004) find positive cash flow sensitivity of cash for financially constrained firms. In a multicountry study, Ferreira and Vilela (2004) prove that cash holdings are positively affected by cash flows. This finding is consistent with Gill and Shah (2012) in the Canadian context. Hence, a positive relationship between cash flow levels and cash holdings is anticipated.

Sales: Following Kim et al. (1998), Opler et al. (1999) and Kalcheva and Lins (2007), a sales variable is included as a proxy for firm performance. High sales levels lead to more cash holdings in the current year. Hence, a positive relationship is expected between sales and cash holdings.

Short term debts: Bao et al. (2012) find that an increase in short-term debt positively affects cash balances to provide funds for debt payments. However, Uyar and Kuzey (2014) document an inverse association between debt and cash holdings in Turkey. Therefore, a direction of the relationship between short-term debt and cash balances is not expected.

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Table 3 Descriptive statistics.

Variables	Mean	St. Dev.	Quartiles		
			25	Median	75
Cash holdings t	0.059	0.097	0.005	0.022	0.067
Cash flow t	0.037	0.187	0.008	0.051	0.101
Diversification t	0.176	0.274	0.000	0.091	0.228
Size t-1	10.935	2.284	9.350	10.639	12.230
M/B Ratio t-1	1.766	1.656	1.001	1.392	1.985
Tangibility t-1	0.076	0.142	0.006	0.022	0.079
Volatility t-1	-0.367	33.104	-0.827	-0.184	0.367
Sales t-1	0.815	1.020	0.151	0.590	1.184
ST Debt t-1	0.273	0.239	0.099	0.227	0.384

Correlation matrix.

	Cash flow t	Diversification t	Size t-1	M/B Ratio _{t-1}	Tangibility t-1	Volatility t-1	Sales t-1	ST Debt t-1
Cash flow t	1	-0.002 (0.872)	0.085*** (0.000)	0.085*** (0.000)	0.068*** (0.000)	0.136*** (0.000)	0.065*** (0.000)	-0.108*** (0.000)
Diversification t		1	-0.235*** (0.000)	-0.028^{*} (0.074)	-0.031** (0.027)	-0.016 (0.269)	0.219*** (0.000)	0.174*** (0.000)
Size t-1			1	-0.073*** (0.000)	-0.006 (0.670)	0.022 (0.121)	-0.371*** (0.000)	-0.426*** (0.000)
M/B Ratio _{t-1}				1	-0.020 (0.183)	0.003 (0.842)	-0.007 (0.648)	-0.024 (0.122)
Tangibility _{t-1}					1	0.005 (0.731)	0.044*** (0.002)	-0.031** (0.028)
Volatility t-1						1	-0.028** (0.047)	-0.021 (0.136)
Sales t-1							1	0.510*** (0.000)
ST Debt t-1								1

4. Results and discussion

4.1. Descriptive statistics

Table 3 reports descriptive statistics for the dependent and independent variables. On average, cash holdings account for 5.9% of the total assets of French firms. The cash flow ratio is 3.7%. These proportions are small compared with those found by Bao et al. (2012) for US firms but comparable to those reported by Martínez-Carrascal (2010) for the Euro area . The diversification variable shows that French firms record, on average, foreign sales of 17.6% of their total sales. The sampled firms have, on average, a market value of approximately 1.8 times their book value. The mean value of tangible assets is approximately 7%. Volatility has an average value of -36.7%, with a high level of standard deviation. The Sales ratio reaches a mean of 81.5%, but the first and third quartiles display large differences (15.1% and 118.4%, respectively). Finally, short-term debts are, on average, 27.3% of total assets.

Table 3 reports descriptive statistics for a sample of 4979 firm-year observations. Cash holdings amount to cash and cash equivalents scaled by total assets; Cash flow is the operating cash flow scaled by total assets; Diversification is the percentage of foreign sales among total sales; Crisis is a dummy variable coded as 1 for the crisis period between 2008 and 2011 and 0 otherwise; Size is the firm size measured by the natural logarithm of total assets; M/B Ratio is the market-to-book ratio; Tangibility is the ratio of non-current assets scaled by total assets; Volatility is the coefficient of variation of net income; Sales is the total sales scaled by total assets; and ST Debt is Short-term debt scaled by total assets.

Table 4 reports the Pearson correlation matrix for the independent variables. As expected, the correlations are mostly low, but some are significant at the 1% level. The highest correlation, 0.51, is recorded between sales and short-term debt. According to Gujarati (2004), a serious problem of collinearity can exist when correlations exceed 0.80, which is not observed here. Therefore, the correlations between the variables in the regression models do not appear to cause co-collinearity concerns.

Table 4 displays the Pearson correlations of the independent variables for a sample of 4979 firm-year observations. Cash holdings amount to cash and cash equivalents scaled by total assets; Cash flow is the operating cash flow scaled by total assets; Diversification is the percentage of foreign sales among total sales; Crisis is a dummy variable coded as 1 for the crisis period between 2008 and 2011 and 0 otherwise; Size is the firm size measured by the natural logarithm of total assets; M/B Ratio is the market-to-book ratio; Tangibility is the ratio of non-current fixed assets scaled by total assets; Volatility is the coefficient of variation in net income; Sales is the total sales scaled by total assets; and ST Debt is short-term debt scaled by total assets. ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively.

0.155

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egression results.						
Variables	Eq. (1)		Eq. (2)		Eq. (3)	
Intercept	0.041***	(0.030)	0.006***	(0.029)	0.011***	(0.029)
Cash flow t	0.122***	(0.004)	0.180**	(0.012)	0.186**	(0.012)
Diversification t	-0.064^{***}	(0.015)	-0.059***	(0.015)	-0.068***	(0.015)
(Cash flow x Diversification) t			-0.258***	(0.018)	-0.251***	(0.067)
(Cash flow x Diversification x Crisis) _t					0.171***	(0.070)
Size t-1	-0.075^{*}	(0.002)	-0.043*	(0.002)	-0.041^{*}	(0.002)
M/B Ratio t-1	-0.131***	(0.002)	-0.083***	(0.002)	-0.069***	(0.002)
Tangibility t-1	-0.041**	(0.031)	-0.043**	(0.030)	-0.046***	(0.030)
Volatility t-1	0.142	(0.001)	0.134	(0.001)	0.130	(0.001)
Sales t-1	0.201**	(0.005)	0.195*	(0.005)	0.199*	(0.005)
ST Debt t-1	-0.174	(0.019)	-0.181*	(0.018)	-0.186*	(0.018)
Fixed effects		Y		Y		Y
Obs		4979		4979		4979

0.098

0.139

Table 5 Regr

4.2. Regression results and discussion

Adj. R²

Table 5 reports the panel fixed-effect regression results estimated with heteroskedasticity-consistent standard errors clustered at the firm level. The findings show that cash flows are positively and significantly associated with the amount of held cash at the 1% level across the three regression models. This result suggests that there is a propensity of French firms to save cash out of their cash flows for French-listed companies during the study period. French firms are then likely to save cash out of their cash flows. This result is consistent with Teclezion et al. (2012) and also partially consistent with Almeida et al. (2004), who predict and find that the cash flow sensitivity of cash in a sample of US manufacturing firms is positive for financially constrained firms and indeterminate for financially unconstrained firms.

Table 5 also shows that the results for the diversification variable are negative and significant across the three models. International firms are likely to hold less cash than their undiversified counterparts. The two last models show that the propensity of firms to save cash out of their cash flows is negatively related to international diversification. Table 5 shows that the coefficient on the interaction term is negative and significant at the 1% level. Hence, French diversified firms are more likely to save cash out of their cash flows than their stand-alone counterparts. This finding is consistent with Teclezion et al. (2012) in the US context for industrially diversified firms only. French international companies have a low level of cash flow sensitivity of cash, suggesting that these firms access international capital markets and rely less on internally generated funds (Volkov and Smith, 2015 and Atanasova and Li, 2019). Moreover, international firms may expect a loss from hoarding large amounts of cash. In support of this argument, Tong (2011) shows empirically that the marginal value of a dollar is approximately 82 cents for shareholders of diversified companies, leading diversified companies to reduce the amount of asset liquidity to benefit from positive firm valuation.

This result also supports the portfolio theory perspective, which suggests that internationalization is likely to mitigate the overall risk for diversified firms. This is consistent with the existing literature on risk-reducing effects of international diversification, such as Khanna and Yafeh (2005) and Mansi et al. (2002). Hence, in response to low risk levels that a firm can bear, internationally diversified firms will be more inclined to use their generated cash flows for investment or distribute it as dividends to shareholders.

All in all, this finding implies that the risk-reducing effects coupled with greater access to external financing of international firms prevail over high agency costs and exacerbated information asymmetry. Indeed, Doukas and Pantzalis (2003) argue that the informational gap is exacerbated in internationally diversified firms and that managerial monitoring is costlier. The present results show that arguments supporting the negative relationship between international diversification and the propensity of firms to save cash out of their cash flows outweigh arguments in favor of a positive relationship. These findings are consistent with Wu et al. (2016) who find that multinational corporations hold less cash than their domestic counterparts. By contrast, the present results are inconsistent with Pinkowitz et al. (2015), who find a positive diversification effect on cash holdings and Atanasova and Li (2019), who show that there is a weak effect of international diversification on cash policy.

To investigate the effect of the financial crisis on the propensity of international firms to save cash out of their cash flows, a double interaction term is used. The results of Eq. (3) show that the relationship between international diversification and the propensity of firms to save cash out of their cash flows becomes positive. In periods of recession, international firms are likely to save more cash out of their cash flows, suggesting that uncertain periods exacerbate the information asymmetry problem faced by these firms and lead to greater stockpiling of cash compared with domestic firms.

The positive relationship between international diversification and the propensity of firms to save cash out of their cash flows during the crisis might be driven by the propensity of diversified firms to reduce their leverage levels in periods of economic downturns. To sustain the level of their investments, diversified firms are inclined to hoard cash to avoid the high costs of external financing. This argument supports the results of Volkov and Smith (2015), who examine the effect of corporate diversification on firm value during periods of economic downturns. According to Volkov and Smith, the leverage

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Table 6

Regression results with an alternative measure of diversification.

Variables	Eq. (1)		Eq. (2)		Eq. (3)	
Intercept	0.389***	(0.093)	0.390***	(0.093)	0.363***	(0.093)
Cash flow t	0.365***	(0.077)	0.615***	(0.113)	0.617***	(0.113)
Diversification t	-0.063**	(0.028)	-0.046**	(0.029)	-0.037^{*}	(0.029)
(Cash flow x Diversification) t			-0.440***	(0.146)	-0.371***	(0.226)
(Cash flow x Diversification x Crisis) _t					0.197***	(0.223)
Size t-1	-0.012^{*}	(0.007)	-0.013*	(0.007)	-0.011*	(0.007)
M/B Ratio _{t-1}	-0.252***	(0.008)	-0.253***	(0.008)	-0.250***	(0.008)
Tangibility _{t-1}	-0.149	(0.092)	-0.168*	(0.092)	-0.159^{*}	(0.092)
Volatility t-1	0.001	(0.001)	0.001	(0.001)	0.001	(0.002)
Sales t-1	0.029*	(0.017)	0.031*	(0.017)	0.031*	(0.017)
ST Debt _{t-1}	-0.106	(0.067)	-0.122*	(0.068)	-0.098	(0.067)
Fixed effects		Y		Y		Y
Obs.		4979		4979		4979
Adj. R ²		0.197		0.199		0.204

of diversified firms decreases during recession. This finding is also similar to Kuppuswamy and Villalonga (2015), who show that external capital markets became costlier during the financial crisis.

Table 5 reports regression coefficients and heteroskedasticity-consistent standard errors clustered at the firm level between parentheses. Cash holdings amount to cash and cash equivalents scaled by total assets; Cash flow is the operating cash flow scaled by total assets; Diversification is the percentage of foreign sales among total sales; Crisis is a dummy variable coded as 1 for the crisis period between 2008 and 2011 and 0 otherwise; Size is the firm size measured by the natural logarithm of total assets; M/B Ratio is the market-to-book ratio; Tangibility is the ratio of non-current fixed assets scaled by total assets; Volatility is the coefficient of variation of net income; Sales is the total sales scaled by total assets; and ST Debt is short-term debt scaled by total assets. ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively.

Hence, in periods of economic downturn, firms adopt the precautionary motive documented by Han and Qiu (2007). In such a situation, international firms are likely to hoard more cash than their domestic counterparts to hedge against high levels of information asymmetry and costly external capital markets.

Among the control variables, firm size is negatively and significantly associated with cash holdings at the 10% level in Tables 5 and 6. This finding is in line with Harris and Raviv (1988) in the US; Ferreira and Vilela (2004) in an international context; and Gill and Shah (2012) in Canada. Miller and Orr (1966) suggest that large firms have economies of scale and therefore hold less cash. Table 5 also shows that there is a negative and significant relationship at the 1% level between growth opportunities and cash holdings. Firms with high growth opportunities are less likely to stockpile high cash reserves. This result suggests that future growth opportunities may incite corporate managers to hold less cash. We also notice that tangibility is negatively and significantly associated with cash holdings because tangible assets can be sold in case of cash deficits. Drobetz and Gruninger (2007) find the same result for Swiss companies. Finally, our findings show that sales positively influence the cash holding decision as in Kim et al. (1998), Harford (1999), Opler et al. (1999) and Kalcheva and Lins (2007). This finding suggests that lagged high sale levels lead to more cash holdings in the current year.

4.3. Robustness checks

Table 6 reports the results of additional tests performed to assess the robustness of the results. An alternative measure of international diversification is used. This variable is a dummy that takes a value of 1 if the firm is internationally diversified and 0 otherwise. The results for the diversification variable and the interaction terms between cash flow and diversification remain qualitatively unchanged. The propensity to save cash out of their cash flows of international firms during the crisis is positive, consistent with the findings presented above. Overall, the results presented in Table 6 using a dummy variable for international diversification do not alter the major findings.

Table 6 reports regression coefficients and heteroskedasticity-consistent standard errors clustered at the firm level between parentheses. Cash holdings amount to cash and cash equivalents scaled by total assets; Cash flow is the operating cash flow scaled by total assets; Diversification is a dummy variable coded as 1 if the firm achieves foreign sales and 0 otherwise; Crisis is a dummy variable coded as 1 for the crisis period between 2008 and 2011 and 0 otherwise; Size is the firm size measured by the natural logarithm of total assets; M/B Ratio is the market-to-book ratio; Tangibility is the ratio of non-current fixed assets scaled by total assets; Volatility is the coefficient of variation of net income; Sales is the total sales scaled by total assets; and ST Debt is short-term debt scaled by total assets. ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively.

5. Conclusion

This paper aims to investigate the effect of international diversification on corporate cash holding behavior in a continental European context, i.e. France during economic downturns. The findings reveal that international diversification negatively

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affects the propensity of firms to save cash out of their cash flows, suggesting that international firms have greater access to financial markets and are therefore less likely to save cash. These results are consistent with the portfolio theory assump-

financial markets and are therefore less likely to save cash. These results are consistent with the portfolio theory assumption. Internationally diversified firms may be able to reduce their risk exposure since they are active in different capital markets. The present findings imply that accessing external finance and risk-reducing effects prevail over the characteristics of international firms associated with high agency costs and information asymmetry levels.

The effect of the global financial crisis on the propensity of international firms to save cash out of their cash flows is also examined. The empirical results show that the relationship between international diversification and the propensity of firms to save cash out of their cash flows becomes positive, highlighting the significant effect of the financial crisis. Hence, international firms are more inclined to save cash out of their cash flow than their undiversified counterparts, which suggests that during economic downturn periods, French internationally diversified firms adopt precautionary savings behavior because they face exacerbated information asymmetry and high financial external costs. These findings could provide useful insights for academics, practitioners as well as financial regulators to better understand the relationship between international diversification and corporate cash holding behavior, particularly in an economic downturn environment. Future research could deepen the analysis by focusing on how the relationship between international diversification and corporate cash holding behavior could inter alia affect the firm capital demand and investment policy.

Declaration of Competing Interest

None.

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