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Pilot CEOs and Corporate Cash Holdings

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ABSTRACT

This study examines the effect of a personality trait exhibited by pilot chief executive officers (CEOs), that is, situation awareness, on corporate cash policies. Our results show that firms led by pilot CEOs are more likely to hold higher levels of cash for firms with higher growth opportunities and greater firm risks. The findings suggest that pilot CEOs have greater situation awareness and are more likely to plan ahead to cope with future liquidity needs. We also find that the strength of their situation awareness is associated with pilot certification levels but does not change between the pre- and post-certification periods.

JEL Classification: G32, G30

1 | Introduction

Chief executive officers (CEOs) are often considered to have the most important economic role in shaping corporate policies (Graham et al. 2013). Prior studies show that CEOs' past experiences in life account for variations in corporate policies that cannot be explained by traditional determinants, such as firm, industry or market characteristics. For example, Bamber et al. (2010) find that CEOs' different backgrounds in life affect their firms' voluntary disclosures. Recent studies have also examined the effect of CEOs' characteristics, captured by pilot certificates, on corporate outcomes. Cain and McKeon (2016) use the pilot certificate as a proxy for personal risk-taking and find that pilot CEOs are associated with higher firm risk, as evidenced by higher stock return volatility. They also show that these CEOs have a higher propensity to complete value-adding acquisitions for firms with high book-to-market ratios. Sunder et al. (2017) use the pilot license as a proxy for sensation-seeking and find that pilot CEOs contribute to corporate innovation success. Both studies use the pilot certificate as a proxy for intrinsic personalities, such as risk-taking and sensation-seeking. Interestingly, other intrinsic personalities that are found in pilots have not been examined in terms of their effects on corporate outcomes.

Fitzgibbons et al. (2004) note that there are several dimensions and facets of personality that contribute to pilot performance. The authors used the general personality inventory (NEO-PI-R) to determine if there are distinct patterns in the personality dimensions of pilots. Among the "Big Five" dimensions, pilots showed atypical results in Neuroticism, Conscientiousness and Extraversion. Specifically, 60% had low or very low neuroticism, 58% had high or very high conscientiousness and 42% had high or very high extraversion. Within Neuroticism, 71% were low on vulnerability, indicating they felt capable of handling difficult situations. In Conscientiousness, 65% had high competence and achievement-striving, and 61% had high deliberation. Within Extraversion, 71% were highly assertive. These findings align with Picano's (1991) study of military pilots, which showed pilots adopted a structured approach to problem-solving, emphasizing planning, rational analysis and attention to detail.

While Cain and McKeon (2016) and Sunder et al. (2017) are silent on the "Big Five" personality dimensions, we investigate whether these traits help explain why firms managed by pilot CEOs have the capacity to complete value-adding acquisitions, and diverse and innovative projects. Saus et al. (2012) find personality traits, such as Neuroticism, Conscientiousness and Extraversion affect situation awareness; situation awareness can be described as a person's perception and understanding of

the surrounding environment (Endsley 2021; Woodward and Ruiz 2023). Specifically, Saus et al. (2012) find candidates with low scores on Neuroticism and high scores on Extraversion and Conscientiousness predicted both subjective and observer-rated situation awareness. That is, these candidates are better able to register and comprehend the meaning of a given environment and to project the likely events in the future.

To further study how pilot CEOs affect corporate decisions, we focus on pilot CEOs' situation awareness and examine its effect on corporate cash holdings. The reasons why we study corporate cash holdings are stated as follows. First, cash holdings are particularly important to firms as they affect corporate investment decisions (e.g., Almeida and Campello 2007; Almeida et al. 2004), talent competition (e.g., He 2018) and the ability to defend against shareholder litigation (e.g., Nguyen et al. 2018), making managing cash reserves an important decision for firms. Second, setting corporate cash holdings is, to a large extent, at the discretion of top management (Belghitar and Clark 2014). CEOs need to assess corporate situations and estimate future unknowns to determine corporate cash holdings (Dessaint and Matray 2017). Therefore, corporate cash holding policy is an important and reasonable setting to examine whether pilot CEOs are sensitive to potential uncertainties, plan ahead to cope with anticipated liquidity risks and adopt corporate policies that ensure they act in the best interest of shareholders.

Dessaint and Matray (2017) argue that risk assessments are essential when deciding on a company's cash policy, where the CEO and the management team are required to estimate future unknowns and use their predictions as inputs to make corporate decisions. Dessaint and Matray (2017) find that CEOs tend to increase corporate cash holdings when there is a sudden shock to the perceived liquidity risk.[1] Since cash holdings can be used as a buffer against the risk of liquidity shocks (e.g., Almeida et al. 2004; Han and Qiu 2007; Opler et al. 1999; Qiu and Wan 2015), the level of corporate cash holdings can indicate the CEO's assessment of liquidity risk and preference for planning ahead. The studies on the personality traits of pilots suggest that pilot CEOs are more likely to exhibit strong situation awareness. Hence, we expect firms led by pilot CEOs to have higher corporate cash holdings where liquidity is more likely to be needed.

In contrast, counterarguments can be mounted to suggest that firms led by pilot CEOs are related to lower corporate cash holdings. Cain and McKeon (2016) find that pilot CEOs are associated with risk-taking behaviour and this risk-taking behaviour has been shown to be associated with lower cash holdings. Specifically, CEOs with risk-taking behaviour are less worried about corporate uncertainties and thus may not feel the need to hold cash to mitigate the potential liquidity risks (Bernile et al. 2017). In addition, risk-taking CEOs are less likely to constrain their spending, leading to less corporate cash holdings.

We use the pilot certificate as a proxy for situation awareness since CEOs' aviation achievements occur outside of the firms and are less likely to be subject to endogeneity concerns. The data on the pilot CEOs are hand-collected using the Federal Aviation Administration (FAA) online airmen credential records. Our sample consists of 136 pilot CEOs and 2289 nonpilot CEOs, covering 862 pilot-CEO firm-years and 12,865 nonpilot-CEO firm-years for the period 1992–2017. We find that firms led by pilot CEOs hold more cash when the firm has higher growth opportunities and when the firm faces financial constraints and greater asset risks. These findings are consistent with our conjectures that pilot CEOs tend to hold more cash when they anticipate future opportunities and risks.

The situation awareness literature suggests that expert pilots are more likely to exhibit stronger situation awareness and are better at assessing potential opportunities and risks (Doane et al. 2004; Endsley 2006). This could be because pilots develop situation awareness from aviation training and flying experiences, which endows them with the ability to better integrate available information and to plan ahead (e.g., Doane et al. 2004; Endsley 1995a, 1995b; Endsley and Garland 2000; Sarter and Woods 1991). It is, hence, plausible for training to affect pilot CEOs' awareness of potential opportunities and risks and affect the CEO's use of cash as safety assets to respond to anticipated liquidity shocks. We examine if situation awareness developed through training and aviation experiences translates to pilot CEOs being better at integrating available information and to plan. However, we do not find evidence to support this conjecture. In additional analysis, we examine whether the achievement of different levels of certification, in fact, proxies for the CEO's underlying trait, that is, the extent of situation awareness. Our findings provide support for this notion. That is, we find CEOs with a higher level of pilot certification have higher corporate cash holdings than those with a lower level of certification.

Although our study is less likely to be subjected to endogeneity concerns, it is possible that firms with certain characteristics tend to hire pilot CEOs and that those characteristics could be related to corporate cash holdings. To alleviate the endogeneity concern, we incorporate a propensity score matching approach in our analysis. The results are consistent with our main findings that firms led by pilot CEOs hold more cash relative to those led by nonpilot CEOs when CEOs anticipate future opportunities and risks. We also check the robustness of our results by excluding firms in the aviation-related industry, controlling for industry–year fixed effects, using different sample selection criteria, and using alternative measures of key variables. Our results are robust, and we continue to observe the positive effects of pilot CEOs on corporate cash holdings. In additional analyses, we find that pilot CEOs do not affect the value of cash holdings, which suggests that the excess cash holdings might not be optimal.

Our study contributes to the literature in the following ways. First, it adds to the literature that investigates the effects of CEOs' personality traits on their managerial styles, corporate policies and managerial ability. Prior studies find that the backgrounds of managers can influence their disclosure styles and quality (Bamber et al. 2010; Hasan 2020; Demerjian et al. 2013; Martikainen et al. 2023), ethical behaviour (Benmelech and Frydman 2015; García-Sánchez et al. 2020; S. Xu and Ma 2022), corporate policies (Bernile et al. 2017; Malmendier et al. 2011), and quality and level of innovation

(Islam and Zein 2020; Zhou et al. 2021). Our study contributes to the literature by documenting a positive association between CEOs' personality traits (in the form of situation awareness) and corporate cash holdings. These findings extend the evidence that CEOs' past experiences are important in corporate decision-making.

Second, our study is complementary to recent studies on pilot CEOs (Cain and McKeon 2016; Sunder et al. 2017; H. Xu et al. 2021; Freund et al. 2023). Cain and McKeon (2016) use pilot licences as a proxy for CEOs' risk-taking behaviour and find that firms managed by pilot CEOs are associated with higher risks. Sunder et al. (2017) use pilot licences as a proxy for CEOs' sensation-seeking and find that pilot CEOs are related to firms' innovation success. Relying on pilot certificates as a proxy for sensation-seeking, H. Xu et al. (2021) find that firms with pilot CEOs have a higher level of trade credit due to the difficulties faced when funding growth opportunities to fuel the CEO's sensation-seeking behaviour. Similarly, Freund et al. (2023) find that firms with pilot CEOs use longer-maturity debt financing even when it is more costly than shorter-term debt to avoid liquidity risk. In contrast to these studies, we focus on the situation awareness of pilot CEOs as a personality trait. We contribute to the literature on pilot CEOs by showing that different levels of situation awareness can affect corporate policies.

Next, this study builds on the literature that investigates the determinants of corporate cash holdings. In addition to traditional determinants, including firm, industry and market characteristics, CEO characteristics, such as risk-taking (Bernile et al. 2017), optimism (Huang-Meier et al. 2016) and marital status (Elnahas et al. 2024) also affect corporate cash holdings. However, CEOs' situation awareness has not been examined. This study fills the gap in the literature by using pilot certificates as a proxy for situation awareness and studying the effect of situation awareness on corporate cash holdings.

The remainder of the paper proceeds as follows. Section 2 develops our hypotheses. Section 3 describes the sample selection and descriptive statistics. Section 4 discusses our main findings. Sections 5 and 6 present robustness checks and additional analyses, respectively. Section 7 concludes.

2 | Hypotheses Development

2.1 | Pilot CEOs, Situation Awareness and Corporate Cash Holdings

Situation awareness can be described as requiring an "advanced level of situation understanding and projection of future systems states in light of the operator's pertinent goals" (Endsley 2011, p. 9). Situation awareness has been studied in a variety of dynamic environments, including aviation (Muehlethaler and Knecht 2016), driving (Jackson et al. 2009), medicine (Chapman et al. 2020) and sports (Huffman et al. 2022). In the aviation psychology literature, situation awareness is a well-documented factor attributed to aviation safety and performance. Endsley (1995b) points out that 88% of aircraft accidents result from human factors and that the lack of situation awareness is one of these key factors. Since situations do not always go to plan, pilots need to be aware of changes, infer potential problems and take actions to address any issues (Endsley 1995a, 2006, 1995b; Endsley and Garland 2000; Sarter and Woods 1991). Failing to notice potential risks can cause a loss of control (Doane et al. 2004).

As noted by Fitzgibbons et al. (2004), pilots consistently exhibit particular dimensions and facets that could be critical in an aviation environment. Using the general personality inventory (NEO-PI-R), Fitzgibbons et al. (2004) observe from their survey of pilots, that certain personality dimensions are consistently demonstrated. Among the "Big Five" dimensions, the three dimensions that are atypical are Neuroticism (60% reported low or very low), Conscientiousness (58% reported high or very high) and Extraversion (42% reported high or very high). Within the Neuroticism dimension, 71% of the pilots were low on vulnerability, indicating they perceive themselves as being able to handle difficult situations. Within the Conscientious dimension, 65% of pilots indicated high levels of competence and achievement-striving and 61% of pilots indicated high levels of deliberation. Within the Extraversion dimension, 71% of pilots indicated high levels of assertiveness.

Saus et al. (2012) find personality traits, such as neuroticism, conscientiousness and extraversion affect the situation awareness of a group of Navy Officer candidates undergoing training in a navigator simulator. Specifically, they find candidates with low scores on Neuroticism and high scores on Extraversion and Conscientiousness predicted both subjective and observer-rated situation awareness. That is, these candidates are better able to register and comprehend the meaning of a given environment and to project the likely events in the future.

Setting corporate cash holding policy to meet operation needs is, to a large extent, at the discretion of CEOs and other managers (Belghitar and Clark 2014). Managers estimate future unknowns (e.g., customer demand, production costs, competition and regulatory changes) and use their predictions as inputs to make corporate cash policy (Dessaint and Matray 2017). Given that cash holdings can be used as a buffer against the risk of liquidity shocks (e.g., Almeida et al. 2004; Han and Qiu 2007; Opler et al. 1999), variations in CEOs' perceived liquidity risk and preference for planning-ahead contribute to differences in corporate cash holdings. Since pilots are better at integrating available information, are more aware of future opportunities and risks, and tend to plan ahead (e.g., Doane et al. 2004; Endsley 1995a; Endsley and Garland 2000; Horne 1997), it is possible that pilot CEOs are more likely to accumulate cash for a precautionary motive to cope with anticipated uncertainties and opportunities.

While we argue that there is likely to be a positive relationship between pilot CEOs and corporate cash holdings, prior studies provide evidence and arguments to suggest otherwise. For instance, CEOs with pilot certificates are found to be associated with risk-taking behaviour (Cain and McKeon 2016). Also, risk-taking behaviour and risk incentives have been shown to be associated with lower cash holdings in the firm (Bernile et al. 2017; Tong 2010). Although pilot CEOs anticipate future situations, their risk-taking trait may encourage them to be less worried about corporate uncertainties. Therefore, they are less likely to reserve cash as safe assets to mitigate liquidity risks. In

addition, it could be the case that pilot CEOs tend to spend cash. For example, Cain and McKeon (2016) find that firms managed by pilot CEOs make more successful acquisitions than other firms, which indicates that pilot CEOs may rush to spend cash. As a result, CEOs with pilot certificates may take more risks and spend more cash, leading to less corporate cash holdings. Our first hypothesis is stated as follows in the null form.

H1: *Firms managed by pilot CEOs are no different in the level of corporate cash holdings when facing anticipated uncertainties and opportunities, when compared with firms managed by nonpilot CEOs.*

2.2 | Aviation Training, Level of Certification and Cash Holdings

Prior literature shows that CEOs' experiences in other fields account for the variations in corporate policies. Specifically, Bamber et al. (2010) find that managers with military experience are more likely to have more precise disclosure styles, while managers who were born before World War II are more reluctant to make forecasts. Malmendier et al. (2011) find that CEOs who grew up during the Great Depression prefer self-sufficiency and tend to avoid risky capital, while CEOs with battlefield experience are more prone to have aggressive corporate policies. Benmelech and Frydman (2015) show that military CEOs are less likely to engage in corporate fraudulent activities and more likely to perform better during times of industry distress.

To be better at diagnosing and preventing potential risks, pilots are trained to develop and maintain situation awareness (Horne 1997). To obtain pilot certificates, individuals need to acquire basic knowledge, assess flying situations, and make adequate planning. Endsley (1995a), Horne (1997) and Doane et al. (2004) suggest that situation awareness developed from aviation training and experiences allows pilots to process a greater amount of available information related to their goals and be prepared to deal with potential risks, which is essential to pilots' flying performance and safety. Therefore, it is plausible that situation awareness developed from pilot training and aviation experiences can influence pilot CEOs' decision-making in corporate policies.

Endsley (1995b) categorizes situation awareness into three different levels. The basic level includes the perception of the elements in the environment. The second level involves the comprehension of the current situation. The third and highest level involves the projection of future status. Novice pilots exhibit the basic level, whereas proficient pilots are associated with a higher degree of situation awareness. Doane et al. (2004) conduct an experiment to examine pilots' situation awareness and find that expert pilots are more sensitive to minor elements and are better at judging future changes than novice pilots. Endsley (2006) also suggests that expert pilots are more likely to achieve a higher level of situation awareness.

Given that proficient pilots are more aware of potential opportunities and risks than novice pilots, we posit that the training that pilot CEOs receive and the experience that is gained over time enhances the pilot CEO's situation awareness. That is, we should observe an increase in pilot CEOs' ability to anticipate and ensure capacity for potential value-increasing projects, leading to higher levels of corporate cash holdings. Our second hypothesis is stated as follows.

H2: *Firms managed by pilot CEOs are more likely to have higher corporate cash holdings after the pilot CEOs receive their certification compared with before they receive their certification.*

However, if the certification is a proxy for the underlying personality traits (i.e., situation awareness) of the pilot CEOs, we should not observe any differences in their management of cash holdings before and after receiving their certification. Instead, we should observe differences between pilot CEOs with higher and those with lower certification. Specifically, pilot CEOs with higher certification should exhibit stronger situation awareness than those with lower certification.

H3: *Firms managed by pilot CEOs with higher level of certificates are more likely to have higher corporate cash holdings when facing anticipated uncertainties and opportunities, as compared with firms managed by CEOs with lower level of certificates.*

3 | Sample Selection and Descriptive Statistics

3.1 | Sample Selection

Our initial sample comprises 45,696 firm-year observations from the ExecuComp database for the period 1992–2017.[2] Following Cain and McKeon (2016) and Sunder et al. (2017), we restrict our sample to observations with CEOs whose "Became CEO" dates on or after January 1, 1991. This serves to alleviate any survival bias and results in a sample of 36,098 firm-year observations with 6309 unique CEOs. We search for each CEO on the FAA's online Airmen Inquiry website.[3] The name search is based on the CEO's first name, middle initial and last name. If the name does not produce a match using the FAA inquiry website, we categorize that CEO as a nonpilot. If the name produces at least one match on the FAA inquiry website, we categorize that CEO as a "possible" pilot. After querying the FAA inquiry website, we identify 4242 nonpilot CEOs and 2067 "possible" pilot CEOs.

For these "possible" pilot CEOs, we verify the accuracy of the matching by using the pilot CEO list shared by Cain and McKeon (2016)[4] and the CEO's date of birth. In several cases where the date of birth is unavailable, we use the CEO's home address and background information to verify the accuracy of the matching.[5] We collect CEOs' biographical information from LexisNexis, the Notable Names Database (NNDB), BoardEx and public records. After completing the verification, we identify 219 pilot CEOs. Their latest certificate level and the issuance date of the certificate are collected from the FAA inquiry website.[6] We delete the remaining 1848 "possible" pilot CEOs that are not verified. This leaves us with 25,940 firm-year observations.

We exclude financial firms (SIC codes 6000-6999) and firms in the utility sector (SIC codes 4900-4999) due to their special regulatory requirements. We obtain firm-level financial data

TABLE 1 | Sample selection and distribution of pilot chief executive officers (CEOs).

Panel A reports the sample selection process. Our sample contains 13,727 firm-year observations for the period 1992–2017. Panel B reports the distribution of pilot CEOs by certificate level. There are 136 unique pilot CEOs in our sample. Panel C reports the distribution of pilot CEOs and pilot-CEO firm-year observations by Fama–French 12 industries (excluding financial firms and utilities).

Panel A: Sample selection

Steps	Observations
1. Start with observations from ExecuComp where "CEOANN" = 1 for the period 1992–2017	45,696
2. Restrict the sample to observations with CEOs whose "Became CEO" dates are on or after 1/1/1991	36,098
3. Delete observations with "possible" pilot CEOs that are not verified	25,940
4. Exclude financial firms (SIC Codes 6000-6999) and firms in the utility sector (SIC codes 4900-4999)	20,440
5. Exclude observations with missing values of the key dependent variable (*CASH*)	20,311
6. Exclude observations with missing values of CEO characteristics	16,493
7. Exclude observations with missing values of firm characteristics	13,727

Panel B: Distribution of pilot CEOs by certificate level

Pilot certificate level	Number of pilot CEOs
Student pilot	11
Private pilot	86
Commercial pilot	27
Airline transport pilot	12
Total	136

Panel C: Sample distribution of pilot CEOs by industry

Industry	Number of firm-years	Number of pilot-CEO firm-years	Percentage of pilot-CEO firm-years (%)
Consumer nondurables	1098	72	6.6
Consumer durables	529	15	2.8
Manufacturing	2402	195	8.1
Energy	735	41	5.6
Chemicals and allied products	619	47	7.6
Business equipment	2918	192	6.6
Telecommunication	342	10	2.9
Shops	2045	117	5.7
Health	1343	55	4.1
Other	1696	118	7.0
Total number	13,727	862	
Average percentage			6.3

from Compustat and stock return data from CRSP and exclude firm-year observations where the key dependent variable (*CASH*) or the control variables are missing. These restrictions result in a sample of 862 pilot-CEO firm-years and 12,865 nonpilot-CEO firm-years between 1992 and 2017, covering 136 pilot CEOs and 2289 nonpilot CEOs.[7] We report the sample selection procedures in Panel A of Table 1.

3.2 | Descriptive Statistics

Panel B of Table 1 reports the distribution of pilot CEOs by certificate level. Among the 136 pilot CEOs in our sample, 11 (8.1%) CEOs have student pilot certificates. According to the FAA, the student pilot certificate is the lowest level of certification that a pilot can obtain and allows the pilot to fly alone in specific types of aircraft. The majority of pilot CEOs (63.2%) hold private pilot certificates that allow pilots to operate a wide range of aircrafts but not for commercial purposes. Of the remaining pilot CEOs, 27 (19.9%) and 12 (8.8%) CEOs hold commercial and airline transport pilot certificates, respectively. Pilots who hold these two levels of certificates are able to command complex airplanes and fly for commercial purposes.

Panel C of Table 1 reports the distribution of pilot-CEO firm-years by Fama–French 12 industries (excluding financial firms

TABLE 2 | Descriptive statistics.

This table presents the descriptive statistics for firm-years with and without pilot chief executive officers (CEOs) separately. The sample consists of 862 pilot-CEO firm-year observations and 12,865 nonpilot firm-year observations. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. Tests of the differences in means are based on *t* tests for continuous variables and *z* tests for binary variables. Tests of the differences in medians are based on Wilcoxon rank sum tests. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	Pilot CEOs ($N = 862$): (A)		Nonpilot CEOs ($N = 12{,}865$): (B)		Test of difference (A − B)	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Dependent variable						
CASH	0.151	0.081	0.152	0.092	−0.001	−0.010
CEO characteristics						
LNAGE	4.004	4.025	3.994	4.007	0.009**	0.018***
LNTENURE	1.681	1.609	1.609	1.609	0.072***	0.000***
LNDELTA	5.482	5.360	5.175	5.193	0.307***	0.167***
LNVEGA	4.163	4.250	3.582	3.877	0.581***	0.372***
OVERCONFIDENCE	0.466	0.000	0.444	0.000	0.023	0.000
MILITARY	0.193	0.000	0.043	0.000	0.150***	0.000***
MBA	0.354	0.000	0.313	0.000	0.041**	0.000**
PHD	0.060	0.000	0.046	0.000	0.014*	0.000*
IVYLEAGUE	0.242	0.000	0.189	0.000	0.053***	0.000***
EDUMISSING	0.175	0.000	0.149	0.000	0.026**	0.000**
Firm characteristics						
SIZE	7.610	7.463	7.345	7.261	0.265***	0.202***
MB	1.932	1.574	2.008	1.627	−0.076*	−0.053
LEVERAGE	0.237	0.220	0.227	0.212	0.010	0.008***
NWC	0.059	0.051	0.073	0.065	−0.014***	−0.014***
LOSS	0.161	0.000	0.175	0.000	−0.014	−0.000
CAPEX	0.061	0.045	0.052	0.037	0.009***	0.009***
RDEX	0.031	0.003	0.033	0.005	−0.002	−0.001
ACQUISITION	0.025	0.000	0.032	0.001	−0.007**	−0.001**
DIVIDEND	0.564	1.000	0.482	0.000	0.082***	1.000***
CF	0.084	0.084	0.083	0.086	0.001	−0.002
CFVOL	0.035	0.021	0.038	0.023	−0.003*	−0.002**
SALESGROWTH	0.109	0.069	0.108	0.072	0.001	−0.003
LNFIRMAGE	3.212	3.296	3.121	3.135	0.091***	0.161***
LNSEGMENTS	1.129	1.099	1.101	0.693	0.028*	0.405*
FOREIGNINC	0.324	0.000	0.368	0.000	−0.044***	−0.000***

and utilities). Across the 13,727 firm-years, 6.3% of the CEOs hold a pilot certificate (i.e., 862 pilot-CEO firm-years).[8] Across industries, pilots are more likely to hold a CEO position in the manufacturing sector (8.1%) and least likely in the consumer durables sector (2.8%). Overall, pilot CEOs manage firms in a diverse range of industries rather than in any single industry.

Table 2 reports descriptive statistics of firm and CEO characteristics for firm-years with and without pilot CEOs separately. We perform *t* tests for continuous variables and *z* tests for binary variables to compare the sample means between firms with pilot CEOs and firms without pilot CEOs. Wilcoxon rank sum tests are conducted to compare the sample medians. We find important differences in the characteristics of the firms in the two groups. Consistent with the findings of Cain and McKeon (2016), firms run by pilot CEOs are more likely to have a higher leverage ratio (*LEVERAGE*). Pilot-CEO firms are also larger (*SIZE*), have a lower market-to-book ratio (*MB*), have lower net working capital (*NWC*), have more capital expenditures (*CAPEX*) but less acquisition expenditures (*ACQUISITION*), are more likely to pay dividends (*DIVIDEND*), have lower cash flow volatility (*CFVOL*), are older

(*LNFIRMAGE*) and more complex (*LNSEGMENTS*), and have lower foreign income (*FOREIGNINC*).

In terms of CEO characteristics, we find that CEOs with pilot certificates are more likely to have higher pay-performance sensitivity (*LNDELTA*) and higher risk-taking incentives (*LNVEGA*) in their compensation packages, which is consistent with Cain and McKeon (2016) and Sunder et al. (2017). In addition, pilot CEOs are relatively older (*LNAGE*), have longer tenure (*LNTENURE*), are more likely to have a military background (*MILITARY*), tend to hold an MBA (*MBA*) or a PhD (*PHD*), and are more likely to have graduated from an ivy league institution (*IVYLEAGUE*). The differences in the firm characteristics and CEO characteristics, as shown above, highlight the importance of controlling for these characteristics in our analyses.

4 | Main Results

4.1 | Effects of Pilot CEOs on Corporate Cash Holdings (Test of H1)

To examine the overall effect of pilot CEOs on corporate cash holdings, we estimate the following model:

$$\begin{aligned} CASH_{i,t} = {} & \alpha + \beta_1 PILOT_{i,t} + \beta_2 LNAGE_{i,t} + \beta_3 LNTENURE_{i,t} \\ & + \beta_4 LNDELTA_{i,t} + \beta_5 LNVEGA_{i,t} \\ & + \beta_6 OVERCONFIDENCE_{i,t} + \beta_7 MILITARY_{i,t} \\ & + \beta_8 MBA_{i,t} + \beta_9 PHD_{i,t} + \beta_{10} IVYLEAGUE_{i,t} \\ & + \beta_{11} EDUMISSING_{i,t} + \beta_{12} SIZE_{i,t-1} \\ & + \beta_{13} MB_{i,t-1} + \beta_{14} LEVERAGE_{i,t-1} \\ & + \beta_{15} NWC_{i,t-1} + \beta_{16} LOSS_{i,t-1} + \beta_{17} CAPEX_{i,t-1} \\ & + \beta_{18} RDEX_{i,t-1} + \beta_{19} ACQUISITION_{i,t-1} \\ & + \beta_{20} DIVIDEND_{i,t-1} + \beta_{21} CF_{i,t-1} \\ & + \beta_{22} CFVOL_{i,t-1} + \beta_{23} SALESGROWTH_{i,t-1} \\ & + \beta_{24} LNFIRMAGE_{i,t-1} + \beta_{25} LNSEGMENTS_{i,t-1} \\ & + \beta_{26} FOREIGNINC_{i,t-1} \\ & + Year\ FE + Industry\ FE + \varepsilon_{i,t}, \end{aligned} \quad (1)$$

where $CASH_{i,t}$ is the cash-to-asset ratio in year *t*. $PILOT_{i,t}$ is an indicator variable which is equal to one for CEOs with a pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. Following Cain and McKeon (2016) and Sunder et al. (2017), we control for CEO-specific variables, including the CEO's age ($LNAGE_{i,t}$), tenure ($LNTENURE_{i,t}$), incentives induced by their compensation contracts ($LNDELTA_{i,t}$ and $LNVEGA_{i,t}$), overconfidence ($OVERCONFIDENCE_{i,t}$) and military experience ($MILITARY_{i,t}$). Specifically, $LNAGE_{i,t}$ is the natural logarithm of CEO age. $LNTENURE_{i,t}$ is the natural logarithm of one plus CEO tenure in years. $LNDELTA_{i,t}$ is the natural logarithm of one plus the dollar change in CEO stock and option portfolio for a 1% change in stock price. $LNVEGA_{i,t}$ is the natural logarithm of one plus the dollar change in CEO option holdings for a 1% change in stock return volatility. $OVERCONFIDENCE_{i,t}$ is an indicator variable which equals one if the CEO's options exceed 100% moneyness in the current period or any prior period. $MILITARY_{i,t}$ is an indicator variable which equals one if the CEO has a military background.

To alleviate the concern that our *PILOT* variable captures CEO ability and skills, we also control for CEOs' education background ($MBA_{i,t}$, $PHD_{i,t}$, $IVYLEAGUE_{i,t}$, and $EDUMISSING_{i,t}$). $MBA_{i,t}$ is an indicator variable which equals one for CEOs with an MBA. $PHD_{i,t}$ is an indicator variable which equals one for CEOs with a PhD. $IVYLEAGUE_{i,t}$ is an indicator variable which equals one if the CEO attended an Ivy League school at any academic level. $EDUMISSING_{i,t}$ is an indicator variable which equals one if we cannot obtain the CEO's education background.

Following prior literature on corporate cash holdings (e.g., Gao et al. 2013; Hanlon et al. 2017), we control for a set of firm characteristics. Specifically, we include firm size ($SIZE_{i,t-1}$), market-to-book ratio ($MB_{i,t-1}$), leverage ($LEVERAGE_{i,t-1}$), net working capital ($NWC_{i,t-1}$), an indicator variable which equals one if a firm has negative pretax income ($LOSS_{i,t-1}$), capital expenditures ($CAPEX_{i,t-1}$), research and development expenditures ($RDEX_{i,t-1}$), acquisition expenses ($ACQUISITION_{i,t-1}$), an indicator variable which equals one if a firm pays a common dividend ($DIVIDEND_{i,t-1}$), cash flows ($CF_{i,t-1}$), volatility of cash flows ($CFVOL_{i,t-1}$), sales growth ($SALESGROWTH_{i,t-1}$), firm age ($LNFIRMAGE_{i,t-1}$), the number of segments a firm has ($LNSEGMENTS_{i,t-1}$) and an indicator variable which equals one if a firm's pretax foreign income accounts for more than 20% of its pretax income ($FOREIGNINC_{i,t-1}$). All the firm characteristics are lagged by 1 year to alleviate endogeneity concerns. In addition, our model includes time fixed effects and industry fixed effects (i.e., year dummies and Fama–French 12 industry dummies). Standard errors are robust to heteroscedasticity and clustered by year.

Column (1) of Table 3 presents the regression results of corporate cash holdings on the pilot CEO dummy and control variables. We focus on the coefficient on *PILOT*, which captures the relation between pilot CEOs and corporate cash holdings. After controlling for CEO characteristics, firm characteristics, and year and industry fixed effects, the coefficient on *PILOT* is 0.019 and is statistically significant at the 1% significant level ($p = 0.000$). The positive relation between pilot CEOs and corporate cash holdings is also economically significant. Specifically, pilot CEOs are associated with an increase in corporate cash holdings of approximately 1.9% of total assets.[9] This is significant given the average level of cash holding for the full sample is around 15.2% of total assets.

With respect to the other CEO characteristics, we find that the coefficient on *DELTA* is 0.008 and statistically significant at the 1% level ($p = 0.000$). *LNVEGA* is negatively related to corporate cash holdings ($coefficient = -0.002$; $p = 0.053$), which is similar to that shown in Tong (2010). This implies that firms managed by CEOs with higher risk incentives have a lower level of cash holdings. In addition, the results show that *LNTENURE*, *MILITARY* and *MBA* are all negatively related to corporate cash holdings. The coefficients on firm characteristics are generally consistent with prior studies (e.g., Gao et al. 2013; Hanlon et al. 2017; Liu and Mauer 2011; Tong 2010). Specifically, firm size, leverage, net working capital, capital expenditures, acquisition expenses and the dividend indicator have negative effects on cash reserves, while market-to-book ratio, the need to make R&D expenditures, cash flow volatility and sales growth have positive effects on cash reserves.

TABLE 3 | Pilot chief executive officers (CEOs), situation awareness and corporate cash holdings.

This table reports the results of the effect of pilot CEOs and situation awareness on corporate cash holdings. Column (1) reports the results of the effect of pilot CEOs on corporate cash holdings. *PILOT* is an indicator variable which equals one for CEOs with a pilot certificate, and zero otherwise. Column (2) reports the results of the effect of pilot CEOs and growth opportunities on corporate cash holdings. *HIGHTECH* is an indicator variable which is equal to one if the firm is in a high-tech industry based on the classification in Loughran and Ritter (2004), and zero otherwise. Column (3) reports the results of the effect of pilot CEOs and financial constraints on corporate cash holdings. *WWINDEX_H* is an indicator variable which is equal to one if the 1-year lagged WW index is higher than the sample median, and zero otherwise. Column (4) reports the results of the effect of pilot CEOs and asset beta on corporate cash holdings. *ASSETBETA_H* is an indicator variable which is equal to one if the 1-year lagged asset beta is higher than the sample median, and zero otherwise. The dependent variable and CEO characteristics are measured in the same year. Firm characteristics are lagged by 1 year. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. Year fixed effects (FE) and industry FE are included in the regressions. Standard errors are robust to heteroscedasticity and are clustered by year. *p* values are in parentheses. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.019***	0.006**	−0.002	0.013***
	(0.000)	(0.036)	(0.466)	(0.002)
PILOT × HIGHTECH		0.063***		
		(0.000)		
PILOT × WWINDEX_H			0.047***	
			(0.000)	
PILOT × ASSETBETA_H				0.013*
				(0.071)
HIGHTECH		−0.000		
		(0.973)		
WWINDEX_H			0.003	
			(0.262)	
ASSETBETA_H				0.018***
				(0.001)
LNAGE	−0.013	−0.011	−0.014	−0.012
	(0.218)	(0.290)	(0.189)	(0.250)
LNTENURE	−0.006***	−0.006***	−0.005**	−0.006***
	(0.010)	(0.010)	(0.016)	(0.008)
LNDELTA	0.008***	0.009***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)
LNVEGA	−0.002*	−0.002*	−0.002*	−0.002*
	(0.053)	(0.052)	(0.058)	(0.053)
OVERCONFIDENCE	−0.001	−0.002	−0.001	−0.001
	(0.669)	(0.328)	(0.606)	(0.384)
MILITARY	−0.010***	−0.010***	−0.010***	−0.009***
	(0.002)	(0.003)	(0.003)	(0.006)
MBA	−0.004**	−0.004*	−0.004*	−0.005**
	(0.043)	(0.074)	(0.052)	(0.033)
PHD	0.003	0.004	0.002	0.004
	(0.488)	(0.411)	(0.604)	(0.400)
IVYLEAGUE	−0.002	−0.001	−0.001	−0.001
	(0.456)	(0.663)	(0.571)	(0.748)

(Continues)

TABLE 3 | (Continued)

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
EDUMISSING	0.020***	0.020***	0.020***	0.020***
	(0.000)	(0.000)	(0.000)	(0.000)
SIZE	−0.019***	−0.019***	−0.018***	−0.019***
	(0.000)	(0.000)	(0.000)	(0.000)
MB	0.017***	0.017***	0.017***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)
LEVERAGE	−0.180***	−0.179***	−0.180***	−0.167***
	(0.000)	(0.000)	(0.000)	(0.000)
NWC	−0.201***	−0.204***	−0.202***	−0.206***
	(0.000)	(0.000)	(0.000)	(0.000)
LOSS	−0.003	−0.003	−0.003	−0.004
	(0.367)	(0.346)	(0.348)	(0.241)
CAPEX	−0.484***	−0.490***	−0.486***	−0.487***
	(0.000)	(0.000)	(0.000)	(0.000)
RDEX	0.742***	0.742***	0.747***	0.727***
	(0.000)	(0.000)	(0.000)	(0.000)
ACQUISITION	−0.278***	−0.277***	−0.278***	−0.276***
	(0.000)	(0.000)	(0.000)	(0.000)
DIVIDEND	−0.017***	−0.017***	−0.015***	−0.014***
	(0.000)	(0.000)	(0.000)	(0.000)
CF	−0.165***	−0.164***	−0.164***	−0.162***
	(0.000)	(0.000)	(0.000)	(0.000)
CFVOL	0.304***	0.296***	0.306***	0.290***
	(0.000)	(0.000)	(0.000)	(0.000)
SALESGROWTH	0.015**	0.015**	0.016**	0.015**
	(0.040)	(0.041)	(0.030)	(0.046)
LNFIRMAGE	0.000	−0.000	0.000	0.001
	(0.800)	(0.934)	(0.842)	(0.776)
LNSEGMENTS	−0.023***	−0.023***	−0.023***	−0.023***
	(0.000)	(0.000)	(0.000)	(0.000)
FOREIGNINC	0.012***	0.012***	0.012***	0.011***
	(0.000)	(0.000)	(0.000)	(0.001)
Constant	0.387***	0.357***	0.387***	0.344***
	(0.000)	(0.000)	(0.000)	(0.000)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658
R^2	0.539	0.540	0.540	0.543

To understand if pilot CEOs are better at assessing situations and are more aware of future opportunities, we examine whether the effect of pilot CEOs on cash reserves is stronger for firms with more growth opportunities. We categorize the firms in our sample into high-tech firms and nonhigh-tech firms using their SIC codes and the classification in Loughran and Ritter (2004). We include firms in the following industries as high-tech firms (i.e., *HIGHTECH* = 1): computer hardware, communications equipment, electronics, navigation equipment, measuring and controlling devices, medical instruments, telephone equipment, communications services and software. Firms in the other industries are categorized as nonhigh-tech

firms (i.e., *HIGHTECH* = 0). We use Equation (1) and add the *HIGHTECH* dummy variable and the interaction between *PILOT* and *HIGHTECH*:

$$CASH_{i,t} = \alpha + \beta_1 PILOT_{i,t} + \beta_2 PILOT_{i,t} \times HIGHTECH_{i,t-1} + \beta_3 HIGHTECH_{i,t-1} + Controls + Year\ FE + Industry\ FE + \varepsilon_{i,t}. \quad (2)$$

Column (2) of Table 3 reports the regression results where we examine differences for firms with pilot CEOs in the high-tech industries compared with other firms. The coefficient on *PILOT* is 0.006 and significant at the 5% level, indicating that pilot CEOs hold slightly more cash when firms face less growth opportunities. The coefficient on the interaction term, *PILOT* × *HIGHTECH*, is 0.063 and statistically significant at the 1% level. This suggests that pilot CEOs are associated with much higher levels of corporate cash holdings when firms have more growth opportunities. Therefore, the effect of pilot CEOs on corporate cash holdings is more pronounced for firms with higher growth opportunities than for other firms.

To investigate if pilot CEOs with situation awareness are more sensitive to firm risks, we examine how financial constraints and asset risks affect the effect of pilot CEOs on cash holdings. Following Whited and Wu (2006) and Hennessy and Whited (2007), we measure financial constraints based on the WW index.[10] The model is similar to Equation (3):

$$CASH_{i,t} = \alpha + \beta_1 PILOT_{i,t} + \beta_2 PILOT_{i,t} \times WWINDEX\_H_{i,t-1} + \beta_3 WWINDEX\_H_{i,t-1} + Controls + Year\ FE + Industry\ FE + \varepsilon_{i,t}, \quad (3)$$

where *WWINDEX_H* is an indicator variable which is equal to one if the 1-year lagged WW index is higher than the sample median, and zero otherwise.

To examine the moderating effect of risks associated with investment opportunities, we replace the financial constraint measure, *WWINDEX_H*, in model (3) with a measure of asset risks, *ASSETBETA_H*. Similar to Skinner (1993), we compute the beta for each firm using 5 years of monthly CRSP data and "unlever" the firm beta by multiplying the number by the market value of equity (*csho*prcc_f*) divided by the market value of the firm (*csho*prcc_f* + *dltt* + *dlc*). *ASSETBETA_H* is an indicator variable which is equal to one if the 1-year lagged asset beta is higher than the sample median, and zero otherwise.

The results are reported in Columns (3) and (4) of Table 3. Column (3) presents the moderating effects of financial constraints. While the coefficient on *PILOT* is not statistically significant, the coefficient on the interaction term *PILOT* × *WWINDEX_H* is positive and significant at the 1% level ($p = 0.000$). This suggests that pilot CEOs only hold more cash when firms are financially constrained. Column (4) reports the effects of asset risks for pilot CEOs. We find that the coefficient on the interaction term *PILOT* × *ASSETBETA_H* is positive and statistically significant at the 10% level, indicating that pilot CEOs are associated with more cash holdings when firms face higher risks associated with investment opportunities. In addition, the coefficient on *ASSETBETA_H* is significantly positive, consistent with the finding of Acharya et al. (2013) that firms with higher asset beta tend to hold more cash as they face greater costs on their bank lines of credit.

Overall, our results suggest that the positive effect of pilot CEOs on corporate cash holdings is more pronounced for firms with higher levels of growth opportunities, financial constraints and asset risks. These findings are consistent with our conjecture (i.e., alternative to the null hypothesis H1) that pilot CEOs have greater situation awareness and thus tend to hold more cash when they anticipate higher growth opportunities and greater firm risks.

4.2 | Effects of Aviation Training on Corporate Cash Holdings (Test of H2)

To test whether situation awareness is driven by personality traits or affected by aviation training, we examine the effect of pilot CEOs with different levels of aviation training on corporate cash holdings. Specifically, we create two dummy variables to capture pilot CEOs with relatively lower and higher levels of aviation training (i.e., *PILOT_BEFORE* and *PILOT_AFTER*, respectively). *PILOT_BEFORE* (*PILOT_AFTER*) is an indicator variable which equals one for pilot-CEO firm-years before (after) the CEO received its pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. The model is estimated as follows:

$$CASH_{i,t} = \alpha + \beta_1 PILOT\_BEFORE_{i,t} + \beta_2 PILOT\_AFTER_{i,t} + Controls + Year\ FE + Industry\ FE + \varepsilon_{i,t}. \quad (4)$$

We report the results in Column (1) of Table 4. We find that the coefficients on *PILOT_BEFORE* and *PILOT_AFTER* are both positive and significant at the 1% level. The test of equality of the coefficients on *PILOT_BEFORE* and *PILOT_AFTER* is insignificant ($p = 0.265$), suggesting that aviation training by pilot CEOs does not affect corporate cash holdings.[11]

To examine whether CEOs' aviation training affects corporate cash holdings when firms face anticipated uncertainties and opportunities, we interact *PILOT_BEFORE* and *PILOT_AFTER* with measures of growth opportunities and firm risks (i.e., *HIGHTECH*, *WWINDEX_H* and *ASSETBETA_H*). The results are reported in Columns (2)–(4) of Table 4. In Column (2), when examining the moderating effect of growth opportunities, we find the coefficients on the interaction terms *PILOT_BEFORE* × *HIGHTECH* and *PILOT_AFTER* × *HIGHTECH* are both positive and significant at the 1% level. In addition, the difference in the coefficients on the two interaction terms is insignificant ($p = 0.430$), indicating that pilot CEOs in high-tech firms do not hold more cash after obtaining their certification. Column (3) reports the effect of financial constraints. The coefficient on *PILOT_AFTER* × *WWINDEX_H* is not significantly larger than that on *PILOT_BEFORE* × *WWINDEX_H*, which suggests that CEOs' aviation training does not affect the

TABLE 4 | Aviation training and corporate cash holdings.

This table reports the results of the effect of pilot chief executive officers (CEOs) with different levels of aviation training on corporate cash holdings. *PILOT_BEFORE* is an indicator variable which equals one for pilot-CEO firm-years before the CEO received its pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *PILOT_AFTER* is an indicator variable which equals one for pilot-CEO firm-years after the CEO received its pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *HIGHTECH* is an indicator variable which is equal to one if the firm is in a high-tech industry based on the classification in Loughran and Ritter (2004), and zero otherwise. *WWINDEX_H* is an indicator variable which is equal to one if the 1-year lagged WW index is higher than the sample median, and zero otherwise. *ASSETBETA_H* is an indicator variable which is equal to one if the 1-year lagged asset beta is higher than the sample median, and zero otherwise. The dependent variable and CEO characteristics are measured in the same year. Firm characteristics are lagged by 1 year. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. Year fixed effects (FE) and industry FE are included in the regressions. Standard errors are robust to heteroscedasticity and are clustered by year. *p* values are in parentheses. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT_BEFORE	0.023***	0.009*	0.001	0.025***
	(0.000)	(0.070)	(0.794)	(0.000)
PILOT_AFTER	0.016***	0.004	−0.004	0.004
	(0.002)	(0.173)	(0.303)	(0.317)
PILOT_BEFORE × HIGHTECH		0.053***		
		(0.000)		
PILOT_AFTER × HIGHTECH		0.073***		
		(0.000)		
PILOT_BEFORE × WWINDEX_H			0.043***	
			(0.001)	
PILOT_AFTER × WWINDEX_H			0.050***	
			(0.000)	
PILOT_BEFORE × ASSETBETA_H				−0.004
				(0.760)
PILOT_AFTER × ASSETBETA_H				0.024***
				(0.001)
HIGHTECH		−0.000		
		(0.981)		
WWINDEX_H			0.003	
			(0.266)	
ASSETBETA_H				0.018***
				(0.001)
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658
R^2	0.539	0.540	0.540	0.543
p value of test of equality of coefficients on *PILOT_BEFORE* and *PILOT_AFTER*	0.265			
p value of test of equality of coefficients on *PILOT_BEFORE × HIGHTECH* and *PILOT_AFTER × HIGHTECH*		0.430		
p value of test of equality of coefficients on *PILOT_BEFORE × WWINDEX_H* and *PILOT_AFTER × WWINDEX_H*			0.740	
p value of test of equality of coefficients on *PILOT_BEFORE × ASSETBETA_H* and *PILOT_AFTER × ASSETBETA_H*				0.093

cash holdings of financially constrained firms. Column (4) reports the effect of asset risks. While the coefficient on *PILOT_BEFORE* × *ASSETBETA_H* is not statistically significant, the coefficient on *PILOT_AFTER* × *ASSETBETA_H* is 0.024, significant at the 1% level. The difference between the two coefficients is significant at the 10% level ($p = 0.093$), providing weak evidence that CEOs' aviation training affects their situation awareness.

Overall, our results from Tables 3 and 4 support the notion that the higher level of situation awareness exhibited by pilot CEOs in the corporate setting is largely driven by their underlying personality traits rather than aviation training. However, we acknowledge the possibility that pilots' situation awareness in the aviation setting could be improved by aviation training and experience, as shown in Doane et al. (2004) and Endsley (2006).

4.3 | Effects of Level of Certification on Corporate Cash Holdings (Test of H3)

As expert pilots are more likely to exhibit a high level of situation awareness (Doane et al. 2004; Endsley 2006, 1995b), we examine whether the achievement of different levels of pilot certification captures CEOs' personality traits, thus proxying for the extent of situation awareness. We expect CEOs with higher levels of pilot certification to have higher corporate cash holdings than those with lower levels of certification.

To estimate the effect of pilot certificate levels on corporate cash holdings, we use Equation (1) and replace the *PILOT* dummy variable with dummy variables based on the pilot certificate levels (*HIGHLEVEL* and *LOWLEVEL*).[12] The model is estimated as follows:

$$CASH_{i,t} = \alpha + \beta_1 HIGHLEVEL_{i,t} + \beta_2 LOWLEVEL_{i,t} + Controls + Year\ \ FE + Industry\ \ FE + \varepsilon_{i,t}, \quad (5)$$

where *HIGHLEVEL* equals one for CEOs with a commercial pilot or an airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *LOWLEVEL* equals one for CEOs with a student pilot or a private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.

As reported in Column (1) of Table 5, the coefficient on *HIGHLEVEL* is positive as expected. The magnitude of coefficient is 0.030 and statistically significant at the 1% level. While the coefficient on *LOWLEVEL* is also positive and statistically significant at the 1% level, its magnitude is lower (0.014). The difference between the coefficient magnitudes of CEOs with high and low certificate levels is significant at the 1% level. This indicates that, when not controlling for growth opportunities and risk, CEOs with high certificate levels hold more cash.

To provide evidence for H3, we examine the moderating effects of growth opportunities and firm risks for pilots with different

TABLE 5 | Level of certification and corporate cash holdings.

This table reports the results of the effect of pilot chief executive officers (CEOs) with different levels of certification on corporate cash holdings. *HIGHLEVEL* is an indicator variable which equals one for CEOs with a commercial pilot or an airline transport pilot certificate, and zero otherwise. *LOWLEVEL* is an indicator variable which equals one for CEOs with a student pilot or a private pilot certificate, and zero otherwise. *HIGHLEVEL_BEFORE* (*HIGHLEVEL_AFTER*) is an indicator variable which equals one for pilot-CEO firm-years before (after) the CEO received its commercial or airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *LOWLEVEL_BEFORE* (*LOWLEVEL_AFTER*) is an indicator variable which equals one for pilot-CEO firm-years before (after) the CEO received its student or private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. The dependent variable and CEO characteristics are measured in the same year. Firm characteristics are lagged by 1 year. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. Year fixed effects (FE) and industry FE are included in the regressions. Standard errors are robust to heteroscedasticity and are clustered by year. *p* values are in parentheses. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	CASH				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
HIGHLEVEL	0.030***	−0.007	−0.012***	0.011*	
	(0.000)	(0.104)	(0.004)	(0.077)	
LOWLEVEL	0.014***	0.011***	0.003	0.014***	
	(0.000)	(0.001)	(0.406)	(0.002)	
HIGHLEVEL × *HIGHTECH*		0.139***			
		(0.000)			
LOWLEVEL × *HIGHTECH*		0.013			
		(0.166)			
HIGHLEVEL × *WWINDEX_H*			0.102***		
			(0.000)		

(Continues)

TABLE 5 | (Continued)

	CASH				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
LOWLEVEL × *WWINDEX_H*			0.022**		
			(0.012)		
HIGHLEVEL × *ASSETBETA_H*				0.039***	
				(0.003)	
LOWLEVEL × *ASSETBETA_H*				−0.002	
				(0.819)	
HIGHTECH		−0.000			
		(0.997)			
WWINDEX_H			0.003		
			(0.255)		
ASSETBETA_H				0.018***	
				(0.001)	
HIGHLEVEL_BEFORE					0.028***
					(0.000)
HIGHLEVEL_AFTER					0.033***
					(0.000)
LOWLEVEL_BEFORE					0.020***
					(0.000)
LOWLEVEL_AFTER					0.010**
					(0.015)
Constant	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658	13,727
R^2	0.539	0.542	0.541	0.543	0.539
p value of test of equality of coefficients on *HIGHLEVEL* and *LOWLEVEL*	0.001				
p value of test of equality of coefficients on *HIGHLEVEL* × *HIGHTECH* and *LOWLEVEL* × *HIGHTECH*		0.000			
p value of test of equality of coefficients on *HIGHLEVEL* × *WWINDEX_H* and *LOWLEVEL* × *WWINDEX_H*			0.000		
p value of test of equality of coefficients on *HIGHLEVEL* × *ASSETBETA_H* and *LOWLEVEL* × *ASSETBETA_H*				0.009	
p value of test of equality of coefficients on *HIGHLEVEL_BEFORE* and *HIGHLEVEL_AFTER*					0.549
p value of test of equality of coefficients on *LOWLEVEL_BEFORE* and *LOWLEVEL_AFTER*					0.179

certification levels and report the results in Columns (2)–(4) of Table 5. Column (2) shows that the coefficient on the interaction term *HIGHLEVEL* × *HIGHTECH* is 0.139 and significant at the 1% level, while the coefficient on *LOWLEVEL* × *HIGHTECH* is not statistically significant. The test of equality of the coefficients indicates that the certification level has a significantly positive effect on the level of corporate cash holdings in high-tech firms ($p = 0.000$). This is consistent with the notion that CEOs with high levels of certification have greater situation awareness and thus accumulate more cash when they expect greater growth opportunities. In contrast, for firms that are not in the high-tech industry, CEOs with high levels of certification

do not hold more cash, as shown by the negative and insignificant coefficient on *HIGHLEVEL* and the significantly positive coefficient on *LOWLEVEL*.

Column (3) reports results of the effect of financial constraints. The coefficient on the interaction term *HIGHLEVEL* × *WWINDEX_H* is significantly larger than that on *LOWLEVEL* × *WWINDEX_H* ($p = 0.000$). The results suggest that pilot CEOs with higher certification levels tend to hold more cash when firms are financially constrained, compared with CEOs with lower certification levels. In Column (4), the test of equality of the coefficients on *HIGHLEVEL* × *ASSETBETA_H* and *LOWLEVEL* × *ASSETBETA_H* indicates that the certification level significantly affects cash holdings in firms with higher asset risks ($p = 0.009$). Overall, our results suggest that CEOs with higher certification levels are more likely to plan ahead to cope with uncertainties and opportunities, providing evidence that these CEOs have greater situation awareness.

To further examine whether our results are driven by CEOs' aviation training rather than their underlying traits, we create dummy variables for pilot CEOs with different levels of certification in the periods pre- and post-certification. Specifically, *HIGHLEVEL_BEFORE* (*HIGHLEVEL_AFTER*) is an indicator variable which equals one for pilot-CEO firm-years before (after) the CEO received its commercial or airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *LOWLEVEL_BEFORE* (*LOWLEVEL_AFTER*) is an indicator variable which equals one for pilot-CEO firm-years before (after) the CEO received its student or private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise. *HIGHLEVEL_AFTER* (*LOWLEVEL_AFTER*) captures a higher level of aviation training compared with *HIGHLEVEL_BEFORE* (*LOWLEVEL_BEFORE*). We report the results in Column (5) of Table 5. The coefficients on the four dummy variables (*HIGHLEVEL_BEFORE*, *HIGHLEVEL_AFTER*, *LOWLEVEL_BEFORE* and *LOWLEVEL_AFTER*) are all positive and significant. In addition, we do not find any significant differences between the coefficients on *HIGHLEVEL_BEFORE* and *HIGHLEVEL_AFTER* and between the coefficients on *LOWLEVEL_BEFORE* and *LOWLEVEL_AFTER*. The results suggest that aviation training, at all certification levels, does not affect pilot CEOs' situation awareness in our setting.

5 | Robustness Checks

5.1 | Using the Propensity Score Matched Sample

Although we argue that CEOs' aviation achievements are outside the scope of firms, whether firms hire pilot CEOs may be determined by firm characteristics. To alleviate the endogeneity concern, we adopt the propensity score matching approach to verify the robustness of our results. We first regress *PILOT* on CEO characteristics and 1-year lagged firm characteristics used in our main model to estimate the probability of a firm hiring a pilot CEO (i.e., the propensity score). We then match a pilot-CEO firm-year observation with two nonpilot firm-year observations using nearest-neighbours matching. We require the matched firms to be in the same industry and the same year as the treatment firm (i.e., *PILOT* = 1). The propensity score matched sample consists of 2583 observations (861 pilot-CEO firm-year observations and 1722 nonpilot firm-year observations).[13]

To validate our matching process, we examine the differences in means and medians of the matching variables. As shown in Panel A of Table 6, we find the two subsamples are not significantly different in most of the aspects, indicating that our matching is valid. In addition, the univariate tests show that firms led by pilot CEOs have a higher cash holdings ratio (*CASH*). Panel B of Table 6 reports the effect of pilot CEOs on corporate cash holdings using the propensity score matched sample. We continue to find a positive association between *PILOT* and corporate cash holdings (see Column 1). We also continue to find a positive association between the interaction terms *PILOT* × *HIGHTECH* (see Column 2) and *PILOT* × *WWINDEX_H* (see Column 3) and corporate cash holdings. While the coefficient on the interaction term *PILOT* × *ASSETBETA_H* (see Column 4) is positive, it is not statistically significant at the 10% level. The results generally support the notion that pilot certificates capture CEOs' underlying trait (i.e., situation awareness). Overall, our conclusion is robust to using the propensity score matched sample.

5.2 | Excluding Firms in the Aviation Industry

To deal with the concern that firms in the aviation industry tend to hire pilot CEOs, we rerun our regressions after excluding firms in this industry from our sample. Specifically, we remove firms in the air transportation sector (SIC codes 4500-4599) and firms in aircraft and parts sector (SIC codes 3720-3729). The results are reported in Panel A of Table 7. Column (1) shows that the coefficient on *PILOT* is positive and significant at the 1% level. Columns (2)–(4) show that the coefficients on the interaction terms (i.e., *PILOT* × *HIGHTECH*, *PILOT* × *WWINDEX_H* and *PILOT* × *ASSETBETA_H*) are positive and statistically significant. The results suggest that our main findings are not driven by aviation-related firms.

5.3 | Controlling for Industry–Year Fixed Effects

In our main model, we control for year fixed effects and industry fixed effects separately. To test the robustness of our results, following Gao et al. (2013), we include industry–year fixed effects. This is to control for the effect of time-varying industry factors on corporate cash holdings. Panel B of Table 7 reports the results after controlling for industry–year fixed effects. The coefficient on *PILOT* (see Column 1) remains positive and significant. The coefficients on the interaction terms (i.e., *PILOT* × *HIGHTECH* and *PILOT* × *WWINDEX_H*) also remain positive and statistically significant. Therefore, the positive relation between situation awareness and corporate cash holding is robust to controlling for industry–year fixed effects.

5.4 | Including Observations With "Possible" Pilot CEOs That Are Not Verified in the Control Group

When constructing our main sample, we exclude observations with "possible" pilot CEOs that cannot be verified from our sample. In this robustness test, we include those observations

TABLE 6 | Using the propensity score matched sample.

Panel A of this table presents the descriptive statistics for firm-years with and without pilot chief executive officers (CEOs) separately using the propensity score matched sample. To estimate the propensity score, we regress *PILOT* on CEO characteristics and 1-year lagged firm characteristics used in our main model. We then match a pilot-CEO firm-year observation with two nonpilot firm-year observations using nearest-neighbours matching. We require the matched firms to be in the same industry and the same year as the treatment firm (i.e., $PILOT = 1$). The propensity score matched sample, therefore, consists of 2583 observations (861 pilot-CEO firm-year observations and 1722 nonpilot firm-year observations). Tests of the differences in means are based on *t* tests for continuous variables and *z* tests for binary variables. Tests of the differences in medians are based on Wilcoxon rank sum tests. Panel B reports the results of the effect of pilot CEOs on corporate cash holdings using the propensity score matched sample. Year fixed effects (FE) and industry FE are included in the regressions. The dependent variable and CEO characteristics are measured in the same year. Firm characteristics are lagged by 1 year. Standard errors are robust to heteroscedasticity and are clustered by year. *p* values are in parentheses. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Panel A: Descriptive statistics

	Pilot CEOs ($N = 861$): (A)		Nonpilot CEOs ($N = 1722$): (B)		Test of difference (A–B)	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Dependent variable						
CASH	0.151	0.082	0.142	0.077	0.009	0.004**
CEO characteristics						
LNAGE	4.004	4.025	3.990	4.007	0.014***	0.018***
LNTENURE	1.682	1.609	1.609	1.609	0.073***	0.000***
LNDELTA	5.479	5.360	5.421	5.404	0.058	−0.044
LNVEGA	4.163	4.250	4.085	4.285	0.078	−0.035
OVERCONFIDENCE	0.467	0.000	0.444	0.000	0.023	0.000
MILITARY	0.192	0.000	0.155	0.000	0.037**	0.000**
MBA	0.354	0.000	0.314	0.000	0.040**	0.001**
PHD	0.060	0.000	0.070	0.000	−0.010	−0.000
IVYLEAGUE	0.242	0.000	0.243	0.000	−0.002	−0.000
EDUMISSING	0.175	0.000	0.215	0.000	−0.039**	−0.000**
Firm characteristics						
SIZE	7.608	7.460	7.451	7.381	0.157**	0.080*
MB	1.933	1.575	1.944	1.611	−0.012	−0.036
LEVERAGE	0.237	0.220	0.231	0.231	0.006	0.011
NWC	0.059	0.051	0.072	0.063	−0.013**	−0.012**
LOSS	0.160	0.000	0.165	0.000	−0.005	−0.000
CAPEX	0.061	0.045	0.062	0.044	−0.001	0.001
RDEX	0.031	0.003	0.033	0.005	−0.002	−0.002
ACQUISITION	0.025	0.000	0.029	0.000	−0.004	−0.000
DIVIDEND	0.564	1.000	0.555	1.000	0.009	0.000
CF	0.084	0.084	0.085	0.088	−0.001	−0.004*
CFVOL	0.035	0.021	0.034	0.021	0.001	0.001
SALESGROWTH	0.109	0.069	0.118	0.072	−0.009	−0.003
LNFIRMAGE	3.212	3.296	3.195	3.332	0.018	0.036
LNSEGMENTS	1.130	1.099	1.122	1.099	0.008	0.000
FOREIGNINC	0.324	0.000	0.337	0.000	−0.013	−0.000

Panel B: Regression results

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.012***	0.003	−0.004	0.012**

(Continues)

TABLE 6 | (Continued)

Panel B: Regression results

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
	(0.000)	(0.344)	(0.136)	(0.028)
PILOT × HIGHTECH		0.044***		
		(0.007)		
PILOT × WWINDEX_H			0.032***	
			(0.000)	
PILOT × ASSETBETA_H				0.000
				(0.995)
HIGHTECH		−0.002		
		(0.930)		
WWINDEX_H			0.004	
			(0.606)	
ASSETBETA_H				0.022**
				(0.012)
LNAGE	0.001	0.007	−0.003	0.001
	(0.969)	(0.779)	(0.893)	(0.981)
LNTENURE	0.004	0.004	0.004	0.004
	(0.416)	(0.441)	(0.346)	(0.391)
LNDELTA	0.004	0.004	0.004	0.004
	(0.239)	(0.188)	(0.235)	(0.222)
LNVEGA	−0.003	−0.003	−0.003	−0.003
	(0.245)	(0.236)	(0.225)	(0.252)
OVERCONFIDENCE	0.011**	0.010*	0.012**	0.009*
	(0.030)	(0.056)	(0.027)	(0.065)
MILITARY	−0.004	−0.005	−0.003	−0.003
	(0.380)	(0.299)	(0.460)	(0.549)
MBA	−0.001	0.001	−0.001	−0.002
	(0.855)	(0.880)	(0.906)	(0.785)
PHD	0.002	0.005	−0.001	0.004
	(0.867)	(0.713)	(0.935)	(0.736)
IVYLEAGUE	−0.003	−0.001	−0.002	−0.002
	(0.561)	(0.843)	(0.748)	(0.698)
EDUMISSING	0.050***	0.050***	0.049***	0.050***
	(0.000)	(0.000)	(0.000)	(0.000)
SIZE	−0.024***	−0.024***	−0.021***	−0.024***
	(0.000)	(0.000)	(0.000)	(0.000)
MB	0.017***	0.017***	0.017***	0.016***
	(0.000)	(0.000)	(0.000)	(0.000)
LEVERAGE	−0.172***	−0.172***	−0.173***	−0.154***
	(0.000)	(0.000)	(0.000)	(0.000)
NWC	−0.240***	−0.243***	−0.240***	−0.247***
	(0.000)	(0.000)	(0.000)	(0.000)

(Continues)

TABLE 6 | (Continued)

Panel B: Regression results				
	CASH			
	(1)	**(2)**	**(3)**	**(4)**
LOSS	−0.007	−0.007	−0.007	−0.008
	(0.450)	(0.471)	(0.433)	(0.346)
CAPEX	−0.518***	−0.523***	−0.516***	−0.525***
	(0.000)	(0.000)	(0.000)	(0.000)
RDEX	0.637***	0.637***	0.652***	0.638***
	(0.000)	(0.000)	(0.000)	(0.000)
ACQUISITION	−0.279***	−0.280***	−0.279***	−0.276***
	(0.000)	(0.000)	(0.000)	(0.000)
DIVIDEND	−0.024***	−0.025***	−0.019**	−0.021***
	(0.000)	(0.000)	(0.011)	(0.001)
CF	−0.151***	−0.153***	−0.151***	−0.144***
	(0.003)	(0.002)	(0.002)	(0.004)
CFVOL	0.325***	0.297***	0.327***	0.312***
	(0.002)	(0.003)	(0.001)	(0.003)
SALESGROWTH	0.019	0.019	0.020	0.019
	(0.163)	(0.165)	(0.133)	(0.160)
LNFIRMAGE	0.015***	0.013***	0.014***	0.015***
	(0.000)	(0.000)	(0.000)	(0.000)
LNSEGMENTS	−0.024***	−0.024***	−0.023***	−0.024***
	(0.001)	(0.001)	(0.001)	(0.001)
FOREIGNINC	0.012*	0.012*	0.011*	0.011
	(0.073)	(0.084)	(0.090)	(0.112)
Constant	0.228**	0.215**	0.220**	0.338***
	(0.022)	(0.038)	(0.028)	(0.000)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	2583	2583	2583	2578
R^2	0.598	0.601	0.601	0.600

in the control group rather than deleting them. The sample size increases to 17,063 observations. The results reported in Panel C of Table 7 show that the coefficient on *PILOT* (see Column 1) is 0.018, significant at the 1% level. The coefficients on the interaction terms (i.e., *PILOT* × *HIGHTECH* and *PILOT* × *WWINDEX_H*) are also positive, significant at the 1% level. Therefore, our results are robust to including observations with "possible" pilot CEOs that are not verified in the control group.

5.5 | Using All Independent Variables as Lagged by 1 Year

In our main regressions, CEO characteristics are measured in the same year as the dependent variable (i.e., *CASH)*. Firm characteristics are lagged by 1 year. In this robustness test, we examine the effect of pilot CEOs on corporate cash holdings using all independent variables as lagged by 1 year. We continue to find a positive relationship between pilot CEOs and corporate cash holdings and positive relationships between the interaction terms and corporate cash holdings. The results are reported in Panel D of Table 7.

5.6 | Using an Alternative Measure of Corporate Cash Holdings

We use *NETCASH* as an alternative measure of corporate cash holdings. *NETCASH* is defined as the ratio of cash and marketable securities to net assets, where net assets are

TABLE 7 | Robustness checks.

This table reports the results of robustness checks. Panel A reports results of the effect of pilot chief executive officers (CEOs) on corporate cash holdings after excluding firms in the aviation industry (SIC codes 4500-4599 and 3720-3729). Panel B reports the results of the effect of pilot CEOs on corporate cash holdings after controlling for industry–year fixed effects (FE). Panel C reports the results of the effect of pilot CEOs on corporate cash holdings by including observations with "possible" pilot CEOs that are not verified in the control group. Panel D reports the results of the effect of pilot CEOs on corporate cash holdings using all independent variables as lagged by 1 year. Panel E reports the results of the effect of pilot CEOs on corporate cash holdings using *NETCASH* as the dependent variable. *NETCASH* is defined as the ratio of cash and marketable securities to net assets, where net assets are defined as total assets minus cash and marketable securities. Panel F reports the results of the effect of pilot CEOs on corporate cash holdings after excluding *MILITARY* from the control variables. Panel G reports the results of cross-sectional analyses using alternative measures of growth opportunities and financial constraints. *INDGROWTH_H* is an indicator variable which equals one if the sales growth of the industry that the firm is in is higher than the sample median, and zero otherwise. Industries are classified based on the Fama–French 48 industry classification. *CREDITRATING_L* is an indicator variable which equals one if the firm's S&P credit rating is worse than the sample median, and zero otherwise. All the continuous variables are winsorized at the top and bottom one percentile. The appendix provides detailed variable definitions. Standard errors are robust to heteroscedasticity and are clustered by year. *p* values are in parentheses. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Panel A: Excluding firms in the aviation industry

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.018***	0.003	−0.005	0.008*
	(0.000)	(0.353)	(0.114)	(0.056)
PILOT × HIGHTECH		0.066***		
		(0.000)		
PILOT × WWINDEX_H			0.050***	
			(0.000)	
PILOT × ASSETBETA_H				0.020**
				(0.011)
HIGHTECH		−0.001		
		(0.912)		
WWINDEX_H			0.004	
			(0.155)	
ASSETBETA_H				0.019***
				(0.001)
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE and Industry FE	Yes	Yes	Yes	Yes
Observations	13,467	13,467	13,467	13,399
R^2	0.540	0.542	0.541	0.544

Panel B: Controlling for industry–year FE

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.018***	0.006**	−0.004	0.013***
	(0.000)	(0.024)	(0.228)	(0.002)
PILOT × HIGHTECH		0.056***		
		(0.000)		
PILOT × WWINDEX_H			0.049***	
			(0.000)	
PILOT × ASSETBETA_H				0.009
				(0.199)

(Continues)

TABLE 7 | (Continued)

Panel B: Controlling for industry–year FE

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
HIGHTECH		−0.001		
		(0.800)		
WWINDEX_H			0.003	
			(0.289)	
ASSETBETA_H				0.016***
				(0.003)
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Industry–Year FE	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658
R^2	0.548	0.549	0.550	0.552

Panel C: Including observations with "possible" pilot CEOs that are not verified in the control group

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.018***	0.005*	−0.004	0.013***
	(0.000)	(0.056)	(0.214)	(0.002)
PILOT × HIGHTECH		0.058***		
		(0.000)		
PILOT × WWINDEX_H			0.047***	
			(0.000)	
PILOT × ASSETBETA_H				0.009
				(0.177)
HIGHTECH		0.002		
		(0.548)		
WWINDEX_H			0.002	
			(0.520)	
ASSETBETA_H				0.018***
				(0.001)
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE and Industry FE	Yes	Yes	Yes	Yes
Observations	17,063	17,063	17,063	16,983
R^2	0.537	0.538	0.538	0.541

Panel D: Using all independent variables as lagged by 1 year

	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT (lagged)	0.020***	0.006**	−0.003	0.014***
	(0.000)	(0.020)	(0.310)	(0.001)
PILOT (lagged) × HIGHTECH (lagged)		0.063***		
		(0.000)		
PILOT (lagged) × WWINDEX_H (lagged)			0.052***	

(Continues)

TABLE 7 | (Continued)

Panel D: Using all independent variables as lagged by 1 year				
	CASH			
	(1)	**(2)**	**(3)**	**(4)**
			(0.000)	
PILOT (lagged) × ASSETBETA_H (lagged)				0.012**
				(0.035)
HIGHTECH (lagged)		−0.000		
		(0.973)		
WWINDEX_H (lagged)			−0.000	
			(0.892)	
ASSETBETA_H (lagged)				0.017***
				(0.001)
Constant	Yes	Yes	Yes	Yes
Controls (lagged)	Yes	Yes	Yes	Yes
Year FE and Industry FE	Yes	Yes	Yes	Yes
Observations	13,072	13,072	13,072	13,060
R^2	0.532	0.534	0.534	0.535

Panel E: Using an alternative measure of corporate cash holdings				
	NETCASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.047***	0.012	−0.001	0.025**
	(0.000)	(0.243)	(0.900)	(0.047)
PILOT × HIGHTECH		0.168***		
		(0.000)		
PILOT × WWINDEX_H			0.107***	
			(0.000)	
PILOT × ASSETBETA_H				0.044*
				(0.061)
HIGHTECH		−0.037**		
		(0.030)		
WWINDEX_H			−0.010	
			(0.252)	
ASSETBETA_H				0.037***
				(0.006)
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE and Industry FE	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658
R^2	0.458	0.459	0.458	0.460

Panel F: Excluding *MILITARY* from the control variables				
	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT	0.018***	0.004	−0.004	0.011***
	(0.000)	(0.133)	(0.270)	(0.008)

(Continues)

TABLE 7 | (Continued)

Panel F: Excluding *MILITARY* from the control variables				
	CASH			
	(1)	**(2)**	**(3)**	**(4)**
PILOT × *HIGHTECH*		0.063***		
		(0.000)		
PILOT × *WWINDEX_H*			0.047***	
			(0.000)	
PILOT × *ASSETBETA_H*				0.013*
				(0.057)
HIGHTECH		0.000		
		(0.992)		
WWINDEX_H			0.003	
			(0.236)	
ASSETBETA_H				0.018***
				(0.001)
Constant	Yes	Yes	Yes	Yes
Controls (*Excluding MILITARY*)	Yes	Yes	Yes	Yes
Year FE and Industry FE	Yes	Yes	Yes	Yes
Observations	13,727	13,727	13,727	13,658
R^2	0.539	0.540	0.540	0.543

Panel G: Using alternative measures of growth opportunities and financial constraints		
	CASH	
	(1)	**(2)**
PILOT	0.012***	−0.002
	(0.008)	(0.590)
PILOT × *INDGROWTH_H*	0.014**	
	(0.034)	
PILOT × *CREDITRATING_L*		0.047***
		(0.000)
INDGROWTH_H	−0.006	
	(0.247)	
CREDITRATING_L		0.015***
		(0.000)
Constant	Yes	Yes
Controls	Yes	Yes
Year FE and Industry FE	Yes	Yes
Observations	13,727	7060
R^2	0.539	0.423

defined as total assets minus cash and marketable securities. Panel E of Table 7 reports the results of the effect of pilot CEOs and the interaction terms on corporate cash holdings using *NETCASH* as the dependent variable. It shows that our findings are robust to this alternative measure.

5.7 | Excluding MILITARY From the Control Variables

In our main regressions, we include an indication variable for CEOs with military background (*MILITARY*) as one of the control variables. To alleviate the concern that the correlation between *PILOT*

and *MILITARY* could bias our results, we examine the effect of pilot CEOs on corporate cash holdings after dropping *MILITARY* from our regressions. As shown in Panel F of Table 7, our main findings continue to hold after excluding *MILITARY*. In untabulated results, we split the sample by *MILITARY* and find a similar effect of pilot CEOs on corporate cash holdings for both subsamples.

5.8 | Using Alternative Measures of Growth Opportunities and Financial Constraints

We then conduct some cross-sectional analyses using alternative measures of growth opportunities and financial constraints. Specifically, we use the industry sales growth (*INDGROWTH_H*) as an alternative measure of firms' growth opportunities and use firms' credit ratings (*CREDITRATING_L*) as an alternative measure of financial constraints. *INDGROWTH_H* is an indicator variable which equals one if the sales growth of the industry that the firm is in is higher than the sample median, and zero otherwise. Industries are classified based on the Fama–French 48 industry classification. *CREDITRATING_L* is an indicator variable which equals one if the firm's S&P credit rating is worse than the sample median, and zero otherwise.

The results for the cross-sectional analyses are reported in Panel G of Table 7. We find that pilot CEOs hold more cash when firms are in industries with higher average sales growth and when firms have lower credit ratings. The results are consistent with the notion that pilot CEOs are more likely to plan ahead to cope with future liquidity needs.

6 | Additional Analyses—Effects of Pilot CEOs on Value of Cash Holdings

So far, the results show a positive relation between pilot CEOs and corporate cash holdings, and between the certification level and corporate cash holdings. Similar to Aktas et al. (2019), which examines how CEO overconfidence affects the value of cash holdings, we examine the impact of pilot CEOs on the value of an additional dollar of cash to shareholders. This would provide us with insights into whether pilot CEOs' situation awareness is perceived by the market to be beneficial or detrimental to the firms.

We adapt the model from Faulkender and Wang (2006) by adding the dummy variable for pilot CEOs and an interaction term between that variable and the change in cash holdings (normalized by 1-year lagged market value of equity). The model is stated as follows:

$$\begin{aligned} EXCESSRET_{i,t} = {} & \alpha + \beta_1 PILOT_{i,t} + \beta_2 PILOT_{i,t} \\ & \times \Delta C_{i,t}/M_{i,t-1} + \beta_3 \Delta C_{i,t}/M_{i,t-1} \\ & + \beta_4 \Delta E_{i,t}/M_{i,t-1} + \beta_5 \Delta NA_{i,t}/M_{i,t-1} \\ & + \beta_6 \Delta RD_{i,t}/M_{i,t-1} + \beta_7 \Delta I_{i,t}/M_{i,t-1} \\ & + \beta_8 \Delta D_{i,t}/M_{i,t-1} + \beta_9 C_{i,t-1}/M_{i,t-1} \\ & + \beta_{10} L_{i,t} + \beta_{11} NF_{i,t}/M_{i,t-1} \\ & + \beta_{12} C_{i,t-1}/M_{i,t-1} \times \Delta C_{i,t}/M_{i,t-1} \\ & + \beta_{13} L_{i,t} \times \Delta C_{i,t}/M_{i,t-1} + \varepsilon_{i,t}, \end{aligned} \tag{6}$$

where $EXCESSRET_{i,t}$ is the stock return during the fiscal year minus the benchmark portfolio return during the fiscal year. To determine the benchmark, we group every firm in our sample into one of the 25 portfolios sorted by size and book-to-market. The portfolio return is the value-weighted return based on market capitalization within the portfolio. $\Delta X_{i,t}$ represents a change in the variable X of firm i from year $t-1$ to t (e.g., $\Delta C_{i,t} = C_{i,t} - C_{i,t-1}$). $C_{i,t}$ represents the total cash and marketable securities.

The control variables are as in the model from Faulkender and Wang (2006) and include firm characteristics that may be correlated with both returns and cash holdings. Specifically, we control for changes in firms' profitability using earnings before extraordinary items ($E_{i,t}$) and changes in investment policy using total assets net of cash ($NA_{i,t}$) and research and development expenses ($RD_{i,t}$). Changes in firms' financial policy are controlled for using interest expenses ($I_{i,t}$), common dividends ($D_{i,t}$), market leverage ($L_{i,t}$) and net financing ($NF_{i,t}$). All firm-specific factors, except for $L_{i,t}$, are scaled by 1-year lagged market value of equity ($M_{i,t-1}$).

Column (1) of Table 8 reports the results of the relation between pilot CEOs and the value of cash holdings. The coefficient on $\Delta C/M_{t-1}$ (i.e., 1.717) shows that, for firms led by nonpilot CEOs, \$1 of cash is valued by the market at \$1.717. The coefficient on the interaction term between *PILOT* and $\Delta C/M_{t-1}$ is 0.142 but not statistically significant at the conventional level, indicating that pilot CEOs do not increase the value of cash holdings. Column (2) reports the results of the effects of pilot CEOs with different levels of aviation training. The coefficients on the interaction terms $PILOT\_BEFORE \times \Delta C/M_{t-1}$ and $PILOT\_AFTER \times \Delta C/M_{t-1}$ are both insignificantly positive. In addition, the difference between the two coefficients on the interaction terms is insignificant ($p = 0.626$). Column (3) reports the results of the effects of pilot CEOs with different certification levels on the value of cash holdings. We find positive but insignificant coefficients on the interaction terms $HIGHLEVEL \times \Delta C/M_{t-1}$ and $LOWLEVEL \times \Delta C/M_{t-1}$. The test of equality of coefficients shows that the difference between the two coefficients is insignificant. Overall, our results suggest that investors do not perceive the cash holdings held by pilot CEOs as more valuable.

7 | Conclusion

This study examines the relationship between CEOs' situation awareness, as proxied by pilot certifications, and corporate cash holdings. By focusing on the personality traits of pilot CEOs, we demonstrate that firms led by pilot CEOs tend to hold more cash, particularly in cases where they face higher growth opportunities, financial constraints, or asset risks. Furthermore, we show that pilot CEOs with higher certification levels display stronger situation awareness, leading to even higher corporate cash holdings compared with those with lower certification levels.

Our results remain robust even after accounting for potential endogeneity concerns and conducting various robustness checks. We continue to observe the positive effects of pilot CEOs on corporate cash holdings when we use the propensity score matched sample, exclude firms in the aviation-related

TABLE 8 | Pilot chief executive officers (CEOs) and the value of cash holdings.

This table reports results of the effect of pilot CEOs on the value of cash holdings. We adapt the model from Faulkender and Wang (2006). The dependent variable, *EXCESSRET*, is the stock return during the fiscal year minus the benchmark portfolio return during the fiscal year. To determine the benchmark, we group every firm into one of the 25 Fama and French portfolios based on size and book-to-market sorts. A portfolio return is a value-weighted return based on market capitalization within each of the 25 portfolios. ΔC is the change in cash. M_{t-1} is the lagged market value of equity. ΔE is the change in earnings before interest and extraordinary items. ΔNA is the change in total assets net of cash. ΔRD is the change in R&D expenditures (replaced with zero if missing). ΔI is the change in interest expense. ΔD is the change in dividends. C_{t-1} is the lagged cash. L is the market leverage. NF is the firm's net financing during the fiscal year. All the continuous variables are winsorized at the top and bottom one percentile. Standard errors are robust to heteroscedasticity and are clustered by year. p values are in parentheses. *, ** and *** stand for statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	EXCESSRET		
	(1)	**(2)**	**(3)**
PILOT	−0.016		
	(0.256)		
$PILOT \times \Delta C/M_{t-1}$	0.142		
	(0.578)		
PILOT_BEFORE		−0.008	
		(0.742)	
PILOT_AFTER		−0.019	
		(0.291)	
$PILOT\_BEFORE \times \Delta C/M_{t-1}$		0.025	
		(0.956)	
$PILOT\_AFTER \times \Delta C/M_{t-1}$		0.270	
		(0.199)	
HIGHLEVEL			−0.043
			(0.230)
LOWLEVEL			−0.003
			(0.852)
$HIGHLEVEL \times \Delta C/M_{t-1}$			0.069
			(0.910)
$LOWLEVEL \times \Delta C/M_{t-1}$			0.212
			(0.176)
$\Delta C/M_{t-1}$	1.717***	1.717***	1.714***
	(0.000)	(0.000)	(0.000)
$\Delta E/M_{t-1}$	0.402***	0.402***	0.402***
	(0.000)	(0.000)	(0.000)
$\Delta NA/M_{t-1}$	0.203***	0.203***	0.204***
	(0.000)	(0.000)	(0.000)
$\Delta RD/M_{t-1}$	1.888**	1.891**	1.892**
	(0.014)	(0.014)	(0.013)
$\Delta I/M_{t-1}$	−1.819*	−1.814*	−1.810*
	(0.085)	(0.088)	(0.089)
$\Delta D/M_{t-1}$	0.282	0.279	0.296
	(0.733)	(0.737)	(0.720)
C_{t-1}/M_{t-1}	0.356***	0.357***	0.360***
	(0.000)	(0.000)	(0.000)
L	−0.409***	−0.409***	−0.409***
	(0.000)	(0.000)	(0.000)

(Continues)

TABLE 8 | (Continued)

	EXCESSRET		
	(1)	**(2)**	**(3)**
NF/M_{t-1}	−0.206***	−0.206***	−0.206***
	(0.009)	(0.008)	(0.008)
$C_{t-1}/M_{t-1} \times \Delta C/M_{t-1}$	0.006	0.006	0.020
	(0.974)	(0.976)	(0.926)
$L \times \Delta C/M_{t-1}$	−1.607***	−1.607***	−1.607***
	(0.000)	(0.000)	(0.000)
Constant	0.036***	0.036***	0.035***
	(0.008)	(0.008)	(0.010)
Observations	9227	9227	9227
R^2	0.184	0.184	0.184
p value of test of equality of coefficients on $PILOT\_BEFORE \times \Delta C/M_{t-1}$ and $PILOT\_AFTER \times \Delta C/M_{t-1}$		0.626	
p value of test of equality of coefficients on $HIGHLEVEL \times \Delta C/M_{t-1}$ and $LOWLEVEL \times \Delta C/M_{t-1}$			0.807

industry, control for industry–year fixed effects, use different sample selection criteria, and use alternative measures of key variables. In further analyses, we examine the effects of pilot CEOs on the value of cash holdings. Interestingly, we do not find evidence to support the proposition that pilot CEOs increase the value of cash holdings. Additionally, the level of aviation training or certification among pilot CEOs does not significantly affect the market's valuation of cash holdings.

In contrast to previous studies that focus on risk-taking and sensation-seeking behaviours of pilot CEOs, our study emphasizes situation awareness as a crucial personality trait. By contributing to the broader literature on CEO personality traits and corporate decision-making, we provide new insights into how nontraditional factors, that is, situation awareness, play a role in shaping corporate policies. Our findings suggest that the unique cognitive and personality traits affect the management of corporate liquidity, although we note that the excess cash holdings in some cases may not always be optimal for firms.

This study has several implications. First, our results provide evidence that CEOs' personality traits can influence their managerial styles. Specifically, CEOs' situation awareness can affect their decision-making relating to corporate cash holdings. Second, this study has practical implications for firms by providing an alternative explanation of why pilot CEOs are more likely to undertake value-adding acquisitions and diverse and original innovation projects. Firms may potentially use pilot certification to identify CEOs who are likely to be aware of potential opportunities and risks and who tend to plan ahead. Third, this study provides additional insights into the determinants of corporate cash holdings, suggesting that proxies such as pilot certification may capture the characteristics of CEOs that may not be measured conventionally.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the Federal Aviation Administration Airmen Inquiry website, as detailed in the paper, and from the subscription-based sources specified in the paper. Restrictions apply to the availability of subscription-based data, which were used under license for this study.

Endnotes

[1] Dessaint and Matray (2017) find there can be bias in the assessment of risk changes after a sudden shock, where perceived risk is higher than actual risk. This can lead to increases in corporate cash holdings that are suboptimal, resulting in interest misalignment with shareholders.

[2] We require "CEOANN" to be equal to one.

[3] Available at https://amsrvs.registry.faa.gov/airmeninquiry/.

[4] We would like to thank the authors of Cain and McKeon (2016) for sharing their pilot-CEO names. Their sample period is between 1992 and 2010, covering 179 pilot CEOs.

[5] The FAA website also provides a downloadable database of airmen certificate information. However, the downloadable database does

not contain information on the pilots' date of birth and address. Therefore, we use the FAA online inquiry website to ensure the accuracy of the matching.

[6]The FAA inquiry website provides pilots' latest certificate level and the issuance date of that certificate. Pilot certificates are permanent unless revoked by the Administrator, although pilots must hold valid medical certificates for the flying they intend to do.

[7]Following Cain and McKeon (2016) and Sunder et al. (2017), all firm-years for a CEO are classified as "pilot" if the CEO has a pilot certificate regardless of when the certification is obtained.

[8]The percentage of pilot-CEO firm-years is 6.5% in Cain and McKeon (2016) and 7.8% in Sunder et al. (2017).

[9]In an untabulated analysis, we find that pilot CEOs are more likely to use equity financing compared with nonpilot CEOs.

[10]The WW index is calculated as $-0.091[(ib+dp)/at]-0.062$[indicator set to one if $dvc+dvp$ is positive, and zero otherwise] $+0.021[dltt/at]-0.044[\log(at)]+0.102$[average industry sales growth, estimated separately for each three-digit SIC industry and each year] -0.035[sales growth]. Sales growth is an annual percentage increase in sales: *revt*/lagged *revt* -1. All variables in italics are Compustat data items. Whited and Wu (2006) note that, unlike the KZ index, the WW index is consistent with firm characteristics associated with external finance constraints.

[11]In an untabulated analysis, we restrict the treatment group to 3 years before and 3 years after the certificate issuance date and continue to find an insignificant difference between the coefficients on *PILOT_BEFORE* and *PILOT_AFTER*.

[12]The benchmark group comprises CEOs who do not hold a pilot certificate.

[13]We are not able to find matched firms for one treatment firm.

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Appendix
See Table A1.

TABLE A1 | Variable definitions.

Variable	Definition	Data source
CASH	Cash and marketable securities divided by total assets (*che*/*at*).	Compustat
PILOT	An indicator variable equal to one for chief executive officers (CEOs) with a pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
LNAGE	The natural logarithm of CEO age.	ExecuComp
LNTENURE	The natural logarithm of one plus CEO tenure in years.	ExecuComp
LNDELTA	The natural logarithm of one plus the dollar change in CEO stock and option portfolio for a 1% change in stock price.	ExecuComp
LNVEGA	The natural logarithm of one plus the dollar change in CEO option holdings for a 1% change in stock return volatility.	ExecuComp
OVERCONFIDENCE	An indicator variable equal to one if the CEO's options exceed 100% moneyness in the current year or any prior year, and zero otherwise.	ExecuComp
MILITARY	An indicator variable equal to one for CEOs with military background, and zero otherwise.	LexisNexis
MBA	An indicator variable equal to one for CEOs with an MBA, and zero otherwise.	BoardEx
PHD	An indicator variable equal to one for CEOs with a PhD, and zero otherwise.	BoardEx
IVYLEAGUE	An indicator variable equal to one if the CEO attended an Ivy League school at any academic level, and zero otherwise.	BoardEx
EDUMISSING	An indicator variable equal to one if we cannot identify the CEO's education background, and zero otherwise.	BoardEx
SIZE	The natural logarithm of total assets (*at*).	Compustat
MB	The market value of equity plus total assets reduced by the book value of equity, divided by total assets ((*csho***prcc_f* + *at*-*ceq*)/*at*).	Compustat
LEVERAGE	The sum of long-term debt and debt in current liabilities divided by total assets ((*dltt* + *dlc*)/*at*).	Compustat
NWC	Working capital minus cash holdings, divided by total assets ((*wcap*-*che*)/*at*).	Compustat
LOSS	An indicator variable equal to one if the firm has negative pretax income (*pi*), and zero otherwise.	Compustat
CAPEX	Capital expenditures divided by total assets (*capx*/*at*).	Compustat
RDEX	Research and development expenditures (replaced with zero if missing) divided by total assets (*xrd*/*at*).	Compustat
ACQUISITION	Acquisitions expenses divided by total assets (*aqc*/*at*).	Compustat
DIVIDEND	An indicator variable equal to one if the firm pays a common dividend (*dvc*), and zero otherwise.	Compustat
CF	Earnings after interest, dividends and taxes but before depreciation, divided by total assets ((*oibdp*-*xint*-*txt*-*dvc*)/*at*).	Compustat
CFVOL	The standard deviation of earnings after interest, dividends and taxes but before depreciation (*oibdp*-*xint*-*txt*-*dvc*) over a 4-year lagged period, scaled by total assets (*at*).	Compustat
SALESGROWTH	The change in sales (*revt*) divided by 1-year lagged sales.	Compustat
LNFIRMAGE	The natural logarithm of one plus cumulative number of firm-years listed in Compustat database.	Compustat
LNSEGMENTS	The natural logarithm of one plus the number of segments the firm has.	Compustat
FOREIGNINC	An indicator variable equal to one if the fraction of pretax foreign income to total pretax income (*pifo*/*pi*) exceeds 20%, and zero otherwise.	Compustat
HIGHTECH	An indicator variable which is equal to one if the firm is in a high-tech industry based on the classification in Loughran and Ritter (2004), and zero otherwise. High-tech industries include computer hardware (SIC codes 3571, 3572, 3575, 3577, 3578), communications equipment (3661, 3663, 3669), electronics (3671, 3672, 3674, 3675, 3677, 3678, 3679), navigation equipment (3812), measuring and controlling devices (3823, 3825, 3826, 3827,	Compustat

(Continues)

TABLE A1 | (Continued)

Variable	Definition	Data source
	3829), medical instruments (3841, 3845), telephone equipment (4812, 4813), communications services (4899), and software (7371, 7372, 7373, 7374, 7375, 7378, 7379).	
WWINDEX_H	An indicator variable which is equal to one if the 1-year lagged WW index is higher than the sample median, and zero otherwise. WW index is constructed following Whited and Wu (2006) and Hennessy and Whited (2007) as −0.091[(*ib* + *dp*)/*at*] − 0.062[indicator set to one if *dvc* + *dvp* is positive, and zero otherwise] +0.021[*dltt*/*at*] − 0.044 [log(*at*)] + 0.102 [average industry sales growth, estimated separately for each three-digit SIC industry and each year] −0.035[sales growth], where all variables in italics are Compustat data items.	Compustat
ASSETBETA_H	An indicator variable which is equal to one if the 1-year lagged asset beta is higher than the sample median, and zero otherwise. Asset beta equals to beta of the firm's stock multiplied by the market value of equity (*csho***prcc_f*) divided by the market value of the firm (*csho***prcc_f* + *dltt* + *dlc*). Beta is estimated using the past 5 years of monthly CRSP data.	CRSP and Compustat
PILOT_BEFORE	An indicator variable which equals one for pilot-CEO firm-years before the CEO received its pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
PILOT_AFTER	An indicator variable which equals one for pilot-CEO firm-years after the CEO received its pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
HIGHLEVEL	An indicator variable equal to one for CEOs with a commercial pilot or an airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
LOWLEVEL	An indicator variable equal to one for CEOs with a student pilot or a private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
HIGHLEVEL_BEFORE	An indicator variable which equals one for pilot-CEO firm-years before the CEO received its commercial or airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
HIGHLEVEL_AFTER	An indicator variable which equals one for pilot-CEO firm-years after the CEO received its commercial or airline transport pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
LOWLEVEL_BEFORE	An indicator variable which equals one for pilot-CEO firm-years before the CEO received its student or private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
LOWLEVEL_AFTER	An indicator variable which equals one for pilot-CEO firm-years after the CEO received its student or private pilot certificate as shown on the FAA Airmen Inquiry website, and zero otherwise.	FAA Airmen Inquiry
NETCASH	Cash and marketable securities (*che*) divided by net assets, where net assets are defined as total assets minus cash and marketable securities (*at-che*).	Compustat
INDGROWTH_H	An indicator variable which equals one if the sales growth of the industry that the firm is in is higher than the sample median, and zero otherwise. Industries are classified based on the Fama–French 48 industry classification.	Compustat
CREDITRATING_L	An indicator variable which equals one if the firm's S&P credit rating (*splticrm*) is worse than the sample median, and zero otherwise.	Compustat