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Dark Triad Personality Traits and Selective Hedging*

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Abstract We study the relationship between risk managers' dark triad personality traits (Machiavellianism, narcissism, and psychopathy) and their selective hedging activities. Using a primary survey of 412 professional risk managers, we find that managers with dark personality traits are more likely to engage in selective hedging than those without. This effect is particularly pronounced for older, male, and less experienced risk managers. The effect is also stronger in smaller firms, less centralized risk management departments, and family-owned firms, and it cannot be explained by managerial (over)confidence.

Keywords: Managers, personality traits, corporate risk management, selective hedging.

JEL Classification: G30, G34, G39.

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[...] the most significant risk management failures in recent history have their roots in psychology, and [...] the practice of risk management can be improved by incorporating an explicit psychological dimension.

Shefrin (2016)

1 Introduction

This paper studies how risk managers' personality traits can explain selective hedging behavior and shows that managers with pronounced dark personality traits exhibit an increased propensity to engage in selective hedging.

The main goal of financial risk management is to stabilize cash flows, eliminate specific sources of volatility, reduce the risk of losing money because of market uncertainty, and reduce the probability of entering distress (Stulz, 1996; Mian, 1996; Faulkender, 2005; Cotter and Hanly, 2006; Stulz, 2013). In contrast to passive hedging, *selective hedging* refers to managers *actively* varying the size and timing of their derivatives transactions based on their market views and in accordance with their personal preferences, attitudes, or skills (Brown et al., 2006; Adam et al., 2015, 2017). Thus, when risk managers engage in selective hedging, their views of future interest rates, exchange rates, commodity prices, and others influence their hedge ratios (Stulz, 1996). By doing so, they increase the risk exposure of firms, the firms' probabilities of bankruptcy, and—ultimately—the firms' future stock return volatility (Adam et al., 2017; Glaum, 2002; Stulz, 1996). As such, selective hedging stands in contrast to corporate risk management policies from textbook hedging (Beber and Fabbri, 2012).

Surveys and empirical studies of corporate hedging programs provide extensive evidence that firms around the world adjust their hedge ratios and regularly speculate within the context of their hedging programs (Adam and Fernando, 2006; Adam et al., 2017; Jin and Jorion, 2006; Tufano, 1996). For example, Beber and Fabbri (2012) find that 63% of firms in their sample change their derivative position at least by 30% every year, which is consistent with managers adjusting derivative holdings over time according to active views, but “hard to reconcile with derivatives being exclusively managed according to an optimal hedging policy” (p. 1066).

The widespread use of selective hedging is difficult to understand, and a large body of literature shows that taking on additional risk by engaging in selective hedging does not provide shareholders any added return (Adam and Fernando, 2006; Beber and Fabbri, 2012; Brown et al., 2006; Naik and Yadav, 2003), not even if one ignores the costs associated with selective hedging, such as the cost of managerial time and other resources that selective hedging consumes (Brown et al., 2006). Adam et al. (2017) even document that the extent of selective hedging is positively correlated with a firm’s future stock return volatility, which provides empirical evidence for the homonymous suggestion by Stulz (1996). Also consistent with the notion of Stulz (1996), firms that speculate the most feature the highest probabilities of bankruptcy.

Several examples of companies that incurred major losses because of their risk managers engaging in selective hedging highlight the potentially devastating consequences of this practice. For example, Japan’s leading oil refiner and distributor, Showa Shell Sekiyu, half-owned by the Royal Dutch/Shell Group, reported in February 1993 that it lost approximately \$1 billion—an amount equal to more than 80% of its shareholder equity at the time—because of risk managers’ unauthorized incorporation of their mar-

ket view on the dollar-yen foreign exchange rate when making their hedging decisions and speculating that the dollar would rise against the yen (Giddy, 2001; Ipsen, 1993). In another case, Chesapeake’s reported selective hedging losses exceeded \$750 million in 2012 as a result of a failed attempt to make money with their hedging decisions (Adam et al., 2017). Against this backdrop, “the widespread practice of managers speculating by incorporating their market views into firms’ hedging programs (“selective hedging”) remains a puzzle” (Adam et al., 2017).

Liu et al. (2020) note that “people hope and expect that appointees to high-ranking positions will use their authority wisely and for the betterment of their organizations” (p. 745). Based on this principle and considering that the primary task of risk managers is to stabilize cash flows and reduce volatility (Stulz, 1996; Mian, 1996; Faulkender, 2005; Cotter and Hanly, 2006; Stulz, 2013), one would expect risk managers not to engage in selective hedging and, by doing so, increase the risk exposure of the firm (Adam et al., 2017; Glaum, 2002). In view of the potentially severe financial losses for companies that might result in serious consequences for investors, employees, and the company’s reputation, the additional risk-taking of risk managers is ethically at least debatable (Van Scotter and Roglio, 2020; Jones, 1991).

In this paper, we analyze how risk managers’ personality traits can explain their selective hedging behavior. We develop and test the hypothesis that dark personality traits increase managers’ propensity to engage in selective hedging activities. Our hypothesis is based on the notion that dark personality traits are associated with increased sensation-seeking and risky behaviors (Crysel et al., 2013). Engaging in selective hedging activities satisfies the sensation-seeking need of managers with pronounced dark personality traits. Moreover, selective hedging activities are a good match for other typical behavioral pat-

terns of people with pronounced Machiavellistic, narcissistic, or psychopathic personality traits. As noted by Bajo et al. (2019), “derivative usage offers the narcissistic manager a convenient stage for bold and decisive action that generates a continuous supply of attention.”

According to upper echelons theory, the strategy and performance of a company are the results of managers’ background characteristics and actions (Hambrick and Mason, 1984; Hambrick, 2007). The theory establishes a general link between managerial characteristics and firm outcomes. Senior managers influence firm outcomes both directly through their immediate decisions and indirectly through their guiding example, behavior, and values (Berson et al., 2008; Reed et al., 2011). Hence, it is no surprise that the impact of manager-specific personality traits on financial and corporate decisions and firm outcomes has received increasing attention in recent years (see Bertrand and Schoar, 2003, among others). For example, CEO characteristics as important performance drivers in corporate activities have been studied in detail (Kaplan et al., 2012). Focusing on financial decisions, Gambetti and Giusberti (2012) use a survey to study the relationship between personality traits and real-life investment decision making. They document significant connections between specific traits and risk-taking activities. In the corporate context, Graham et al. (2013) elicit psychological traits and attitudes of senior executives using psychometric tests and observe a significant difference between CEOs from the United States and those from outside the United States. Moreover, the authors document that CEOs are significantly more optimistic and risk-tolerant than the lay population.

Importantly, not only do senior executives play an important role in organizations, but middle managers with decision-making authority also serve as important interfaces

between otherwise disconnected top and operating-level managers and shape strategic decisions and firm outcomes (Balogun and Johnson, 2004; Wooldridge et al., 2008). According to Wooldridge et al. (2008), “middle managers are central to explaining key organizational outcomes.” Based on the insight that managers exert a strong influence on corporate decisions, we study the impact of dark personality traits on firms’ selective hedging activities.

We use established theory and measures from the psychological literature to study the effects of (dark) managerial personality traits on corporate hedging. The most prominent negative personality traits are Machiavellianism, narcissism, and psychopathy (Paulhus and Williams, 2002; Paulhus and Jones, 2015). Based on the observation that these personality traits show significant overlap (Paulhus and Williams, 2002), they are together referred to as the dark triad of personality (Paulhus and Williams, 2002). Although psychopathy, Machiavellianism, and narcissism affect different parts of the unethical decision-making process, the elements of the dark triad nevertheless act in concert as powerful psychological antecedents to unethical behaviors (Harrison et al., 2018). Dark triad traits predict individuals’ propensity to take financial, investment, and gambling risks (Sekścińska and Rudzinska-Wojciechowska, 2020). Importantly, dark personality traits also predict various (workplace) behaviors (Neo et al., 2018). Previous research has documented the implications of dark personality traits for financial damage to the firm (see, e.g., Babiak and Hare, 2006; Boddy et al., 2015, for the case of corporate psychopathy). Dark triad personality features have been associated with a series of undesirable (firm) outcomes, such as fraudulent financial reporting (Murphy, 2012), extreme and fluctuating organizational performance (Chatterjee and Hambrick, 2007), and reduced investment performance (ten Brinke et al., 2018).

We use a survey-based approach to test our hypotheses. The survey allows us to access managers' personality traits and their hedging activities at the same time, which would not be possible using a large-scale archival analysis (see also Graham et al., 2013). We make use of the “dirty dozen scale” to elicit managers' dark triad personality traits, following along the lines proposed by Cragun et al. (2020) in their meta-analysis.¹ The dirty dozen scale is a well-researched, validated, and commonly used measure to gauge dark personality characteristics (Jonason and Webster, 2010; Webster and Jonason, 2013). As is commonly done in other studies using the scale, we obfuscate the questions within several other uncontroversial questions to ensure that participants do not immediately realize that they are describing potentially negatively perceived personality traits (Mutschmann et al., 2020). We carefully control for other potential drivers of selective hedging, such as the manager's age, overconfidence, and risk preferences. Additionally, we study the moderating influence of the firm's ownership structure and managerial discretion.

Dark personality traits are prevalent among the overall population, with approximately 0.6–1.2 percent of general population samples showing signs of psychopathy (Boddy, 2017; Caponecchia et al., 2012), for example, and even more so in the corporate environment, with an incidence of approximately 3.5 percent at senior organizational levels (Babiak et al., 2010; Boddy, 2011). Various characteristics of a person with dark personality traits seem to be advantageous when rising to leadership positions in organizations (Babiak and Hare, 2006; Boddy, 2011; Rovelli and Curnis, 2020). For example, Boddy (2006) notes that such individuals are superficially charming and skilled manipulators (see also Neo et al., 2018), which can appear to be a good influence and persuasion skills—important traits of an effective leader (Babiak et al., 2010). Babiak et al. (2010) write that psychopathy is positively associated with ratings of creativity, good strategic

thinking, and communication skills. Mahaffey and Marcus (2006) note that the cold-heartedness and manipulativeness of psychopathic employees allow them to gain other people’s confidence and facilitate their entry into leadership positions. A lack of remorse, guilt, and empathy can be interpreted as being “cool under fire” in the corporate world and, thereby, benefit the individual on his or her way to the top (Babiak et al., 2010). At the same time, organizations might even hire managers with dark personality traits because their willingness to push ethical boundaries aligns with organizational objectives (Harris et al., 2021).

We contribute to the literature in three important ways. First, we link findings from personality psychology to the corporate risk management literature by analyzing whether dark personality traits influence corporate risk management. By studying the influence of personality traits on corporate hedging, we extend the existing knowledge on the motivations and drivers of selective hedging. Second, we analyze whether the organizational context can function as a moderator of the influence of personality traits on corporate hedging activities. Important practical implications arise from understanding the conditions under which the influence of personality traits on selective hedging is most pronounced. Third, we contribute to personality theory in the management context. Although a large part of the literature on managerial personality traits focuses on narcissism (Chatterjee and Hambrick, 2007; Petrenko et al., 2016) to exploit several readily available proxies for this personality trait (e.g., signature size, the use of first-person pronouns, or the size of the manager’s picture in annual reports), we study the influence of dark personality traits in general. By doing so, we also address concerns regarding the validity of these proxies for narcissism (Carey et al., 2015).

The remainder of this paper is organized as follows. Section 2 discusses the related

literature and develops our hypotheses. Section 3 describes the survey instrument used in this study and explains the design of the questions and delivery mechanism. Section 4 presents our main analysis. The final section evaluates and discusses our findings, highlights implications for practice, and concludes the paper. items ranking

2 Related literature and hypotheses

This section discusses the related literature on corporate hedging and dark personality traits in the corporate context. We begin with the literature on corporate and selective hedging (section 2.1) before we move on to the literature on dark personality traits (section 2.2). We then discuss the literature on dark triad personality traits in the corporate context in section 2.3. Finally, we present our hypotheses in section 2.4.

2.1 Corporate hedging and selective hedging

Traditional theories of corporate risk management provide numerous theoretical arguments in support of the notion that passively matching one risk exposure with an opposing risk creates value for shareholders (see, e.g., Geyer-Klingeberg et al., 2020, for a recent meta-analysis). Stulz (1984) pioneered this literature by presenting a model in which value-maximizing firms pursue hedging policies. In particular, derivatives allow firms to stabilize their cash flows by eliminating specific sources of volatility (Moore et al., 2000). Importantly, this theory does not suggest that companies should hedge their entire risk exposure, that is, create a hedge ratio of 100%; rather, the theory suggests that firms should determine their optimal hedging policies based on their preferences and passively adhere to them without actively attempting to time their hedging decisions based

on their market views. Thus, companies might decide to passively hedge, for example, 50% to protect themselves against the possibility of financial distress and still be in line with traditional academic theory (Stulz, 1996). In a similar fashion, a passive risk management strategy that is designed to protect the firm against costly lower-tail outcomes is in line with theoretical recommendations from a corporate value-adding perspective (Aabo, 2015; Stulz, 1996). Additionally, this traditional notion of risk management does not hinge on the concept that hedging transactions have zero net present value—that hedging is costless.²

Corporate risk management, for example implemented using derivatives purely for hedging purposes without any speculative motives, adds value to the firm by alleviating market imperfections (Adam and Fernando, 2006; Adam et al., 2017). In particular, hedging affects firm values by reducing the probability of financial distress and expected bankruptcy costs, underinvestment risk, expected tax liabilities, agency costs, and information asymmetries (Bolton et al., 2011; Campello et al., 2011; Carter et al., 2006; Chen and King, 2014; Froot et al., 1993; Géczy et al., 1997; Gilje and Taillard, 2017; Graham and Rogers, 2002; MacKay and Moeller, 2007). In addition, hedging might increase firm value by collecting risk premia in forward markets (Adam and Fernando, 2006).

Estimating the increase in firm value, Geyer-Klingeberg et al. (2020) find that foreign currency hedgers realize a firm value hedging premium of 1.8%. Carter et al. (2006) show for the airline industry that the valuation premium increases in proportion to future fuel requirements hedged. As demonstrated by Biguri et al. (2018), firms that have access to newly created hedging opportunities also experience up to a 40% decline in the variance of their stock returns, which may be explained by an increase in profit margins, investments, better access to credit lines, and a decrease in cash holdings.

However, this passive risk avoidance notion of hedging is deficient in explaining hedging behavior in practice (Adam et al., 2015; Graham and Rogers, 2002; Haushalter, 2000). Survey studies of both corporate exchange risk management and the corporate use of derivatives in general have shown considerable (time) variation in managerial practice because risk managers seem to incorporate their market views and actively vary their hedge ratios (Glaum, 2002). Although most companies engage in selective hedging (Adam and Fernando, 2006; Brown et al., 2006), some firms tend to engage in outright speculation, using derivatives to “deliberately creat[e] risk exposures in addition to those arising from their normal business operations” (Glaum, 2002). In contrast to the theoretical notion that risk management is used to stabilize cash flows, to eliminate specific sources of volatility, and to reduce the probability of entering distress (Stulz, 1996; Mian, 1996; Faulkender, 2005; Cotter and Hanly, 2006; Stulz, 2013), selective hedging increases the risk exposure of firms that engage in this practice and exposes firms to new risks (Adam et al., 2017). Consequently, Adam et al. (2017) argue that “the traditional theories of corporate risk management provide no shareholder value-maximizing rationale for firms to engage in selective hedging.”

A theoretical attempt to explain selective hedging that is in line with a shareholder value-adding perspective comes from Stulz (1996), who argues that some companies might have a comparative advantage in bearing certain financial risks, for example, inside information.³ He notes that particularly large firms might have such a competitive advantage but also cautions that the major risk associated with “selective hedging” is that the firm’s information might not in fact be better than the market’s. In such an instance, managers acting on their market views might in fact destroy value (Brown et al., 2006). Moreover, even if the firm has comparative advantages, trading profits from selective hedging are

by no means “a sure thing”; the possibility always exists that the firm will experience significant losses (Stulz, 1996). In particular, he writes that “the lesson of market efficiency for corporate risk managers is that the attempt to earn higher returns in most financial markets generally means bearing large (and unfamiliar) risks.” Stulz (1996) continues to argue that most industrial corporations do not have a competitive advantage in highly liquid financial markets, such that “setting up the corporate treasury to trade derivatives for profit is a value-destroying proposition.” Stulz (1996) also points out that even financial firms rarely have a competitive advantage when trading foreign exchange.

Thus, not surprisingly, cash flow gains from selective hedging appear to be small at best, and selective hedging does not provide meaningful economic gains (Adam and Fernando, 2006; Beber and Fabbri, 2012; Brown et al., 2006; Naik and Yadav, 2003). Interestingly, firms that engage in selective hedging even underperform a naïve mechanical benchmark contrarian strategy based on negative autocorrelation even though the median company followed a strategy that would benefit from negative autocorrelation (Brown et al., 2006). If anything, passive hedgers appear to have outperformed selective hedgers (see, e.g., Brown et al., 2006; Beber and Fabbri, 2012). Hence, Brown et al. (2006) conclude that managers rarely have advantages that can be translated into substantial increases in shareholder value and, consequently, “successful selective hedging is probably very uncommon in wider samples of firms.” If anything, Brown et al. (2006) find that large firms are able to benefit from selective hedging, which is consistent with the predictions of Stulz (1996).⁴ Consistent with the homonymous notion of Stulz (1996), Adam et al. (2017) even document that the extent of selective hedging is positively correlated with a firm’s future stock return volatility and that firms that speculate the most feature the highest probabilities of bankruptcy. Overall, the evidence does not support the notion

that selective hedging increases firm value (Adam et al., 2017).

Several recent studies attempt to explain the heterogeneity in the corporate use of derivatives. For example, the ownership structure of a firm might explain some of this heterogeneity (Pennings and Garcia, 2004). Empirical research indicates that selective hedging might be related to managerial power (Jankensgård, 2019). In particular, firms with high inside ownership have excessive variability in their derivative portfolios (Jankensgård, 2019). Adam et al. (2017) show that selective hedging is more prevalent among financially constrained firms, suggesting that this practice is driven by asset substitution motives. The authors also find weak relationships between selective hedging and some corporate governance measures and no evidence of a link between selective hedging and managerial compensation (see also Croci et al., 2017).

Another starting point to explain the differences in the corporate use of derivatives is to take a closer look at managers. Regarding the determinants of selective hedging, managers' personal characteristics have been shown to exhibit strong explanatory power over firm and industry characteristics (Beber and Fabbri, 2012), which is consistent with other studies on the importance of individual manager characteristics for corporate decisions (Bertrand and Schoar, 2003; Malmendier and Tate, 2005). Pennings and Garcia (2004) highlight that factors such as risk exposure, risk perception, and individual risk preference explain variations in derivatives usage, whereas Croci et al. (2017) report that firms' hedging practices increase with CEO age, and near-retirement CEOs in particular prefer linear hedging instruments. In line with this, Beber and Fabbri (2012) find that younger, MBA-trained, and less experienced managers exhibit higher variability in notional amounts of hedging dimensions. Several surveys report that a majority of corporate financial managers appear to believe that they are able to "beat the market" (Glaum,

2002). Adam et al. (2015) propose managerial behavioral biases as an explanation for selective hedging. The authors study managerial reactions to their (speculative) gains and losses from market timing when they use derivatives and propose a connection between managerial overconfidence and selective hedging activities. Firms hedge more selectively following past gains, which Adam et al. (2015) attribute to increased confidence levels that lead managers to believe they have superior information or ability when they do not. In addition to overconfidence, managerial loss aversion coupled with mental accounting might also explain selective hedging (Adam et al., 2013). Most closely related to our study, Bajo et al. (2019) investigate the relationship between narcissism and selective hedging and find that narcissistic managers engage more in selective hedging activities.

At the end of the day, many observations and research findings around the practice of selective hedging remain puzzling (Adam et al., 2017). We attempt to help solve this puzzle and investigate the extent to which (dark) personality traits contribute to selective hedging.

2.2 Dark triad personality traits

Personality traits make up who an individual is as a person, defining one's personal values and preferences (Parks-Leduc et al., 2015). The dark triad includes the most prominent negative personality traits: Machiavellianism, narcissism, and psychopathy (Paulhus and Williams, 2002; Paulhus and Jones, 2015).

Individuals who score high on the Machiavellianism scale are, on average, more self-interested and opportunistic than those who do not (Gunnthorsdottir et al., 2002). They exhibit less guilt (Murphy, 2012) and have been reported to be more likely to cheat, manipulate others for their own gain, and believe that manipulation is an important key to

success (Paulhus and Jones, 2015). Additionally, Machiavellianism is often accompanied by a lack of empathy and a focus on pursuing one's own goals at the expense of others (LeBreton et al., 2018). Individuals with pronounced Machiavellianism have a view of morality that offers a greater acceptance of behaviors that are normally be described as immoral or unethical (LeBreton et al., 2018).

The best-known feature of individuals with narcissistic traits is their continuous need for attention and admiration from others as well as the continuous reinforcement of their ego (Vazire and Funder, 2006). People with narcissistic traits are individuals for whom enhancing the positivity of the self is extremely important. As a result, their behavior is directed toward gaining status and esteem (Campbell et al., 2004). Highly narcissistic individuals feel a need to undertake large-stakes initiatives to reinforce their ego (Chatterjee and Hambrick, 2007). Gabriel et al. (1994) argue that people with a high level of narcissism have a need to feel superior to others. According to the authors, individuals with narcissistic traits are even characterized by thinking that they are more intelligent than they actually are. In addition, individuals with narcissistic traits display high levels of impulsivity (Vazire and Funder, 2006), which affects their decision-making style (Campbell et al., 2011). Similar to individuals with pronounced Machiavellianism, narcissists are associated with cheating and unethical behavior (Menon and Sharland, 2011). Individuals with narcissistic traits are also more likely to show a propensity for engaging in exploitative acts or behaviors and simultaneously lack empathy with a tendency toward callousness (LeBreton et al., 2018). Finally, Vogel (2006) argues that the typical narcissist is unfazed by setbacks and feels neither regret nor remorse because they are always capable of finding someone else to blame.

Individuals with psychopathic traits exhibit a significant lack of consciousness and

feelings for others. They experience low empathy and remorse (Babiak and Hare, 2006) and do as they please without any feeling of guilt (Hare, 1999). Research has characterized individuals with psychopathic traits as reckless, selfish, and aggressive (Patrick, 2007). Williams et al. (2007) note that psychopaths pursue an irresponsible lifestyle and counterproductive behavior.

All three personality traits of the dark triad are associated with an increase in excitement seeking and risk taking (Crysel et al., 2013; Jones, 2014). For example, Sekścińska and Rudzinska-Wojciechowska (2020) find that narcissism and psychopathy in particular predict individuals' general propensity for financial risk-taking and their propensity to take investment and gambling risks. As noted by Wink and Donahue (1997), individuals with narcissistic traits cannot stand boredom because it creates a mismatch between their high inner ambitions and external goals. As a result, such individuals tend to engage more in "sensation-seeking" (Emmons, 1981). Similarly, individuals with psychopathic traits have also been reported to more heavily engage in sensation-seeking (Zuckerman, 1979). Turning to risk taking, Rim (1966) studies the influence of Machiavellianism on decisions involving the risk of both individuals and groups. The study documents that subjects who score high on the Machiavellianism scale tend to undertake more risky decisions than other individuals (see also Li-Ping Tang et al., 2008). Moreover, these individuals are particularly influential in group discussions and, thereby, shift group decisions toward increased risk taking. Similarly, the literature has documented that individuals with narcissistic (Campbell et al., 2004; Judge et al., 2006; Maccoby, 2004) and psychopathic (Jones, 2014) traits generally take more risks than those without these traits.

Studies on the composite dark triad of personality traits have associated individuals with a high dark triad score with emotional coldness, unethical decision making, a lack

of guilt and remorse, and a sense of superiority (Babiak and Hare, 2006; Boddy, 2006; Paulhus and Williams, 2002; Stevens et al., 2012).

2.3 Dark triad personality traits in the context of the firm

Dark personality traits might be especially pronounced among corporate executives (Furtner et al., 2017). As noted by Engelen et al. (2016), narcissism among corporate executives seems to be increasing over time. In fact, Kets de Vries (2004) notes that narcissism is “at the heart of leadership” and that rising to the top of an organization might be facilitated by a dose of narcissism (p. 188). Similarly, Marshall et al. (2015) note that “corporate psychopathy thrives perhaps as the most significant threat to ethical corporate behavior around the world.” Furtner et al. (2017) argue that dark triad personalities can be found among leaders because of their strong need for power and their social dominance orientation. At the same time, however, Babiak and Hare (2006) note that individuals with psychopathic traits are good at strategic thinking and tend to be innovative. Consequently, during the last few years, the impact of dark personality traits has also been studied in an organizational context. Previous research provides evidence that managers’ dark personality traits are important in explaining certain organizational activities and outcomes.

Although the literature has linked negative personality traits to several aspects of daily corporate life, such as job performance (O’Boyle Jr. et al., 2012), team processes, citizenship behavior, leadership (Volmer et al., 2016), counterproductive workplace behaviors (O’Boyle Jr. et al., 2012), and job attitudes and negotiations (LeBreton et al., 2018; Spain et al., 2014), we specifically focus on financial decision making and organizational outcomes in the following.

With respect to organizational outcomes, the literature has studied the volatility of organizational performance (Chatterjee and Hambrick, 2007; Wales et al., 2013), the adoption of technological discontinuities (Gerstner et al., 2013), the M&A process (Aktas et al., 2016), tax avoidance (Olsen et al., 2014), accounting choices (Francis et al., 2008; Schrand and Zechman, 2012), fraudulent reporting (Murphy, 2012; Rijsenbilt and Commandeur, 2013; Mutschmann et al., 2020), and risk management decisions (Bajo et al., 2019) in connection with managerial personality traits. Managerial narcissism has also been associated with lower reporting quality (Ham et al., 2017) and less effective monitoring (Chatterjee and Pollock, 2017). Omar et al. (2019) report that the psychopathic characteristics in firms' top management teams reduce future shareholder wealth. Moreover, individuals with psychopathic traits working in leadership positions in financial corporations might have contributed to causing the global financial crisis (Boddy, 2011).

Chatterjee and Hambrick (2007) document that CEOs with narcissistic personality traits favor bold actions, strategic dynamism, and grandiosity, leading to extreme and fluctuating organizational performance (see also Wales et al., 2013). This observation can be explained by narcissists' need for attention. Although the authors document that the performance of affected companies is indeed more volatile than that of non-affected companies, they show that, on average, firms with narcissistic CEOs realize similar performance compared with firms with non-narcissistic CEOs. In a similar study, Chatterjee and Hambrick (2011) evaluate the impact of narcissism on CEOs' risk taking. The authors document that highly narcissistic CEOs are much less responsive to recent objective performance than their less narcissistic peers. In contrast to the findings of Chatterjee and Hambrick (2007), ten Brinke et al. (2018) study hedge fund managers

and document that managers with more psychopathic tendencies produced lower absolute returns than their less psychopathic peers and that managers with more narcissistic traits produced decreased risk-adjusted returns. In their meta-analysis, Cragun et al. (2020) summarize the common themes of the research on CEO narcissism.

In her experimental study on fraudulent financial reporting, Murphy (2012) documents that individuals who exhibit higher Machiavellianism are more likely to misreport. Moreover, she finds that such Machiavellians who misreport feel significantly less guilt than others who misreport. These findings are supported by Rijsenbilt and Commandeur (2013), who find that managers who score high on the Machiavellianism scale seem to be more willing to tamper with financial accounts or engage in fraudulent behavior in an effort to preserve their positive self-image. Similarly, experimental results suggest that managers with greater narcissistic personality tendencies are more likely to inflate reported earnings when there are positive social status implications, such as praise, acclaim, and affirmation (Hobson and Resutek, 2008). According to Harris et al. (2021), some organizations might even go as far as to particularly hire managers with dark personality traits for their accounting departments given their willingness to push ethical boundaries.

Finally, in their study on corporate risk management and narcissism, Bajo et al. (2019) argue that even in the absence of specific beliefs about markets, narcissistic managers might be attracted to derivative usage as a way to enhance their self-image. Making bets using derivatives draws attention and staves off boredom at the same time and might help sustain a perception of the manager as bold and decisive.⁵

In conclusion, a large part of the literature that relates dark personality traits to organizational outcomes focuses on narcissism as a single construct. Much less thought

has been given to Machiavellianism, psychopathy, and the dark triad composite scale, which is surprising considering that, for example, Machiavellianism, narcissism, and psychopathy might act together to explain certain behaviors (Harrison et al., 2018) or the impact of individuals with psychopathic traits in the financial world (Jones, 2014). Thus, we argue that the composite dark triad trait might incorporate the various dimensions of a dark personality that relate to selective hedging activities. In addition, Jonason and Webster (2010) note that the individual scales for Machiavellianism, narcissism, and psychopathy are associated with distinctive response biases. Hence, measuring all three traits simultaneously increases internal consistency.

2.4 Hypotheses

Based on these insights from the literature, we hypothesize that risk managers who score high on the dark triad personality scale engage more heavily in selective hedging activities than other risk managers. Selective hedging provides these managers with several benefits that cater to their personal preferences. Specifically, it provides them with additional excitement and satisfies their “thirst for risk.” Moreover, selective hedging provides the potential for large additional financial gains that will be attributed to the manager’s skill, thereby satisfying the need for attention and status. Finally, managers who score high on the dark triad scale are not affected by the negative outcomes of their speculative behavior because they do not experience feelings of guilt and are likely able to allocate the blame to someone else. As a result, our main hypothesis is as follows.

H1: Managers who score high on the dark triad personality scale engage more heavily in selective hedging activities.

Next, we analyze the cross-sectional differences in the connection between dark triad

personality traits and selective hedging along several dimensions. Considering that several demographic characteristics, such as age and gender, are known to be important determinants of general risk-taking behavior (see, e.g., Riley Jr. and Chow, 1992; Halek and Eisenhauer, 2001; He et al., 2008) and seem to impact managers' hedging practices (Crocchi et al., 2017; Beber and Fabbri, 2012), age and gender might also moderate the relationship between dark triad personality traits and selective hedging activities. Because female and older decision makers are reported to be more risk averse than male and younger decision makers, we hypothesize

H2: The influence of managers' dark personality traits on their selective hedging activities is greater for male and younger managers.

In a similar vein, experience has been documented to have important effects on behavioral biases (Feng and Seasholes, 2005) and managers' hedging preferences (Beber and Fabbri, 2012). In particular, experience has been shown to mitigate the impact of behavioral biases on decision making (Feng and Seasholes, 2005). Consequently, we hypothesize

H3: The influence of managers' dark personality traits on their selective hedging activities is stronger for less experienced managers.

At the same time, managers' education influences their hedging decisions (Beber and Fabbri, 2012). In particular, a higher educational background could provide a manager with superior information and a higher (perceived) ability to time the market and forecast future market developments (Beber and Fabbri, 2012). At the same time, people with a superior educational background might be more risk tolerant or even (over)confident as a result of their (perceived) superior training (Beber and Fabbri, 2012). This reasoning is supported by Bertrand and Schoar (2003), who find that managers with higher edu-

cational degrees follow more aggressive strategies. Thus, it is reasonable to assume that education and (perceived) expertise might also moderate the relationship between dark triad personality traits and selective hedging. Based on this notion, we hypothesize

H4: The influence of managers' dark personality traits on their selective hedging activities is greater for highly educated managers.

Risk managers with dark personality traits need to have a platform to receive attention and admiration for their selective hedging activities. Specifically, these managers need to be able to regularly report to their supervisors on their hedging activities. Without being able to regularly report on their selective hedging activities, risk managers will not have access to external admiration, to a large extent. Consequently, a reduced reporting frequency undermines the benefits of these managers from engaging in selective hedging. Based on this notion, we hypothesize the following:

H5: The influence of managers' dark personality traits on their selective hedging activities is stronger for managers who report on their hedging activities more frequently.

Risk managers might have different perceptions about what constitutes successful risk management. For example, some risk managers might perceive little variation in firms' cash flows as an indication of successful risk management—in line with traditional theories of corporate risk management. Others, however, might perceive the creation of financial gains with their derivatives usage as an indication of successful risk management. For managers with pronounced dark personality traits to feel admired for their financial gains, these managers first need to perceive generating financial gains as an indication of successful risk management. In other words, risk managers who feel that only little cash flow variation is a sign of successful risk management will not feel excited about financial

gains. Based on this argument, we posit our sixth hypothesis:

H6: The influence of managers' dark personality traits on their selective hedging activities is greater for managers who perceive financial gains as an indication of successful risk management.

The organizational context is important for managerial interpretations (Sharma, 2000). Firms that have established routines and structures with respect to corporate hedging decisions leave less scope for managerial discretion (see also Li and Tang, 2010). In addition, empirical findings indicate that selective hedging is related to managerial power (Jankensgård, 2019). Therefore, organizational factors might also moderate the impact of managers' personality traits on their selective hedging decisions. Managers' personality traits might influence their risk management activities through their opportunity to exercise discretion (Hemingway and Maclagan, 2004; Li and Tang, 2010; Finkelstein and Hambrick, 1990; Finkelstein and Boyd, 1998; Crossland and Hambrick, 2007). Thus, we hypothesize that the impact of risk managers' dark personality traits on their selective hedging activities increases in their discretion.

H7: The influence of managers' dark personality traits on their selective hedging activities increases in their managerial discretion.

3 Methodology and data

We use an online survey to collect information about managers' personality traits and their hedging activities.⁶ The survey allows us to gather data on the personality traits of risk managers and their preferred hedging activities at the same time, which would not be possible using large archival data sources (see, e.g., Graham et al., 2013). Using a self-

reported measure provides a valid proxy for managers' personality traits. In fact, Cragun et al. (2020) emphasize in their meta-analysis that a psychometric self-report is the first choice for researchers to study managers' personality traits. Similarly, Graham et al. (2013) argue that inferring managerial attitudes from observed actions in archival datasets raises questions about the validity of the action as a broad-based proxy. Additionally, such samples are limited to a few managers for whom such actions are observable (Graham et al., 2013).

3.1 Data collection

The survey targets high-ranking professionals responsible for the corporate hedging decisions of their organization.⁷ We commissioned *QuestionPro* to carry out the actual questioning of the respondents. *QuestionPro* has an extensive database of industry professionals and continuously attempts to recruit new members for its database. In particular, *QuestionPro* is one of the largest providers of online panels and has a database of more than 22 million potential respondents. Its business online panel consists primarily of business decision makers, such as CEOs or company owners. During the recruiting process, individuals are asked to indicate several characteristics about themselves, allowing researchers to profile respondents based on, for example, in which industry they work or the department of their occupation. In addition, *QuestionPro* continuously monitors its panel for duplicate, fraudulent, and suspicious records. Lastly, *QuestionPro* provides respondents a strong assurance of anonymity, which may improve the response rate and quality of the data collected (Durant et al., 2002; Pearlin, 1961; Podsakoff et al., 2003) and is compliant with general data protection regulations. Thus, making use of this database allows us to obtain a high-quality sample. The survey was executed in English

via the *QuestionPro* survey platform.

The invitation to the survey was sent to 1,220 professionals from *QuestionPro*'s database based on the target group of the survey. In particular, we specifically targeted individuals who had previously indicated that they hold a high-ranking position (e.g., EVP, SVP, AVP, Director or Group Manager, Senior Manager) with decision-making authority in the financial department of their organization. We specifically targeted individuals from financial departments because previous research indicates that the risk management function is commonly anchored in this division (Aabo et al., 2012; El-Masry, 2006). We screened individuals for whether their original indications are still up to date. In addition, respondents had to reply "yes" to two qualifying questions to be included in our survey. First, the organization for which they worked had to use derivatives (e.g., forwards, futures, options, swaps). Second, the hedging decisions had to fall into the professional area of the respondent's responsibility. Last, we restricted participation to respondents from firms in the United States or the United Kingdom. These restrictions were included in the announcement of the survey and queried using the first questions in the questionnaire; only participants who answered "yes" to these questions were allowed to continue the survey. The initial reply rate was 87%. A total of 135 respondents were disqualified because of our screening and qualification questions, and 161 respondents did not complete the survey. Because the literature indicates that data from online surveys might be contaminated by careless responses, we included an attention check in our actual survey (Kung et al., 2018).⁸ A total of 333 respondents did not pass the attention check and, thus, were also excluded. One respondent did not provide answers to all of the items on the dirty dozen scale. Another seventeen respondents did not provide answers to performance evaluation questions. The remaining 412 complete questionnaires were

used for the analysis. The average time needed to complete the questionnaire was 11 minutes. Respondents received monetary compensation for their efforts.

Table 1 shows the distribution of respondents across industries, firm size, and firm structures. We proxy the size of the firms in our sample with the number of employees and sales revenue. The sample includes an overrepresentation of firms in the financial sector, with almost 54% of all observations. To address the concern that our results might exclusively be driven by respondents from the financial sector, we present robustness tests in which we repeat our main analysis excluding respondents from the financial sector in the Appendix. Our results are robust to this specification, indicating that our conclusions are not (exclusively) driven by respondents from the financial sector. The sample includes public (38.11%), private, and government-owned firms (6.07%). The majority of private firms are non-family-owned (42.96%), but the sample also includes almost 13% of family-owned firms.

Insert Table 1 here

The unit of analysis is risk managers' corporate hedging decisions. Table 2 summarizes the personal characteristics of the respondents in our sample. The majority of the respondents were between 35 and 44 years old, male, and held a graduate degree. Additionally, more than 90% of respondents had at least 3 years of experience / tenure with the organization.

Insert Table 2 here

Common method bias is an important issue when using data collected through surveys. We attempt to reduce common method bias by following best practices to enhance the

validity of our survey procedure and by using both procedural and statistical remedies that have been employed by other researchers (Abernethy et al., 2011; Fowler, Jr., 2013; Bergman et al., 2020). In particular, we measure the dependent and independent variables at a maximum distance within the survey (Chang et al., 2010; Podsakoff et al., 2003). We also measure the independent variable of interest with negatively loaded items and hide them among a positively loaded scale, which further reduces bias (Mutschmann et al., 2020). We use the Harman (1976) single-factor test to test whether the correlations between the variables are artificially inflated and find that a single factor can explain 23.2 percent of the variance. This finding indicates low common method bias (Abernethy et al., 2011).

3.2 Variables

We ask the participants about their corporate hedging practices using various questions that allow us to capture different dimensions of selective hedging. Our questions on selective hedging activities are inspired by prior studies on hedging practices (Bodnar et al., 1995, 1998).

Trade for profit. We first ask the participants about the purpose of their derivatives usage. In particular, we ask them to rate their answers to the question, “What best describes the purpose of your derivatives usage?” on an 11-level Likert item ranking from “Reduce cash flow / earnings volatility” to “Trading for profit.” Risk managers in our sample have, on average, a strong tendency to trade for profits, with a mean of 8.54 and a median of 9. The standard deviation is 2.08 (see Table 3).

Market view. Next, we ask participants about the extent to which their view of the market influences their hedging decisions. We ask, “How often does your market view

cause you to... (i) alter the timing of hedges, (ii) alter the size of hedges, and (iii) actively take positions in derivatives?” using 5-level Likert items ranging from “Never” to “Very frequently.” We aggregate the answers to a single variable by taking the average. Factor analysis shows that the three items effectively capture the impact of the market view on hedging decisions (Cronbach’s alpha = 0.71). Risk managers seem to consider their market view quite a bit when making hedging decisions, as indicated by a mean of 3.96 (standard deviation of 0.69) and a median of 4.

Selective hedging. Finally, we create a variable that aggregates the various dimensions of selective hedging behavior using an 8-item scale. We ask the participants about the extent to which they use various practices, ranging from taking a view to trading for profit. In total, the scale contains the following questions:

1. How important do you consider trading for profit for your hedging decisions?
(Ranges from “Never” to “Very frequently”)
2. How often do you use derivatives to reduce costs / increase profits by arbitraging the markets? (Ranges from “Never” to “Very frequently”)
3. How often do you use derivatives to reduce costs / increase profits by taking a view? (Ranges from “Never” to “Very frequently”)
4. How important do you rate the profit potential when you consider choosing a derivative product? (Ranges from “Not at all important” to “Very important”)
5. What best describes the purpose of your derivatives usage? (Ranges from “Reduce cash flow / earnings volatility” to “Trading for profit”)
6. How often does your market view cause you to alter the timing of hedges? (Ranges from “Never” to “Very frequently”)

7. How often does your market view cause you to alter the size of hedges? (Ranges from “Never” to “Very frequently”)
8. How often does your market view cause you to actively take positions in derivatives? (Ranges from “Never” to “Very frequently”)

We obfuscate the selective hedging items among a number of other statements that focus on corporate hedging preferences and activities to ensure that participants are not immediately made aware of the focus of the study. We aggregate the variables that capture the various dimensions of selective hedging behavior to a single variable by first scaling all items to a range from 1 to 5 (if necessary) and then taking the arithmetic average of all eight items. With a Cronbach’s alpha value of 0.82, the internal consistency of the selective hedging measure is very high. Figure 1 shows the distribution of the main dependent variable. With a mean and a median of 4.09 (standard deviation of 0.57), the variable indicates that risk managers in our sample engage in selective hedging practices. This observation is in line with the empirical literature that documents widespread selective hedging practices (Adam et al., 2015, 2017; Brown et al., 2006). In fact, we observe that several risk managers in our sample even exhibit the maximum value of five, indicating that these risk managers very frequently let their market view and thirst for additional profits guide their hedging decisions. This observation is consistent with previous studies that report that large shares of firms engage in selective hedging (Dolde, 1993; Bodnar et al., 1998).

Insert Figure 1 here

Dark triad personality. We ask the participants about the extent to which they agreed with a set of short statements. The statements include the dirty dozen scale to elicit their

dark personality traits (Jonason and Webster, 2010). The scale comprises three four-item subscales for Machiavellianism, narcissism, and (subclinical) psychopathy. Specifically, the scale contains the following questions, with 5-levels ranging from “Disagree strongly” to “Agree strongly”:

- M1 I have used deceit or lied to get my way.
- M2 I tend to manipulate others to get my way.
- M3 I have used flattery to get my way.
- M4 I tend to exploit others toward my own end.
- N1 I tend to want others to admire me.
- N2 I tend to want others to pay attention to me.
- N3 I tend to expect special favors from others.
- N4 I tend to seek prestige or status.
- P1 I tend to lack remorse.
- P2 I tend to be callous or insensitive.
- P3 I tend to not be too concerned with morality or the morality of my actions.
- P4 I tend to be cynical.

The dirty dozen scale has been previously used and validated to measure dark triad personality traits (Miller et al., 2012; Webster and Jonason, 2013). To mitigate the potential impact of social desirability bias in our measure of respondents’ dark personality traits, we obfuscate the dark personality scale among a number of other statements. Specifically, we hide the dirty dozen scale within a large number of positively loaded items that assess general leadership behavior and other personality traits (Gosling et al., 2003). We randomize the order of all of the questions to alleviate the possible bias of negatively framed questions. We opt for the dirty dozen because this shorter scale allows us to hide the items properly, and it can be answered in a short time. The Cronbach’s alpha of the dark triad scale is 0.92, indicating very high internal consistency. Figure

2 shows the distribution of the main explanatory variable. We observe a fairly uniform distribution with several observations, obtaining the largest possible value of five as well.

Insert Figure 2 here

Risk preference. Considering previous findings that risk preferences are related to the hedging behavior of firms (Pennings and Garcia, 2004), we control for managers' risk attitude. We elicit respondents' risk preferences using their responses to the question, "How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" on an 11-level Likert item from "not at all willing to take risks" to "very willing to take risks." As noted by Dohmen et al. (2011), this question is the best overall predictor of risk-taking behavior.

Success=profitability. We proxy risk managers' perception that creating (additional) financial gains is an important success criterion (compared with, for example, reduced volatility relative to a benchmark) through their responses to the questions, "How successful in managing company risk would you characterize your derivatives' usage over the last three years?" and "How profitable would you characterize your derivatives' usage over the last three years?" on 11-level Likert items. We then create a dummy variable that takes the value of one for managers who provide the same reply to both questions and zero otherwise. The main idea is that, on average, risk managers who perceive financial gains as an important success criterion are more likely to reply identically to both questions than those who do not.

Confidence. Motivated by experimental evidence that narcissism is a significant predictor of overconfidence (Campbell et al., 2004), we control for participants' level of confidence.⁹ This control is also important, given the impact of confidence on risk managers'

selective hedging activities (Adam et al., 2015). We measure respondents' confidence in their hedging decisions with the help of a one-item measure based on Weber and Brewer (2003). Specifically, we ask "*How confident are you usually in the derivatives positions that you take?*" on an 11-level Likert item ranging from "not at all confident" to "very confident."

Experience / tenure. We measure managers' tenure with the company using a 5-level item ranging from less than one year to more than 10 years.

Derivatives expertise. We measure managers' expertise with derivatives using a 5-level item ranging from less than one year to more than 10 years.

Performance measurement. The evaluation of the risk manager's performance might provide these managers with incentives to engage in selective hedging activities to better their performance evaluation. Hence, we ask participants to indicate the importance of the absolute profit/loss when assessing their performance as a risk manager using a 5-level Likert item ranging from "Not at all important" to "Very important." On average, the absolute profit/loss is highly important for the evaluation of the performance of risk managers in our sample, as indicated by a mean of 4.4 and a median of 5.

Guidelines. We use a scale ranging from "very restrictive policy" to "No, there is no such policy or guidelines at all" to ask the participants about the extent to which they are bound in their corporate hedging decisions by internal guidelines. For our analysis, we invert the scale such that high values indicate a restrictive policy.

Centralization. We ask participants to rate the degree of centralization of the hedging activities within their firms ("Please rate your organizations' degree of centralization associated with the usage of derivative contracts to manage risk exposure.") on an 11-level Likert item. With a mean of 8.53 and a standard deviation of 2.03, risk management

activities in our sample are fairly centralized.

Reporting frequency. We measure the reporting frequency on derivatives usage using participants' replies to the question, "How often do you report to your supervisors / the board on your derivatives activities?" on a 6-level item ranging from never to daily. The items are "Never," "Annually," "Quarterly," "Monthly," "Weekly," and "Daily."¹⁰

Tail outcomes. We ask participants how important they consider eliminating the possibility of extreme losses for their hedging decisions and how often they use derivatives to eliminate lower-tail outcomes on 5-level Likert items. We aggregate the answers to a single variable by taking the average. A mean of 4.15 (standard deviation 0.65, median 4) indicates that risk managers in our sample consider eliminating lower-tail outcomes to be an important part of their hedging decisions.

Insert Table 3 here

Control variables. Based on the literature on corporate hedging practices, we include several control variables in our analysis. In particular, we collect information about participants' age, gender, education, and residence. We also collect information about their current position. We summarize the characteristics of the respondents in Table 2. We also control for firm size, measured using the number of employees and sales, firm structure (i.e., public firm, private firm, family firm, and government firm), and industry. We summarize all variable definitions in Table A.1 in the Appendix.

3.3 Model estimation

We estimate the following main model using a standard ordinary least squares (OLS) model with robust standard errors (MacKinnon and White, 1985):

$$Selective\ hedging_i = \alpha + \beta\ dark\ triad_i + \sum_{j=1}^J \gamma_j\ controls_{ij} + \epsilon_i \quad (1)$$

Control variables include demographic controls of the manager (gender, age, and education). We also control for tail outcomes, professional position, performance measurement, guidelines, number of employees, and firm type, among others. We run several additional analyses to obtain a more granular view of our results.

4 Results

4.1 Pearson's correlation matrix

We begin our analysis by observing the bivariate correlations between our variables of interest. Table 4 reports the Pearson correlations. We observe a strong positive correlation between the selective hedging variable and the different dimensions of selective hedging. We also observe a significantly positive correlation between the dark triad and selective hedging and the different dimensions of selective hedging. Thus, bivariate correlations provide initial support for our first hypothesis.

Insert Table 4 here

We also observe strong positive correlations between selective hedging activities and risk managers' risk preferences, confidence levels, education, and derivatives expertise.

Risk managers who are particularly concerned with lower tail outcomes are also more engaged in selective hedging activities.

4.2 Predictability of the Dark triad

Next, we investigate the degree to which the variable Dark triad can be predicted using respondents' demographics and firm-specific variables. To this end, we regress Dark triad on the individual demographic variables and our firm-specific variables and fixed effects. We summarize our results in Table 5. We observe a significantly positive correlation between Dark triad and our Male dummy variable, indicating that male respondents in our sample show more pronounced dark personality traits. We also find that older and more experienced respondents indicate less pronounced dark triad personality traits. Finally, we find that respondents who work in family or government firms indicate higher dark triad personality traits than respondents from private firms. We do not observe a correlation between one of our industry dummies and the dark triad variable. Most importantly, the regression only explains less than 6% of the variation in our data, indicating that a large share of the variation within the Dark triad variable remains unexplained by demographics and firm-specific variables.

Insert Table 5 here

4.3 Hypothesis testing

To formally test our hypotheses, we estimate equation (1) using OLS. Table 6 presents our main regression results on managers' selective hedging activities. Column (1) indicates a positive correlation between dark triad personality traits and selective hedging. We

find a positive regression coefficient of 0.0369, with a t -statistic of 2.08. The regression coefficient suggests that a one-unit increase in Dark triad explains approximately 6.6% ($= 0.04/0.6$) of the standard deviation of selective hedging. To put this into perspective, the coefficient of Dark triad is slightly larger than the coefficient of risk preferences, indicating a somewhat larger effect size when comparing the two variables. However, when interpreting the effect size, keep in mind that estimating precise effect sizes is a task that is better suited for large-scale archival studies, as noted by Libby et al. (2002). In columns (2) and (3), we study the relation between dark triad personality traits and different dimensions of selective hedging activities. In particular, we focus on the trade-off between reducing the volatility of earnings and cash flows versus trading for profit in column (2), with risk managers with more pronounced dark personality traits having a clear preference for trading for profit (coefficient of 0.3125; t -statistic of 3.61). Economically, a one-unit increase in Dark triad explains approximately 15% of the standard deviation of Trade for profit. We find statistically significant and positive coefficients in column (3) as well. These results are consistent with Hypothesis H1: Managers who score high on the dark triad personality scale engage more heavily in selective hedging activities.

Insert Table 6 here

Turning briefly to our control variables, we also observe significant positive coefficients on managers' risk preference (0.03, t -statistic of 2.23) and confidence (0.11, t -statistic of 6.44). These findings are in line with the prior literature that reports a positive relation between managers' risk preferences (Pennings and Garcia, 2004) and the impact of managerial confidence on selective hedging (Adam et al., 2015). We also find that managers

concerned with lower-tail outcomes engage more in selective hedging (0.22, t -statistic of 5.72) and a positive correlation between performance measurement and selective hedging (0.18, t -statistic of 5.17).

To alleviate the concern that one particular trait of the dark triad, for example, narcissism, might explain our results, we repeat our main analysis using the subscales for the individual traits as main explanatory variables. We summarize the results in Table A.2 in the Appendix. We observe positive and significant coefficients of similar magnitude for all traits, with the coefficient of Dark triad on psychopathy being the only exception. This observation provides additional support for the use of the composite dark triad measure. In addition, we address the concern that participants from the financial sector are the main driver of our findings. Thus, we repeat our main analysis excluding respondents from the financial sector and summarize the results in Table A.3 in the Appendix. The results indicate that our conclusions are not (exclusively) driven by respondents from the financial sector.

We next study the moderating function of demographic factors. We first study whether managers' gender or age functions as a moderator of the influence of managers' dark personality traits on selective hedging activities. To this end, we add a set of interaction variables to equation (1). We first interact Dark triad with our dummy variable for male managers. To simplify the interpretability of the results, we separately report the coefficients for Dark triad for female managers (Dark triad female) and for male managers (Dark triad male). This approach simplifies the readability of the effect sizes and captures the entire domains of both the dark triad and the relevant dummy, while being otherwise completely equivalent to a standard interaction approach.¹¹ The results of the analysis are presented in column (1) of Table 7. We find a positive coefficient on

Dark triad male (0.0471, t -statistic of 2.1626), whereas the coefficient for female managers (t -statistic of 0.57) is not significantly different from zero. This finding indicates that the relationship between the dark triad personality measure and selective hedging is significantly less pronounced for female risk managers, thereby providing support for Hypothesis H2.

In column (2), we turn to the moderating function of age. We classify managers who are 44 years of age or younger as young and managers who are 45 years or older as old. The results suggest that the relationship between the dark triad personality measure and selective hedging is particularly pronounced for older risk managers because we observe a positive coefficient on Dark triad old (0.0726, t -statistic of 2.12) and a coefficient of 0.0259 (t -statistic of 1.30) on Dark triad young. Thus, the overall support for Hypothesis H2 is mixed.

Insert Table 7 here

In column (3), we study the moderating function of experience. We employ our sample splits at the median, and our findings indicate that the relationship between the dark triad personality measure and selective hedging is particularly pronounced for risk managers who are less experienced. Specifically, we find a positive coefficient on Dark triad short tenure (0.09, t -statistic of 3.58) but not on Dark triad long tenure (t -statistic of 0.41). These findings are in line with Hypothesis H3.

Turning to Hypothesis H4, we observe a positive coefficient on Dark triad high education (0.04, t -statistic of 2.10) and a coefficient of zero on Dark triad low education (t -statistic of 0.26). As an alternative proxy for education, we take risk managers' experience trading with derivatives and report the findings in column 5 of Table 7. The rationale

behind this proxy is that managers with significant experience in trading derivatives are educated *in the field*. Overall, the findings are in line with Hypothesis H4.

We now turn to Hypotheses H5 and H6 and analyze the moderating function of the reporting frequency and the perception of successful risk management, respectively, in Table 8. In particular, we first interact reporting frequency (median split) with the Dark triad variable. We find a coefficient of 0.05 (t -statistic of 1.93) on Dark triad high reporting and a coefficient of zero (t -statistic of 1.14) on Dark triad low reporting, indicating support for Hypothesis H5.

Column (2) of Table 8 indicates that the relationship between dark triad personality traits and selective hedging activities is particularly pronounced for risk managers who perceive generating additional profits through hedging activities as a success. The coefficient on Dark triad success = profitability is 0.05 and statistically significant (t -statistic of 2.31), whereas the coefficient on Dark triad success \neq profitability is statistically not different from zero (t -statistic of 0.67). This finding provides support for Hypothesis H6.

Insert Table 8 here

Finally, we turn to Hypothesis H7 and the moderating role of managerial discretion. We use various proxies for managerial discretion. As a first proxy, we investigate the impact of managers' professional positions on our findings. Through this analysis, we also address the concern that the relationship between managerial personality traits might be driven by managers who are not "in charge" and, thus, might have limited practical implications. One could argue, for example, that once risk managers are in control of the risk management function of the firm, they feel the responsibility of the position and keep in check their urge to engage in selective hedging. We again use an interaction term to

study the role of managers' professional positions. We distinguish between managers who are directors or managers of corporate risk management and those who are not. Obviously, directors enjoy greater managerial discretion. Column (1) of Table 9 summarizes the results. We find positive coefficients for risk managers in charge (coefficient of 0.03, t -statistic of 1.68), also suggesting that our findings are not driven primarily by risk managers who are not in charge.

As a second proxy, motivated by the finding of Pennings and Garcia (2004) that the heterogeneity of hedging behavior can, to some degree, be explained by the firm's ownership structure, we investigate the moderating influence of firm structure on the relationship between managerial personality traits and selective hedging. In particular, we argue that managers of family firms enjoy more discretion than those of non-family firms. It is well known that the characteristics of firm owners tend significantly affect their business strategies (Falkner and Hiebl, 2015). In this context, it is also important to note that family firms do not routinely select employees using common techniques, such as assessment centers, but often put family members in important decision-making positions. This is done after family members form skills and personalities over the years to be successful future leaders within the family business, which should have a significant impact on family firm leaders' personality characteristics. It can be hypothesized that family members who follow in the leadership of the firm might show dark personality traits as a result of their upbringing (Barach and Ganitsky, 1995). Thus, we separately study the impact of dark managerial personality traits on selective hedging for family-owned firms and for non-family-owned firms. Column (2) of Table 9 summarizes the results. The coefficient on Dark triad family is 0.09 (t -statistic of 1.83) and significantly larger than the coefficient on Dark triad other (0.03, t -statistic of 1.56), suggesting that

the relationship between dark personality traits and selective hedging is more pronounced in family firms.

Insert Table 9 here

Next, we argue that larger firms and those with a more centralized risk management approach are more likely to have established routines and structures with respect to corporate hedging decisions, leaving less scope for managerial discretion (see also Li and Tang, 2010). In addition, worth noting is that risk managers with dark personality traits aim to receive attention and admiration for their selective hedging activities. Obviously, these managers have stronger incentives to engage in such activities when the firm is smaller; thus, their impact is relatively higher, ensuring more external admiration for their actions. A similar argument holds when firms have a less centralized risk management approach, making the potential for receiving admiration more pronounced. Thus, we analyze the moderating role of firm size and the centralization of the risk management function. Our results in columns (3) and (4) of Table 9 indicate that the relationship between dark personality traits and selective hedging is more prevalent in small firms, as indicated by the interactions with our proxies for firm size based on the number of employees and the sales revenue of the firm. Both columns feature positive coefficients for small firms but not large firms. In column (5) of Table 9, we turn to the degree of centralization of the risk management function and observe that managers with dark personality traits engage in selective hedging activities, specifically in firms with a decentralized risk management function (coefficient of 0.04, t -statistic of 1.86 on Dark triad less centralized, t -statistic of 1.012 on Dark triad highly centralized). Overall, these findings provide support for Hypothesis H7. Note that our findings on the moderating role of the

manager's age and education are also in line with this hypothesis, considering that older managers—or those with a higher education—likely enjoy more managerial discretion because of their seniority and education. Moreover, older managers might be less driven by future career potential than younger managers.

Finally, we study in greater detail the triangle among managerial confidence, dark triad personality traits, and selective hedging. As noted by Adam et al. (2015) and Beber and Fabbri (2012), managerial overconfidence is an important determinant of selective hedging activities. Given that Campbell et al. (2004) highlight that narcissism is a significant predictor of overconfidence, we investigate whether risk managers who indicate high confidence are the same risk managers that drive our main results. To this end, we define risk managers who indicate that their usual level of confidence in their derivatives positions is lower than the median as having low confidence and risk managers who indicate that their usual level of confidence in their derivatives positions is higher than the median as having high confidence. We then interact the confidence dummy with our dark triad variable. Table 10 summarizes the results. The regression results indicate that, in particular, risk managers with low confidence levels exhibit a strong, positive correlation between the dark triad measure and selective hedging (0.06, *t*-statistic of 1.97). This provides strong evidence that our results are not driven by correlations between the Dark triad variable and managers' confidence.

Insert Table 10 here

5 Implications and conclusion

Managerial personality traits have important implications for organizational decisions, overall organizational health, and company performance (Bertrand and Schoar, 2003; Hambrick and Mason, 1984; Marshall et al., 2015). We contribute to this literature by studying the relation between managerial personality traits and selective hedging activities. To date, the determinants of selective hedging are still not sufficiently understood (see, e.g., Adam et al., 2017). We use a survey setting to elicit risk managers' personality traits and their selective hedging activities. We specifically ask managers to rate the importance of particular criteria when selecting their hedging instruments. This information is (almost) impossible to obtain via large-scale archival data. Our results indicate that dark personality traits are positively associated with selective hedging when controlling for various manager and firm characteristics.

We also find that the results are more pronounced for male and older risk managers. Although this finding is consistent with the general notion that women are more risk averse than men (Halek and Eisenhauer, 2001), it might seem counterintuitive given the well-established idea that individuals' risk aversion increases with age (Riley Jr. and Chow, 1992); however, this finding might be particularly interesting because it hints at the possibility that the dark triad effect overwrites the risk aversion effect as an individual ages. Moreover, the result is consistent with the notion of Croci et al. (2017), who argue that younger managers prefer to hedge more because they suffer the consequences of an impaired reputation that comes from potential financial distress caused by selective hedging activities over a longer career horizon.

In addition to age and gender, we document that managers' experience and education

play an important role in the relationship between the dark triad personality traits and selective hedging activities. In particular, we show that less experienced managers are more prone to selective hedging, given pronounced dark triad personality traits. Overall, this finding is in line with the notion that experience mitigates behavioral biases (Feng and Seasholes, 2005). Note that age is often used as a proxy for experience but does not necessarily determine experience for highly specialized tasks, such as financial risk management. In support of this notion, we observe a correlation between age and experience of 0.33 in our sample, indicating that these two variables have a common dimension but indeed measure different constructs. Our results on education indicate that risk managers with a higher level of education are more prone to engage in selective hedging when scoring high on the dark triad personality scale. In general, this finding is also in line with the notion of Beber and Fabbri (2012) that high levels of education are associated with a greater tendency to engage in selective hedging. Our results indicate that the relation between education and selection hedging might be particularly driven by highly educated risk managers with pronounced dark personality traits.

A finding with important practical implications is that risk managers who perceive the isolated profit of hedging decisions to be a measure of success drive the relationship between dark personality traits and selective hedging activities. In addition, we investigate whether the relationship between dark managerial personality traits and selective hedging varies with the manager's discretion and proxy for managerial discretion with the manager's position, firm structure, and firm size. We find the relationship to be more pronounced in family firms, smaller firms, and firms with a less centralized risk management function. Therefore, overall, the relationship between dark managerial personality traits and selective hedging increases with managerial discretion. Considering

previous evidence that selective hedging is more prevalent in small firms (Adam et al., 2017), which contradicts the notion of Stulz (1996), and when multiple departments are responsible for financial risk management (Aabo et al., 2012), our results indicate that these relationships might be particularly driven by risk managers with pronounced dark personality traits who are responsible for financial risk management in smaller and less centralized firms. Thereby, we add a potential explanation to the literature as to why selective hedging is particularly prevalent in small firms. Although Adam et al. (2017) and Graham and Harvey (2001) suggest that managers of smaller firms might be less sophisticated, our results indicate that risk managers with dark personality traits might engage in selective hedging—particularly in small firms and potentially as a result of increased managerial discretion in these smaller firms.

Finally, we show that our results cannot be explained by managerial (over)confidence.

Our paper speaks to the ethical dimension of selective hedging behavior. Firm stakeholders expect that appointees to important positions, such as risk managers, use their authority to improve the organization. According to traditional financial theory, risk managers should aim to reduce volatility, stabilize cash flows, and reduce the probability of financial distress (Stulz, 1996; Mian, 1996; Faulkender, 2005; Carter et al., 2006; Cotter and Hanly, 2006; Stulz, 2013; Biguri et al., 2018; Geyer-Klingeberg et al., 2020). As such, the goal of hedging is not to make money but to protect from losses. However, the literature provides ample evidence that risk managers instead engage in selective hedging activities (Adam and Fernando, 2006; Adam et al., 2017), thereby creating additional risk exposures and subjecting firms to new risks (Adam et al., 2017). Selective hedging might lead to severe losses for the firm and, consequently, constitutes a potential dimension of ethical misconduct by management (Van Scotter and Roglio, 2020; Jones, 1991).

Our results have important implications, given that various conclusions for public policy and corporate governance, corporate risk management research, education, and theory testing can be drawn from this empirical analysis.

For *corporate practice*, our analysis studies whether specific personality traits might negatively affect financial risk management approaches. Our results demonstrate that managers with dark personalities might be particularly prone to selective hedging behaviors. Thus, our results could have implications for human resources departments to carefully consider dark triad personality traits when hiring risk managers. Management assessment tests, particularly those designed for young “high potentials,” might need to explicitly consider such personality traits. Firms might also want to place more weight on risk managers’ experience because these factors mitigate the impact of dark personality traits on unhealthy financial risk management decisions.

In addition, public and corporate policies promoting explicit corporate hedging activities could be expected to mitigate the impact of managers’ dark personality traits on corporate risk management. Specifically, creating an environment within the risk management function that does not focus on the profitability of the hedging decisions but, rather, uses a risk-related measure to quantify success might be helpful. Particularly useful might also be to identify whether risk managers perceive generating additional profits as an important success criterion for financial risk management. These managers seem to specifically drive the relationship between dark triad personality traits and selective hedging activities. Thus, risk managers who focus on profitability rather than risk measures should not be put in charge of the firm’s risk management function to provides human resources departments with a more practical approach that does not rely on personality assessments. Considering the criticism of these assessments (Caponecchia et al., 2012),

this approach might be particularly valuable.

From a *research* perspective, our study provides evidence that future research on educating risk managers should investigate how personality traits relate to risk management competencies. Although significant research has been conducted on competencies for risk managers, links to personality traits are to date missing in this literature. Can personality traits, which help to support corporate risk management, be identified with specific educational formats? Moreover, how can personality traits be considered when assessing candidates for risk management positions?

Regardless of the contribution to the literature and important practical implications, our study has some caveats. Although the survey methodology allows us to ask important questions, it has limits. Most importantly, discussing causation is not possible. A common concern in survey-based research is that the results are affected by endogeneity issues. However, considering that individual differences in personality traits are essentially fixed by age 30 (McCrae and Costa, 1994), before (most) risk managers are in the position to decide on their firms' hedging decisions, we are cautiously confident that reverse causality is not an issue in our setting. However, individuals with pronounced dark personality traits might actively pursue careers as risk managers to satisfy their thirst for risk and excitement. Such self-selection makes it particularly likely to find individuals with dark personality traits in risk manager positions, given the larger pool of applicants for these positions with said personality traits. However, it would not invalidate the association between dark personality traits and selective hedging. Another potential drawback is that surveys measure beliefs and preferences and not necessarily actions (Graham et al., 2013). However, considering that we specifically target risk managers with decision-making authority, we believe that a respondent who considers objectives such as "trading

for profit” important for his or her hedging decisions not only has a preference to engage in selective hedging activities but also can act on this preference. Thus, we are cautiously confident that the manager’s preferences also characterize the company’s hedging policy. Lastly, some of the questions might be misunderstood or produce only noisy measures of the variable in question. However, because it is difficult to obtain managers’ personality traits and their propensity to engage in selective hedging at the same time through another research method, we nonetheless believe that our paper makes an important contribution. We also take great care and use best practices to mitigate the well-known pitfalls of surveys, such as common method bias. Importantly, our results are in line with the previous literature on the prevalence of selective hedging activities (see, e.g., Adam and Fernando, 2006; Adam et al., 2017) and established determinants of selective hedging, such as (over)confidence (Adam et al., 2015) or risk preferences (Pennings and Garcia, 2004).

Keeping these concerns in mind, our research design offers new and unique insights into the relationship between manager personality characteristics and risk management competence, particularly selective hedging. These findings nicely complement recent studies on the determinants of selective hedging that use archival data (Adam et al., 2015; Bajo et al., 2019).

This study is a first step in evaluating the impact of dark personality traits on financial risk management activities in organizations. Future research should shed additional light on the mitigating factors that might help keep risk managers’ dark personality traits at bay and, thereby, improve corporate risk management outcomes. Future research might also want to study the degree to which the size of selective hedging positions varies with risk managers’ personality traits. In particular, we expect that risk managers with

more pronounced dark personality traits are not only more willing to engage in selective hedging in the first place but also are more willing to take larger positions based on their views.

Compliance with ethical standards

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Conflict of interest All authors declare they have no conflicts of interest.

Research involving human participants and their data All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was reviewed and approved by the institutional ethics review board of a participating institution.

Informed consent Informed consent was obtained from all individual participants included in the study.

A Additional analyses

Insert Table A.1 here

Insert Table A.2 here

Insert Table A.3 here

Notes

¹Cragun et al. (2020) note that a psychometric self-report would be the first choice for researchers to study managers' personality traits. Instead of using a scale to diagnose personality disorders, however, we opt for the shorter dirty dozen scale even though it was developed for the subclinical population and does not guarantee a clinical diagnosis because the shorter scale allows us to hide items of interest among uncontroversial questions and can simultaneously be answered in a short period.

²In fact, Adam and Fernando (2006) show that this assumption can be violated for extended periods.

³Although it is unclear which firms might have an informational advantage, larger firms are viewed as more likely to have higher potential to acquire valuable information than smaller firms because they can hire better analysts and have a more expansive market footprint (Stulz, 1996; Adam et al., 2017). A second important criterion for firms to create value for their shareholders by engaging in selective hedging is that firms need sufficient financial strength to take additional speculative risks based on this information advantage without jeopardizing their core business (see Stulz, 1996; Adam et al., 2017). Other theoretical explanations for selective hedging come from Wojakowski (2012), who justifies selective hedging as a result of convex cash flow structures, or from Brown et al. (2006), who proposes that success in the directional adjustment of hedge ratios might give the impression to senior managers that selective hedging adds significant value, which might be accentuated if the costs of selective hedging are difficult to identify, for example, if selective hedging creates a suboptimal risk exposure for the firm.

⁴Importantly, their estimates do not incorporate transaction costs incurred in making changes to hedge ratios, information costs to be able to run a selective hedging program, or other costs of deviating from an optimal hedging policy. Thus, the actual benefits from selective hedging might actually be even lower.

⁵Our paper is also related to research that studies dark personality traits in student samples (Shank et al., 2019). In this strand of the literature, Shank et al. (2019) find that finance majors score significantly higher on the Machiavellian scale than non-finance majors, including other business majors. The authors provide evidence that students with certain psychopathic personality traits make more rational financial decisions than other students. Similarly, D'Souza and de Lima (2015) study whether students who score high on the dark triad personality scale tend to engage in more opportunistic decision making.

⁶See, for example, Giambona et al. (2018) for a recent survey of risk managers in an investigation of risk management practices.

⁷In line with this goal, 82.52% of the respondents in our sample are the “director/manager corporate risk management” of their organization.

⁸We presented the following prompt to the participants, “Everyone has hobbies. Nevertheless, we would like you to skip this question to show that you are reading carefully. Do not click any of the buttons corresponding to bike riding, hiking, swimming, playing sports, reading or watching TV.” We also provided the following options: bike riding, hiking, swimming, playing sports, reading, and watching TV.

⁹Still important to note is that narcissism and overconfidence are distinct concepts.

¹⁰In a closely related item, we ask participants “How often do you evaluate your derivatives position?” Because these two variables are highly correlated (Pearson correlation coefficient .72), we restrict our analysis to the reporting frequency.

¹¹A “traditional” interaction term in a regression is the product of two terms. However, using such an interacted regressor has one disadvantage when it comes to readability: it requires mental arithmetic, not only to quantify the effect size but also to determine the standard errors of the effect sizes of both groups that are part of the interaction. However, making use of a simple modification and including two “interaction” terms simplifies this issue and allows the reader to immediately read both coefficients and standard errors directly from the table.

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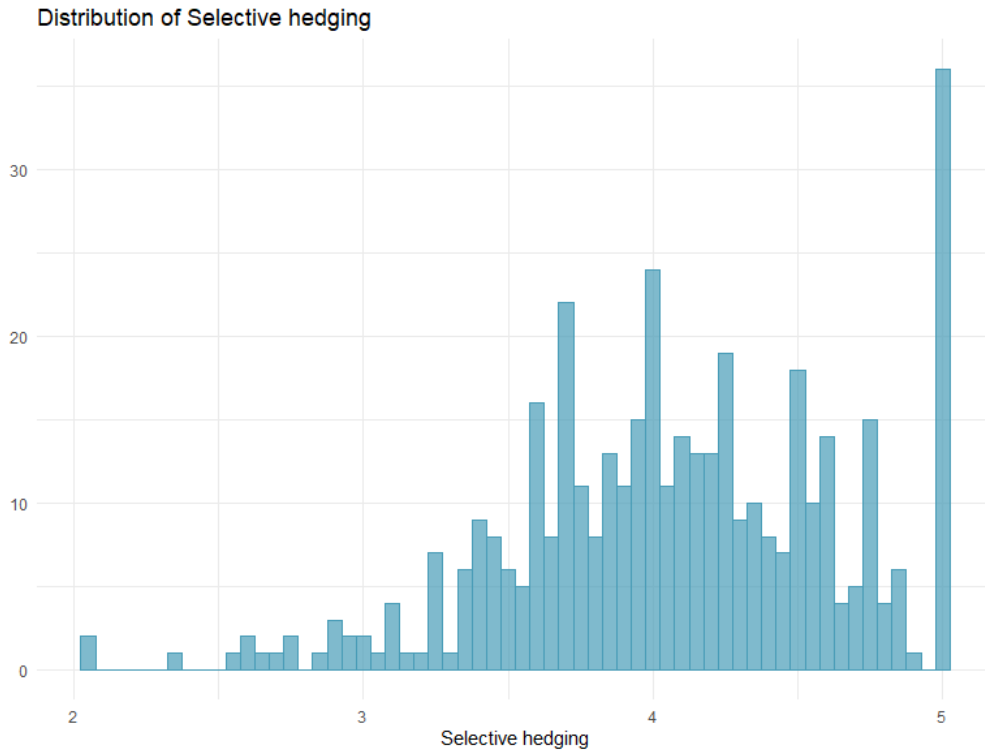


Figure 1: Distribution of the dependent variable, “Selective hedging”

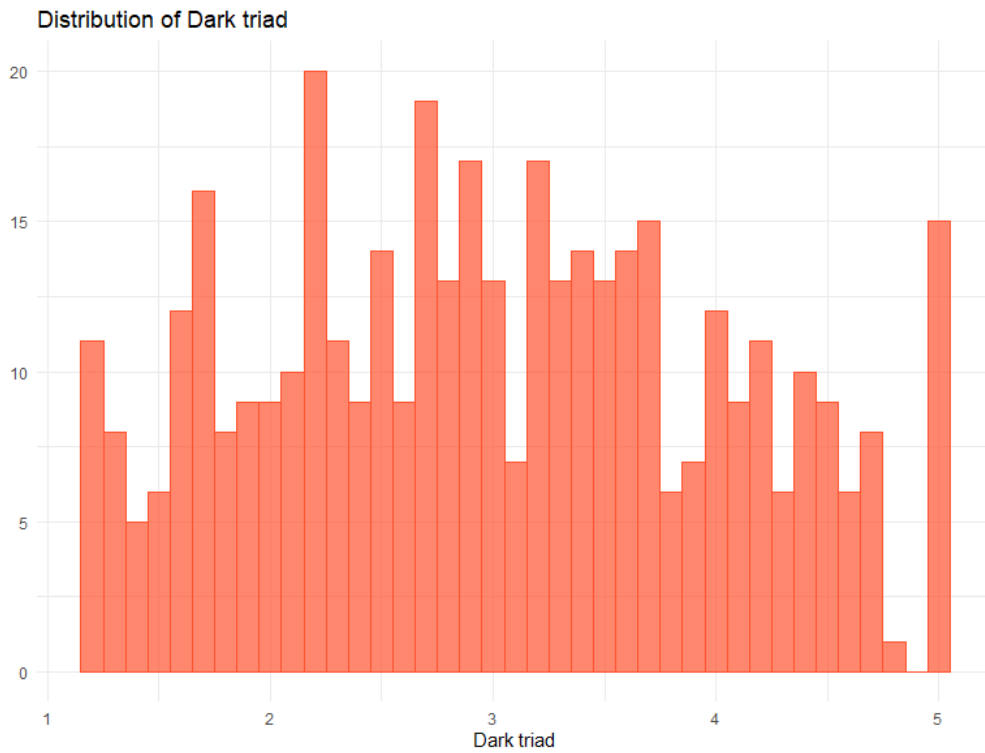


Figure 2: Distribution of the independent variable, “Dark triad”

Table 1: Characteristics of respondents' firms

	Percent
Industry	
Not a managing position	0.24
Agriculture, Forestry, Fishing	1.70
Mining	0.73
Manufacturing	12.86
Transportation & Public utilities	3.64
Wholesale trade	2.67
Retail trade	14.56
Finance, Insurance, Real Estate	54.37
Services	5.58
Public administration	2.43
Unclassified industry	1.46
No. employees	
1 - 50	4.13
51 - 250	14.08
251 - 500	22.57
501 - 1,000	24.27
1,001 - 5,000	22.33
5,001 - 10,000	7.28
10,001 - 25,000	2.67
25,001 or more	2.67
Sales revenue	
0 - 999,999	1.70
1,000,000 - 4,999,999	10.68
5,000,000 - 9,999,999	14.08
10,000,000 - 99,999,999	23.54
100,000,000 - 999,999,999	23.79
1,000,000,000 - 4,999,999,999	13.59
5,000,000,000 - 9,999,999,999	7.04
10,000,000,000 or above	5.58
Firm type	
Public firm	38.11
Private firm	42.96
Family firm	12.86
Government firm	6.07

Table 2: Personal characteristics of the respondents

	Percent
Age	
18 to 34	24.27
35 to 44	55.83
45 to 54	16.99
55+	2.91
Gender	
Female	28.64
Male	71.36
Residence	
United States	52.67
United Kingdom	47.33
Education	
Other	0.00
High School / GED	5.34
Undergraduate degree	17.23
Graduate degree	40.78
MBA	26.70
Other Non-MBA	2.43
Ph.D.	7.52
Experience / tenure	
< 1 year	0.24
1 - 2 years	5.25
3 - 5 years	31.26
6 - 10 years	47.26
> 10 years	18.38
Derivatives expertise	
< 1 year	0.73
1 - 2 years	9.71
3 - 5 years	39.32
6 - 10 years	41.50
> 10 years	8.74
Professional position	
Director/Manager corporate risk management	83.25
Other employee with decision-making power	16.50
Not a managing position	0.24

Table 3: Summary statistics

	N	Mean	SD	Min	25	Median	75	Maximum
Selective hedging	412	4.0863	0.5684	2.0250	3.7250	4.0875	4.5250	5.0000
Trade for profit	412	8.5388	2.0848	1.0000	8.0000	9.0000	10.0000	11.0000
Market view	412	3.9579	0.6889	1.0000	3.3333	4.0000	4.3333	5.0000
Dark triad	412	3.0051	1.0157	1.1667	2.1667	2.9583	3.7500	5.0000
Machiavellianism	412	2.7203	1.2603	1.0000	1.5000	2.7500	3.8125	5.0000
Narcissism	412	3.4132	1.0352	1.0000	2.7500	3.5000	4.2500	5.0000
Psychopathy	412	2.8817	1.1557	1.0000	2.0000	2.7500	3.7500	5.0000
Risk preference	412	8.8252	1.9303	1.0000	8.0000	9.0000	11.0000	11.0000
Confidence	412	9.0801	1.6333	2.0000	8.0000	9.0000	11.0000	11.0000
Tail outcomes	412	4.1553	0.6461	1.5000	4.0000	4.0000	4.5000	5.0000
Success = profitability	412	0.5121	0.5005	0.0000	0.0000	1.0000	1.0000	1.0000
Performance measurement	412	4.3689	0.7891	1.0000	4.0000	5.0000	5.0000	5.0000
Reporting frequency	412	4.2694	1.1282	1.0000	3.0000	4.0000	5.0000	6.0000
Centralization	412	8.5316	2.0305	1.0000	8.0000	9.0000	10.0000	11.0000
Guidelines	412	3.6141	1.1501	0.0000	3.0000	4.0000	4.2500	5.0000

Variable definitions can be found in Table A.1 in the Appendix.

Table 4: Pearson's correlation table

	Selective hedging	Trade for profit	Market view	Dark triad	Machiavellianism	Narcissism	Psychopathy	Risk preference	Confidence	Male	Age	Education	Derivatives expertise	Experience	Tail outcomes	Success = profitability	Professional position	Performance measurement	Reporting frequency	Centralization	Guidelines	No. employees
Selective hedging																						
Trade for profit	0.6592***																					
Market view	0.8509***	0.5037***																				
Dark triad	0.1937***	0.2826***	0.2270***																			
Machiavellianism	0.0708	0.1918***	0.1167*	0.9172***																		
Narcissism	0.3279***	0.3109***	0.3457***	0.8081***	0.5876***																	
Psychopathy	0.1397**	0.2575***	0.1616***	0.9126***	0.8015***	0.5943***																
Risk preference	0.4508***	0.4382***	0.4372***	0.1817***	0.0934	0.2496***	0.1538**															
Confidence	0.6597***	0.5789***	0.5530***	0.1714***	0.0221	0.3275***	0.1343**	0.4621***														
Male	-0.0780	-0.0423	-0.0699	0.1028*	0.0565	0.1182*	0.1037*	-0.0574	0.0147													
Age	0.0468	-0.0803	0.0094	-0.0894	-0.1015*	-0.0452	-0.0846	-0.0628	0.0429	0.0265												
Education	0.2231***	0.2038***	0.2266***	0.0095	-0.0716	0.1488**	-0.0302	0.1446**	0.2532***	0.1148*	0.0086											
Derivatives expertise	0.1752***	0.1029*	0.1212*	-0.0350	-0.0951	0.0760	-0.0567	0.0486	0.2290***	0.0688	0.2896***	0.1007*										
Experience	0.0829	-0.0001	-0.0032	-0.1079*	-0.1280**	-0.0498	-0.1004*	0.0069	0.1248*	0.0827	0.3238***	-0.0222	0.5089***									
Tail outcomes	0.5677***	0.2448***	0.5031***	0.0720	-0.0320	0.2044***	0.0418	0.2374***	0.4309***	-0.0888	0.1266*	0.1363**	0.2145***	0.1011*								
Success = profitability	0.3185***	0.2526***	0.2791***	0.1449**	0.0464	0.1999***	0.1524**	0.2390***	0.2980***	-0.0168	-0.0253	0.0904	0.0126	-0.0025	0.2086***							
Professional position	-0.1723***	-0.1365**	-0.1698***	-0.0367	0.0345	-0.1209*	-0.0260	-0.1772***	-0.2244***	-0.0134	0.0200	-0.1491**	-0.2067***	-0.0851	-0.1169*	-0.0362						
Performance measurement	0.5282***	0.2797***	0.3598***	0.0480	-0.0116	0.1413**	0.0126	0.2565***	0.3489***	-0.1054*	0.0737	0.1114*	0.1299**	0.0752	0.3574***	0.2043***	-0.0873					
Reporting frequency	0.4533***	0.3612***	0.4477***	0.2154***	0.1490**	0.2336***	0.1962***	0.4239***	0.4504***	0.0085	0.0033	0.0996*	0.0527	-0.0054	0.3464***	0.2980***	-0.0669	0.1996***				
Centralization	0.3860***	0.3931***	0.3720***	0.1277**	0.0842	0.2034***	0.0626	0.3050***	0.5352***	-0.0510	-0.0076	0.1618***	0.0990*	-0.0393	0.2837***	0.1864***	-0.1918***	0.1415**	0.2687***			
Guidelines	0.2360***	0.1955***	0.1914***	0.2358***	0.1901***	0.1966***	0.2383***	0.1197*	0.2199***	-0.0212	0.0110	0.0701	0.0182	-0.0816	0.1202*	0.1202*	-0.0552	0.1278**	0.1891***	0.2985***		
No. employees	-0.0026	0.0432	-0.0099	-0.0153	-0.0488	0.0561	-0.0374	-0.0465	-0.0054	-0.0382	0.0135	0.0901	0.0484	0.1023*	-0.1001*	-0.0576	0.0094	-0.0616	-0.0700	0.0106	0.0194	
Sales revenue	-0.0440	0.0221	-0.0106	0.0295	0.0214	0.0667	-0.0054	0.0120	-0.0070	0.1219*	0.0925	0.0174	0.1259*	0.1317**	-0.0602	-0.0020	-0.0450	-0.0203	0.0185	0.0926	-0.0196	0.4056***

Variable definitions can be found in Table A.1 in the Appendix. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 5: Predictability of dark personality traits

	<i>Dependent variable:</i>
	Dark triad
Constant	3.1010*** (6.9392)
Male	0.2262** (1.9676)
Age (18-34)	0.0047 (0.0402)
Age (45-54)	-0.0551 (-0.3653)
Age (55+)	-0.7110*** (-2.7406)
Education	-0.0387 (-0.8741)
Derivatives expertise	0.0578 (0.8076)
Experience	-0.1298* (-1.9451)
No. employees	0.0280 (0.7915)
Sales Revenue	0.0064 (0.1886)
Private firm	-0.0385 (-0.3395)
Family firm	0.3393** (2.0082)
Government firm	0.7210*** (3.2163)
Industry: Mining	-0.1947 (-0.4434)
Industry: Manufacturing	-0.2130 (-0.5637)
Industry: Transportation and Public Utilities	-0.4168 (-0.9949)
Industry: Wholesale Trade	0.1110 (0.2540)
Industry: Retail Trade	-0.2458 (-0.6577)
Industry: Finance, Insurance and Real Estate	0.0104 (0.0289)
Industry: Services	-0.2799 (-0.7026)
Industry: Public Administration	0.0921 (0.2217)
Industry: Unclassified	-0.2952 (-0.5491)
Residence: US	0.1276 (1.1231)
Observations	412
Adjusted R ²	0.0563
Residual Std. Error	0.9867
F Statistic	2.1146***

Regression coefficients are presented with *t*-values in parentheses and robust standard errors (MacKinnon and White, 1985). **p*<0.1; ***p*<0.05; ****p*<0.01. Variable definitions can be found in Table A.1 in the Appendix.

Table 6: Managerial dark triad personality and selective hedging

	<i>Dependent variable:</i>		
	Selective hedging	Trade for profit	Market view
	(1)	(2)	(3)
Constant	0.3824* (1.6883)	-0.3132 (-0.3233)	0.3630 (1.0149)
Dark triad	0.0369** (2.0845)	0.3125*** (3.6050)	0.0764*** (3.1051)
Risk preference	0.0287** (2.2334)	0.1529* (1.8420)	0.0409** (2.2091)
Confidence	0.1055*** (6.4359)	0.4939*** (6.0192)	0.0732*** (3.0869)
Male	-0.0516 (-1.3581)	-0.1924 (-1.1002)	-0.0954* (-1.7661)
Age (18-34)	0.0224 (0.4854)	0.3181* (1.7933)	-0.0564 (-0.9121)
Age (45-54)	0.0397 (0.7909)	-0.1531 (-0.4948)	0.0322 (0.4827)
Age (55+)	0.0127 (0.1222)	-0.2914 (-0.4387)	-0.1563 (-0.9473)
Education	0.0173 (1.1139)	0.1071 (1.4298)	0.0384* (1.7032)
Derivatives expertise	0.0015 (0.0469)	0.1180 (0.8956)	0.0138 (0.2918)
Experience	0.0035 (0.1115)	-0.0195 (-0.1453)	-0.0496 (-1.0943)
Tail outcomes	0.2233*** (5.7175)	-0.1844 (-1.2722)	0.2722*** (5.3324)
Success = profitability	0.0677 (1.6452)	0.1742 (1.0457)	0.0845 (1.4878)
Professional position	-0.0178 (-0.3284)	0.1229 (0.5912)	-0.0519 (-0.7195)
Performance measurement	0.1844*** (5.1729)	0.2502* (1.8931)	0.0903** (2.1161)
Reporting frequency	0.0396** (2.0212)	0.0703 (0.7965)	0.0821*** (2.9974)
Centralization	0.0015 (0.1516)	0.1110* (1.9448)	0.0185 (1.2677)
Guidelines	0.0233 (1.3154)	-0.0211 (-0.2789)	-0.0045 (-0.1541)
No. employees	0.0184 (1.4812)	0.0655 (0.9775)	0.0185 (1.1114)
Private firm	-0.0259 (-0.6685)	-0.4141** (-2.3738)	-0.1069** (-1.9751)
Family firm	-0.0685 (-1.0505)	-0.1365 (-0.6134)	-0.2147** (-2.2804)
Government firm	-0.0099 (-0.1740)	-0.0273 (-0.0884)	-0.0930 (-1.1270)
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412
Adjusted R ²	0.6258	0.4173	0.4934
Residual Std. Error	0.3477	1.5914	0.4903
F Statistic	23.1755***	10.4960***	13.9121***

Regression coefficients are presented with *t*-values in parentheses and robust standard errors (MacKinnon and White, 1985). **p*<0.1; ***p*<0.05; ****p*<0.01. Variable definitions of control variables can be found in Table A.1 in the Appendix.

Table 7: Managerial demographics, dark triad personality, and selective hedging

	<i>Dependent variable:</i>				
	Selective hedging				
	(1)	(2)	(3)	(4)	(5)
Dark triad female	0.0152 (0.5683)				
Dark triad male	0.0471** (2.1626)				
Dark triad young		0.0259 (1.3044)			
Dark triad old		0.0726** (2.1246)			
Young (D)		0.1043 (0.7566)			
Dark triad short tenure			0.0922*** (3.5794)		
Dark triad long tenure			0.0089 (0.4091)		
Experience/ tenure (D)			0.2915** (2.5843)		
Dark triad low education				0.0103 (0.2618)	
Dark triad high education				0.0411** (2.0953)	
Education (D)				-0.0440 (-0.3227)	
Dark triad low derivatives expertise					0.0832 (1.5455)
Dark triad high derivatives expertise					0.0320* (1.7085)
Derivatives expertise (D)					0.2028 (1.1387)
Male	-0.1450 (-1.3179)	-0.0528 (-1.3953)	-0.0589 (-1.5497)	-0.0483 (-1.2404)	-0.0511 (-1.3453)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412	412	412
Adjusted R ²	0.6256	0.6278	0.6305	0.6252	0.6261
Residual Std. Error	0.3478	0.3468	0.3455	0.3480	0.3476
F Statistic	22.4580***	24.1079***	22.9193***	22.4215***	22.5028***

Regression coefficients are presented with t -values in parentheses and robust standard errors (MacKinnon and White, 1985). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Variable definitions: Young (D) is a dummy variable that takes the value of one for risk managers who are 44 years of age or younger and zero otherwise; Experience / tenure (D) is a dummy variable that takes the value of one for risk managers with higher than the median experience and zero otherwise; Education (D) is a dummy variable for risk managers who hold a graduate degree or higher and zero otherwise; Derivatives expertise (D) is a dummy variable that takes the value of one for risk managers with higher than the median derivatives expertise and zero otherwise; *Dark triad female* takes the value of Dark triad for female respondents and zero otherwise; *Dark triad male* takes the value of Dark triad for male respondents and zero otherwise; *Dark triad young* takes the value of Dark triad for Young (D) = 1 and zero otherwise; *Dark triad old* takes the value of Dark triad for Young (D) = 0 and zero otherwise; *Dark triad short tenure* takes the value of Dark triad for Experience / tenure (D) = 0 and zero otherwise; *Dark triad long tenure* takes the value of Dark triad for Experience / tenure (D) = 1 and zero otherwise; *Dark triad low education* takes the value of Dark triad for Education (D) = 0 and zero otherwise; *Dark triad high education* takes the value of Dark triad for Education (D) = 1 and zero otherwise; *Dark triad low derivatives expertise* takes the value of Dark triad for Derivatives expertise (D) = 0 and zero otherwise; *Dark triad high derivatives expertise* takes the value of Dark triad for Derivatives expertise (D) = 1 and zero otherwise. Variable definitions of control variables can be found in Table A.1 in the Appendix.

Table 8: Reporting frequency, perception of success, dark triad personality, and selective hedging

	<i>Dependent variable:</i>	
	Selective hedging	
	(1)	(2)
Dark triad low reporting	0.0315 (1.1433)	
Dark triad high reporting	0.0464* (1.9293)	
Reporting frequency (D)	-0.0157 (-0.1249)	
Dark triad success = profitability		0.0491** (2.3083)
Dark triad success \neq profitability		0.0195 (0.6681)
Success = profitability		-0.0191 (-0.1683)
Controls	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>
Observations	412	412
Adjusted R ²	0.6213	0.6255
Residual Std. Error	0.3498	0.3479
F Statistic	22.0696***	22.4515***

Regression coefficients are presented with t -values in parentheses and robust standard errors (MacKinnon and White, 1985). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Reporting frequency (D) is a dummy variable that takes the value of one for reporting frequencies above the median and zero otherwise; *Dark triad low reporting* takes the value of Dark triad for Reporting frequency (D) = 0 and zero otherwise; *Dark triad high reporting* takes the value of Dark triad for Reporting frequency (D) = 1 and zero otherwise; *Dark triad success = profitability* takes the value of Dark triad for Success = profitability = 1 and zero otherwise; *Dark triad success \neq profitability* takes the value of Dark triad for success = profitability = 0 and zero otherwise. Variable definitions of control variables can be found in Table A.1 in the Appendix.

Table 9: Firm structure, dark triad personality, and selective hedging

	<i>Dependent variable:</i>				
	Selective hedging				
	(1)	(2)	(3)	(4)	(5)
Dark triad not managing	0.0803 (1.3534)				
Dark triad managing	0.0305* (1.6832)				
Professional position (D)	0.1707 (0.8659)				
Dark triad family		0.0913* (1.8278)			
Dark triad other		0.0290 (1.5605)			
Family firm (D)		-0.2533 (-1.2723)			
Dark triad low sales			0.0646*** (2.7042)		
Dark triad high sales			0.0059 (0.2332)		
Sales revenue (D)			0.1564 (1.3774)		
Dark triad few employees				0.0666*** (2.6139)	
Dark triad many employees				0.0118 (0.4951)	
No. employees (D)				0.1718 (1.5471)	
Dark triad less centralized					0.0401* (1.8629)
Dark triad highly centralized					0.0319 (1.0178)
Centralization (D)					0.1035 (0.8148)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412	412	412
Adjusted R ²	0.6258	0.6278	0.6269	0.6249	0.6268
Residual Std. Error	0.3477	0.3468	0.3472	0.3482	0.3472
F Statistic	22.4793***	24.1116***	21.9239***	22.3934***	22.5745***

Regression coefficients are presented with *t*-values in parentheses and robust standard errors (MacKinnon and White, 1985). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Variable definitions: Professional position (D) is a dummy variable that takes the value of one for risk managers who hold a position as director or manager corporate risk management and zero otherwise; Family firm (D) is a dummy variable that takes the value of one for family firms and zero otherwise; Sales revenue (D) is a dummy variable that takes the value of one for firms with above median sales revenue and zero otherwise; No. employees (D) is a dummy variable that takes the value of one for companies with higher than the median number of employees and zero otherwise; Centralization (D) is a dummy variable that takes the value of one for highly centralized firms and zero otherwise; *Dark triad not managing* takes the value of Dark triad for Professional position (D) = 0 and zero otherwise; *Dark triad managing* takes the value of Dark triad for Professional position (D) = 1 and zero otherwise; *Dark triad family* takes the value of Dark triad for Firm type (D) = 1 and zero otherwise; *Dark triad other* takes the value of Dark triad for Firm type (D) = 0 and zero otherwise; *Dark triad low sales* takes the value of Dark triad for Sales revenue (D) = 0 and zero otherwise; *Dark triad high sales* takes the value of Dark triad for Sales revenue (D) = 1 and zero otherwise; *Dark triad few employees* takes the value of Dark triad for No. employees (D) = 0 and zero otherwise; *Dark triad many employees* takes the value of Dark triad for No. employees (D) = 1 and zero otherwise. *Dark triad less centralized* takes the value of Dark triad for centralization (D) = 0 and zero otherwise; *Dark triad highly centralized* takes the value of Dark triad for centralization (D) = 1 and zero otherwise. Variable definitions of control variables can be found in Table A.1 in the Appendix.

Table 10: Robustness: Managerial confidence, dark triad personality, and selective hedging

<i>Dependent variable:</i>	
Selective hedging	
Dark triad low confidence	0.0561** (1.9667)
Dark triad high confidence	0.0297 (1.3638)
Confidence (D)	0.3832*** (3.2242)
Controls	
Industry FE	<i>Yes</i>
Country FE	<i>Yes</i>
Observations	
Adjusted R ²	412
Residual Std. Error	0.6225
F Statistic	0.3493
22.1771***	

Note: *p<0.1; **p<0.05; ***p<0.01

Regression coefficients are presented with *t*-values in parentheses and robust standard errors (MacKinnon and White, 1985). *p<0.1; **p<0.05; ***p<0.01. Variable definitions: Confidence (D) is a dummy variable that takes the value of one for risk managers who display above median confidence and zero otherwise; *Dark triad low confidence* takes the value of Dark triad for Confidence (D) = 0 and zero otherwise; *Dark triad high confidence* takes the value of Dark triad for confidence (D) = 1 and zero otherwise. Variable definitions of control variables can be found in Table A.1 in the Appendix.

Table A.1: Variable definitions

Variable	Definition
<i>Dependent variables</i>	
Selective hedging	Composite scale ranging from 1 to 5 measuring the selective hedging activities of risk managers
Trade for profit	Scale ranging from 1 to 11 measuring the degree to which risk managers attempt to make additional profit with their hedges rather than manage the volatility of earnings and cash flows
Market view	Composite scale ranging from 1 to 5 measuring the degree to which a risk manager's market view influences their hedging decisions
<i>Personality traits</i>	
Dark triad	Composite scale ranging from 1 to 5 measuring managerial personality traits (Machiavellianism, narcissism, and psychopathy) based on Jonason and Webster (2010)
Machiavellianism	Scale ranging from 1 to 5 measuring Machiavellianism based on Jonason and Webster (2010)
Narcissism	Scale ranging from 1-5 measuring narcissism based on Jonason and Webster (2010)
Psychopathy	Scale ranging from 1 to 5 measuring psychopathy based on Jonason and Webster (2010)
<i>Control variables</i>	
Risk preference	11-level scale measuring managerial risk attitude based on Dohmen et al. (2011)
Confidence	11-level scale measuring risk managers' confidence in their hedging activities based on Weber and Brewer (2003)
Male	Dummy variable that takes the value of one for male risk managers and zero otherwise
Age	6-level scale measuring risk managers' age
Education	6-level scale measuring risk managers' education
Derivatives expertise	5-level scale measuring risk managers' experience using derivatives
Experience / tenure	5-level scale measuring the risk manager's tenure with the firm
Tail outcomes	Composite scale ranging from 1 to 5 measuring the degree to which risk managers use hedging to eliminate lower-tail outcomes
Success=profitability	Dummy variable that takes the value of one for risk managers who perceive additional financial gains to be an important success criterion of risk management activities and zero otherwise
Professional position	Dummy variable that takes the value of one if the risk manager is the director/manager corporate risk management and zero otherwise
Performance measurement	Scale ranging from 1 to 5 measuring the degree to which a risk manager's performance is evaluated based on his or her absolute profit/loss
Reporting frequency	Scale ranging from 1 to 6 measuring the reporting frequency on a risk manager's hedging activities
Centralization	Scale ranging from 1 to 11 measuring the degree to which firms' hedging activities are centralized
Guidelines	Scale ranging from 0 to 5 measuring the degree to which risk managers' hedging decisions are bound by internal guidelines

Continued on next page

Table A.1 – continued

Variable	Definition
No. employees	8-level variable indicating the number of employees in the respondent's firm
Sales revenue	8-level variable indicating the annual sales of the respondent's firm
Private firm	Dummy variable that takes the value of one for non-family firms and zero otherwise
Family firm	Dummy variable that takes the value of one for family firms and zero otherwise
Government firm	Dummy variable that takes the value of one for government firms and zero otherwise

Table A.2: Robustness: Dark personality traits and selective hedging

	Dependent variables:		
	Selective hedging	Trade for profit	Market view
	(1)	(2)	(3)
Machiavellianism	0.0266* (1.9360)	0.2446*** (3.7839)	0.0519*** (2.7255)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412
Adjusted R ²	0.6252	0.4167	0.4904
Residual Std. Error	0.3480	1.5922	0.4918
F Statistic	23.1120***	10.4727***	13.7567***
	(4)	(5)	(6)
Narcissism	0.0376* (1.9635)	0.1961** (2.2384)	0.0782*** (2.7055)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412
Adjusted R ²	0.6259	0.4047	0.4937
Residual Std. Error	0.3477	1.6086	0.4902
F Statistic	23.1828***	10.0115***	13.9281***
	(7)	(8)	(9)
Psychopathy	0.0245 (1.5421)	0.2781*** (3.5134)	0.0546** (2.4879)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	412	412	412
Adjusted R ²	0.6242	0.4177	0.4895
Residual Std. Error	0.3485	1.5909	0.4922
F Statistic	23.0183***	10.5103***	13.7136***

Regression coefficients are presented with t -values in parentheses and robust standard errors (MacKinnon and White, 1985). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Variable definitions can be found in Table A.1 in the Appendix.

Table A.3: The non-finance sector, dark triad personality, and selective hedging

	Dependent variable:		
	Selective hedging	Trade for Profit	Market view
	(1)	(2)	(3)
Dark triad	0.0599* (1.9524)	0.3557*** (2.7050)	0.0809* (1.7456)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Country FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	188	188	188
Adjusted R ²	0.6138	0.3959	0.5051
Residual Std. Error	0.3380	1.5898	0.4832
F Statistic	10.9056***	5.0845***	7.3609***

Regression coefficients are presented with t -values in parentheses and robust standard errors (MacKinnon and White, 1985). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Variable definitions can be found in Table A.1 in the Appendix.