The CEO Beauty Premium:

Founder CEO Attractiveness and Firm Valuation in Initial Coin Offerings

Abstract

How do top executives' physical attributes impact firm value? Our study combines Upper Echelons Theory (UET) with insights from research in social psychology and labor economics to investigate how founder chief executive officers' (founder CEOs') facial attractiveness influences firm valuation by investors in initial coin offerings (ICOs). We document a pronounced CEO beauty premium. The positive relationship between founder CEO attractiveness and firm valuation is *not* driven by stereotype-based evaluations; that is, investors do not mistake attractiveness for other latent traits, such as competence, intelligence, likeability, or trustworthiness. Rather, attractiveness seems to bear economic value *per se.* It helps attract institutional investors and has a sustainable effect on post-ICO performance. Our results are immune to recall and confirmation biases, reverse causality, and unobserved heterogeneity.

Keywords: CEO attractiveness, beauty premium, Upper Echelons Theory (UET), Initial Coin Offering (ICO), firm valuation.

1. Introduction

Upper echelons theory (UET) is a cornerstone of strategic management research. Since Hambrick and Mason's (1984) seminal contribution, scholarly consensus has formed around the notion that attributes of chief executive officers (CEOs), alongside other top managers, matter for firm performance (e.g., Bertrand and Schoar, 2003; Hambrick and Quigley, 2014; Quigley and Hambrick, 2015; Balachandran et al., 2019). CEO demographics, educational and racial backgrounds, and professional accomplishments all seem to affect corporate policies and performance (for recent surveys, see Liu et al., 2018 and Wang et al., 2016).

Physical attributes, however, have not received much attention in UET studies despite growing evidence of a "beauty premium" in psychology, politics, and in the labor market (e.g., Berggren et al., 2010; Hamermesh and Biddle, 1994; Maestripieri et al., 2017). The relatively little management "research examining the broader impact of [CEOs'] facial traits" is surprising given that the question of whether looks matter is "especially important in the corporate context" (Graham et al., 2017, p. 3044). Therefore, whether, how much, and why CEO attractiveness matters for corporate outcomes largely remains an open question.

To address this research gap, we examine the relationship between founder CEOs' facial attractiveness and firm valuation in the context of Initial Coin Offerings (ICOs). ICOs are a novel way for entrepreneurial ventures to raise growth capital through the blockchain-based issuance of cryptocurrency tokens (e.g., Fisch, 2019; Howell et al., 2020; Momtaz, 2020a). ICOs offer an ideal context to examine whether, when, and why founder CEO attractiveness matters for organizational outcomes. ICOs are characterized by an exceptionally large amount of uncertainty (e.g., Fisch, 2019; Lyandres et al., 2019; Momtaz, 2020d). The valuation of ICOs is challenging as the typical ICO firm has no track record and its business model is often highly innovative and visionary. In such an uncertainty-plagued transaction context, the CEO is often the most salient

indicator of firm quality and serves as the primary reference point for investors in ICOs (Momtaz, 2020c, Momtaz, 2020d). Specifically, we focus on founder CEOs (i.e., individuals who founded the respective company and serve as the company's CEO) (e.g., Howard et al., 2020; Kumar et al., 2020). Also, because ICOs occur on the internet rather than behind closed doors, such as venture capital deals, valuation-relevant information is readily observable to all potential investors so that we are able to comprehensively capture the set of information available to ICO investors in our models.

Our hypotheses draw on two schools of thought concerned with the advantages experienced by attractive people (for a review, see Maestripieri et al., 2017). The *social psychology school* ascribes "what is beautiful is good" biases to stereotype-based evaluations (e.g., Dion et al., 1972; Langlois et al., 2000). Denying that beauty matters *per se*, stereotype-based theories explain attractiveness advantages through other desirable traits associated with attractiveness, such as trustworthiness, likability, intelligence, and competence. In contrast, work in *labor economics* argues that attractiveness matters because attractive individuals are more likely to develop valuable skills (e.g., social skills), which are conducive to increased productivity (e.g., Hamermesh and Biddle, 1994).

Consistent with both schools of thought, our overarching hypothesis is that a "CEO beauty premium" exists: founder CEO attractiveness is positively related to firm valuation in ICOs. We derive additional hypotheses by applying the arguments of each school of thought to the ICO context. First, according to the *social psychology school*, the CEO beauty premium may be (fully or partially) explained by investors' stereotype-based evaluations of CEO attractiveness. Specifically, other CEO traits that are desirable in ICOs, such as trustworthiness or competence, may explain the attractiveness-valuation relationship through a mediating mechanism. Second, consistent with the *labor economics school*, CEO attractiveness may fill an informational void for

investors in information-scarce ICOs by serving as a reference point for investment-decision heuristics. This implies a weaker CEO attractiveness-firm valuation relationship when more information is available. Following the view that firms led by more attractive CEOs are, on average, of higher quality, we also hypothesize that CEO attractiveness matters for institutional investors (e.g., venture capitalists) who, relative to retail investors, have more resources and incentives to overcome information asymmetries and accurately screen investment opportunities. Lastly, the study of post-ICO performance should reveal whether relying on CEO attractiveness is beneficial for investors in the long term.

We conduct three distinct surveys to obtain a robust measurement of perceived CEO attractiveness. The main survey asked ICO investors to assess CEOs' attractiveness within firms in which they had invested. Two additional surveys use different samples (e.g., individuals with no background knowledge on ICOs) to control for concerns typically raised in contexts like ours, such as recall and confirmation biases, reverse causality, and unobserved heterogeneity.

Our empirical results provide strong support for a CEO beauty premium, indicating that a one-standard-deviation increase in founder CEO attractiveness increases an ICO firm valuation by $7m. We employ matching and instrumental variable (IV) techniques to address remaining endogeneity concerns and, ultimately, show that the CEO beauty premium is a robust, empirical fact. Contrary to stereotype-based predictions, we do not find empirical support that CEOs' perceived trustworthiness, likeability, intelligence, or competence mediate the CEO attractiveness-valuation relation. Our results do, however, suggest that CEO attractiveness serves as a reference point for investment decision making in the presence of highly asymmetric information. The CEO beauty premium is weaker in the presence of positive firm- and market-related sentiment. Moreover, CEO attractiveness increases the likelihood of institutional investors' participation in the ICO. Based on the view that financially motivated institutional

investors have to expect positive returns from CEO attractiveness, this evidence suggests that CEO attractiveness may have economic value. Indeed, we find positive post-ICO buy-and-hold abnormal token returns associated with CEO attractiveness.

With these findings, our study contributes to the UET stream within the broader strategic management literature (e.g., Graham et al., 2017; Liu et al., 2018; Quigley and Hambrick, 2015) by theorizing and empirically analyzing how CEOs' facial attractiveness impacts investors' firm valuations. Our study also contributes to the strategic entrepreneurship and entrepreneurial finance literature. While the importance of founder CEOs for early-stage ventures and ventures' access to scarce resources (e.g., growth capital) is a stylized fact, physical attributes, such as facial attractiveness, have only been recently addressed and have not yet been comprehensively linked to performance outcomes (e.g., Brooks et al., 2014; Duarte et al., 2012). We extend this research by showing that ICO investors value companies led by attractive founder CEOs more highly, and are probably right to do so.

2. Background and hypotheses

2.1 Conceptual background: CEO attributes and firm performance

UET argues that CEOs' managerial abilities are a powerful driver of firm performance (e.g., Liu et al., 2018). Hambrick and Quickley (2014) define the "CEO effect" as the proportion of variance in firm performance that can statistically be attributed to CEO-level factors (see also Mackey, 2008). They estimate that the CEO effect accounts for more than a third of the total variance in firm performance and is even larger in industries where management has more discretion. Also, the CEO effect has generally increased over time (Quigley and Hambrick, 2015; Quickley et al., 2017).

Although the CEO effect is widely documented, there is less agreement about which CEO attributes are most conducive to firm performance (for a meta-analytic review, see Wang et al., 2016). A stream of the UET literature argues that the cognitive abilities of CEOs play a crucial role in this regard because they allow CEOs to overcome limitations in accessing, processing, and using information (Simon, 1957). With few exceptions, studies in this stream of research have found that the CEOs' formal education, as well as their industry and managerial work experience, are positively associated with firms' profitability, growth, and survival. These studies also highlight that firms with older and longer-tenured CEOs perform better (e.g., Fischer and Pollock, 2004; McClelland et al., 2010).

UET literature also considers personality-related CEO attributes, which mostly refer to CEOs' self-concepts. These attributes reflect the extent to which individuals favorably regard themselves, their competencies, and their abilities to influence the environment (e.g., Judge et al. 2008, Hiller and Hambrick, 2005). While a systematic relationship between these attributes and firm performance has not been soundly documented (Wang et al., 2016), previous studies find that CEOs who are more confident in their abilities have more optimistic expectations and pursue riskier initiatives (e.g., Tang et al, 2015, Malmendier and Tate, 2005).[1]

2.2   Conceptual background: the beauty premium

Since the seminal paper by Hamermesch and Biddle (1994), research in labor economics has documented the existence of a positive relationship between individual attractiveness and labor market success, which is generally labeled the "beauty premium." Experimental studies find that

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[1] Some studies do find that these traits of CEOs are conducive to superior performance. For example, Kaplan et al. (2012) consider candidates for CEO positions in firms involved in private equity transactions and find a positive association between attributes reflecting CEOs' resoluteness and both the probability of their being hired and their firms' performance in case they are hired. In relation to this, Benmelech and Frydman (2015) find that CEOs who are used to military discipline and leadership (i.e., served in the military) perform better than other CEOs during industry downturns.

attractive candidates are more often and sooner contacted for job interviews than other candidates, especially if they are male (e.g., López Bóo et al., 2013; Ruffle and Shtudiner, 2015). Attractive candidates are also able to negotiate higher wages (Mobius and Rosenblat, 2006) and make more rapid career progressions (Biddle and Hamermesch, 1998; Hamermesch, 2011).

While the existence of a beauty premium in the labor market is undisputed, there is little consensus about its causes. A first explanation stems from social psychology and attributes the premium to employers' positive stereotypical biases in favor of attractive individuals (for a recent review, see Maestripieri et al. 2017). Individuals are inclined to interpret physical traits as proxies for unobserved attributes that correlate with positive behavioral characteristics, such as competence or trustworthiness. Thus, they judge and treat more attractive individuals more favorably than less attractive ones. The finding that "what is beautiful is good" dates back to the pioneering work of Dion et al. (1972). Since then, the existence of stereotypical biases has been readily explored and coherently summarized in several meta-analyses (e.g., Feingold, 1992; Langlois et al., 2000; Rhodes, 2006).

A second explanation is rooted in the theory of "statistical discrimination" (e.g., Arrow, 1998) and argues that more attractive employees receive preferential treatment in the labor market because they generate, on average, productivity gains for employers. Reasons for the proposed productivity boost include, for example, that consumers' personal utility may increase if they interact with more attractive individuals, thereby increasing demand for the products of the firms that employ them. This bias in favor of attractive people may also become a self-fulfilling prophecy: more attractive individuals receive greater attention and preferential treatment from parents and teachers from their childhood (e.g., Langlois et al., 2000). As a result, they develop superior skills over time, such as social skills, which are useful in negotiating and

communicating with third parties. This ultimately translates into a positive productivity effect (Biddle and Hamermesch, 1998).[2]

Prior research has empirically assessed the relative merits of the different arguments, with mixed results. In line with the view that more attractive individuals are more productive, Biddle and Hamermesch (1998) show that private-sector lawyers are more attractive than those in the public sector, and specialize in tasks with which social skills are more valuable. Physical appearance *per se* partly explains the results of Cao et al. (2020), who link the more accurate earnings forecasts of more attractive financial analysts to the fact that they receive more internal support from their employers, gain more media exposure, and have easier access to firm managers for information than less attractive analysts. Regarding stereotype-based biases, Mobius and Rosenblat's (2006) experiment abstracts from any productivity effect and shows that more attractive individuals are more self-confident, which has a positive impact on employers' perception of their ability. The stereotypical beliefs of employers that operate through both oral and visual interactions with candidate employees "make the beautiful appear more able in the eyes of employers" (p. 15).

A more favorable treatment of attractive individuals also occurs in other spheres of activity.[3] A few studies document the positive role of individuals' physical attractiveness in securing funds. Price (2008) shows that blond, attractive female solicitors are more successful in fundraising. Ravina (2019) finds that attractive borrowers are 11.7% more likely to successfully apply for loans, pay similar interest rates as average-looking borrowers with the same credentials,

[2] Another explanation, inspired by Becker's (1957) "taste for discrimination" model, argues that managers have innate personal preferences for attractive individuals. Thus, they have intrinsic incentives to positively discriminate for attractive candidates in hiring and promotion decisions, without any substantive positive effect on economic output (Mobius and Rosenblat, 2006).

[3] As for education, Cipriani and Zago (2011) show that more physically attractive university students perform better in both oral and written examinations. Research in political sciences finds a positive bias towards more attractive politicians and highlights a positive association between physical attractiveness and electoral success (e.g., Berggren et al., 2010).

and default more often. Brooks et al. (2014) consider pitches presented to a panel of angel

investor judges at three entrepreneurial pitch competitions in the U.S., in which attractive male

entrepreneurs were considerably more likely to achieve pitch competition success than other

entrepreneurs.

A few recent studies consider the physical appearance of CEOs and its link to firm

performance and are thus most closely related to this study. However, their results are

inconclusive. Graham et al. (2017) conduct three internet experiments to evaluate the role of the

facial attributes of CEOs. They find that CEOs are perceived as more competent than non-CEOs.

CEOs that look more competent are more likely to lead larger firms and tend to earn higher

salaries, but only if they are external hires. However, the firms that hire more competent-looking

CEOs do not enjoy superior performance. The authors also consider the attractiveness of CEOs,

but results are inconsistent. Relatedly, Stoker et al. (2016) find that the facial appearance of

CEOs is different from that of other individuals but, again, is not related to firm performance.

Conversely, other studies provide evidence consistent with the existence of a CEO beauty

premium. For example, Cook and Mobbs (2019) show that candidate CEOs' facial attractiveness

positively influences board directors in their CEO selection decisions. CEOs' attractiveness also

relates positively to their compensation and the likelihood of their appointment as chairman

within six months of their selection as the new CEO. Lastly, their findings indicate that

shareholders react more favorably to the appointment of more attractive CEOs. Halford and Hsu

(2020) similarly provide evidence supporting the view that firms led by more attractive CEOs are

more valuable. They find that firms' abnormal stock market returns around CEOs' hiring

announcements are more positive for more attractive CEOs. They also highlight that the

attractiveness of acquirers' CEOs is positively related to acquirers' abnormal returns around the

acquisition announcement date and that stock market investors react more positively to television

news and earning announcement news containing the CEOs' pictures if the CEOs are more attractive. Lastly, CEOs' attractiveness may have a dark side. For example, Connelly et al. (2020) show that when firms are found guilty of misconduct, attractive CEOs are more likely to be fired by boards than their less attractive peers.

2.3   Institutional background: Initial Coin Offerings (ICOs)

We assess the effect of founder CEO attractiveness on firm valuation in the context of ICOs, which represent the latest development in the field of so-called alternative financial channels. ICOs are an innovative funding mechanism that enables firms to raise funding while leveraging blockchain technology (Fisch, 2019; Howell et al., 2020). Despite their novelty, the funding volume raised in ICOs is considerable and already exceeds the funds raised through crowdfunding (Fisch, 2019; Lyandres et al., 2019; Howell et al., 2020). The largest ICOs raise billions (e.g., EOS raised over $4b) and thus compete with large VC financing rounds or Initial Public Offerings (IPOs). Due to their massive growth and large funding amounts, ICOs are currently the subject of lively debate among practitioners, researchers, and policymakers.

In an ICO, firms raise funds by selling tokens online to investors (Fisch, 2019). Tokens are cryptographically protected digital units of value that provide value to investors via a utility, currency, or security function (e.g., Howell et al., 2020). For example, tokens can be used to purchase a product or service in the future, or as a medium of exchange among users on the ICO venture's platform. A special feature of ICOs is that blockchain technology serves as a processing platform, which enables a direct and immediate transaction between ICO investors and ICO firms (e.g., Fisch, 2019; Howell et al., 2020). Blockchain technology is a novel approach to recording and transmitting data across a network in an immutable manner, using cryptographic proof (Chen et al., 2020; Yermack, 2017). ICO firms are therefore typically young firms in the blockchain

sector that work on technologically demanding projects (Fisch, 2019; Howell et al., 2020). Due to the importance of blockchain technology for future innovation, the support and financing of highly innovative projects in the blockchain sector is a key issue for policymakers.

2.4   Hypotheses

ICOs offer an ideal context in which to identify a potential CEO beauty premium for at least two reasons. First, firms are typically in their very early stages when conducting an ICO (Chen et al., 2020; Fisch, 2019; Howell et al., 2020). In these early stages, founder CEO attributes are first-order determinants of firm performance. This is because the strategic decisions taken by founder CEOs in early-stage ventures are particularly crucial for the ventures' development and eventual success (e.g., Chatterji et al., 2019; Colombo and Grilli, 2005; Kulchina, 2017). Second, ICOs happen in a legal "grey zone" characterized by a scarcity of information (Fisch, 2019). Reasons for the large information asymmetry between investors and investees include a lack of effective institutions (Momtaz, 2020b) and established intermediaries (Fisch and Momtaz, 2020), and limited availability of reliable information. Indeed, many ICO firms have no track record and exaggerate their qualities in white papers (Momtaz, 2020b). Thus, investors are forced to rely on noisy indicators of ICO-firms' quality in their investment decisions.

In accordance with the above arguments, the limited existing empirical evidence shows the prominent impact of CEOs' attributes on firm valuations in ICOs. Momtaz (2020c) finds that loyalty toward the CEOs' previous employers is positively related to ICO firm valuations. Other studies point to the influence of CEOs' facial expressions (Huang et al., 2019; Momtaz, 2020d). This paper argues that CEO attractiveness is an important piece of information that ICO investors consider when making investment decisions. Following the statistical discrimination argument (Arrow, 1998), ICO investors recognize that firms led by more attractive CEOs are more likely to

be more productive because of their CEOs' superior managerial abilities, most notably related to their social skills. In the absence of more reliable information about firms' quality, they are more inclined to invest in firms led by these CEOs. Thus, these firms will enjoy more favorable ICO valuations.

Alternatively, ICO investors may assign greater valuations to firms led by more attractive CEOs because they have a positive stereotypical bias in favor of these individuals and (possibly mistakenly) perceive them as more trustworthy, likable, intelligent, competent, and ultimately performant. For example, the tokens sold in ICOs can later be redeemed for firms' products and services but investors have little certainty that these firms will develop them in line with their promises (e.g., Fisch, 2019; Momtaz, 2020a). In case firms renege, investors have hardly any options to file legal suits as cryptocurrency tokens do not generally fall under securities law. Thus, classic investor protection laws do not apply in most jurisdictions (Howell et al., 2020). In this case, ICO investors may show a preference for firms led by more attractive CEOs because they perceive them as more trustworthy, and rely on the CEOs' perceived trustworthiness to assess the probability that the firm will deliver what was promised. Other common stereotypes that could similarly explain the greater inclination of ICO investors to provide greater funding to firms led by more attractive CEOs include competence, likeability, and intelligence (Berggren et al., 2010; Graham et al., 2017).

Based on the arguments above, we derive hypothesis H1, which predicts a positive association between CEO attractiveness and ICO firm valuations. The stereotype-based explanation of the positive association between CEO attractiveness and firm valuation leads to hypothesis H2, which states that this association is mediated by investors' stereotypical biases in favor of more attractive CEOs.

These hypotheses (H1 and H2) are derived in a way to discriminate between the two theoretical mechanisms underlying the relationship between CEOs' attractiveness and firm valuation, as illustrated above. If H1 is confirmed, and this relationship is fully mediated by stereotypical biases, it can be concluded that the alleged productivity advantages of firms led by more attractive CEOs do not play any substantive role in influencing ICO firm valuations. Conversely, if H2 is not confirmed, either because ICO investors do not perceive more attractive CEOs as more trustworthy, likeable, intelligent, and/or competent, or because these perceived CEO characteristics are unrelated to firm valuation, it would therefore be deduced that the explanatory power of stereotypical biases is limited. Lastly, evidence that the relationship is *partially mediated* by ICO investors' stereotypical biases would suggest that both theoretical mechanisms illustrated above are possibly active.

> ***Hypothesis 1 (H1):*** *Founder CEO attractiveness is positively related to ICO firm valuation.*

> ***Hypothesis 2 (H2):*** *The relationship between founder CEO attractiveness and ICO firm valuation is mediated by investors' stereotype-based assessments of trustworthiness, competence, likeability, and intelligence.*

In deriving H1, we emphasize that the lack of information and the pronounced information asymmetry in ICOs are reasons for the existence of a positive association between CEOs' attractiveness and the valuation of their firms in ICOs. Therefore, this relationship should be weaker if additional information exists that ICO investors consider more reliable than CEO attractiveness when valuing firms.

Prior ICO research documents that firm valuations in ICOs rely on current market sentiment (e.g., Drobetz et al., 2019; Howell et al., 2020; Momtaz, 2020b). A possible reason is

that market-related sentiment is perceived as the "wisdom of the crowd" in the absence of more reliable information and the ability to interpret it (Drobetz et al., 2019). The importance of market sentiment is also reflected in the high volatility of the cryptocurrency markets (of which ICOs are a part), which is characterized by cycles of extensive hype that lead to increased firm valuations (e.g., Chaim and Laurini, 2018; Howell et al., 2020).

In addition to market-related sentiment, sentiment can be firm-specific. In particular, ICO firms frequently try to create positive sentiment among investors to solicit investments. This argument is in line with prior research, which shows a positive association between firms' presence and conduct on social media platforms (e.g., Twitter, Telegram) and their ICO valuations (e.g., Fisch, 2019; Howell et al., 2020; Momtaz, 2020a). Both channels enable direct communication between firms and potential ICO investors, which firms can use to create positive sentiment among investors. Another vital tool in ICO firms' communication strategies, which has been associated with increased ICO success, is a white paper, which is a prospectus that provides information on the ICO firm to the public.

In summary, it seems that ICO investors are positively swayed by market-related and firm-related sentiment. Therefore, when market-related sentiment and firm-related sentiment are positive, ICO investors are less sensitive to supposedly noisier information being channeled to them by ICO firms; notably, information on the attractiveness of their CEOs. Under these conditions, the positive relationship between CEO attractiveness and firm valuation becomes weaker.

> **Hypothesis 3a (H3a):** *The relationship between founder CEO attractiveness and ICO firm valuation is negatively moderated by market-related sentiment.*

> **Hypothesis 3b (H3b):** *The relationship between founder CEO attractiveness and ICO firm valuation is negatively moderated by firm-related sentiment.*

Institutional investors generally aim to invest in high-growth markets and new technologies (Gompers and Lerner, 2001). Hence, it is not surprising that they show an increasing interest in markets for digital finance and ICOs specifically (Howell et al., 2020; Kastelein, 2017), investing alongside a crowd of small retail investors (Fisch and Momtaz, 2020). While "crowd" investors do not have the expertise and resources to perform careful due diligence before investing, institutional investors do. The investment process of institutional investors is more professional and characterized by extensive screening activities (e.g., Gompers et al., 2020). Since the cost of performing due diligence is fixed (i.e. does not depend on investment amount) and institutional investors invest a larger amount of capital than crowd investors, they bear lower relative costs in performing due diligence and have greater incentives to accurately scrutinize information on ICO firms. Institutional investors are therefore expected to be able to alleviate information asymmetries by relying on their sophisticated screening activities and investment experience (e.g., Chemmanur et al., 2011), and are more likely to spot "winners" among ICO-firms than crowd investors (e.g., Fisch and Momtaz, 2020). Recent empirical ICO research associates backing by institutional investors with an increased chance of success of the offering (e.g., Howell et al., 2020), as well as improved post-ICO performance (Fisch and Momtaz, 2020).

Therefore, we rely on the presence of institutional investors in order to further disentangle the theoretical mechanisms underlying the "beauty premium." If ICO firms led by more attractive CEOs command a greater valuation because of the superior managerial abilities of their CEOs, one would expect these firms to be more attractive for institutional investors as well. If, on the contrary, firms led by more attractive CEOs are preferred because of stereotypical biases, they should not attract the investments of institutional investors. Indeed, previous studies indicate that institutional investors rely more on fundamental information and respond more rationally to

information arrival (Cohen et al., 2002; Barber and Odean, 2008) than small investors, and are less prone to behavioral biases in their investment decisions (Feng and Seasholes, 2005).

Hypothesis 4 (H4): *Founder CEO attractiveness is positively related to institutional investor backing of ICO firms.*

Public offerings provide a natural setting in which to investigate firms' financing decisions, where asymmetric information is a base for corporate misvaluation. The windows-of-opportunities theory argues that firms benefit from periods during which investors are optimistic about the future of an industry by timing their offering and obtaining higher valuations (Loughran and Ritter, 1995). Accordingly, evidence of the long-run underperformance of firms issuing equity is well-documented (e.g., Ritter, 1991; Schultz, 2003). Empirical evidence is primarily provided by studies on IPOs in traditional stock markets. Instead, no secondary market prices are observable for traditional entrepreneurial finance markets, such as the venture capital market, in which transactions largely occur behind closed doors. The unique context of ICOs allows for CEO attractiveness to be related to post-financing firm performance on a daily basis, by using readily observable daily prices for each cryptocurrency token that is exchange-traded. ICOs are indeed public events and all financial transactions during the ICO and afterward are contained in blockchain data, hence, also publicly available. Since tokens are listed shortly after the ICO ends, investors have both the opportunity to directly and "disintermediately" invest in an ICO firm as well as the possibility to easily divest.

The availability of measures related to the post-financing performance of ICO firms allows for a test as to whether the decisions agents make during an ICO are "right." In this context, "actions" (investments) are "right" as far as they are consistent with the goals of the actors (investors). For investors, returns are the relevant performance measure. If firms led by more

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attractive CEOs enjoy higher valuations at ICO because of the superior managerial abilities of their CEOs, these firms should subsequently outperform their peers in the post-ICO period. If, on the contrary, the attractiveness of CEOs is not related to their firms' quality, the firms' higher ICO valuations will mean-revert over time. These firms may still receive greater valuations at the time of their ICOs, especially if investors have positive stereotypical biases towards attractive CEOs, but will exhibit underperformance in the aftermarket. As market enthusiasm starts to fade, the prices of tokens are progressively downward adjusted over time, resulting in negative post-ICO performance.

Hypothesis 5 (H5): Founder CEO attractiveness is positively related to firms' post-ICO performance.

3. Sample and data

3.1 Main survey to collect data on CEO attractiveness

Prior empirical research on attractiveness typically proceeds without a specific definition of attractiveness. Instead, most empirical studies are survey-based and require respondents to rate the attractiveness of the individuals under investigation. This attractiveness measurement builds on a long tradition of research in social psychology, which documents a considerable agreement on perceptions of attractiveness among individuals, which is stable within and across cultures (Langlois et al., 2000). The use of survey-based measures of attractiveness is common in political sciences (Berggren et al., 2010), economics (Graham et al. 2017), and finance (Duarte et al., 2012). Mimicking the surveys used in these studies, data on CEOs' attractiveness is collected via three distinct surveys. The main survey is described below, while the other two surveys are discussed in the section on robustness checks.

We initially collected a comprehensive sample of photos of ICO firms' founder CEOs, which were later assessed in terms of their attractiveness by our survey respondents. The population of ICOs listed on ICObench (www.icobench.com) was retrieved in April 2019. ICObench is the most comprehensive aggregator of information on ICOs and is a frequently used data source in ICO research (e.g., Lyandres et al., 2019; Momtaz, 2020a, 2020b). This sample of ICOs was supplemented with information from other ICO aggregators, such as ICOalert, ICOdrops, and CoinSchedule. The information provided by such ICO aggregators typically includes a picture of the firm's CEO. Importantly, these ICO aggregators are also used by actual investors when investigating ICOs (Fisch et al., 2019). Hence, these CEO pictures are the same pictures that ICO investors can access during their investment process. In a small number of cases, no photo was available from the aggregator websites. In these cases, the CEO's image was manually researched on the ICO firm's website or LinkedIn.[4] ICO firms for which a picture could not be identified were discarded (less than 5% of the sampled firms). In total, the sample comprises 4,092 CEO pictures. To address a critical endogeneity concern, we only considered those CEOs that were also a founder of the company (i.e., they were not hired later on) (e.g., Howard et al., 2020; Kumar et al., 2020).

A web-based survey was then constructed, based on these pictures. To solicit participants, more than 3,000 individuals were contacted, who identified themselves as ICO investors on Twitter and/or LinkedIn. The survey targeted ICO investors to ensure a high degree of theory-measurement alignment. They were informed about the study and about the intention to measure the attractiveness of CEOs, but were not given any other information, either about the CEO or the ICO. As a reward for participation, advanced access to the study's results was promised to the respondents.

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[4] Our main results are similar in magnitude and significance if these observations are excluded from the sample.

In the survey, respondents were presented with the full list of 4,092 ICOs. Investors were asked to select those ICOs in which they had previously invested, based on the ICO firm's name. For each selected ICO, the respondent was then shown a 5×3.5 cm (2×1.4 inches) photo of the firm's CEO and was asked to rate the attractiveness of each CEO on a scale from 1 (very unattractive) to 10 (very attractive). Respondents that had invested in multiple ICOs were asked to rate multiple CEOs. Only CEOs who had been rated by at least three investors were considered, to ensure a higher validity and robustness of the attractiveness ratings. This restriction led to a final sample of 4,452 CEO attractiveness ratings relating to 740 CEOs, by 633 ICO investors.[5] The range of assessments per investor is one to 43.[6]

The CEO attractiveness data are supplemented with data obtained from ICObench and other ICO aggregators (ICOalert, ICOdrops, and CoinSchedule). This data includes information on ICO firms' valuations, ICO campaign characteristics, and the names of firms' team members. In the case of missing data, ICO firms' websites and white papers were scrutinized. Additionally, every CEO, and all of the firm's team members, were manually researched on LinkedIn. Multiple individual-level variables were constructed, based on information from LinkedIn, such as the CEO's level of formal education or the aggregated work experience of the venture team. Other data sources considered include CoinMarketCap, GitHub, and CryptoFundResearch.

3.2   Variables

The main dependent variable is the ICO firm valuation (*firm valuation (log.)*), measured via the (log of the) amount of funding raised in the ICO (in $m). Funding raised is the most prevalent proxy of ICO success in prior research (e.g., Fisch, 2019; Momtaz, 2020a) and is commonly used

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[5] The total response rate for our main survey is approximately equal to 17%.
[6] We also checked interrater reliability and confirmed that Cronbach's alpha exceeds the commonly agreed upon threshold of 0.7 (e.g., Halford and Hsu, 2020; Momtaz, 2020d).

as a proxy of ICO firm valuation (Momtaz, 2020d). The variable is included in logged form to account for its skewness. The data is obtained from ICO aggregators.

To capture the involvement of institutional investors in an ICO firm, a dummy variable is included, which equals one if one or more institutional investors back the ICO firm, and zero otherwise (*institutional investor*). The data is retrieved from CryptoFundResearch, which maintains a comprehensive list of institutional investors and their investments in ICO firms (Fisch and Momtaz, 2020).

Post-ICO performance is measured via buy-and-hold abnormal returns (*BHAR*). BHAR quantify investor returns over the first six months following the first trading day. Following Momtaz (2019), the raw returns of each ICO token are adjusted by a value-weighted market benchmark. The value-weighted index is constructed based on all cryptocurrencies with available price data on CoinMarketCap, which is the premier source of information on the trading of ICO tokens (e.g., Momtaz 2019; Lyandres et al., 2019).

The independent variable is CEO attractiveness (*CEO attractiveness*). As described earlier, the attractiveness data is collected via a web-based survey in which ICO investors rated the attractiveness of firms' CEOs on a scale from 1 (very unattractive) to 10 (very attractive). The variable is calculated as the median of all available investor ratings for every CEO with more than three ratings.

The mediators are CEOs' perceived trustworthiness, competence, likeability, and intelligence, the most common stereotypes considered in prior attractiveness research (e.g., Berggren et al., 2010; Graham et al., 2017). Therefore, the survey also asked respondents to rate each CEO's *trustworthiness*, *competence*, *likeability*, and *intelligence*. Each variable is scaled from 1 (e.g., not trustworthy at all) to 10 (e.g., very trustworthy).

The moderators capture firm- and market-related sentiment. To measure *firm-related sentiment*, a Natural Language Processing (NLP) approach is applied to ICO firms' white papers to extract the polarity of expressed opinion. A higher polarity score signifies a more positive sentiment. The QDAP dictionary is used, but the results are robust when others are used (e.g., Harvard IV, Loughran-McDonald) (Momtaz (2020b)). To measure *market-related sentiment*, Thomson Reuters' MarketPsych index is used, which measures sentiment for the entire crypto market (i.e., ICOs and cryptocurrencies in general). The index is constructed daily, via a lexical analysis obtained from more than 2,000 news sources included in LexisNexis, and 800 social media platforms (Twitter, Reddit, etc.). Specifically, the "buzz index" is used, which measures the expression intensity and is, therefore, a good proxy for market sentiment (Drobetz et al., 2019).

Lastly, to rule out confounding explanations, a rich set of control variables is included, in line with prior ICO research (e.g., Fisch, 2019; Howell et al., 2020; Momtaz, 2020b). The first set of control variables refers to CEO characteristics, which might distort how investors perceive the attractiveness of CEOs, and which might be related to firm valuation. As suggested in prior research, these characteristics include age, gender, and race (Graham et al., 2017). For example, younger or older CEOs might be perceived as more attractive to some investors. Thus, two dummy variables are created, which capture whether the CEO is *young* (i.e., less than 30 years old) or *old* (i.e., more than 40 years old). We also control for the CEOs' gender (*female*) and race (*white*). Finally, we capture the CEO's level of formal education by controlling for whether the CEO has a *PhD* degree or not, which might positively influence investors' firm valuations.[7] The

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[7] Our main results remain similar in magnitude and significance when (a) replacing the PhD dummy with an MBA dummy and (b) adding an MBA dummy as an additional control variable.

information is obtained from visually inspecting CEO pictures and from manually researching every CEO on LinkedIn.

The second set of controls includes team characteristics. Larger amounts of teams' human and social capital are associated with an increased probability of ICO success (e.g., Lyandres et al., 2019; Howell et al., 2020; Momtaz, 2020a). We include the firm's *team size*, as well as the team's aggregate work experience. Our study distinguishes between *general professional experience* and more specific *crypto experience*, which captures work experience related to ICOs and the crypto sector. To account for the teams' social capital, we consider the number of the focal firm's ICO advisors (*# advisors*). Also, the number of contacts of the firm's team members is measured on LinkedIn, the largest social network in the professional sphere *(# LinkedIn contacts (log.))*. Information on the team members is obtained from ICO aggregators and supplemented with data from LinkedIn.

The third set of controls include ICO characteristics. We control for whether the ICO firm uses ICO-related promotion tools such as a pre-ICO, in which early investors can buy a limited number of discounted tokens (*pre-ICO*), or a reward program (i.e., bounty programs), in which ICO investors receive rewards (free tokens, discounts) for promoting the ICO (*bounty)* (Fisch and Momtaz, 2020; Howell et al., 2019). We also include a variable that captures the ICO's duration in days (*ICO duration*) (Fisch, 2019). ICOs frequently implement Know-Your-Customer (*KYC*) processes that bar unregistered investors from participating in the ICO, which could negatively impact the funding raised because the pool of potential investors is reduced (e.g., Fisch and Momtaz, 2020). Hence, we include a dummy variable, which captures whether a KYC policy is in place (*KYC*). A further dummy variable is included, which captures whether the venture makes its source code freely available online on GitHub (*open source*). Having open-source code has been described as a signal of technological capabilities, which is related to ICO success (Fisch,

2019; Howell et al., 2020). Furthermore, we control for whether the ICO firm operates on an already existing blockchain standard, such as Ethereum, or whether the ICO develops a proprietary blockchain (*blockchain*). The advantages of using a preexisting blockchain typically include greater interoperability, a more advanced infrastructure, and access to network externalities (Fisch and Momtaz, 2020). Another variable that has been associated with firm valuation in ICOs is token supply (*token supply (log.)*), which measures the number of tokens offered to investors. ICOs can impose trading restrictions on their tokens after the ICO. During this lock-up period, investors cannot sell the tokens they acquired in ICOs. The limitation on exit options and liquidity might deter some ICO investors and impact firm valuation. The dummy variable takes a value of one if a token lock-up is in place, and zero otherwise (*lock-up*). Finally, we include time dummies (quarter-years), industry dummies, and country dummies.

- Please insert Table 1 about here -

Table 1 shows summary statistics and pairwise correlations between the variables (for variable definitions and data sources, see Table A1 in the Appendix). The summary statistics are comparable to other ICO studies (e.g., Fisch, 2019; Howell et al., 2020; Momtaz, 2020b). The correlations indicate that multicollinearity should not bias the results in a meaningful way.

4. Empirical results

4.1 Main results

The effect of attractiveness on firm valuation is quantified while controlling for potential confounding variables in a multivariate setting. The econometrical specification of our main model is as follows:

$$FV_i = \beta_1 CEO\ attractiveness_i + \Omega_i'\lambda_1 + u_i \qquad (1)$$

where the dependent variable, FV_i, denotes the valuation of firm i, $CEO\ attractiveness_i$ denotes the average investor rating for each CEO, and Ω_i is a vector of control variables. All tables report robust standard errors. We also check Variance Inflation Factors (VIFs) and find in untabulated results that all VIFs are well below the commonly agreed threshold of 5 (e.g., Leitterstorf and Rau, 2014).

Table 2 shows regression results for the main model defined in equation 1 in column (3). To demonstrate that the CEO attractiveness-firm valuation relationship is not driven by the presence of our control variables, columns (1) and (2) present a control model and a reduced model (including CEO characteristics only), respectively. The main model in column (3) indicates, *ceteris paribus*, that *firm valuation* is an increasing function of *CEO attractiveness*. The coefficient of this variable (0.2247) is statistically significant (p-value = 0.0005). Comparing the R-squared between the control model and the main model, we find that CEO attractiveness explains about 1.6% of the total variation in firm valuation. To ease the economic interpretation of the results, we calculate the overall estimated effect of a one-standard-deviation increase in *CEO attractiveness*. For the hypothetical scenario in which two identical average firms would conduct an ICO with CEOs who only differed in their perceived attractiveness by one-standard deviation, the more attractive CEO would increase firm valuation by $7.4m.

Several additional econometric approaches help assess the robustness of the main result. First, to rule out that outliers are driving our results, we resort to a dummy variable approach, in which *CEO attractiveness* takes the value of 1 if the CEO's attractiveness is rated above the sample median, and 0 otherwise. The results are shown in column (4) and suggest that firms led by above-median CEOs are associated with a higher firm valuation of $7.0m. Statistically, the effect is highly significant (p-value = 0.0006). Second, two distinct two-stage approaches are employed to address concerns about potential unobserved heterogeneity. This would be an issue

if more valuable firms were more likely to appoint more attractive CEOs for whatever reason. In the first approach, we re-run the main model with a Propensity Score-Matched (PSM) sample. The propensity score is derived from the first stage that predicts *CEO attractiveness* by other CEO characteristics, which is reported in column (5). A one-to-one nearest-neighbor matching algorithm is employed without replacement.[8] The regression results with the PSM sample are shown in column (6). The results underline the robustness of the main results. The other approach is based on an econometric instrumental variable (IV) estimator.[9] We instrument CEO attractiveness with the generalized residual from the selection model, which addresses endogeneity in the attractiveness score by removing any spurious correlation with the error term (Gourieroux et al., 1987; Wooldridge, 2015). The regression results with the instrumented CEO attractiveness variable are reported in column (7) and indicate that the CEO attractiveness-firm valuation relation is not driven by unobserved heterogeneity. Altogether, the evidence provides clear support for H1; that is, there appears to be a pronounced CEO beauty premium in ICOs.

For the control variables, largely consistent parameter estimates are found throughout all model specifications. In particular, team size, team's professional experience, and the size of the social network positively relate to firm valuation, while ICO duration is negatively related to firm valuation. Interestingly, CEO attributes other than attractiveness, such as age and the CEO's level

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[8] This approach leads to the best matching result based on two frequently used evaluation criteria. First, we check for statistical significance of the differences in means in the two groups (CEO attractiveness dummy = 1 vs. 0) before and after the matching, and find a reassuring decrease in most p-values after the matching. Second, McFadden's R^2 increases when we estimate the prediction model with the post-matching sample.

[9] Similar to a regular IV, the econometric IV only uses the "unbiased" variation between the dependent and independent variables. We are forced to resort to an "econometric" IV because we are not aware of any available "conceptual" IV for facial attractiveness.

of formal education, become insignificant in the presence of team- and ICO-related control variables.[10]

- Please insert Table 2 about here -

H2 posits that CEO attractiveness may impact firm valuation *indirectly* via stereotype-based evaluations (i.e., trustworthiness, competence, likeability, and intelligence). Therefore, a test of H2 requires a mediation model. Our mediation model follows the classic approach by Baron and Kenny (1986), while considering the recommendations in Aguinis et al. (2017). Let MED_i^m denote the mediating variable for firm i, with $m \in \{\text{trustworthiness, competence, likeability, intelligence}\}$. All other variables are as defined in equation 1. The mediation model is defined as a system of three equations:

$$FV_i = \alpha_1 + \beta_1 CEO\ attractiveness_i + \Omega_i'\lambda_1 + u_1 \qquad (2)$$

$$MED_i^m = \alpha_2 + \beta_2 CEO\ attractiveness_i + \Omega_i'\lambda_2 + u_2 \qquad (3)$$

$$FV_i = \alpha_3 + \beta_3 CEO\ attractiveness_i + \gamma_3 MED_i^m + \Omega_i'\lambda_2 + u_3 \qquad (4)$$

To identify a mediation process, four conditions must be met. First, the overall treatment effect of *CEO attractiveness* in equation (2) has to be significant. Second, there needs to be a significant effect of *CEO attractiveness* on the mediator. Third, controlling for CEO attractiveness, the mediator should have a significant impact on the outcome. Fourth, the residual direct treatment effect of *CEO attractiveness* in equation (4) should be eliminated or less than the overall treatment effect of *CEO attractiveness* in equation (2) to have full or partial mediation, respectively. Technically: $\beta_1 \neq 0$; $\beta_2 \neq 0$; $\gamma_3 \neq 0$, and $\beta_3 < \beta_1$.

Table 3 reports the mediation results for the stereotype-based explanations. In column (1) we report the estimates of Model (3) in Table 2, corresponding to equation (2). In columns (2)-(3)

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[10] In unreported results, we also study ICO duration as dependent variable to further establish how CEO attractiveness affects ICO outcomes. The model is defined as a time-to-event model with random-effects (see Momtaz, 2020b). The results suggest that more attractive CEOs are able to complete the ICO more quickly.

and (4)-(5) in panel A we report the mediation regression systems, corresponding to equations (3) and (4), for trustworthiness and competence, respectively. Columns (1)-(2) and (3)-(4) in panel B report the mediation regression systems for likeability and intelligence, respectively.

In summary, the causal-steps analysis in the spirit of Baron and Kenney (1986) suggests that stereotype-based evaluations *do not mediate* the effect of *CEO attractiveness* on *firm valuation* and that *there is a direct effect of CEO attractiveness on firm valuation*. For all the mediation variables under consideration, the null hypothesis that the mediation effect is null cannot be rejected at conventional confidence levels. In particular, although *CEO attractiveness* is significantly related to firm value and *trustworthiness* (see columns (1) and (2) of panel A), there is no mediation process, because *trustworthiness* does not predict firm value, and the CEO attractiveness effect is not weaker in the presence of a trustworthiness control (see column (3) of panel A). For the same reasons, the mediation process via intelligence can be rejected (see columns (3)-(4) of panel B). Moreover, there is no mediation via competence or likeability (see columns (4)-(5) of panel A and columns (1)-(2) of panel B, respectively), because *CEO attractiveness* is not significantly related to these two variables in the sample.

As is recommended by Aguinis et al. (2017), for each of these mediation models, we check two additional statistics. First, we test the null hypothesis that $\beta_2 * \gamma_3 = 0$ (MacKinnon et al., 2004). This important test complements our examination of the *direct* effect in the Baron and Kenney (1986) causal-steps framework in order to ensure that there is no *indirect* effect. Our nonparametric bootstrap tests indicate p-values of >0.8, suggesting that we cannot reject the null (that is, there is no indirect effect). Second, we test the null hypothesis that $R^2 = R^2_{partial}$ where $R^2_{partial}$ is the goodness-of-fit statistics for the model that omits the direct effect, captured by β_3 in equation (4). Aguinis et al. (2017, p. 12) recommend this robustness test because "routinely

including the direct effect violates the principle of parsimony" (see also James et al., 2006;

LeBreton et al., 2009). We find p-values<0.001, suggesting that we can reject the null that

omitting the direct effect does not have significantly detrimental consequences for overall model

fit. In fact, our test rejects the null for each mediation model individually as well as for all four

models jointly (the joint test p-value is 0.0002). Overall, the empirical evidence does not support

H2.[11]

- Please insert Table 3 about here -

H3 posits that the CEO beauty premium is moderated by firm and market-related

sentiment. To test H3, the main model shown in equation 1 is modified as follows:

$$FV_i = \alpha + \beta_1 CEO\ attractiveness_i + \theta_1 FRS_i + \theta_2 MRS_i$$

$$+ \zeta_1 CEO\ attractiveness_i x FRS_i + \zeta_2 CEO\ attractiveness_i x MRS_i \quad (5)$$

$$+ \delta_i FRS_i x MRS_i + \Omega_i' \lambda + u$$

where FRS_i and MRS_i denote firm- and market-related sentiment for firm i's ICO and all other

variables are defined above.

Table 4 shows the regression results for equation 5 in column (1). *CEO attractiveness*,

firm- and *market-related sentiment* are all individually significantly positive. The interactions of

CEO attractiveness with the firm- and market-sentiment variables are significantly negative (p-

value=0.0248 and 0.0408, respectively), suggesting that the association between *CEO*

attractiveness and *firm valuation* weakens in the presence of more positive sentiment. The

moderation effects are of large economic magnitude. Holding *market-related sentiment* constant

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[11] In unreported tests (available from the authors upon request), we explore whether self-confidence mediates the attractiveness-valuation relation. We examine the role of the facial Width-to-Height Ratio (fWHR) as a proxy for self-confidence, as neuroscience shows that it is related to testosterone levels and masculinity (He et al., 2019), which are determinants of self-confidence. We also investigate "market conformity" as the mediating variable, which is defined as the absolute-value deviations from peer firms in ICO durations in days, where peer firms are determined by the same months in which the ICO started. Conformity has been employed in prior studies as a proxy for error-avoiding behavior that is negatively correlated with self-confidence (e.g., Delgado-Garcia and De La Fuente-Sabate, 2010). However, the results for both additional mediating variables are not significant.

at its mean, a one-standard-deviation increase of *CEO attractiveness* results in a $4.81m

estimated increase in firm valuation for ICO firms at the 90th percentile of the *firm-related*

sentiment distribution. In contrast, a one-standard-deviation increase of *CEO attractiveness* is

associated with an estimated increase in firm valuation of $7.29m for firms at the 10th percentile

of the *firm-related sentiment* distribution. Similarly, with *firm-related sentiment* fixed at its mean

value, firms at the 90th (10th) percentile of the *market-related sentiment* distribution have an

estimated effect of a one-standard-deviation increase in *CEO attractiveness* on firm value of

$5.76m ($7.0m).

These results suggest that the size of the CEO beauty premium depends on investors'

information sets, in that investors rely more on CEO attractiveness as an indicator of firm value

when they have a more limited information set. Interestingly, the triple interaction term has a

positive coefficient. Also, the coefficient of the interaction term between *firm-* and *market-*

related sentiment is negative. This indicates that firm- and market-related sentiment are

informational substitutes. When firm-related sentiment is more positive, market-related sentiment

is less important for investors, and vice versa. The results illustrated above hold in the dummy

variable, propensity score matching, and instrumental variable specifications (see Table A2 in the

Appendix). Overall, the findings lend strong support to H3a and H3b.

- Please insert Table 4 about here -

In Table 4 column (2), regression results are reported for the probability that ICO firms obtain

backing from institutional investors. We re-estimate the baseline model in equation 1, but replace

the dependent variable with a binary variable that equals 1 if one or more institutional investors

back the firm, and 0 otherwise, and therefore employ a conditional logit approach, with quarter-

years, industry, and country fixed effects. The results for the dummy variable, propensity score

matching, and instrumental variable approaches, respectively, are reported in Table A3 in the

Appendix, in columns (1), (2), and (3), respectively. The results are consistent throughout all model specifications and indicate that the probability of institutional investor backing increases in *CEO attractiveness* overall. For example, in the model reported in column (1), the marginal effect of *CEO attractiveness* is positive, (weakly) significant (p-value = 0.0935), and of large economic magnitude. With all other variables at their mean value (median value for dummies), a one-standard-deviation increase of *CEO attractiveness* leads to a 23.7% estimated increase of the probability of the ICO being subscribed to by institutional investors. Altogether, the evidence supports H4.[12]

To assess the relationship between *CEO attractiveness* and post-ICO firm performance, Buy-and-Hold Abnormal Returns (*BHAR*) are computed for holding periods of 6 months after the initial listing date. The main model specified in equation 1 is then estimated, but with *firm value* replaced with *BHAR* as the dependent variable. The results are shown in column (3) of Table 4. We find that *CEO attractiveness* is positively related to *BHAR*, indicating that the CEO beauty premium may persist in the long term.[13] Despite a substantial drop in sample size due to data availability, the effect of *CEO attractiveness* on *BHAR* is positive, (weakly) significant (p-value = 0.0587), and of large economic magnitude. A one-standard-deviation increase of *CEO attractiveness* leads to an estimated increase of *BHAR* equal to 60.9%. These results confirm H5.

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[12] Additionally, in unreported results (available from the authors upon request), we examine whether *firm-* and *market-related sentiment* moderate the relation between *CEO attractiveness* and *institutional investor backing*. Interestingly, *CEO attractiveness* is still significantly positive; however, the sentiment variables have almost no effect on the probability that a firm will be backed by an institutional investor in an ICO. This is consistent with theories of corporate governance (Edmans, 2014) that argue that institutional investors have the knowledge and resources to screen the market and produce valuable private information on their own, which reduces their reliance on public information.

[13] To shed more light on the long-term relationship between *CEO attractiveness* and *BHARs*, we estimated the measures for different holding periods ranging from one to twelve months after the first day of trading. The results (available from the authors upon request) show that the effect of CEO attractiveness is persistent over time.

4.2 Robustness checks

To assess the robustness of the results and to mitigate endogeneity concerns, two additional surveys were conducted. Table A4 and A5 in the Appendix provide a comparative overview of the surveys conducted in this study. In the main survey, ICO investors were asked to rate the attractiveness of CEOs of firms in which the investors had actually invested. While this approach has the advantage of using as informants the agents (ICO investors) whose decisions are the focus of our theoretical hypotheses, it may give rise to a potential confirmation and recall bias because ICO investors may evaluate CEOs of firms with higher ICO valuations or post-ICO returns as more attractive. Also, self-selection may bias the estimates if investors only selected those CEOs of whom they had a better memory, or when their selection was affected by information about the startup that surfaced only after they had invested. To address these concerns, an additional survey (survey B) was conducted, in which a different set of ICO investors was asked to evaluate CEOs of firms in which they had *not* previously invested. In the survey, each participant was given 40 randomly selected CEO photos to assess. This resulted in 5,116 photo assessments by 213 respondents. Again, only CEOs that had been rated at least three times were included in the final sample. The correlation between the original *CEO attractiveness* measurement and the one obtained from the second survey is 0.54, indicating the absence of bias in the econometric results. For further confirmation, all main models were re-estimated with the average CEO attractiveness score from this additional survey. The results are presented in Table A5 in the Appendix, column (2). For the sake of brevity, only the main coefficient of interest is reported, i.e., CEO attractiveness. Column (1) reprints the coefficients from the main survey for comparability. In summary, our results are robust.

While survey B addresses potential investor-specific biases, endogeneity issues such as reverse causality might still bias the results. Berggren et al. (2010) state that more successful

individuals may have access to more resources that make them appear more attractive (e.g., more expensive clothes and hair stylists, better photographers). To rule out such bias, a third survey (survey C) was conducted, in which all CEO photographs were modified in such a way that only the face (no outfit, only minimal hair) was visible. Additionally, each photograph was converted to grayscale and the light and contrast ratios were normalized to an average level. Overall, neither concern is expected to be problematic in the survey. First, ICObench profiles were used in contrast with random CEO photos from the press or the internet. These profile photos were provided by the CEOs themselves which, as a result, depict the CEOs in the most favorable way. This, in turn, should keep the heterogeneity in the quality of photos or outfits/styles to a minimum. Second, research in social psychology shows that attempts to improve one's natural beauty by means of cosmetics or clothing has only a minimal impact on perceived beauty by others (Hamermesh et al., 2002).

Survey C addresses another issue that is related to the sampling of respondents. Specifically, common latent factors among ICO investors may bias the first two surveys in that the perception of certain facial attributes may differ among ICO investors and the overall non-investor population. The respondents in the third survey were paid to assess the photos and were hired from online platforms such as www.freelancer.com and www.upwork.com. The main requirement to participate in the survey was that the freelancer was not familiar with the ICO/startup financing context. This was done so that the robustness of the results could be compared between survey responses received from participants who were both familiar and unfamiliar with the ICO context. Insignificant differences would support the claim of ecological validity. The remaining design of the survey was the same as in survey B, and each respondent evaluated 40 randomly selected photos. This resulted in 5,243 assessments by 197 respondents. The correlation between the original CEO attractiveness measure and the one obtained from

survey C is 0.40. Again, all models were re-estimated with this measure of CEO attractiveness. Column (3) of Table A5 in the Appendix shows that the estimates of the beauty premium are slightly smaller than in the regressions, based on the sample of ICO investors and unmodified CEO photographs. However, *CEO attractiveness* is always significantly positive (the p-value is 0.0455 or lower), which suggests that the main results of the beauty premium are robust (Table A5).

5. Discussion and concluding remarks

In this study, we investigate the effect of founder CEO attractiveness on firm valuation in the context of ICOs. Our empirical results provide strong support for the existence of a CEO beauty premium: a one-standard-deviation increase in founder CEO attractiveness is associated with a $7m increase in firm valuation. CEO attractiveness explains roughly 2% of the total variation in firm valuations and therefore constitutes a prime determinant of ICO success. The effect of founder CEO attractiveness is not mediated by investors' stereotype-based evaluations related to perceived trustworthiness, likeability, intelligence, and competence. However, firm- and market-related sentiment negatively influence the CEO attractiveness-firm valuation relation. This suggests that CEO attractiveness indeed serves as a reference point, but only when investment-related information is scarce. We find that firms led by more attractive CEOs are more likely to receive backing by institutional investors, and enjoy superior post-ICO performance as reflected in the returns of a buy-and-hold investment strategy. Our results are robust to the use of different econometric techniques and different survey-based measures of CEO attractiveness.

Our paper contributes to strategic management research by theorizing and empirically analyzing how CEO attractiveness impacts firm valuation and performance. While the "beauty premium" has been documented in fields as diverse as the labor market (Hamermesh and Biddle,

1994), the performance of financial analysts (Cao et al., 2020), politics (Berggren et al., 2010), and charitable giving (Jenq et al., 2015), the effect of CEO attractiveness on corporate outcomes remain largely underresearched. This is surprising because a long and lively debate exists in strategic management research on the "CEO effect" and its determinants (e.g., Liu et al., 2018; Quigley and Hambrick, 2015; Wang et al., 2016). Our study brings to the fore CEO attractiveness as an additional important determinant of strategic outcomes, and highlight boundary conditions for the existence of a CEO beauty premium. Our findings suggest that in contexts such as ICOs, where typically there is a lack of reliable information, CEO attractiveness is a predictor of firm performance. ICO investors are more inclined to invest in firms led by more attractive CEOs as they rely on CEO attractiveness to (statistically) discriminate firms of higher quality (see Cook and Mobbs, 2019 and Halford and Hsu, 2020 for results that are in line with this view but relate to different contexts). The evidence that institutional investors also prefer firms led by more attractive CEOs, and that these firms outperform other firms in the post-ICO period, indicates that in absence of more reliable indicators of firm performance, ICO investors are probably right in using CEO attractiveness as a predictor of firm success.

Our results are not consistent with the argument that the "beauty premium" enjoyed by firms led by more attractive CEOs can simply be traced to the stereotypical biases which may shape the decisions of economic agents (in our case, ICO investors), and is inconsequential for firm performance. Hence, our findings somewhat contrast previous studies that failed to detect a positive relation between CEO attractiveness and firm performance (Stoker et al., 2016; Graham et al., 2017). The divergence between the findings of these studies and our findings suggests that the effect of CEO attractiveness on firms' strategic outcomes likely depends on boundary conditions relating to the informational and situational contexts. Following this view, we find that

when more information is available to ICO investors (e.g. because market- and/or firm-related sentiments are positive), CEO attractiveness becomes less salient for their investment decisions.

Our paper also contributes to research in entrepreneurial finance, which has documented the importance of the CEO for early-stage ventures (see, e.g., Kaplan et al., 2009). This research has frequently identified the firm's CEO (and top management team) as being one of, or the most important criterion guiding investors' funding decisions (e.g., Bernstein et al., 2017; Gompers et al., 2020). CEOs' physical attributes, such as attractiveness, have received limited attention, although a few previous studies have highlighted the positive influence of individuals' physical appearance on financial outcomes relating to the loan market (Ravina, 2019) and peer-to-peer lending (Duarte et al., 2012). Brooks et al. (2014) is an exception. They find that more attractive male entrepreneurs are more likely to win pitch competitions, thus obtaining seed funding, than their less attractive peers. However, the theoretical mechanisms underlying this positive association have not been thoroughly investigated. Our study makes an important step forward in this direction by documenting that investors value companies led by more attractive CEOs higher when the information set on which they base their investment decisions is limited, and in doing so, they obtain higher returns.

As with any study, ours has some limitations which open avenues for further research. First, one may wonder about the external validity of our findings. ICOs are an appropriate setting to test the existence of the CEO beauty premium when the amount of information available is scarce because images of firms' CEOs are immediately visible to all prospective ICO investors. However, it is unclear whether our findings can be extended to other more established domains even within entrepreneurial finance, such as venture capital deals or IPOs. While CEO characteristics also play an important role in these more established funding settings (e.g., Gompers et al., 2020), the availability of more reliable information in those settings likely

reduces the CEO beauty premium. Hence, our estimates may constitute an upper-bound of the relationship between attractiveness and firm valuation. Conversely, a CEO beauty premium might exist in equity crowdfunding, where crowd investors have both limited screening abilities and limited information on firms that are asking for finance, like in ICOs. It might also exist in angel investments since these types of early-stage investors frequently make decisions based on their "gut feeling" instead of solely relying on objective data (Huang and Pearce, 2015). Future research could thus assess under what conditions a CEO beauty premium exists in other entrepreneurial finance domains. One could also take a step further and investigate the existence of a CEO beauty premium (and its drivers) in other settings involving, for example, customers or employees, rather than investors.

Another limitation refers to the data considered in our analyses. For example, we study the involvement of institutional investors in ICOs. Ideally, one would consider the amount invested by institutional investors, which would enable more insights into their involvement with ICO firms. However, such information is not available as yet, due to the ICO sector's short history. Future research can draw on larger, more nuanced data to more carefully assess how CEO attractiveness influences institutional investor backing. Similarly, future research may further explore other moderators and mediators that could shape the CEO attractiveness-firm valuation relationship.

Third, the domain of digital finance in general, and our sample specifically, are dominated by male CEOs. While we do control for the CEO's gender and do not find differences between the attractiveness ratings, it is unclear how our results can be extended to other funding settings that might be less male-dominated. In particular, it would be interesting to assess whether the relationship between CEO attractiveness and firm performance is gender-specific, and why.

In spite of these limitations, this study has important implications for investors and entrepreneurs. A straightforward implication of our findings for investors is to invest in the ICOs of firms led by more attractive CEOs since they tend to achieve higher valuations and higher returns in the aftermarket. This information is particularly useful in an investment context that is characterized by a paucity of information, and for investors who do not have the capabilities or resources to perform extensive due diligence processes. After all, assessing attractiveness is straightforward. Our findings are also interesting for startups seeking external finance in a context characterized by strong information asymmetry such as ICOs. If startups can hire attractive leaders, they may have better access to growth capital.

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Tables

Table 1. Summary statistics and correlation matrix.

Variables	#obs.	Mean	StDev	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.
1. Firm valuation (log.)	740	2.48	1.71																											
2. Institutional investor	740	0.150	0.36	0.29																										
3. BHAR	249	0.46	3.98	-0.10	0.14																									
4. CEO attractiveness	740	6.76	2.15	0.07	0.03	0.05																								
5. Trustworthiness	740	5.61	1.51	0.02	0.07	0.03	0.31																							
6. Competence	740	6.05	1.42	-0.05	-0.02	-0.07	0.17	-0.02																						
7. Likability	740	6.70	1.58	0.03	0.06	-0.01	0.26	0.06	0.01																					
8. Intelligence	740	6.62	1.03	0.01	0.02	0.07	0.35	0.34	0.01	0.11																				
9. Firm-related sentiment	649	1.00	0.58	0.12	0.01	-0.03	0.00	0.01	0.03	0.07	0.01																			
10. Market-related sentiment	649	1.00	0.40	0.08	-0.09	-0.31	-0.01	0.01	0.02	0.02	-0.01	0.02																		
11. Young	740	0.40	0.49	-0.10	-0.01	-0.05	0.01	0.12	0.02	-0.01	-0.04	-0.12	0.03																	
12. Old	740	0.09	0.28	0.01	-0.05	0.06	-0.06	-0.12	-0.04	-0.01	0.06	0.03	-0.06	-0.32																
13. Female	740	0.07	0.25	0.01	0.02	-0.05	0.04	-0.06	0.01	0.07	-0.07	0.06	0.02	-0.02	0.00															
14. White	740	0.67	0.47	-0.06	-0.03	0.03	0.01	-0.08	0.04	0.01	-0.04	0.08	-0.03	-0.03	-0.02	-0.05														
15. PhD	740	0.10	0.30	0.11	0.09	0.05	0.03	0.00	-0.01	0.02	0.04	0.07	-0.01	-0.07	0.04	-0.03	-0.02													
16. Team size	740	10.87	6.31	0.23	0.07	0.00	0.05	0.00	-0.01	0.04	0.04	0.22	0.05	-0.06	0.02	-0.01	0.02	0.18												
17. Team's professional exp.	740	159.44	76.81	0.17	0.05	0.04	0.04	-0.09	0.01	0.04	0.01	0.07	-0.02	-0.38	0.27	0.03	0.05	0.12	-0.02											
18. Team's crypto exp.	740	2.18	3.73	0.12	0.04	-0.11	0.04	-0.05	-0.05	0.00	0.02	0.04	-0.08	0.06	0.00	0.00	0.03	0.16	0.32	0.14										
19. # advisors	740	4.90	4.36	0.19	0.1	-0.16	0.04	-0.02	-0.02	0.09	0.03	0.21	0.10	-0.13	0.05	0.08	-0.05	0.04	0.03	0.27	0.04									
20. # LinkedIn cont. (log.)	740	346	122	0.21	0.12	-0.03	-0.00	-0.02	-0.02	0.08	0.03	0.08	-0.15	0.07	0.00	0.02	0.04	0.07	-0.01	0.35	0.22	0.14								
21. Pre-ICO	740	0.55	0.50	0.02	-0.08	-0.17	0.02	0.00	-0.01	-0.01	0.01	0.08	0.18	-0.05	0.03	0.02	0.04	0.03	0.02	0.11	0.06	0.03	0.16							
22. ICO duration	740	49.72	45.52	-0.09	-0.11	-0.07	-0.02	-0.08	-0.02	-0.03	-0.01	0.04	-0.07	0.08	-0.02	0.03	-0.05	0.03	0.05	0.00	0.02	0.00	-0.04	-0.03						
23. Bounty	740	0.37	0.48	-0.02	-0.09	-0.13	0.03	-0.06	-0.03	0.00	0.03	0.07	0.16	-0.02	0.06	-0.02	-0.04	0.02	0.16	-0.06	0.13	0.18	-0.01	0.20	0.09					
24. KYC	740	0.19	0.39	-0.04	-0.05	-0.08	0.02	-0.06	-0.02	0.00	0.03	0.03	0.12	-0.05	0.04	-0.05	-0.04	-0.03	0.09	-0.02	0.05	0.11	-0.01	0.07	0.11	0.18				
25. Open source	740	0.94	0.24	0.07	0.03	-0.04	0.02	-0.03	0.02	-0.01	-0.03	0.01	0.08	0.04	-0.06	0.00	0.03	0.01	0.10	-0.02	0.01	0.09	-0.01	0.04	-0.02	0.04	0.02			
26. Blockchain	740	0.77	0.42	-0.01	-0.07	-0.15	0.02	0.02	0.00	0.02	0.03	0.00	0.16	-0.03	0.00	-0.02	-0.03	0.03	0.06	-0.02	0.03	0.13	-0.01	0.08	0.07	0.15	0.12	0.04		
27. Token supply (log.)	740	3.59	2.93	0.12	-0.04	-0.04	-0.04	0.06	-0.02	0.08	0.01	0.11	0.26	0.01	-0.01	0.04	-0.09	0.05	0.25	0.01	0.1	0.19	-0.07	0.17	0.09	0.15	0.13	0.13	0.20	
28. Lock-up	740	0.05	0.21	0.02	0.02	0.00	0.01	0.02	0.00	0.01	0.02	0.04	0.02	-0.02	0.01	-0.02	0.00	0.03	0.04	0.00	0.03	0.07	-0.01	0.03	0.01	0.05	0.01	0.02	0.02	0.07

Table 2. The CEO beauty premium: main results for firm valuation (H1).

Dependent variable	Firm valuation (log.)				Attractiveness (dummy)	Firm valuation (log.)	
Model	Control model	Human capital model	Full model	Dummy approach	Selection model	Propensity score matching	Instrumental variable
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO attractiveness							
CEO attractiveness		0.2192	0.2247				
		(0.0655)	(0.0644)				
CEO attractiveness (dummy)				0.4630		0.4827	
				(0.1346)		(0.1949)	
CEO attractiveness (IV)							0.4264
							(0.1390)
Other CEO characteristics							
Young	-0.1959	-0.2954	-0.1842	-0.1798	-0.2954	-0.1119	-0.1770
	(0.1512)	(0.1360)	(0.1499)	(0.1499)	(0.1360)	(0.1822)	(0.1500)
Old	-1.7803	-1.5569	-1.8595	-2.0343	-1.5569	-1.9864	-2.1687
	(1.6704)	(1.6802)	(1.6539)	(1.6556)	(1.6802)	(1.7009)	(1.6630)
Female	0.1565	0.2139	0.1345	0.1102	0.2139	0.1918	0.1262
	(0.3062)	(0.3108)	(0.3034)	(0.3038)	(0.3108)	(0.3418)	(0.3044)
White	-0.1337	-0.0845	-0.1424	-0.1076	-0.0845	-0.0963	-0.1058
	(0.1473)	(0.1484)	(0.1460)	(0.1461)	(0.1484)	(0.1769)	(0.1461)
PhD	0.2284	0.2705	0.1804	0.1814	0.2705	0.2362	0.1746
	(0.1397)	(0.1404)	(0.1391)	(0.1391)	(0.1404)	(0.1622)	(0.1394)
Team characteristics							
Team size	0.0513		0.0504	0.0503		0.0655	0.0501
	(0.0106)		(0.0105)	(0.0105)		(0.0133)	(0.0106)
Team's professional exp.	0.0017		0.0018	0.0019		0.0020	0.0020
	(0.0011)		(0.0011)	(0.0011)		(0.0013)	(0.0011)
Team's crypto exp.	0.0061		0.0073	0.0073		0.0062	0.0070
	(0.0196)		(0.0194)	(0.0194)		(0.0221)	(0.0194)
# advisors	0.0130		0.0109	0.0111		0.0068	0.0113
	(0.0154)		(0.0153)	(0.0153)		(0.0186)	(0.0153)
# LinkedIn contacts (log.)	0.3592		0.3635	0.3812		0.4361	0.3886
	(0.1538)		(0.1523)	(0.1525)		(0.1730)	(0.1528)
ICO characteristics							
Pre-ICO	0.1334		0.1499	0.1659		0.2147	0.1717
	(0.1379)		(0.1367)	(0.1370)		(0.1669)	(0.1371)
ICO duration	-0.0051		-0.0050	-0.0050		-0.0047	-0.0049
	(0.0017)		(0.0017)	(0.0017)		(0.0021)	(0.0017)
Bounty	-0.0370		-0.0466	-0.0459		-0.1244	-0.0487
	(0.1534)		(0.1522)	(0.1522)		(0.1824)	(0.1523)
KYC	-0.1685		-0.1569	-0.1418		-0.0496	-0.1429
	(0.1733)		(0.1717)	(0.1718)		(0.2064)	(0.1719)
Open source	-0.1019		-0.0609	-0.0358		0.1490	-0.0469
	(0.2845)		(0.2866)	(0.2867)		(0.3595)	(0.2870)
Blockchain	-0.1666		-0.1963	-0.1814		-0.2975	-0.1690
	(0.1677)		(0.1662)	(0.1661)		(0.1961)	(0.1668)
Token supply	0.0032		0.0032	0.0031		0.0089	0.0031
	(0.0084)		(0.0084)	(0.0084)		(0.0103)	(0.0084)
Lock-up	-0.1668		-0.1829	-0.2063		-0.3178	-0.2041
	(0.2907)		(0.2880)	(0.2883)		(0.3520)	(0.2884)
Fixed effects							
Quarter-years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	740	740	740	740	740	652	740
R^2 / McFadden R^2	0.246	0.191	0.262	0.261	0.126	0.318	0.261

Notes: The sample consists of 740 ICOs with CEOs' attractiveness rated by investors. We regress firm valuation on CEO attractiveness and a vector of relevant control variables. Columns (1), (2), and (3) present control, reduced, and full OLS regression models, respectively, for firm valuation (in $) (log.) as the dependent variable. Column (4) presents results from a dummy variable approach, where the independent variable, CEO attractiveness, takes the value of 1 if the CEO is ranked above the median rating, and 0 otherwise. Column (5) presents a selection model, where beauty is a function of other human capital characteristics. Column (6) re-runs the model shown in column (4) with a propensity score-matched sample based on one-to-one nearest-neighbor matching (without replacement) on the propensity score derived from the selection model. Finally, column (7) presents an instrumental variable (IV) analysis where, for each CEO, CEO attractiveness is instrumented for by the transformed residuals from the selection model, following the method discussed in Wooldridge (2015). Heteroskedasticity-adjusted and clustered standard errors in parentheses below the coefficient estimates. All variables are defined in Table A1.

Table 3. Mediation models (H2): trustworthiness and competence (Panel A), likability and intelligence (Panel B).

	Panel A: Mediation models for trustworthiness and competence					
Dependent variable	Firm valuation (log.)	Trustworthiness	Firm valuation (log.)	Firm valuation (log.)	Competence	Firm valuation (log.)
Column	(1)	(2)	(3)	(4)	(5)	(6)
CEO attractiveness	0.2247	0.2811	0.2053	0.2247	-0.0504	0.2198
	(0.0644)	(0.0875)	(0.0935)	(0.0644)	(0.0812)	(0.0775)
Trustworthiness			-0.0315			
			(0.0420)			
Competence						-0.1687
						(0.1508)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	740	740	740	740	740	740
R²	0.262	0.171	0.266	0.262	0.081	0.264

	Panel B: Mediation models for likability and intelligence					
Dependent variable	Firm valuation (log.)	Likability	Firm valuation (log.)	Firm valuation (log.)	Intelligence	Firm valuation (log.)
Column	(1)	(2)	(3)	(4)	(5)	(6)
CEO attractiveness	0.2247	0.0932	0.2216	0.2247	0.2508	0.2193
	(0.0644)	(0.0972)	(0.0574)	(0.0644)	(0.0613)	(0.0590)
Likability			-0.0176			
			(0.0304)			
Intelligence						0.0209
						(0.0672)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	740	740	740	740	740	740
R²	0.262	0.124	0.262	0.262	0.143	0.265

Notes: This table presents the results from mediation models as a test of stereotype-based explanations (H3). The sample consists of 740 ICOs with CEOs' attractiveness and four other stereotypical attributes (i.e., trustworthiness, competence, likability, and intelligence) rated by investors. Columns (1)-(3) and (4)-(6) in panel A report mediation models for trustworthiness and competence, respectively. Columns (1)-(3) and (4)-(6) in panel B report mediation models for likability and intelligence, respectively. For brevity, controls are suppressed in the table. Heteroskedasticity-adjusted and clustered standard errors in parentheses below the coefficient estimates. All variables are defined in Table A1.

Table 4. Firm- and market-related sentiment (H3a and H3b), institutional investor backing (H4), and post-ICO performance (BHAR) (H5).

Dependent variable	Firm valuation (log.)	Institutional investor backing (dummy)	BHAR (six months) (log.)
Hypothesis	H3a and H3b	H4	H5
Column	(1)	(2)	(3)
CEO attractiveness	0.1787	0.1100	0.2212
	(0.0855)	(0.0655)	(0.1163)
× firm-related sentiment	-0.0018	-	-
	(0.0008)		
× market-related sentiment	-0.0041	-	-
	(0.0020)		
× firm-related sentiment ×market-related sentiment	0.0004	-	-
	(0.0002)		
Firm-related sentiment	0.0623	-	-
	(0.0283)		
Market-related sentiment	0.1525	-	-
	(0.0701)		
Firm-related sentiment ×market-related sentiment	-0.0161	-	-
	(0.0059)		
Controls and fixed effects	Yes	Yes	Yes
No. Observations	649	740	249
R²	0.275	0.070	0.095

Notes: Column (1) presents the results from moderation models to assess H3. We regress firm valuation of CEO attractiveness and interactions with firm- and market-related sentiment, and a vector of relevant control variables. The dependent variable is firm valuation (in $) (log.). Column (2) assesses the effect of CEO attractiveness on the probability of institutional investor backing (H4) using a conditional logit approach. Column (3) presents an OLS regression model with buy-and-hold abnormal returns (BHARs) as the dependent variable (H5). Heteroskedasticity-adjusted and clustered standard errors are in parentheses below the coefficient estimates. All variables are defined in Table A1. For brevity, control variables are suppressed because they are very similar to those reported in Table 2. Robustness checks are displayed in Tables A2 and A3.

Appendix

Table A1. Variables, descriptions, and data sources.

Variable	Description	Data source(s)
Panel A: Dependent variables		
Firm valuation (log.)	The funding amount raised in the ICO in $m (log.).	ICObench, other ICO websites[a]
Institutional investor	A dummy variable that equals one if an institutional investor backed the company, and zero otherwise.	CryptoFundList, firm websites
BHAR	Buy-and-hold abnormal returns. The excess return of the token over a holding period of 6 months after its first trading day, computed by adjusting the raw return by the equally-weighted market benchmark. The equally-weighted index is constructed based on all cryptocurrencies with available price data.	Coinmarketcap
Panel B: Independent variable		
CEO attractiveness	Investors' average rating of CEO attractiveness on a scale of 1 (= very unattractive) to 10 (= very attractive).	Own survey
Panel C: Mediators		
Trustworthiness	Investors' average rating of CEO perceived trustworthiness on a scale of 1 (= not trustworthy at all) to 10 (= very trustworthy).	Own survey
Competence	Investors' average rating of CEO perceived competence on a scale of 1 (= not competent at all) to 10 (= very competent).	Own survey
Likability	Investors' average rating of CEO perceived likability on a scale of 1 (= not likable at all) to 10 (= very likable).	Own survey
Intelligence	Investors' average rating of CEO perceived intelligence on a scale of 1 (= not intelligent at all) to 10 (= very intelligent).	Own survey
Panel D: Moderators		
Firm-related sentiment	The variable is computed using Natural Language Processing (NLP) and employing various common dictionaries, such as QDAP, Harvard IV, and Loughran-McDonald (with qualitatively similar results). The NLP approach extracts the polarity of expressed opinion from the firms' white paper. A higher polarity score is associated with a more positive sentiment.	ICO firms' white papers
Market-related sentiment	Market-related sentiment is measured for the entire crypto market (i.e., ICOs and cryptocurrencies in general) and provided by Thomson Reuters MarketPsych. The index is constructed via a lexical analysis obtained from more than 2,000 news sources included in LexisNexis and 800 social media platforms (Twitter, Reddit, etc.), on a daily basis. Specifically, we use the "buzz index," which measures the expression intensity and is therefore a good proxy for overall crypto sentiment. For details, see Drobetz et al. (2019).	Thomson Reuters MarketPsych

Notes: [a] = The valuation data was mainly obtained from ICObench. We cross-validated the data using information from other ICO-compiling sites, such as ICOdrops, CoinSchedule, and ICO firms' websites.

Table A1 (continued). Variables, descriptions, and data sources.

Variable	Description	Data sources
	Panel E:Control variables	
CEO characteristics		
Young	A dummy variable that equals one if the CEO is less than 30 years old, and zero otherwise.	LinkedIn
Old	A dummy variable that equals one if the CEO is more than 40 years old, and zero otherwise.	LinkedIn
Female	A dummy variable that equals one if the CEO is female, and zero otherwise.	LinkedIn
White	A dummy variable that equals one if the CEO is white (i.e., Caucasian), and zero otherwise.	CEO picture
PhD	A dummy variable that equals one if the CEO has a PhD degree, and zero otherwise.	LinkedIn
Team characteristics		
Team size	The number of team members in the ICO firm.	ICObench
Team's prof. experience	Professional experience in years, summarized across all team members.	LinkedIn
Team's crypto experience	Experience in the crypto-industry in years, summarized across all team members.	LinkedIn
# Advisors	The number of advisors in the ICO firm.	ICObench
# LinkedIn contacts	The number of social network contacts on LinkedIn, summarized across all team members.	LinkedIn
ICO characteristics		
Pre-ICO	A dummy variable that equals one if the firm conducted a Pre-ICO, and zero otherwise.	ICObench
ICO duration	The difference in days between the ICO end and the ICO start.	ICObench
Bounty	A dummy variable that equals one if the firm has a bounty program in place, and zero otherwise.	Firm websites
KYC	A dummy variable that equals one if the firm has a Know-Your-Customer (KYC) procedure, and zero otherwise.	ICObench
Open source	A dummy variable that equals one if the firm publishes open source code on GitHub, and zero otherwise.	GitHub
Existing blockchain	A dummy variable that equals one if the firm uses a pre-existing blockchain, such as Ethereum, and zero otherwise.	ICObench
Token supply	The number of issued tokens (log.).	Coinmarketcap
Lock-up	A dummy variable that equals one if the firm has a lock-up program for their team members in place, and zero otherwise.	Firm websites

Table A2. Robustness checks: Moderation models for firm- and market-related sentiment (H3a and H3b).

Dependent variable	Firm valuation (log.)			
Model	Main model (= Column 1, Table 3)	Dummy approach	Propensity score matching	Instrumental variable
Column	(1)	(2)	(3)	(4)
CEO attractiveness	0.1787			
	(0.0855)			
× firm-related sentiment	-0.0018			
	(0.0008)			
× market-related sentiment	-0.0041			
	(0.0020)			
× firm-related sentiment ×market-related sentiment	0.0004			
	(0.0002)			
CEO attractiveness (dummy)		0.7002	0.6911	
		(0.2026)	(0.3248)	
× firm-related sentiment		-0.0083	-0.0044	
		(0.0026)	(0.0029)	
× market-related sentiment		-0.0289	-0.0207	
		(0.0070)	(0.0069)	
× firm-related sentiment ×market-related sentiment		0.0002	0.0001	
		(0.0001)	(0.0001)	
CEO attractiveness (instrument)				0.8162
				(0.4591)
× firm-related sentiment				-0.0127
				(0.0070)
× market-related sentiment				-0.0290
				(0.0175)
× firm-related sentiment ×market-related sentiment				0.0003
				(0.0001)
Firm-related sentiment	0.0623	0.0599	0.0308	0.1097
	(0.0283)	(0.0172)	(0.171)	(0.496)
Market-related sentiment	0.1525	0.1934	0.1346	0.2479
	(0.0701)	(0.0442)	(0.0171)	(0.1375)
Firm-related sentiment ×market-related sentiment	-0.0161	-0.0014	-0.0009	-0.0027
	(0.0059)	(0.0004)	(0.0004)	(0.0013)
Controls and fixed effects	Yes	Yes	Yes	Yes
No. Observations	649	649	588	649
R²	0.275	0.264	0.330	0.278

Notes: This table presents the results from moderation models to examine the role of asymmetric information. The sample consists of 740 ICOs with CEOs' attractiveness rated by investors. We regress firm valuation on CEO attractiveness and interactions with firm- and market-related sentiment, and a vector of relevant control variables. Columns (1), (2), and (3) present main, dummy, propensity score-matched, and IV models, respectively. All methods follow the same approach as discussed for our main results (Table 4). The dependent variable is firm valuation (in $) (log.). For brevity, control variables are suppressed because they are very similar to those reported in Table 2. Heteroskedasticity-adjusted and clustered standard errors are in parentheses below the coefficient estimates. All variables are defined in Table A1.

Table A3. Robustness checks: Institutional investor backing (H4) and post-ICO performance (BHAR) (H5).

Dependent variable	Institutional investor backing				BHAR (six months) (log.)
Model	Main model (= Table 3, column 2)	Dummy approach	Propensity score matching	Instrumental variable	Main model (= Table 3, column 3)
Column	(1)	(2)	(3)	(4)	(5)
CEO attractiveness					
CEO attractiveness	0.1100				0.2212
	(0.0655)				(0.1163)
CEO attractiveness (dummy)		0.2946	0.2936		
		(0.1326)	(0.1794)		
CEO attractiveness (IV)				0.2675	
				(0.1342)	
Other CEO characteristics					
Young	0.3266	0.4366	0.6209	0.4397	-0.3178
	(0.2401)	(0.2882)	(0.3337)	(0.2930)	(0.2103)
Old	-0.1305	-0.1629	-0.1607	-0.2061	-
	(0.2777)	(0.4747)	(0.4845)	(0.4735)	-
Female	-0.5801	-0.4984	-0.3144	-0.8204	-0.0039
	(0.5650)	(0.6326)	(0.6991)	(0.6786)	(0.5097)
White	-0.0062	-0.2428	0.0001	-0.1669	0.3577
	(0.2255)	(0.2756)	(0.3344)	(0.2878)	(0.2192)
PhD	0.4443	0.4041	0.4266	0.1731	0.2152
	(0.1660)	(0.2310)	(0.2685)	(0.2732)	(0.1939)
Team characteristics					
Team size	0.0028	-0.0165	-0.0182	-0.0197	-0.0118
	(0.0158)	(0.0194)	(0.0248)	(0.0197)	(0.0130)
Team's professional exp.	0.0002	0.0038	0.0031	0.0042	-0.0005
	(0.0016)	(0.0021)	(0.0024)	(0.0021)	(0.0016)
Team's crypto exp.	0.0117	-0.0028	-0.0192	0.0007	-0.0275
	(0.0267)	(0.0359)	(0.0432)	(0.0354)	(0.0328)
# advisors	0.0684	0.0350	0.0413	0.0381	-0.0087
	(0.0223)	(0.0280)	(0.0319)	(0.0281)	(0.0215)
# LinkedIn contacts (log.)	0.1534	0.1128	0.1788	0.1098	-0.5100
	(0.0424)	(0.0485)	(0.0626)	(0.0487)	(0.3644)
ICO characteristics					
Pre-ICO	-0.4098	-0.3030	-0.5153	-0.2772	-0.4182
	(0.2096)	(0.2575)	(0.3000)	(0.2602)	(0.1919)
ICO duration	-0.0096	-0.0104	-0.0073	-0.0106	-0.0028
	(0.0029)	(0.0043)	(0.0049)	(0.0044)	(0.0020)
Bounty	-0.9708	-1.0176	-0.8273	-1.0229	0.326
	(0.2446)	(0.3190)	(0.3600)	(0.3198)	(0.2384)
KYC	-0.2305	-0.5381	-0.6660	-0.5483	0.0643
	(0.2850)	(0.3895)	(0.4466)	(0.3886)	(0.2847)
Open source	0.4979	0.1440	-0.0945	0.4088	0.6374
	(0.4846)	(0.6008)	(0.6511)	(0.6579)	(0.4428)
Blockchain	-0.3015	-0.1871	-0.1596	-0.1169	-0.2095
	(0.2418)	(0.2884)	(0.3346)	(0.2951)	(0.2444)
Token supply	0.0145	0.0233	0.0373	0.0214	0.0109
	(0.0136)	(0.0158)	(0.0191)	(0.0160)	(0.0114)
Lock-up	1.1390	1.0658	1.2649	1.0718	0.0415
	(0.3965)	(0.5097)	(0.6234)	(0.5108)	(0.4927)
Fixed effects					
Quarter-years	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	No
Country	Yes	Yes	Yes	Yes	Yes
No. Observations	740	740	652	740	249
R^2	0.0698	0.1053	0.1110	0.1133	0.095

Notes: Columns (1)-(4) assess the effect of CEO attractiveness on the probability of institutional investor backing. Columns (1), (2), (3), and (4) present main, dummy, propensity score-matched, and instrumental variable models, respectively, using a conditional logit approach. Column (5) presents an OLS regression model with buy-and-hold abnormal returns (BHARs) as the dependent variable. The sample consists of 740 ICOs with CEOs' attractiveness rated by investors, of which 249 firms were listed for at least six months as of April 2019. All methods follow the same approach as discussed for our main results (Table 2). Heteroskedasticity-adjusted and clustered standard errors are in parentheses below the coefficient estimates. All variables are defined in Table A1.

Table A4. Overview of the three surveys conducted.

Survey	Respondents	Context	Selection of photos	# respondents	# assessments
A. Main survey	ICO investors	Known	Self-selection (1–43 per respondent)	633	4,452
B. Control survey	Non-investors	Known	Random (40 per respondent)	213	5,116
C. Endogeneity survey	Non-investors	Unknown	Random (40 per respondent)	197	5,243

Notes: This table provides an overview of the three surveys that we conducted to measure CEO attractiveness. Survey A is our main survey and was conducted among investors who had invested in the specific ICO for which they provided an attractiveness rating. Survey B was conducted among investors with ICO investment experience but who had not invested in the particular ICO they rated. Survey C was conducted among a random set of individuals without prior knowledge of ICOs. Also, survey C used manipulated photos to address endogeneity concerns (e.g., "dress for success" or "bad hair day" bias).

Table A5. Robustness tests based on additional surveys

Survey	Main survey	Control survey	Endogeneity survey
Reported coefficient:	CEO attractiveness	CEO attractiveness	CEO attractiveness
Column	(1)	(2)	(3)
Table 2, Column 3 (*firm valuation, main model*)	0.2247 (0.0644)	0.2654 (0.0781)	0.1879 (0.0709)
Table 2, Column 4 (*firm valuation, dummy approach*)	0.4630 (0.1346)	0.3992 (0.1413)	0.2605 (0.1300)
Table 3, Panel A, Column 3 (*mediation model for trustworthiness*)	0.2053 (0.0935)	0.2078 (0.0717)	0.1522 (0.0729)
Table 3, Panel A, Column 6 (*mediation model for competence*)	0.2198 (0.0775)	0.2285 (0.0769)	0.1634 (0.0572)
Table 3, Panel B, Column 3 (*mediation model for likability*)	0.2216 (0.0574)	0.2101 (0.0618)	0.1683 (0.0605)
Table 3, Panel B, Column 6 (*mediation model for intelligence*)	0.2193 (0.0590)	0.1958 (0.0654)	0.1427 (0.0693)
Table A2, Column 1 (*moderation effects, main model*)	0.1787 (0.0855)	0.1870 (0.0923)	0.1652 (0.0816)
Table A2, Column 2 (*moderation effects, dummy approach*)	0.7002 (0.2026)	0.6381 (0.1929)	0.4967 (0.2605)
Table A3, Column 1 (*institutional investors, main model*)	0.1100 (0.0655)	0.1165 (0.5473)	0.0987 (0.0642)
Table A3, Column 2 (*institutional investors, dummy approach*)	0.2946 (0.1326)	0.3349 (0.1169)	0.2405 (0.1327)
Table A3, Column 5 (*buy-and-hold abnormal returns*)	0.2212 (0.1163)	0.2009 (0.1108)	0.1724 (0.0941)

Notes: This table presents re-estimated CEO attractiveness coefficients for all models in this study, based on additional investor ratings of CEO attractiveness from the control and endogeneity surveys described in Table A4. Other controls are suppressed for brevity. The models in column (1) are shown for the sake of comparability. Column (2) reports results from input variables based on the control survey. Column (3) does the same with input variables based on the endogeneity survey. Heteroskedasticity-adjusted and clustered standard errors are in parentheses below the coefficient estimates. All variables are defined in Table A1.