Explaining the ambiguous impact of overconfidence on corporate decision-making: a critique of the research methodology

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Abstract:
Prior entrepreneurship research shows that individuals often possess biased expectations regarding their chances of success in the market compared to objective reality, as well as to their success and profitability compared to their peers. This distorted, biased view on one’s chances of success is referred to as overconfidence. The present study addresses the effect of overconfidence on corporate decision-making with regard to the methodology used in economic and psychological studies. Current research provides contradictory and inconclusive results about the effect of overconfidence on various Chief Executive Officers’ decisions and profitability. In this study, I try to explain this inconclusiveness by outlining some of the most important methodological issues in the overconfidence research. In psychological literature, there is a wide consensus among researchers about the robustness of overconfidence in human reasoning. This cognitive bias has been demonstrated in many populations and work domains; like clinical psychologists, drivers, financial analysts, investors, stock market specialists, statisticians, basketball players, or managers. In the literature, overconfidence appears mainly in three different constructs – calibration of probabilities, overestimation, and overplacement. The calibration of probabilities is measured by comparing individuals’ subjective probability judgments with the real objective probability. Overestimation is based on comparing individuals’ performance in a particular task with their belief about how they will perform or how they performed. Finally, overplacement is measured by comparing individuals’ belief about their own performance with the belief about the performance of other individuals. According to these three constructs, overconfidence can be defined as a systematic tendency to overestimate one’s own ability to make accurate forecasts, or as an overestimation of one’s own performance, or knowledge, compared to his/her actual performance, or others’ knowledge. In recent decades, authors from economic disciplines started to omit the direct measurement of overconfidence and instead they have often searched for various indirect variables that could serve as proxies for overconfidence; like holding options beyond rational thresholds, purchasing stocks of one’s own company despite the high exposure to risk, or chief executive officers’ press portrayals. Additionally, the effect of overconfidence has started to be linked and sometimes confused with other similar concepts like optimism or illusion of control. Authors often use findings from multiple different constructs as a basis for their hypotheses about the effect of overconfidence in corporate decision-making. Moreover, they often use different measurement tools or other proxies for examining overconfidence compared to the previous studies they reported. This confusion of different forms of overconfidence together with different operationalizations causes difficulty in integrating knowledge about particular overconfidence constructs.

In this paper, I describe, firstly, the origins and differences in operationalization between economic and psychology studies. Several widely-used measures and proxies of overconfidence in economic research are described and the diversity of using these measures in previous studies is showed. Subsequently, I discuss how different forms of overconfidence impact the decision-making and performance of entrepreneurs. In this part, the study focuses on the three most frequent areas that are reflected in the current literature; namely the effect of overconfidence on financial decision-making, firm profitability, and entrepreneurs’ innovativeness. It is showed that studies in these areas often bring contradictory findings; mainly in the context of risk-taking, debt usage, or dividend payment, and this contradiction seems to result mostly from using different operationalizations of overconfidence. The final part of the study outlines several possible ways how problems with methodology and inconclusiveness in the overconfidence research could be solved. Firstly, is the importance of finding and using a valid direct overconfidence measure in entrepreneurship research. The ability to make an accurate reasoning about one’s own
performance or abilities depends on how the question/task format is designed, what information about testing an individual possesses, how their reasons will be evaluated by researcher, or what reference group will be used in the evaluation. Considering this, many overconfidence measures do not meet these conditions. Moreover, indirect measures of overconfidence not only miss these conditions, but they also miss the main principle of direct overconfidence measures, which is the comparison of one’s reasoning about one’s performance or abilities with one’s real performance or abilities. Therefore, it is questionable whether indirect measures and proxies used in economic literature really measure overconfidence, i.e. they investigate the biased reasoning about one’s performance, ability, or knowledge. Considering this validity issue, the direct measures for examining overconfidence should be preferred in future research. They could be focused on a direct examination of individuals’ beliefs about their performance, knowledge, and abilities necessary for any entrepreneurial activity; like managerial or functional skills (finance, distribution, sales, marketing, leadership, etc.). The second way to address methodology issues in the overconfidence research is to test whether and to what extent some of the widely-used indirect overconfidence measures correlate with direct measures. Economic studies often use two or more overconfidence measures, but most of these measures are indirect. Combining indirect and direct measures could help to find out whether indirect measures are really associated with biased reasoning about one’s performance or abilities. Finally, the third way to solve the knowledge integration problem is conducting meta-analyses regarding the effect of overconfidence on specific CEOs’ corporate decision-making. In these analyses the type of overconfidence measurement should be examined as a moderator of the effect of overconfidence on corporate decision-making. This could identify how different overconfidence measures affect specific corporate decisions and hopefully explain some contradictory findings in current literature. Besides the three main proposals, there are also other more general crucial factors that need to be taken into account when designing measurement tools or improving validity and reproducibility of the overconfidence research methodology. This concerns mostly various questionable research practices; like selective reporting of variables or results, p-hacking, or harking, in order to support the widespread notion of robustness of overconfidence in human reasoning and decision-making. Considering the proposed ways of improving the methodology in overconfidence research, a joint and vital step is to properly distinguish overconfidence constructs and also other related constructs like optimism, or illusion of control.

Keywords: Overconfidence. Entrepreneurship. Decision-making. Expectations.

Introduction

Empirical research, as well as practice, often shows that chances for success in entrepreneurship are rather low and many newly-established enterprises discontinue shortly after their formation (Baldwin, 1995; Dunne, Roberts, & Samuelson, 1988). Fifty years ago, Dun and Bradstreet (1967 in Cooper, Woo, & Dunkelberg, 1988) found that 67% of new businesses discontinue within four years. This proportion is comparable with Slovak (and also many other European countries) business survival rate statistics – the data from Eurostat shows that between 2008 and 2015, Slovak business survivability within three years ranged from approximately 43% to 58% and the survivability within five years ranged only from 35% to 44%1. Moreover, Hamilton (2000) showed that in general, entrepreneurs have not only lower initial financial returns, but also lower return growth compared to individuals with the same characteristics working in a waged job. Koellinger, Minniti, and Schade (2007) state that considering the low average earnings together with high business failure rates, too many people enter the market as entrepreneurs, suggesting irrational acting.

When examining what factors cause individuals to enter the market, it was showed that these tendencies are positively related with biased expectations. For instance, Cooper, Woo, & Dunkelberg (1988) found that entrepreneurs’ expectations about their success significantly differ from their objective chances. Additionally, individuals have biased expectations not only about their chances of success compared to objective reality, but also about their success and profitability compared to their peers (Camerer & Lovallo, 1999). In the literature, this distorted

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The origin and different forms of overconfidence in literature

In the literature there is a wide consensus among researchers about the robustness of overconfidence in human reasoning. For instance, Meloy, Russo, and Miller state (2006, p. 272): “The phenomenon of overconfidence is one of the most robust findings in the decision and judgment literature.” Similar comments are available in many other works, for instance: “It has been consistently observed that people are generally overconfident when assessing their performance.” (Schaefer, Williams, Goodie, & Campbel, 2004 p. 473); “Another common error is overconfidence. In general, people tend to overestimate the accuracy of their judgements.” (Sternberg, 2008, p. 495). Despite the wide consensus about the robustness of overconfidence, there are also some theories and scholars who question its significance in human reasoning and explain its occurrence as a consequence of using non-ecological measurement tools, non-representative item sampling, or task format (e.g., Gigerenzer, Hoffrage, & Kleinbölting, 1991; Juslin, Wennerholm & Olsson, 1999; Juslin, Olsson, & Björkman, 1999; Winman, Hansson, & Juslin, 2004; Hansson, 2005; Erev, Wallsten, & Budescu, 1994).

The overconfidence effect firstly started to appear in psychological literature in the 1960s. After some decades, economists started to widely implement findings from psychology into economic models, and examine its impact mainly in the field of financial markets and corporate finance (Skala, 2008). An interdisciplinary aspect in the field of overconfidence brought a variability in definitions, operationalizations, and measurements of this construct. In the psychological literature, overconfidence appears mainly in three different constructs – overestimation, overplacement, and calibration of probabilities (Olsson, 2014). Overestimation is measured by comparing individuals’ performance in a particular task with their beliefs about how they will perform or how they performed. Overplacement (often called better-than-average effect) is measured by comparing individuals’ beliefs about their own performance compared to the performance of other individuals. Finally, calibration of probabilities is measured by comparing individuals’ subjective probability judgments (often estimated in
explaining the ambiguous impact of overconfidence on corporate decision-making: a critique of the research methodology

Confidence intervals) with the real objective probability. According to these three constructs, overconfidence can be defined as a systematic tendency to overestimate one’s own ability to make accurate forecasts, or as an overestimation of one’s own performance, or knowledge, compared to his/her actual performance, or others’ knowledge (Koellinger, Minniti, & Schade, 2007).

The overconfidence effect was demonstrated in many populations and work domains, such as: clinical psychologists (Oskamp, 1965), drivers (Svenson, 1981), financial analysts, investors, or stock market specialists (Staël von Holstein, 1972; Hilary & Menzly, 2006; Menkhoff, Schmeling, & Schmidt, 2013; Grežo, 2017), statisticians (Wagenaar & Keren, 1985), basketball players (McGraw, Mellers, & Ritov, 2004), managers (Malmendier & Tate, 2005a).

Some troubles with overconfidence

As I stated before, overconfidence started to be implemented and widely used in economic disciplines, and this resulted in the increased variety of how overconfidence is defined and operationalized. Researchers from economic disciplines started to omit the direct measurement of overconfidence; i.e. assessing individuals’ actual reasoning in the context of the three above mentioned overconfidence constructs; and instead they often searched for various indirect variables that could serve as proxies for overconfidence (e.g. examining CEOs’ portfolio transactions – Malmendier & Tate, 2005a; examining CEOs’ press portrayals – Malmendier & Tate, 2005b; examining whether securities bought by investor outperformed those they sold – Barber & Odean, 1999).

Additionally, the effect of overconfidence started to be linked (and sometimes confused) with other concepts; like optimism, positive illusions, illusion of control (Han, Lai, & Ho, 2015; Hilary, Hsu, Segal, & Wang 2016; Hackbarth, 2008; Puri & Robinson, 2007). There have been several studies reporting findings from multiple constructs (e.g. better-than-average effect, calibration of probabilities, and unrealistic optimism) and subsequently using these diverse findings to create hypotheses. Moreover, they often use different measurement tools or other proxies for examining overconfidence compared to the previous studies they reported (De Paola, Gioia, & Scoppa, 2014; Cesarini, Sandewall, & Johannesson, 2006). This confusion of different forms of overconfidence together with different operationalizations causes difficulty in integrating knowledge about particular overconfidence constructs. Moreover, many authors question the external validity of methods used in overconfidence measurement (see Grežo, 2015). As Olsson stated (2014), it is unknown whether all these measurement forms represent the same psychological construct. Only some studies tried to measure two or more overconfidence constructs at a time, and examine the difference of their effect on one’s reasoning and decision-making (e.g. Grežo, 2017; Larrick, Burson, & Soll, 2007; Glaser, Langer, & Weber, 2005; Hilton et al., 2011; Menkhoff, Schmeling, & Schmidt, 2013; Fellner & Krügel, 2012). The findings in these studies highlight the importance of distinguishing different forms of overconfidence, because of their different effect in reasoning and decision-making and their weak, non-significant, or even negative relationship (see Moore & Swift, 2011; Moore & Schatz, 2017 for reviews).

In the next section, I describe the main and mostly used operationalizations of overconfidence in economic literature. More specifically, I focus mainly on economic studies which observe entrepreneurs’ and chief executive officers’ (CEOs) overconfidence indirectly. Subsequently, I report and discuss some main findings about the effect of overconfidence on corporate decision-making in regard to how the overconfidence was measured.
The most widely used proxies for measuring overconfidence

Holding options beyond rational thresholds
Some very influential studies on overconfidence in corporate decision-making are those of Malmendier and Tate (2005a; 2005b). In these studies, they used three different proxies for overconfidence which were widely used in many further studies. The first approach capturing CEO’s beliefs on a firm’s future performance was based on investigating a CEO’s personal portfolio transactions. Specifically, they examined whether a CEO holds company stocks and options beyond rational thresholds (called Holder 67), thus excessively betting their wealth on future company stock performance.

Managerial acquisitiveness
The second Malmendier and Tate’s (2005a) overconfidence measure, called Net Buyer, is defined as a tendency of a CEO to purchase additional stocks of his own company, adding to his personal property, despite his already high exposure to company risk.

Press portrayals
The third measure of overconfidence proposed by Malmendier and Tate (2005b) is based on the perception of outsiders. This approach is based on investigating press portrayals of the CEO during a certain time period using a quantitative content analysis. In this analysis, authors searched for articles in the media referring to CEOs and examined the number of articles containing words such as: “confident, confidence, optimistic, optimism, reliable, cautious, steady, conservative, practical, and frugal”. They constructed an indicator which referred to 1 if a CEO was more often described as “confident or optimistic” compared to “reliable, cautious, conservative, practical, frugal, or steady”; and 0, if otherwise.

Biased earnings forecasts by managers and entrepreneurs
Besides the three Malmendier and Tate’s (2005a; 2005b) overconfidence constructs, there is another widely used measurement of overconfidence, which is the comparison of forecasted and objective enterprise profit (e.g. Longjie & Anfeng, 2017). If the number of upward-biased earnings forecasts is greater than downward-biased forecasts, the manager is perceived as overconfident. This was used in several studies (e.g. Hribar & Yang, 2016; Lin, Hu, & Chen, 2005; Wang et al., 2016; Huang, Jiang, Liu, & Zhang, 2011).

Managers’ relative pay
This measure was proposed by Hayward and Hambrick (1997) and is based on examining the difference between a CEO’s compensation and the compensation of the second highest paid officer in a firm. Hayward and Hambrick (1997) argued that the higher CEO’s relative pay to other managers is, the more important his position in a firm is, and so s/he would be prone to act overconfidently.

Besides the above mentioned operationalizations, there are many studies using their own different ways of measuring overconfidence, or just using variations of them. Often the overconfidence is investigated with more than one measure. Table 1 presents how the operationalization of overconfidence differs across economic studies. In the next section I report and discuss some of the main findings from the effect of overconfidence on corporate decision making. Since the operationalization of overconfidence in reported studies differs significantly, I discuss these findings in regards to how the overconfidence is measured.
Table 1: Different operationalizations of overconfidence in economic studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Study design</th>
<th>Overconfidence examination</th>
<th>Overconfidence operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hayward &amp; Hambrick (1997)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- Praise in media articles&lt;br&gt;- Recent acquirer performance&lt;br&gt;- CEO’s relative pay</td>
</tr>
<tr>
<td>Malmendier &amp; Tate (2005b)</td>
<td>Model</td>
<td>Indirect</td>
<td>- Investigating portfolio transactions&lt;br&gt;- Praise in media articles</td>
</tr>
<tr>
<td>Malmendier &amp; Tate (2008)</td>
<td>Model</td>
<td>Indirect</td>
<td>- Praise in media articles&lt;br&gt;- CEO overinvestment</td>
</tr>
<tr>
<td>Malmendier, Tate, &amp; Yan (2011)</td>
<td>Model</td>
<td>Indirect</td>
<td>- Praise in media articles&lt;br&gt;- over-exposing firm to company-specific risk</td>
</tr>
<tr>
<td>Daniel, Hirshleifer, &amp; Subrahmanymam (1998)</td>
<td>Model</td>
<td>Indirect</td>
<td>- Overestimating own private information</td>
</tr>
<tr>
<td>Wang et al. (2016)</td>
<td>Empirical</td>
<td>Direct</td>
<td>- Comparing actual and forecasted net profit</td>
</tr>
<tr>
<td>Hirshleifer, Low, &amp; Teoh (2012)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- The average moneyness of vested options held by the CEO&lt;br&gt;- Praise in media articles</td>
</tr>
<tr>
<td>Wang, Zhang, &amp; Yu (2008)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- Tendency of CEO to purchase company stock despite already high exposure to company risk</td>
</tr>
<tr>
<td>Adebambo &amp; Yan (2016)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- Index of six components: gender, management structure, portfolio turnover, portfolio concentration, prior portfolio performance, portfolio idiosyncratic risk</td>
</tr>
<tr>
<td>Purhanudin &amp; Zakaria (2015)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- Index of five components: CEO age, CEO tenure, CEO ownership, CEO education, CEO education background</td>
</tr>
<tr>
<td>Longjie &amp; Anfeng, 2017</td>
<td>Empirical</td>
<td>Direct</td>
<td>- The deviation of forecasted and objective profit of enterprise</td>
</tr>
<tr>
<td>Rihab &amp; Lotfi (2016)</td>
<td>Empirical</td>
<td>Indirect</td>
<td>- Holding more than 50% of firm’s common shares</td>
</tr>
<tr>
<td>Park &amp; Kim (2009)</td>
<td>Model</td>
<td>Indirect</td>
<td>- Business survey index – the ratio between positive and negative answers</td>
</tr>
<tr>
<td>Ben-David, Graham, &amp; Harvey (2013)</td>
<td>Empirical</td>
<td>Direct</td>
<td>- Miscalibration of market value estimates</td>
</tr>
</tbody>
</table>

Note: Indirect overconfidence examination uses various proxies that indirectly indicate the level of overconfidence. Compared to direct methods, they do not directly ask individual about his expectations or believes about his own knowledge and performance.
The effect of overconfidence on corporate decision-making – different perspectives

Financial decision-making

Many previous studies investigate how overconfidence affects corporate financial policy and various financial decisions of CEOs, such as using cash-flow, firm merging, paying dividends, investing, limiting risk-taking, using external debts. In their seminal work, Malmendier and Tate (2005a) found that a CEO’s overconfidence increased the sensitivity of corporate investment to internal cash flow availability. Since corporate investment policies are dependent on internal cash flow, the overconfidence can be associated with over-investment and under-investment problems. It was shown that over-confident CEOs intensively invest when cash flows are available (creating an over-investment problem) and they do not invest when cash flows are insufficient (thus under-investing). A similar effect of overconfidence in cash flow sensitivity was found in other studies (Mohamed, Fairchild, & Bouri, 2014; Iyer, Sankaran, & Nejadmalayeri, 2017).

The effect of overconfidence on investing was investigated in other studies. For instance, using a Net Buyer overconfidence measure, Eichholtz and Yönder (2015) found that over-confident CEOs were more likely to purchase and less likely to sell assets compared to their peers. Moreover, over-confident CEOs had worse operating and stock performance. They tended to purchase more and sell less and this effect was strengthened when the firm performed badly (Eichholtz & Yönder, 2015). The positive association between overconfidence and over-investing was found in some other studies (Heaton, 2002; Wang, Zhang, & Yu, 2009; Wang et al., 2016).

Ben-David, Graham, and Harvey (2013) also showed that over-confident CEOs invested more. Additionally, they found that over-confident CEOs were more likely to re-purchase shares, used more long-term debt, and they were less likely to pay dividends. The effect of overconfidence on dividend payouts was investigated by other studies, but they brought different results. For instance, Desmukh, Goel, and Howe (2013) found that the level of dividend payout is about one-sixth lower in firms with over-confident CEOs. Contrary to this, Banerjee, Humphery-Jenner, and Nanda (2014) reported a positive association between overconfidence and dividend payments.

Some studies investigated the effect of overconfidence on limiting a firm’s risk-taking. In their study, Han, Lai, and Ho (2015) found that over-confident CEOs tended to increase the usage of re-insurance in order to limit their risk and they also adapt their risk-taking behavior according to different regulatory and economic environments. Another study reporting a positive effect of overconfidence on reducing risk-taking was proposed by Banerjee, Humphery-Jenner, and Nanda (2014). They found that over-confident CEOs measured by Holder 67 reduced investment and risk exposure. Besides studies reporting the positive effect of overconfidence on limiting a firm’s risk-taking, there are a few studies reporting the opposite findings. The effect of overconfidence on risk-taking was also examined by Hirshleifer, Low, and Teoh (2012), using Holder 67 and press portrayals as measures of overconfidence. Although both of these measures lead to higher stock return volatility, i.e. higher risk-taking, the effect of overconfidence measured by press portrayals was much greater (approximately three times higher). Another study showed that overconfidence lead CEOs to increasing speculative investing activities and thus increasing financial risk-taking (Adam, Fernando, & Golubeva, 2011).

Finally, a study investigating demographic and national patterns of managerial overconfidence and its association with a firm’s merging tendencies was proposed by Ferris, Jayaraman, and Sabherwal (2013). They used the press portrayals measure of overconfidence and found that
this cognitive bias is an international phenomenon. Moreover, the overconfidence was shown to be higher in younger CEOs heading firms headquartered in Christian countries, and this could be described as individualistic and short-term oriented. Additionally, it was found that overconfident CEOs make, on average, more firm merger offers than their non-confident peers. Especially in Christian countries with a low uncertainty avoidance, high individualism and low long-term orientation, overconfident CEOs make riskier diversifying merger offers (i.e. trying to buy firms out of their core business/specialization). Finally, Ferris, Jayaraman, and Sabherwal (2013) found that over-confident CEOs make a greater use of cash to finance mergers.

Profitability
A few studies investigated the effect of overconfidence on firm profitability. Using the press portrayals measure, Hayward & Hambrick (1997) found that overconfidence was negatively related to 1-year returns of a CEO’s firm. Moreover, this relationship was strongest among all observed overconfidence measures (CEO relative pay and Recent acquirer performance were not significantly correlated to a firm’s performance). Contrary to these findings, Lai, Lin, and Chen (2017) found that overconfidence measured by press portrayals was not significantly correlated with a firm’s performance, but the overconfidence measured as Holder 67 was positively correlated. Similar positive effects of overconfidence (measured as Holder 67) on firm performance was also found in studies of Ruissen (2012), Banerjee, Humphery-Jenner, and Nanda (2014), and Han, Lai, and Ho (2015).

Innovativeness
Some of the above-discussed studies showed that overconfidence is positively associated with investing (Ben-David, Graham, & Harvey, 2013; Eichholtz & Yönder, 2011). Investigating this association more specifically, Hirshleifer, Low, and Teoh (2012) found that firms with overconfident CEOs invest more in innovation, they obtain more patents and patent citations. Moreover, they also achieve greater innovative success for given research and development expenditures. However, this was observed only in innovative industries. Similar findings on overconfidence (measured as Holder 67) and innovativeness were also reported by Galasso and Simcoe (2011). They found that overconfidence was positively associated with the tendency to pursue new innovations in a firm. Moreover, the effect of overconfidence on innovativeness was stronger in more competitive industries.

Conclusion
The above-discussed studies indicate that overconfidence affects various corporate decisions. However, these studies often brought contradictory findings, mainly in the context of risk-taking, debt usage, dividend payment, or firm profitability. As I stated before, the main problem with integrating knowledge about the impact of overconfidence in entrepreneurship could lie in the current research methodology, mainly in using indirect proxies for measuring overconfidence. In general, the direct overconfidence measure is based on examining the accuracy of one’s reasoning about their abilities, performance, or chances of success. According to Gigerenzer, Hoffrage, and Kleinböting (1991) we use external clues for reasoning and decision-making. Each of these clues has certain validity and serves as a basis for creating an accurate reason. However, many measures of overconfidence in laboratory conditions eliminate the ecological structure of real-life conditions – they insufficiently simulate the natural environment in which individual reason and makes decisions (e.g. asking for percentage probability estimation for success despite the fact that people do not use to reason about their probability of success in percentages). This causes individuals in laboratory conditions to often
show overconfidence, but this bias can be caused by an inappropriate overconfidence measure. Taking this into account, the direct measure of overconfidence is very sensitive to whether it simulates the real-life natural reasoning environment. Moreover, whether individuals make an accurate reason about their performance or abilities, depends on what information they possess, how their reasons will be evaluated by a researcher, what reference group will be used in evaluation, etc. In order to make an accurate reason in laboratory conditions, an individual should at least possess such information. Considering this, many overconfidence measures do not meet these conditions. Moreover, we could argue that indirect measures of overconfidence not only miss these conditions, but they also miss the main principle of direct overconfidence measures – comparing one’s beliefs about his/her performance or abilities with his/her actual performance or abilities. This raises the question whether various indirect proxies for overconfidence represent the overconfidence construct and whether they are really associated with the biased reasoning about one’s performance or abilities (Fellner & Krügel, 2012). For instance, it is questionable whether/to what extent a CEO’s higher relative pay, or a CEO’s optimistic press portrayals correlates with the accuracy of their reasoning. The importance to find a valid direct overconfidence measure in the economic research has recently been highlighted (Fellner & Krügel, 2012; Bayat, Salehnejad, & Kawalek, 2016).

I see three possible ways how the above mentioned problems with the methodology and knowledge integration could be solved. First, is the importance of finding and using valid direct overconfidence measures in entrepreneurship research. These measures could be focused on a direct examination of an individuals’ beliefs about their performance, knowledge, and abilities necessary for any entrepreneurial activity, such as managerial or functional skills (finance, distribution, sales, marketing, leadership, etc.). Individuals can be asked to reason about their knowledge or performance compared to the knowledge or performance of their peers (over-placement), or their reasons and beliefs can be evaluated according to their actual objective knowledge or performance in these domains (over-estimation). Moreover, they can be asked to indicate confidence intervals about the future values of a variety of firm’s performance indicators and their accuracy can be evaluated after a given predicted period (calibration of probabilities).

The second way is to test whether and to what extent some of the widely-used indirect overconfidence measures correlate with direct measures. Economic studies often use two or more overconfidence measures, but most of these measures are indirect. Combining indirect and direct measures could help to find out whether indirect measures are really associated with biased reasoning about one’s performance or abilities.

Finally, the third way to solve the knowledge integration problem is conducting meta-analyses about the effect of overconfidence on specific CEOs’ corporate decision-making. In these analyses the type of overconfidence measurement should be the moderator. This could identify how different overconfidence measures affect specific corporate decisions and hopefully explain some contradictory findings in current literature.

Besides the above-mentioned three proposals, there are also other more general crucial factors that need to be taken into account when designing measurement tools or improving the validity and reproducibility of the overconfidence research methodology. This concerns mostly various questionable research practices, like selective reporting of variables or results, p-hacking, or harking (see John, Loewenstein & Prelec, 2012; Nelson, Simmons, & Simonsohn, 2018; Munafò et al., 2017) in order to support the notion of robustness of overconfidence in human reasoning and decision-making. Considering the proposed ways of improving the methodology in overconfidence research, a joint and most a vital step is to properly distinguish overconfidence constructs and also other related constructs like optimism, or illusion of control.
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