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Boundedly Rational Entrepreneurs and Antitrust

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Abstract

This article examines entrepreneurial activity and its implication for policy and antitrust law from a behavioral perspective. In particular, the analysis here focuses on the role of two sets of behavioral phenomena—overconfident beliefs and risk-seeking preferences—in facilitating boundedly rational entrepreneurship. Boundedly rational entrepreneurs may engage in entrepreneurial activity, such as the starting of new business ventures, under circumstances in which rational entrepreneurs would decline to do so. Consequently, overconfident or risk-seeking entrants compete with their more rational counterparts and create a post-entry landscape that differs markedly from the picture assumed by traditional economic accounts of entrepreneurial activity. The behaviorally informed analysis of entry sheds new light on the dynamics of competition among entrepreneurs and on its implications for policy and antitrust law.

Keywords

rationality, bounded rationality, risk-seeking, overconfidence, optimism, entry

I. Introduction

Entrepreneurship is a complex and multifaceted phenomenon that defies a simple, single definition, as the other articles in this symposium make clear.¹ Scholars noted that “[e]ntrepreneurship has meant different things to different people,”² beginning with historical definitions identifying the term with self-employment with uncertain returns.³ Schumpeter, for instance, viewed entrepreneurs as those who carry out new combinations, creating new products, processes, markets, organizational forms, or

1. See generally Greg Gundlach, *Introduction: Broadening the Lens—Entrepreneurship & Antitrust*, ANTITRUST BULL. (2016, this issue).
2. Pramodita Sharma & James J. Chrisman, *Toward a Reconciliation of the Definitional Issues in the Field of Corporate Entrepreneurship*, 23 ENTREPRENEURSHIP THEORY & PRAC. 12 (1999).
3. Wayne Long, *The Meaning of Entrepreneurship*, 8 AM. J. SMALL BUS. 47, 47 (1983) (citing the eighteenth-century usage of Cantillon).

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sources of supply.⁴ For the sake of clarity, however, the present article focuses on one common and important form of entrepreneurship—the creation of new business ventures in manufacturing industries.⁵

Traditional economic models assume rational entrepreneurship, expecting new ventures to be created only when it is profit maximizing to do so.⁶ The empirical evidence on entry suggests, on the other hand, that many entrepreneurs attempt entry in circumstances that would have led them to avoid doing so if they were perfectly rational.⁷ As this article shows, however, the bounded rationality of real entrepreneurs can account for the observed pattern of excess entry.⁸

Unlike the hypothetical, perfectly rational entrepreneur, real individuals are “boundedly rational”: they possess limited cognitive resources and their behavior is partly shaped by affect and motivation.⁹ They sometimes engage in deliberate, formal judgment and decision making. But more commonly, to survive and function well in a complex world, individuals instead use cognitive and affective heuristics when making judgments under uncertainty and rely on situational cues to guide their decisions. Although heuristic judgment and cue-dependent decision making are generally adaptive and useful, they also lead people systematically and predictably to deviate from strict rationality.¹⁰

The behavioral evidence on human judgment and decision making under uncertainty helps explain otherwise perplexing patterns of excessively risky entry into manufacturing industries. In particular, this evidence suggests that boundedly rational entrepreneurs may hold overoptimistic expectations regarding the prospects of their ventures.¹¹ With such expectations, even entrepreneurs possessing rational risk preferences unwittingly may undertake excessively risky entry attempts.¹² Moreover, the aspirations of real entrepreneurs may lead them to manifest greater risk seeking (or at least lesser risk

4. JOSEPH A. SCHUMPETER, *THE THEORY OF ECONOMIC DEVELOPMENT* 132 (1934).
5. Cf. William B. Gartner, “*Who Is an Entrepreneur? Is the Wrong Question*,” 12 *AM. J. SMALL BUS.* 11, at 26 (1988) (stating that “[e]ntrepreneurship is the creation of organizations”); see also William B. Gartner, *What Are We Talking About When We Talk About Entrepreneurship?* 5 *J. BUS. VENTURING* 15 (1990) (using a survey and statistical analyses to identify and categorize common usages of the term into those that focus on the characteristics of entrepreneurship as a situation versus those that view a situation as entrepreneurial only if value was created). The focus on manufacturing industries is due to their central role in the economy and the superior data available on these compared to service industries.
6. See, e.g., PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION*, ¶ 113 (CCH IntelliConnect, database updated Aug. 2015) (stating that “[a]s a general proposition business firms are (or must be assumed to be) profit-maximizers”); *id.* ¶ 422a (stating, when discussing the likelihood of entry, that “‘likely’ generally means ‘profitable,’ for entry will not occur in the absence of expected profits, after taking all costs and risks into account”) (emphasis added).
7. Avishalom Tor, *The Fable of Entry: Bounded Rationality, Market Discipline, and Legal Policy*, 101 *MICH. L. REV.* 482, 490–92 (2002).
8. The article draws extensively on the author’s previous work, most notably *id.*; Avishalom Tor, *The Methodology of the Behavioral Analysis of Law*, 4 *HAIFA L. REV.* 237 (2008) [hereinafter Tor, *Methodology*]; and Avishalom Tor, *Understanding Behavioral Antitrust*, 92 *TEX. L. REV.* 573 (2014) [hereinafter Tor, *Behavioral Antitrust*].
9. Tor, *Methodology*, *supra* note 8.
10. Christine Jolls, Cass R. Sunstein, & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 *STAN. L. REV.* 1471, 1477 (1998); Tor, *Methodology*, *supra* note 8, at 242–43.
11. See Colin Camerer & Dan Lovallo, *Overconfidence and Excess Entry: An Experimental Approach*, 89 *AM. ECON. REV.* 306 (1999); Giovanni Dosi & Dan Lovallo, *Rational Entrepreneurs or Optimistic Martyrs? Some Considerations on Technological Regimes, Corporate Entities, and the Evolutionary Role of Decision Biases*, in *TECHNOLOGICAL INNOVATION: OVERSIGHTS AND FORESIGHTS* 41 (Raghu Garud, Praveen Rattan Nayyar, & Zur Baruch Shapira eds., 1997). See generally TALI SHAROT, *THE OPTIMISM BIAS: A TOUR OF THE IRRATIONALLY POSITIVE BRAIN* (2001).
12. In this article, the terms “overoptimism” and “overconfidence” are used interchangeably, following the common usage in the behavioral economics and behavioral finance literatures as positively biased judgments. This usage should not be confused with the much narrower usage of “overconfidence” in behavioral decision theory as the overestimation of the accuracy of one’s judgments.

aversion) than rationally warranted.¹³ By definition, such risk-seeking entrepreneurs willingly embark upon ventures that their rational counterparts would have avoided for being too risky.

Recognition of the prevalence of excessively risky entry attempts—whether made by entrants who harbor biased estimates of their prospects or by entrepreneurs who willingly take risks that rational actors would have avoided—offers a new perspective on the competition among new entrants. Specifically, competitive pressures inevitably weed out the significant majority of these excessively risky ventures. Yet at the same time, the probabilistic nature of entrepreneurial competition necessarily culminates in the success “against the odds” of a small minority of the very large number of those boundedly rational entrants. Hence, the resulting postentry landscape includes many ventures that would never have been started if entrants were all rational. The presence of many excessively risky ventures also diminishes other entrants’ likelihood of success, further deterring some rational entrepreneurs from attempting entry.

At first blush, these seemingly harmful consequences may appear to justify policy interventions aimed at curbing excessively risky entry, the better to align entrepreneurial competition with rational action. Yet a closer look reveals that the regulation of excessively risky entry is mostly impractical and generally undesirable. Moreover, despite its social costs, the excessive risk taking of many entrepreneurs also generates important social benefits, most notably by directly and indirectly facilitating innovation and growth and providing an important source of long-term discipline for incumbent firms.

The revised understanding of the competition among boundedly rational and other entrepreneurs that the behavioral analysis of entry offers also has important implications for antitrust law. For one, the important benefits of excessively risky entry support antitrust law’s traditional hostility to regulatory or other artificial barriers to entry, if for reasons different from those commonly articulated. The dynamics of competition in the face of boundedly rational entrepreneurship also suggest some necessary adjustments in those areas of antitrust law in which actual or prospective entry plays an important role.

Section II of this article reviews the psychological processes that lead some entrepreneurs to attempt excessively risky entry and the empirical evidence that shows such entry takes place in the field. Section III examines the consequences of boundedly rational entry for the competition among entrants, while Section IV outlines some of its implications for entrepreneurship policy and antitrust law. Section V concludes.

II. Boundedly Rational Entrepreneurs

Antitrust law and economics (following basic microeconomic theory) assume that entrepreneurs are strictly rational actors.¹⁴ Rational entrepreneurs should attempt only profit-maximizing entry and

13. See, e.g., Isabel Grilo & Roy Thurik, *Latent and Actual Entrepreneurship in Europe and the U.S.: Some Recent Developments*, 1 INT’L ENTREPRENEURSHIP & MGMT. J. 441, 451 (2005) (survey results from Europe and the United States that “confirm[] the wide-spread belief that risk tolerance is a fundamental driving force for entrepreneurship”); Chip Heath, Richard P. Larrick, & George Wu, *Goals as Reference Points*, 38 COGNITIVE PSYCHOL. 79 (1999) (explaining how goals can serve as reference points that, inter alia, facilitate risk seeking behavior to avoid outcomes that fall short of these goals); Joo-Heon Lee & S. Venkataraman, *Aspirations, Market Offerings, and the Pursuit of Entrepreneurial Opportunities*, 21 J. BUS. VENTURING 107, 117 (2006) (“[D]ecision-makers tend to pursue uncertain entrepreneurial opportunities because the choice gives higher probabilities for satisfaction of their aspiration vector.”); see also Johannes Abeler, Armin Falk, Lorenz Goette, & David Huffman, *Reference Points and Effort Provision*, 101 AM. ECON. REV. 470 (2011) (providing experimental evidence for the role of goals in increasing effort).

14. See, e.g., RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 3 (7th ed. 2007) (“The task of economics . . . is to explore the implications of assuming that man is a rational maximizer of his ends. . . .”); STEVEN SHAVELL, *FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW* 1–2 (2004) (discussing the role of the rationality assumption in descriptive analysis and noting that “the view taken will generally be that actors are ‘rational’” and “maximize their expected utility”).

certainly avoid investing resources in entry when its net present value is negative.¹⁵ Yet a voluminous behavioral literature in psychology and economics, which has been reviewed at some length already by this author and other legal scholars, documents robust and systematic deviations of individuals from strict rationality.¹⁶ In recent years, these findings have been applied to various areas of antitrust law.¹⁷ This section therefore focuses only on those findings most pertinent to entrepreneurs' excessive risk taking—the evidence concerning overconfident beliefs and risk-seeking preferences.

A. Overconfident Beliefs

The behavioral literature reveals a number of processes that lead entrants, like other individuals making judgments with significant personal stakes under uncertainty, to be overconfident regarding the prospects of their ventures.¹⁸ From a behavioral perspective, the most significant characteristics of the judgments entrepreneurs must make when deciding whether to enter are, first, that entrants make their decisions under a heavy veil of uncertainty and, second, that the consequences of these decisions are extremely important to them.

The empirical behavioral evidence shows that in these circumstances people tend to exhibit overconfidence due to a number of psychological processes that affect entrepreneurs' judgments of both the probability of success and the anticipated value of their prospective ventures. The most significant of these processes are optimistic bias, desirability-related biases, and the illusion of control.

Optimistic bias findings indicate that entrants are likely to have inflated views of both their absolute and their comparative entrepreneurial ability vis-à-vis their potential competitors, with a resulting bias in their perceptions of the probability of their ventures' success. Moreover, to the extent that the value of successful entry (that is, net profit) depends on one's business acumen, overconfident entrants will also expect that value to be higher than objectively warranted.¹⁹

Individuals have a strong tendency to exhibit optimistic bias.²⁰ They overestimate their positive traits, abilities, skills, and likelihood of experiencing positive events, while they underestimate their vulnerability to certain risks.²¹ Overoptimism is especially pronounced in comparative contexts, in

15. AREEDA & HOVENKAMP, *ANTITRUST LAW*, *supra* note 6; RICHARD A. BREALEY & STEWART C. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 11–28, 85–108 (5th ed. 1996).
16. Some key cites and findings in this literature, with specific application to the law, can be found in Jolls, Sunstein, & Thaler, *A Behavioral Approach to Law and Economics*, *supra* note 10; Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051 (2000); Tor, *Methodology*, *supra* note 8.
17. Tor, *Behavioral Antitrust*, *supra* note 8, at 594–606 (illustrative application of behavioral antitrust); Amitai Aviram & Avishalom Tor, *Overcoming Impediments to Information Sharing*, 55 ALA. L. REV. 231 (2004); Amanda P. Reeves & Maurice E. Stucke, *Behavioral Antitrust*, 86 IND. L.J. 1527 (2011); Maurice E. Stucke, *Behavioral Economists at the Gate: Antitrust in the Twenty-First Century*, 38 LOY. U. CHI. L.J. 513 (2007); Avishalom Tor, *A Behavioural Approach to Antitrust Law and Economics*, 14 CONSUMER POL'Y REV. 18, 18–19 (2004); Avishalom Tor, *Illustrating a Behaviorally Informed Approach to Antitrust Law: The Case of Predatory Pricing*, 18 ANTITRUST 52 (2003).
18. As noted in the concluding paragraph of this section, of course not all prospective entrants will exhibit overconfidence. Some entrants may even be underconfident. However, the entrant population overall is likely to exhibit the trends discussed in the text below, which are reinforced by the selection effects examined in Section III.
19. Tor, *The Fable of Entry*, *supra* note 7, at 505; *see also* P.A. Geroski, *Some Data-Driven Reflections on the Entry Process, in ENTRY AND MARKET CONTESTABILITY: AN INTERNATIONAL COMPARISON* 282, 284 (P.A. Geroski & Joachim Schwalbach eds., 1991); Camerer & Lovallo, *Overconfidence and Excess Entry*, *supra* note 11.
20. *See generally* SHAROT, *THE OPTIMISM BIAS*, *supra* note 11.
21. *See, e.g.*, Shelley E. Taylor & Jonathon D. Brown, *Positive Illusions and Well-Being Revisited: Separating Fact from Fiction*, 116 PSYCHOL. BULL. 21, 22–23 (1994) (reviewing and discussing findings on individuals' mildly distorted positive perceptions); Neil D. Weinstein & William M. Klein, *Unrealistic Optimism: Present and Future*, 15 J. SOC. & CLINICAL PSYCHOL. 1, 1–6 & n. 2 (1996) (summarizing key findings and mentioning more than 200 studies showing unrealistic

which people judge themselves in relation to others.²² Indeed, in recent decades a wealth of empirical data evidencing boundedly rational behavior in financial markets has accumulated, with studies documenting the effects of optimistic bias on the performance of investors—including professionals—and markets alike.²³

Similarly, recent work in the field of behavioral corporate finance links the overconfidence of senior management of established firms with the patterns of these firms' performance in areas ranging from managerial compensation, through investment and financing decisions, to mergers and acquisitions, and more.²⁴ In fact, recent studies link managerial overconfidence in particular to greater investments in research and development—an area characterized by a high degree of uncertainty akin to new entry—without commensurately superior outcomes in firm performance.²⁵ Perhaps it is unsurprising, therefore, that the optimistic bias found in other business environments also appears in experimental economic games that illustrate how participants' overestimation of their comparative skill generates excessive entry.²⁶

Overoptimism affects entrants' perceptions and expectations regarding their future performance primarily by inflating their self-perception, but desirability-related phenomena impact a broader range of judgments. These biases occur when people predict future events that implicate their self-perception, emotions, or interests.²⁷ Desirability bias causes decision makers to align their expectations with the preferences they hold for outcomes of events that are beyond their own actions or control, as when predicting market-wide trends or the behavior of other actors. Such biases can affect predictions of factors that partly determine the value and probability of success of entrepreneurs' ventures.

In particular, entrepreneurs who manifest desirability-biased predictions may overestimate the profitability of successful entry and underestimate the investment and time necessary for the venture

optimism in expectations regarding positive and negative life events the author had accumulated already by 1996); James A. Shepperd, William M. P. Klein, Erika A. Waters, & Neil D. Weinstein, *Taking Stock of Unrealistic Optimism*, 8 PERSP. ON PSYCHOL. SCI. 395 (2013) (distinguishing among four distinct types of unrealistic optimism and discussing the evidence for their manifestation).

22. See, e.g., David Dunning, Judith A. Meyerowitz, & Amy D. Holzberg, *Ambiguity and Self-Evaluation: The Role of Idiosyncratic Trait Definitions in Self-Serving Appraisals of Ability*, 57 J. PERSONALITY & SOC. PSYCHOL. 1082 (1989) (academic skills, leadership ability, marriage prospects, and health); Ola Svenson, *Are We All Less Risky and More Skillful than Our Fellow Drivers?*, 47 ACTA PSYCHOLOGIA 143 (1981); Taylor & Brown, *Positive Illusions and Well-Being Revisited*, *supra* note 21, at 22–23 (stating that people choose dimensions of comparison in which they excel, and select worse-off comparison targets that guarantee a favorable comparison).
23. See ADVANCES IN BEHAVIORAL FINANCE (Richard H. Thaler ed., 1993) (a classic collection of articles on behavioral finance); see also Terrance Odean, *Volume, Volatility, Price, and Profit When All Traders Are Above Average*, 53 J. FIN. 1887 (1998) (testing a model of overconfidence and surveying the literature); Brad M. Barber & Terrance Odean, *Trading Is Hazardous to Your Health: The Common Stock Investment Performance of Individual Investors*, 55 J. FIN. 773 (2000) (finding in a sample of 66,465 households a high portfolio turnover and a negative correlation between turnover and profitability); Don A. Moore, Terri R. Kurtzberg, Craig R. Fox, & Max H. Bazerman, *Positive Illusions and Forecasting Errors in Mutual Fund Investment Decisions*, 79 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 95 (1999); William N. Goetzmann & Nadav Peles, *Cognitive Dissonance and Mutual Fund Investors*, 20 J. FIN. RES. 145 (1997) (also finding that mutual fund investors exhibit overly optimistic perceptions of past mutual fund performance).
24. See Tor, *Behavioral Antitrust*, *supra* note 8, at 632–38 (reviewing relevant evidence). See generally Malcolm Baker & Jeffrey Wurgler, *Behavioral Corporate Finance: An Updated Survey*, in 2A HANDBOOK OF THE ECONOMICS OF FINANCE 357, 391–404 (George M. Constantinides, Milton Harris, & René M. Stulz eds., 2013).
25. See, e.g., Baker & Wurgler, *Behavioral Corporate Finance*, *supra* note 24, at 398 (summarizing some recent studies).
26. Camerer & Lovallo, *Overconfidence and Excess Entry*, *supra* note 11, at 310–12.
27. See, e.g., Elisha Babad & Yosi Katz, *Wishful Thinking—Against All Odds*, 21 J. APPLIED SOC. PSYCHOL. 1921 (1991); David V. Budescu & Meira Bruderman, *The Relationship Between the Illusion of Control and the Desirability Bias*, 8 J. BEHAV. DECISION MAKING 109 (1995). For a clear, early study, see Douglas McGregor, *The Major Determinants of the Prediction of Social Events*, 33 J. ABNORMAL PSYCHOL. 179 (1938).

to become viable. This may happen, for instance, if entrepreneurs underestimate the full scope of investments that ventures of the type they contemplate require, the numerous possible future events in the industry or the economy at large that may negatively affect the prospects of their entry attempt, or the time required for them to achieve profitability.

The desirability bias has been measured directly, with many experiments showing that estimates of the likelihood of future events are correlated with people's desirability ratings of these events.²⁸ The effects of this bias are manifest even when people have no preexisting stake in the subject of their judgment and cannot affect the outcome of the predicted event.²⁹ Indeed, even professional investment managers exhibit the desirability bias.³⁰

Moreover, this bias is especially strong and pervasive when people have extant, vested interests in the outcomes of a predicted event, such as when voters predict election outcomes or fans predict the outcomes of sport matches.³¹ As noted above, entry is also characterized by the significant positive and negative consequences it harbors for entrants, who are therefore likely to exhibit a strong desirability bias as well.³²

Both real-world anecdotes and experimental evidence on the "planning fallacy" further document how desirability leads people specifically to underestimate the time and costs required for completing projects, especially when these projects are complex and protracted, as in the case of entry.³³ For example, experimental studies and field evidence both highlight the prevalence of optimistic predictions of task completion times in novel and familiar tasks, from research and development in the private sector to public works and more.³⁴

Besides these effects of optimistic and desirability-related biases, individuals often consider themselves able to control chance occurrences and risky eventualities, exhibiting the illusion of control. This illusion leads to inflated expectations of success in tasks whose outcomes wholly or partly depend on chance factors and is particularly prevalent when these outcomes depend on a mixture of skill and chance, as they invariably do in case of entrepreneurial success.³⁵ For instance, people think they are more likely to win when they can choose among options; when they are more familiar or skilled with either the stimulus (such as a particular lottery ticket) or the necessary response; when they are actively

28. See Budescu & Bruderman, *The Relationship Between the Illusion of Control and the Desirability Bias*, *supra* note 27.

29. For example, in one set of studies, participants who were designated either "plaintiffs" or "defendants" exhibited systematically biased expectations of the decision an objective judge would arrive at in a tort case, each group in accordance with its designation, although their roles were merely ad hoc designations and they had no opportunity to address the judge. George Loewenstein, Samuel Issacharoff, Colin Camerer, & Linda Babcock, *Self-Serving Assessments of Fairness and Pretrial Bargaining*, 22 J. LEGAL STUD. 135, 151, tbl. 2 (1993); *see also* Linda Babcock, George Loewenstein, Samuel Issacharoff, & Colin Camerer, *Biased Judgments of Fairness in Bargaining*, 85 AM. ECON. REV. 1337 (1995).

30. Robert A. Olsen, *Desirability Bias Among Professional Investment Managers: Some Evidence from Experts*, 10 J. BEHAV. DECISION MAKING 65, 66–70 (1997).

31. *See, e.g.*, Donald Granberg & Edward Brent, *When Prophecy Bends: The Preference-Expectation Link in U.S. Presidential Elections, 1952–1980*, 45 J. PERSONALITY & SOC. PSYCHOL. 477, 477–79, tbl. 1 (1983); Babad & Katz, *Wishful Thinking*, *supra* note 27, at 1923–24, 1929–32 (finding that high incentives for accuracy do not eliminate fans' bias).

32. A related phenomenon that further contributes to the effect of desirability is the affect heuristic. *See* Tor, *The Fable of Entry*, *supra* note 7, at 510.

33. *See* Roger Buehler, Dale Griffin, & Michael Ross, *Exploring the "Planning Fallacy": Why People Underestimate Their Task Completion Times*, 67 J. PERSONALITY & SOC. PSYCHOL. 366 (1994); Roger Buehler, Dale Griffin, & Heather MacDonald, *The Role of Motivated Reasoning in Optimistic Time Predictions*, 23 PERSONALITY & SOC. PSYCHOL. BULL. 238 (1997).

34. For a brief review of some earlier studies documenting the planning fallacy in laboratory settings, *see* Buehler, Griffin, & Ross, *supra* note 33, at 367. *See generally* Roger Buehler, Dale Griffin, & Johanna Peetz, *The Planning Fallacy: Cognitive, Motivational, and Social Origins*, 43 ADVANCES IN EXPERIMENTAL SOC. PSYCHOL. 1 (2010).

35. *See* Ellen J. Langer, *The Illusion of Control*, 32 J. PERSONALITY & SOC. PSYCHOL. 311, 313 (1975) (citing earlier studies); *see also* Budescu & Bruderman, *The Relationship Between the Illusion of Control and the Desirability Bias*, *supra* note 27, at 110 (citing additional studies).

(versus passively) involved in the task; and, importantly, when competition is present.³⁶ The illusion of control pervades business judgments. Managers do not consider themselves risk takers but rather “risk controllers,” sophisticated actors who take only calculated, controlled risks; they think that “managerial risk taking is an endeavor in which a manager can use his judgment, exert control, and utilize skills.”³⁷

Entrepreneurs, like other business decision makers, are prone to exhibit the illusion of control, often perceiving the risks associated with their new ventures as significant but largely controllable.³⁸ The factors that facilitate the illusion of control are typically found in entry decision making, where entrants choose which ventures and strategies to pursue, often consider themselves familiar with both the task and the necessary behaviors (regardless of the accuracy of their perceptions), are actively involved in the venture, and make judgments in highly competitive settings.

Together, therefore, the psychological processes that underlie entrepreneurial overconfidence tend to facilitate excessively risky entry attempts, because they lead some potential entrants to underestimate the risks associated with their prospective ventures and overestimate the expected value of these ventures. Of course, not all potential entrants hold overconfident judgments of their prospects. Some potential entrants, particularly those with relevant experience, better knowledge of the industry, superior information and analysis, and so on, will hold more rational judgments and thus tend to enter primarily when it is (approximately) rational for them to do so. Yet the number of riskier potential ventures is far larger than the competing ventures that are rationally attractive. Hence those more biased entrepreneurs will attempt entry at a far greater frequency than their more rational counterparts and therefore constitute a disproportionately large fraction of the entrant pool.

B. (More) Risk-Seeking Preferences

Boundedly rational entrepreneurs who believe their prospects are attractive and therefore consider attempting entry will also tend willingly to take greater risks than rational entrants would in their place. As noted already, rational entrepreneurs would never attempt negative expected value entry attempts because such attempts require risk-seeking preferences.³⁹ Yet behavioral research shows that real individuals tend to exhibit risk seeking under predictable circumstances.

36. Langer, *The Illusion of Control*, *supra* note 35, at 315 (experiment 1, competition); *id.* at 316–17 (experiment 2, choice); *id.* at 318 (experiment 3, stimulus familiarity); *id.* at 319–20 (experiment 4, response familiarity); *id.* at 320–22 (experiments 5–6, type of involvement); *see also* Budescu & Bruderman, *The Relationship Between the Illusion of Control and the Desirability Bias*, *supra* note 27, at 109–10, 114–15 (illusion of control results in experiment 1).

37. ZUR SHAPIRA, RISK TAKING: A MANAGERIAL PERSPECTIVE 48 (1995).

38. Mark Simon, Susan M. Houghton, & Karl Aquino, *Cognitive Biases, Risk Perception, and Venture Formation: How Individuals Decide to Start Companies*, 15 J. BUS. VENTURING 113 (1999) (experimental study that presented MBA students with a detailed case involving a possible venture found participants to exhibit a significant illusion of control that was further found to affect their decision to start a venture both directly and by decreasing the risk they perceived the venture to entail).

39. Note that traditional studies of entrepreneurship consider the role of risk-taking propensity in facilitating entrepreneurial behavior. *See, e.g.*, Scott Shane, *Explaining Variation in Rates of Entrepreneurship in the United States: 1899–1988*, 22 J. MGMT. 747 (1996) (finding some empirical evidence for the contribution of risk taking propensity to variation in the rate of entrepreneurship in the United States throughout the twentieth century); Wayne H. Stewart Jr. & Philip L. Roth, *Risk Propensity Differences Between Entrepreneurs and Managers: A Meta-Analytic Review*, 86 J. APPLIED PSYCHOL. 145 (2001) (concluding, based on a meta-analytic review of the literature, that there are statistically significant differences in risk-taking propensity between entrepreneurs and managers). These studies, however, treat the propensity for risk taking as a fixed, individual differences variable and do not measure entrepreneurial risk taking in terms of rational economic decision making (that is, by analyzing net present value). The present analysis, on the other hand, focuses on the role of contextual

Most pertinently, this evidence suggests that decision makers are likely to take greater risks when they aspire to a concrete goal—such as establishing a new venture—than when they merely aim to do well. This section therefore reviews some key findings in this area and explains why they apply to potential entrepreneurs generally and, in particular, to the overconfident among them. These findings, which suggest that entrants often hold risk-seeking preferences, combine with the evidence on entrepreneurial overconfidence to account for the field data described in the following section that reveal the prevalence of excessively risky new ventures.

A wealth of psychological research shows that the risk attitudes manifested by boundedly rational decision makers violate the axioms of rational choice in a number of respects. Most relevant for the present purposes is the principle of *invariance* in rational choice among risky (or uncertain) prospects, which requires that choices not depend on how these risky options are framed or described.⁴⁰ Nonetheless, Tversky and Kahneman's pioneering research showed that the description or "framing" of alternatives can exert a dramatic impact on choice among risky prospects in violation of the invariance requirement.⁴¹

To illustrate, in the early, well-known "Asian disease" problem, one group of participants read:

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Which of the two programs would you choose?

When faced with this question, 72% of the participants chose Program A, with the remaining 28% choosing Program B. Note that the actuarial value of the two programs is identical, though they differ markedly in the distribution of outcomes they offer. The majority's choice of Program A therefore represents a risk-averse preference, which appears to value the certain saving of two hundred lives over the risky alternative that may save more lives but is more likely to save none.

Another group of participants was asked the same question, but with the following, different framing of the prospects associated with the two programs:

If Program C is adopted, 400 people will die.

If Program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

Which of the two programs would you choose?

Thus, the problem given to this second group involved identical prospects but a different frame from the one used in the question presented to the first group. In striking contrast to the choices made by the first group, however, 78% of the participants in this group chose the risky Program D—whose

variables—such as the framing of new venture prospects—on risk-taking behavior and draws on evidence that compares risk seeking behavior with normative economic standards. *But see* Lee & Venkataraman, *Aspirations*, *supra* note 13 (offering the uncommon suggestion of a relationship between entrepreneurial aspirations and risk taking).

40. *See, e.g.*, Robyn M. Dawes, *Behavioral Decision Making and Judgment*, in *HANDBOOK OF SOCIAL PSYCHOLOGY* 497, 512 (Daniel T. Gilbert, Susan T. Fiske, & Gardner Lindzey eds., 1998) (characterizing framing-based violations of rational choice); Daniel Kahneman & Amos Tversky, *Choices, Values, and Frames*, 39 *AM. PSYCHOL.* 341 (1984).

41. Following Tversky and Kahneman's work, numerous other researchers found evidence of framing effects in the lab and the field alike. *See, e.g.*, Colin F. Camerer, *Prospect Theory in the Wild: Evidence from the Field*, in *CHOICES, VALUES, AND FRAMES* 288 (Daniel Kahneman & Amos Tversky eds., 2000).

prospects are identical to those of the disfavored Program B. Only 22% opted for the certain prospects of Program C, which is identical to Program A favored by the first group.⁴²

Kahneman and Tversky used this and other studies to illustrate some common characteristics of human decision making under risk and uncertainty, which they combined in their descriptive “prospect theory.”⁴³ First, choice is reference-dependent, so that outcomes are evaluated as positive (“gains”) or negative (“losses”) changes from a psychologically neutral reference point.⁴⁴ For this reason, prospect theory describes choice as based on “value” rather than being a mere revelation of utility.⁴⁵ Second, individuals’ sensitivity to positive and negative changes in prospects is strongest near the reference point and diminishes with the distance from it.⁴⁶ The difference between a gain of \$100 and a gain of \$200 appears greater, for example, than the difference between a gain of \$1,100 and a gain of \$1,200. Hence the value function is concave in the “gains” domain and convex in the “loss” domain.⁴⁷ Third, because of “loss aversion”—that is, losses are felt more strongly than comparable gains—prospect theory’s value function is significantly steeper for losses than for gains.⁴⁸

Together, these characteristics of human decision making make individuals more likely to exhibit risk aversion when faced with prospects that are potentially beneficial when compared to their psychologically neutral reference point (“gains”), but more inclined to be risk seeking when faced with outcomes that appear negative in comparison with the same reference point.⁴⁹ Consequently, the framing of options—as in the case of lives saved versus lives lost in the Asian disease problem— influences risk attitudes so that people tend to be risk averse or risk seeking depending on the psychological frame they adopt when making their decision.

One natural and well-studied reference point that people use to judge outcomes is the status quo, and thus options better than the status quo are often perceived as gains while those inferior to it are frequently viewed as losses.⁵⁰ At first blush, therefore, one might have thought that prospective entrants would be risk averse when considering a risky venture that might generate gains over the status quo. If this were the case, we should have found real entrepreneurs routinely avoiding positive net present value entry opportunities that their hypothetical, strictly rational counterparts would have considered attractive.⁵¹

42. Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 *Sci.* 453, 453 (1981).

43. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA* 263 (1979). Note also that prospect theory is only the famous member of a large family of models that seek a better descriptive fit by modifying some rational choice assumptions. See generally Chris Stramer, *Developments in Nonexpected-Utility Theory: The Hunt for a Descriptive Theory of Choice Under Risk*, in *ADVANCES IN BEHAVIORAL ECONOMICS* 104 (Colin F. Camerer, George Loewenstein, & Matthew Rabin eds., 2004) (reviewing the development of such theories, how they fare in experimental tests, and how they can be used).

44. Kahneman & Tversky, *Prospect Theory*, *supra* note 43, at 277–80. Such choice patterns, of course, stand in sharp contrast to the rational-actor model, where choices are made based on their effect on the decision maker’s overall utility, or total asset position in the case of financial decisions, but different descriptions of the same overall outcomes are normatively irrelevant.

45. *Id.*

46. *Id.* at 278. This is a typical psychophysical function common to human (and animal) perception in many domains.

47. *Id.* at 279.

48. *Id.* (noting that “most people find symmetric bets of the form (x, .50; -x, .50) distinctly unattractive” and that “the aversiveness of symmetric fair bets generally increases with the size of the stake”); see also Tor, *Methodology*, *supra* note 8, at 260–63.

49. Kahneman & Tversky, *Prospect Theory*, *supra* note 43, at 297–323.

50. See, e.g., Daniel Kahneman, Jack L. Knetsch, & Richard H. Thaler, *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 *J. ECON. PERSP.* 193 (1991).

51. See Stucke, *supra* note 17, at 569–72; Maurice E. Stucke, *New Antitrust Realism*, *GCP MAG.* (Jan. 2009), at 6–11; Nicolas Petit & Norman Neyrinck, *Behavioral Economics and Abuse of Dominance: A Fresh Look at the Article 102 TFEU Case-Law 4–5* (May 15, 2010) (unpublished manuscript), http://papers.ssrn.com/abstract_id=1641431.

Yet the (mistaken) prediction that entrepreneurs will be risk averse not only contradicts the evidence from the field described below but is also based on a misunderstanding of the nature of psychological reference points.⁵² Most pertinently, behavioral research identified a number of situations in which reference points other than the status quo affect choice and risk attitudes. In particular, studies found that aspirations—that is, the goals people wish to achieve—can serve as powerful reference points.⁵³

Heath, Larrick, and Wu examined the ways in which goals function as reference points that make people perceive outcomes falling short of their goals as losses and those exceeding these goals as gains. They also found the related characteristics of prospect theory's value function—both the diminishing sensitivity to outcomes further away from the reference point and loss aversion—to characterize decisions in which goals serve as reference points.⁵⁴ This combination of characteristics also suggests that decision makers will exhibit greater risk seeking when trying to attain concrete goals, because they find the loss associated with failing to reach the goal more painful than the pleasure they would derive from exceeding their goal.

Thus, one of the experimenters' problems asked two groups of participants to imagine they were managers of a large manufacturing unit in a Fortune 100 company who were in the midst of a year-long plan to cut costs in their unit.⁵⁵ Participants in the first group then read that their goal was to do their best to save money during the current quarter. The second group's scenario, on the other hand, stated that participants' goal for this quarter was to save \$250,000. This between-subjects design therefore sought to compare the decision behavior of those who simply aim to do their best with the behavior of those who face a concrete goal.

Both groups then read the following:

At present, you are considering two plans:

Plan M. Plan M will save \$120,000.

Plan N. Plan N has an 80% chance of saving \$50,000 and a 20% chance of saving \$250,000.

Both plans are one-time options. They will not be available later in the year, and you have time to complete only one of them during the current quarter. Which plan will you choose?

When comparing the two plans, the reader of course will have noted that Plan M offers a certain but lower rate of \$120,000 of savings, which means that the plan offers no chance of reaching the higher saving target of \$250,000. Plan N, however, offers a 20% chance of meeting the \$250,000 saving target, but an 80% chance of saving only \$50,000. Besides being risky, therefore, the latter plan also has a substantially lower expected value (of \$90,000) than the sure option of Plan M. Any participant who chooses Plan N over Plan M, therefore, is making a risk-seeking choice of a dominated alternative. The results showed that participants in the "Save \$250,000" group chose the risky Plan N option significantly more often (47%) than participants in the "Do your best" group (24%).⁵⁶

52. This is the main but by no means the only error in interpreting the relevant behavioral evidence for predicting the likely risk attitudes of potential entrants. See Tor, *Behavioral Antitrust*, *supra* note 8, at 610–12 (discussing this and additional errors relating to the prediction that entrepreneurs will tend to be risk averse).

53. Heath, Larrick, & Wu, *Goals as Reference Points*, *supra* note 13 (presenting evidence that goals both function as reference points and exhibit the associated properties of loss aversion and diminishing sensitivity); Richard P. Larrick, Chip Heath, & George Wu, *Goal-Induced Risk Taking in Negotiation and Decision Making*, 27 *SOC. COGNITION* 342 (2009) (providing further evidence that goals can serve as reference points, with the attendant implications identified by prospect theory).

54. Heath, Larrick, & Wu, *Goals as Reference Points*, *supra* note 13, at 82–83.

55. *Id.* at 94 (problem 11).

56. *Id.* at 94. A similar result was obtained by Larrick, Heath, & Wu, *Goal-Induced Risk Taking*, *supra* note 53, 355–57 (study 3).

Other research showed similar effects of goals on risk taking. For instance, a recent study by Schiebener and colleagues examined performance in a computerized gambling task in which participants receive an initial hypothetical endowment that they can increase or decrease by choosing among gambles with clear expected payoffs.⁵⁷ The game is structured so that lower-risk gambles with positive expected payoffs offer the best strategy for maximizing one's overall outcomes, while higher-risk gambles offer potentially higher payoffs that are highly unlikely to materialize, particularly over the repeated trials that the experiment involved.⁵⁸ This study found that participants who set relatively low goals took fewer of those excessive risks than participants with no goals and showed no significantly different overall performance. On the other hand, participants who set higher goals took a significantly greater proportion of high-risk gambles, with a resulting significantly diminished performance.⁵⁹

These and similar findings suggest that entrepreneurs may consciously make some negative expected value attempts, much like other individuals who tend to exhibit more risk-seeking behavior when attempting to reach their goals. Furthermore, potential entrants are particularly likely to exhibit risk seeking because they usually do not consider the prospects of entry in the abstract, but rather contemplate a specific venture. They are likely therefore to compare the various possible outcomes of entry to the successful outcome they hope to achieve—their goal and reference point—perceiving those outcomes that fall short of their aspiration as undesirable losses they would wish to avoid.⁶⁰

Additionally, as in the case of entrepreneurial overoptimism, not all risk-seeking entrants decide to attempt entry in fact. Instead, those decision makers who are most influenced by their prospective venture's reference point exhibit a greater propensity for entering generally and for negative net present value entry in particular. Thus, the forces of self-selection again increase the proportion of excessively risky ventures among the general ranks of new entrants.

Finally, the two manifestations of boundedly rational entrepreneurship examined in this article—overconfident entry and risk-seeking entry—can be present either independently from one another or jointly. A given entrepreneur may be overoptimistic without manifesting risk-seeking preferences, or vice versa, and either phenomenon on its own can lead that entrepreneur to make an entry attempt that, objectively speaking, is excessively risky. Yet the two phenomena may combine to greater effect when potential entrants exhibit both. In fact, the central role of aspirations in facilitating risk-seeking entry suggests that the most overconfident entrepreneurs—who hold particularly high expectations for their ventures' prospects—may also be more inclined than their less-biased counterparts willingly to embark on excessively risky ventures.

C. Evidence from the Field

Importantly, the available empirical evidence supports the theoretical predictions of the behavioral analysis of boundedly rational entrepreneurs' judgment and decision making. The data on the patterns of entry into manufacturing industries, together with related findings on entrants' survival and exit patterns, strongly suggest that excessively risky (negative net present value) entry is quite common.⁶¹

57. Johannes Schiebener, Elisa Wegmann, Mirko Pawlikowski, & Matthias Brand, *Effects of Goals on Decisions Under Risk Conditions: Goals Can Help to Make Better Choices, but Relatively High Goals Increase Risk-Taking*, 26 J. COGNITIVE PSYCHOL. 473 (2014).

58. *Id.* at 478.

59. *Id.* at 479–81 & tbls. 1–2. Notably, the hypothetical nature of the study suggests the possibility that low goal setting merely implied greater attention and care than that exerted by participants with no concrete goal.

60. See Abeler, Falk, Goette, & Huffman, *Reference Points and Effort Provision*, *supra* note 13 (showing experimentally how expectations affect real effort provision).

61. Although the present analysis focuses on the particular entrepreneurial activity of starting new ventures in manufacturing industries, other empirical findings on entrepreneurship point to similar conclusions. See, e.g., Javier Gimeno, Timothy B. Folta, Arnold C. Cooper, & Carolyn Y. Woo, *Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of*

Entry is pervasive, amounting on average to about 50% of all existing firms every five years across all domestic manufacturing industries.⁶² But this extensive entrepreneurial activity appears to have a very limited longer-term impact on the market, because entrants exhibit strikingly high mortality rates.⁶³ In fact, a high volume of exit usually accompanies the high volume of entry, ultimately resulting in limited net entry.⁶⁴

The limited penetration of those surviving entrants is also apparent.⁶⁵ When measured by either output or employment, the share of new entrants in an industry is even smaller than their numbers suggest and nearly negligible in the short term.⁶⁶ This minimal penetration reveals, moreover, that the success of entrants who survive and grow does not compensate sufficiently for the strong effect of their

Underperforming Firms, 42 ADMIN. SCI. Q. 750 (1997) (using a sample of 1,547 new businesses in the United States and finding that some choose to continue or survive despite their inferior performance); Barton H. Hamilton, *Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment*, 108 J. POL. ECON. 604 (2000) (comparing earnings in self-employment and paid employment and finding that most entrepreneurs enter and persist in business despite the fact that they have both lower initial earnings and lower earnings growth than in paid employment, implying a median earnings differential of 35% for individuals in business for ten years); Tobias J. Moskowitz & Annette Vissing-Jørgensen, *The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle?*, 92 AM. ECON. REV. 745 (2002) (documenting the return to investing in U.S. nonpublicly traded equity and finding that not only is entrepreneurial investment extremely concentrated and thus poorly diversified, but the returns to private equity are no higher than the returns to public equity, showing that entrepreneurs invest substantial amounts in single privately held firms with seemingly far worse risk-return trade-offs).

62. See Timothy Dunne, Mark J. Roberts, & Larry Samuelson, *Patterns of Entry and Exit in U.S. Manufacturing Industries*, 19 RAND J. ECON. 495, 497 & n. 4 (1998) (the average rate of gross entry in the United States during the period 1963–82 is greater than 10% per year, amounting to more than 25,000 annual new entrants). International comparisons, especially from other industrialized countries, report high rates of gross entry as well. See, e.g., P. A. Geroski, *Domestic and Foreign Entry in the United Kingdom*, in ENTRY AND MARKET CONTESTABILITY: AN INTERNATIONAL COMPARISON, *supra* note 19, at 63, 64, 76 (United Kingdom data); Joachim Schwalbach, *Entry, Exit, Concentration, and Market Contestability*, in ENTRY AND MARKET CONTESTABILITY, *supra* note 19, at 121, 121–22 (German data). But see JOHN R. BALDWIN, THE DYNAMICS OF INDUSTRIAL COMPETITION: A NORTH AMERICAN PERSPECTIVE 17, 401–2 (1995) (reporting somewhat smaller figures in a study disregarding those small firms that together account for 40% to 54% percent of all manufacturing establishments).
63. Within ten years, only about 20% of any entrant cohort still operates. Attrition, moreover, begins right from the start, with more than 25% percent of new entrants exiting within two years and over 60% disappearing within five years. See David B. Audretsch & Talat Mahmood, *The Post-Entry Performance of New Firms*, in MARKET EVOLUTION: COMPETITION AND COOPERATION 245, 250, tbl. 1 (Arjen van Witteloostuijn ed., 1995) (analysis of data in table); Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 509, tbl. 8; Geroski, *Domestic and Foreign Entry*, *supra* note 62, at 79 (reporting even more striking figures from the United Kingdom from 1974–82: “Roughly 12.4 percent of entrants survived no longer than 6 months, 27.3 percent no longer than a year, 55 percent no longer than 2 years, and roughly 85 percent no longer than 4 years. Only 0.1 percent of the cohort of 1974 entrants were still operating in 1982.”) (emphasis added). For similar, more recent data, see Stefano Scarpetta, Philip Hemmings, Thierry Tressel, & Jaejoon Woo, *The Role of Policy and Institutions for Productivity and Firm Dynamics: Evidence From Micro and Industry Data* (OECD Economics Dep’t Working Paper No. 329, 2002) (exploiting a new firm-level database for ten OECD countries and industry-level data for a broader set of countries and finding, *inter alia*, that only half of all startups last more than three years).
64. See, e.g., Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 503, tbl. 2 (exit rates averaging 95% of entry rates); *id.* at 506, tbl. 5 (the similarity appears at all levels: the particular industry, the industrial sector, and all manufacturing industries together); P. A. Geroski, *What Do We Know About Entry?*, 13 INT’L J. INDUS. ORG. 421, 423 (1995) (concluding, in a recent review of the empirical findings on entry, that “[e]ntry and exit rates are highly positively correlated, and net entry rates and penetration are modest fractions of gross entry rates and penetration”).
65. Geroski, *What Do We Know About Entry?*, *supra* note 64, at 422 (“Entry is common. Large numbers of firms enter most markets in most years, but entry rates are far higher than market penetration rates.”) (emphasis added).
66. Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 505, tbl. 4 (analysis of data in tables yielding a net negative market share penetration of 0.1%); see also BALDWIN, THE DYNAMICS OF INDUSTRIAL COMPETITION, *supra* note 62, at 16, tbl. 2-2 (Canadian data showing a negative penetration of 0.3% employment, with the best of the twelve years reported showing a positive net penetration of 0.3%); John Cable & Joachim Schwalbach, *International Comparisons of Entry and Exit*, in ENTRY AND MARKET CONTESTABILITY, *supra* note 19, at 256, 260, tbl. 14.2 (a review of eight, mostly international studies, showing similar findings).

peers' extremely high attrition rate, a conclusion corroborated by studies following specific cohorts of entrants longitudinally.⁶⁷ Hence, most entrants displace preceding entrants but do little to reduce the market share of incumbents.⁶⁸

Unsurprisingly, therefore, even without any reference to the behavioral evidence on the process of entrepreneurial judgment and decision making, scholars could not fail to observe that the empirical evidence indicates an excessive rate of entry in light of its prospects.⁶⁹ Indeed, considering the high attrition and many costly years they face until profitability even if they survive, most entrants would have to expect significantly higher returns to success than they objectively face or, alternatively, willingly take risks that rational entrepreneurs would have avoided.⁷⁰

Interestingly, moreover, the empirical findings on entry also reveal that startup entrants—new firms entering industry by new plant construction—attempt entry far more frequently than extant firms who are diversifying by entering a new industry.⁷¹ Startups also exhibit higher failure rates and inferior average performance as compared to diversifying entrants who enter a new industry by constructing a new plant.⁷² Taken alone, the higher failure rates of startups might simply indicate that these ventures tend to be riskier but more profitable and thus equally attractive to rational entrepreneurs, but the data show that startups underperform diversifying entrants on average.⁷³ This evidence indicates that the

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67. Dunne et al. show how the already limited market share of entrants further shrinks with time when all entrants are included. Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 509, tbl. 8. *But see* BALDWIN, *THE DYNAMICS OF INDUSTRIAL COMPETITION*, *supra* note 62, at 21–23 & n. 14 (asserting his Canadian data show an increase in entrant cohorts' value-added share (indexed on entrants' initial share), but accomplishing this feat only by cumulating the data of successive cohorts and using only about the larger half of the entrant population; even then, moreover, he admits that "if employment were used rather than value-added, the results would show a decline in share after several years").
68. Cable & Schwalbach, *International Comparisons of Entry and Exit*, *supra* note 66, at 266. This pattern led scholars to view the competition among new entrants primarily as "churning," BALDWIN, *THE DYNAMICS OF INDUSTRIAL COMPETITION*, *supra* note 62, at 359, a "revolving door"; Laurie Beth Evans & John J. Siegfried, *Entry and Exit in United States Manufacturing Industries from 1977 to 1982*, in *EMPIRICAL STUDIES IN INDUSTRIAL ORGANIZATION* 253, 254 (David B. Audretsch & John J. Siegfried eds., 1992), or "turbulence"; Geroski, *Some Data-Driven Reflections*, *supra* note 19, at 282, 295.
69. *See, e.g.* BALDWIN, *THE DYNAMICS OF INDUSTRIAL COMPETITION*, *supra* note 62, at 359; Geroski, *Some Data-Driven Reflections*, *supra* note 19, at 282, 295.
70. As pointed out by Camerer and Lovallo, however, "even if cumulative industry profits are actually negative at some point in time, it is possible that positive returns will roll in later. . . . So it is hard to imagine how to establish conclusively that expected industry returns were negative." Camerer & Lovallo, *Overconfidence and Excess Entry*, *supra* note 11, at 307. In fact, Schumpeter already pointed to a similar ambiguity when discussing the possibility that entry may bring "negative return[s] to entrepreneurs . . . as a group," explaining, "[w]hether this actually is so in any particular case is, of course, extremely difficult to establish." Joseph A. Schumpeter, *The Creative Response in Economic History*, 7 *J. ECON. HIST.* 149, 156 & n.14 (1947).
71. Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 504 & tbl. 3 (analysis of data shows that startups constitute 87% of all entry by new plant creation in the United States, while diversifying firms make up only the remaining 13%).
72. Thus, Geroski's summary states, "[d]e novo entry is more common but less successful than entry by diversification." Geroski, *What Do We Know About Entry?*, *supra* note 64, at 424; *see also* Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 501, 513, tbl. 11 (providing cumulative exit rates for both startups and diversifying entrants).
73. Thus, Dunne et al. report that startup entrants are on average 28.4% as large as incumbent producers, while diversifying entrants are as much as 87.1% of the size of the latter. Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 504. Startups fail to reach the average size in the industry after fifteen years, *id.* at 512, tbl. 10; but diversifying entrants begin operating at levels comparable to industry averages, Timothy Dunne, Mark J. Roberts, & Larry Samuelson, *The Growth and Failure of U.S. Manufacturing Plants*, 104 *Q.J. ECON.* 671, 676, tbl. 1, 689 (1989), and grow at spectacular rates. The evidence suggests that all entrants have lower productivity than incumbents because of their smaller size. *See, e.g.*, BALDWIN, *THE DYNAMICS OF INDUSTRIAL COMPETITION*, *supra* note 62, at 209–10, 217–18; David B. Audretsch & Michael Fritsch, *Creative Destruction: Turbulence and Economic Growth in Germany*, in *BEHAVIORAL NORMS, TECHNOLOGICAL PROGRESS, AND ECONOMIC DYNAMICS: STUDIES IN SCHUMPETERIAN ECONOMICS* 137, 139–40 & n. 2 (Ernst Helmstadter & Mark Perlman eds., 1996) (citing numerous studies indicating that small entrants enter at suboptimal scale that often forces them to exit unless they can expand).

higher average risk they bear is not coupled with an appropriately high rate of return, given startups' significantly worse performance than the already unimpressive outcomes of their diversifying competitors.⁷⁴

Yet when comparing the performance of *successful* plants alone, startups exhibit higher growth and fare better than diversifying firms, in relative terms.⁷⁵ This intriguing pattern suggests that while the average fate of startups is worse, those relatively rare successful startups may be better off than their diversifying counterparts, which are successful somewhat more frequently but less spectacularly.⁷⁶

All in all, therefore, the evidence from the field is in line with the behavioral prediction, revealing prevalent excessively risky entry, even while suggesting that all entrants are not the same. Clearly, some boundedly rational entrants hold more optimistic predictions regarding the likely outcomes of their prospective ventures or willingly take greater risks than their more rational counterparts. Moreover, the rationality of entrepreneurial ventures appears to differ systematically when comparing startups to diversifying entrants, with the former exhibiting more excessively risky entry as a group. The systematic difference between these two groups of entrants is understandable, however, considering the economic and legal reasons that shape established firms' decisions to channel riskier ventures to the startup route while diversifying to exploit less risky entrepreneurial opportunities;⁷⁷ the superior resources, expertise, and experience of diversifying entrants;⁷⁸ and the related behavioral differences between the two entrant types.⁷⁹

III. Competition with Boundedly Rational Entrepreneurs

Entrepreneurs who overestimate their prospects or willingly take excessive risks are more likely to fail than their rational counterparts, but their presence also decreases other entrants' probability of success and changes the composition of the final cohort of successful entrants. Boundedly rational entrepreneurs diminish the prospects of all entrants because their high-volume attempts substantially increase the intensity of competition. Their influence on market outcomes for all entrants, however, goes beyond an across-the-board detraction from the net present value of entry.

Those fortunate boundedly rational entrepreneurs who succeed against the odds necessarily displace some more rational entrants with better *ex ante* prospects. The impact of this probabilistic displacement is particularly pronounced in the competition among entrants because the size of the

74. The longitudinal performance of new entrant cohorts further shows that the market share of startups as a group declines with the passage of time, indicating that the increase in the share of successful startups does not compensate for the decline in share resulting from those who fail. The opposite obtains for diversifying entrants, however, where the impressive growth of surviving entrants more than offsets the loss of market share due to the failure of others, resulting in an overall gradual increase in their market share. Dunne, Roberts, & Samuelson, *The Growth and Failure of U.S. Manufacturing Plants*, *supra* note 73, at 672–73, 689–93. Diversifying firms also show a higher growth rate even after controlling for the systematic size differences between these two entrant types. *See id.* at 686–93; Dunne, Roberts, & Samuelson, *Patterns of Entry and Exit*, *supra* note 62, at 509–13.

75. Dunne, Roberts, & Samuelson, *The Growth and Failure of U.S. Manufacturing Plants*, *supra* note 73, at 672–73, 689–93.

76. This pattern suggests that the higher risk associated with startups may be coupled with somewhat higher returns to success. *See* Leo A. Weiss, *Start-Up Businesses: A Comparison of Performances*, 23 *SLOAN MGMT. REV.* 37 (1981) (comparing the performance of successful startups started by individual entrepreneurs with those started by large firms, finding the former to grow faster and achieve higher profitability sooner, and speculating that the possibly higher risk associated with individually started ventures is reflected in their higher returns). Yet these higher returns are insufficient to compensate the average startup for the significantly increased risk of failure it bears.

77. *See* Tor, *The Fable of Entry*, *supra* note 7, at 495, n. 50.

78. *Id.* at 494–96, 528–31.

79. *Id.* at 520–31.

pool of overconfident or risk-seeking prospective entrants is far larger than the limited number of entry opportunities that are rationally attractive.⁸⁰ These effects on the composition of the successful entrant cohorts are further exacerbated when the more rational among the potential entrants avoid entry that they recognize as riskier due to the prevalence of excess entry.⁸¹ Thus, the operation of competitive pressures on a background of entrepreneurial bounded rationality draws a postentry landscape with an increased proportion of ex ante more biased, less qualified entrants, in direct contradiction to the conventional view of competition as the “survival of the fittest.”⁸²

The emerging picture of the competition among boundedly rational entrepreneurs may appear troubling to those used to assuming entrants are rational actors. After all, those negative expected value entrants by definition incur losses as a group. The private costs of negative expected value entry to these failed entrepreneurs that should never have attempted entry translate into a deadweight loss to society from the unrecoverable resources wasted on these failed attempts. Yet there remains the possibility that all entrants (rational and boundedly rational alike) collectively may still generate direct social gains if the net benefits earned by those successful entrants exceed the net costs generated by all failed entrepreneurs, including those embarking on excessively risky ventures.

Negative expected value entrants generate social costs beyond the resources they waste directly. They generate significant negative externalities, diminishing the success prospects of more rational entrepreneurs and interfering with the efficient allocation of resources through market competition. Entrants that had superior ex ante prospects but either failed after initially attempting entry because of probabilistic displacement or refrained from entry altogether must direct their resources to less beneficial uses instead, thereby further reducing social welfare.

Excess entry also interferes with the market mechanism of resource allocation. Under ideal circumstances, market trading directs resources to their most valuable use regardless of their original distribution in society.⁸³ Consumers can purchase, however, only from among those products that are actually available in the marketplace. Some products, which would have been offered by rational entrants who either refrained from entry altogether or were replaced by boundedly rational competitors, inevitably are eliminated from the set of products on which consumer choice and selection operate. Consumer demand also selects some negative expected value products, which would not have been offered at all if entrants were strictly rational, over some other competing products. Consequently, some negative net present value products (or product mixes that include such products) substitute for those superior products that have never been offered.⁸⁴

Yet besides its various social costs, excessively risky entry also generates positive externalities and is likely to produce social benefits beyond those produced by rational entry, most notably due to the close association between the former and innovation.⁸⁵ Innovative entry, for instance, is more closely

80. Cf. Richard R. Nelson & Sidney G. Winter, *Forces Generating and Limiting Concentration Under Schumpeterian Competition*, 9 BELL J. ECON. 524, 524–25 (1978) (introducing an influential evolutionary model by describing competitive outcomes saying that “[i]ndeed, a situation that is regarded as “highly competitive” is typically one in which *luck is the principal factor* that finally distinguishes winners from near-winners”) (emphasis added).

81. For further analysis, see Tor, *The Fable of Entry*, *supra* note 7, at 533, n. 222, and accompanying text.

82. *Id.* at 533–34, n. 223.

83. See, e.g., JOSEPH E. STIGLITZ & JAY K. ROSENGARD, *ECONOMICS OF THE PUBLIC SECTOR* 66–68 (4th ed. 2015) (an introductory exposition of the fundamental theorems of welfare economics).

84. For a related analysis of the potential costs of consumer choice of freely offered goods, see Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement* (UC Berkeley Public Law Research Paper No. 2529425 and NYU Law and Economics Research Paper no. 14-44, Jan. 2015) (examining the potential competitive harm and welfare costs of freely offered goods).

85. See Kevin Bryant, *Promoting Innovation: An Overview of the Application of Evolutionary Economics and Systems Approaches to Policy Issues*, in FRONTIERS OF EVOLUTIONARY ECONOMICS: COMPETITION, SELF-ORGANIZATION AND INNOVATION POLICY 361, 371 (John Foster & J. Stanley Metcalfe eds., 2001) (concluding that empirical studies establish that various

associated with riskier startups rather than with the somewhat less risky diversifying entry.⁸⁶ Innovative entry typically involves more risk than noninnovative entry because the introduction of new products and technologies is associated with a greater degree of uncertainty.⁸⁷ Due to its greater riskiness, innovative entry is more likely to be undertaken by startup entrants.⁸⁸ Innovators may prefer to sell their innovations to incumbent firms rather than take the risk of independent entry, but incumbents' willingness to acquire innovations is negatively correlated with their originality.⁸⁹

In addition, because risk is positively associated with originality, interested incumbents will be more likely to introduce more original innovations through the startup route rather than under their own name and full liability. And innovative entrants who are unable (or unwilling) to convince incumbents of the attractiveness of their innovation are likely to embark on even riskier ventures.⁹⁰ After all, these innovators face the choice of either giving up or attempting independent new entry. The

“market imperfections,” such as imperfect knowledge, bounded rationality, and the inclusion of nonfinancial considerations in decision making, “are universal—and are necessary to drive change”); Giovanni Dosi & Yuri Kaniovski, *The Method of Generalized Urn Schemes in the Analysis of Technological and Economic Dynamics*, in *THE ECONOMICS OF GROWTH AND TECHNICAL CHANGE: TECHNOLOGIES, NATIONS, AGENTS* 261, 280 (Gerald Silverberg & Luc Soete eds., 1994) (using a new modeling paradigm to show how “‘market imperfections’ and ‘informational imperfections’ often tend to foster technological variety”).

86. See Zoltan J. Acs, Randall Morck, & Bernard Yeung, *Productivity Growth and Firm Size Distribution*, in *ENTREPRENEURSHIP, SMALL AND MEDIUM-SIZED ENTERPRISES AND THE MACROECONOMY* 367, 369–71, 392–93 (Zoltan J. Acs, Bo Carlsson, & Charlie Karlsson eds., 1999) (providing a brief review of arguments for and against the relative innovative advantages of small versus large firms and, *ceteris paribus*, of startup versus diversifying entrants); see also F. M. Scherer, *Corporate Size, Diversification, and Innovative Activity*, in *INNOVATION AND GROWTH* 222, 237 (F. M. Scherer ed., 1984) (concluding from the analyses of various data sources that large corporations invest greater relative resources in R&D, but “contribute[] fewer significant innovations, contest-winning technical advances, and invention patents . . . than smaller enterprises”).
87. See Giovanni Dosi, *The Nature of the Innovative Process*, in *TECHNICAL CHANGE AND ECONOMIC THEORY* 221, 222 (Giovanni Dosi, Christopher Freeman, Richard Nelson, & Luc Soete eds., 1988) (stating “innovation involves a fundamental element of uncertainty”); see also Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609 (1962) (arguing that more frequent innovation may be associated with greater uncertainty, not only as to the development of the product but also as to consumer demand); CHRISTOPHER FREEMAN, *THE ECONOMICS OF INDUSTRIAL INNOVATION* 148–68 (2d ed. 1982) (discussing the relationship between uncertainty and innovation and ways to deal with this risk); Giovanni Dosi, *Sources, Procedures, and Microeconomic Effects of Innovation*, 26 *J. ECON. LIT.* 1120 (1988) (suggesting that the increased uncertainty associated with innovation decreases the probability of survival of the innovating business).
88. Cf. Janet E. L. Bercovitz et al., *Firm Capabilities and Managerial Decision Making: A Theory of Innovation Biases*, in *TECHNOLOGICAL INNOVATION: OVERSIGHTS AND FORESIGHTS*, *supra* note 11, at 233 (arguing that large incumbents tend to introduce less radical innovations than do small firms because of the various individual and organizational biases exerted on the former); see also FREEMAN, *THE ECONOMICS OF INDUSTRIAL INNOVATION*, *supra* note 87, at 135–37 (suggesting that the evidence on the relationship between firm size and innovation is not fully conclusive, but that small firms tend to introduce more innovations, while larger firms are instrumental in developing many innovations and bringing these innovations to the market).
89. See, e.g., David B. Audretsch & Zoltan J. Acs, *Entrepreneurial Activity, Innovation, and Macroeconomic Fluctuations*, in *INNOVATION IN TECHNOLOGY, INDUSTRIES, AND INSTITUTIONS: STUDIES IN SCHUMPETERIAN PERSPECTIVES* 173, 174 (Yuichi Shionoya & Mark Perlman eds., 1994) (“[T]he more radical an innovation is—that is, the degree to which the competence of a firm is destroyed by that innovation—the more costly it will be for the firm to pursue that innovation.”). The more innovative the new invention, the more incumbents' benefits and costs from the adoption of the innovation, as well their objective opinion of its attractiveness will diverge from those of inventors. *Id.* at 174 (because of the “subjectivity of knowledge” involved in estimating the benefits of innovation, “a differential in the expected net value of a potential innovation between the innovator and incumbent firm is likely to emerge. As this gap gets large enough, the inventor will weight the costs of starting his own firm against the net benefits accruing from such a new start-up”).
90. This will typically happen when the divergence between the innovators' valuation of their innovations and that of incumbents is great. In these cases, innovators may be unwilling to sell for value they deem unreasonable, and incumbents may even be unwilling to make any offer for innovations they consider too risky or of a very low value. Cf. DAVID B. AUDRETSCH, *INNOVATION AND INDUSTRY EVOLUTION* (1995) (proposing a model in which an individual agent within an organization, who possesses new knowledge that may or may not have positive economic value because of uncertainty, may

more determined among them, who enter by themselves in the face of adversity, thus will embark more often on higher-risk, negative expected value ventures.⁹¹

The economic factors associated with innovative entry also increase the likelihood of bias in these entrepreneurs' assessments of their prospects. Innovative entrants face a greater degree of uncertainty when making their entry decisions than do less innovative or noninnovative entrants. Because greater ambiguity facilitates judgmental overconfidence, those highly innovative entrants will be prone to holding more extreme estimates of their potential ventures' value and probability of success.⁹² Non-innovative entrants, in contrast, face less risk and uncertainty. They may therefore be less biased, making fewer negative expected value attempts. It thus appears that, although some negative expected value entry results from the inflated assessments of noninnovative ventures, both economic and psychological factors direct highly biased innovative entrants to attempt negative expected value entry frequently, with startups being the likely venue.⁹³

The link between the bias in boundedly rational entrepreneurs' judgments of entry and innovation has further implications for entrants' risk taking. In particular, we saw that more biased entrants are also likely to exhibit greater risk seeking than their less biased counterparts. Hence, insofar as innovative, biased entrepreneurs are channeled to the startup route, innovative startups frequently will take even greater risks than they already would be expected to take on traditional economic grounds.

Importantly, the association among overconfidence, risk seeking, and innovative entry suggests boundedly rational entrepreneurs facilitate innovation and its attendant benefits, from the expansion of consumer choice, through technological "spillovers" and an increased rate of growth, to the increase of competitive pressures upon incumbents.

When overconfident entrepreneurs attempt entry more frequently than rationality dictates, they increase the range of possible outcomes of competitive selection among entrants, bringing to the market many innovative products, services, and methods of operation that otherwise would not have been introduced.⁹⁴ Of those high-risk innovative ventures, the substantial majority fail, but the minority that survive expose the economy to a significant amount of innovation. Even ventures that fail, moreover, expose other market participants to new ideas and information that may later provide a basis for successful ventures by other entrants or incumbents.⁹⁵ Failed entrants may also facilitate and shape

decide to exit and start a new venture due to asymmetries in knowledge and valuation between the individual and the organization).

91. In certain cases, the innovator may be unable to convince incumbents of the truly positive NPV of the venture or prefer, for solid economic reasons, to attempt new entry. Under these uncommon circumstances, the innovative new entry will be rational. Cf. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, *supra* note 87 (suggesting that given some simple assumptions small firms are likely to generate a large proportion of innovative research and only some production, while large firms engage more often in the mass production on the basis of ideas generated by small firms).

92. See Tor, *The Fable of Entry*, *supra* note 7, at 526–28.

93. See *id.* at 528–31.

94. See, e.g., Martin Carree & Roy Thurik, *Industrial Structure and Economic Growth*, in *INNOVATION, INDUSTRY EVOLUTION, AND EMPLOYMENT* 86, 88 (David B. Audretsch & A. Roy Thurik eds., 1999) (suggesting that "small businesses may contribute to higher growth because of their contribution to the selection process due to their variety"); Geroski, *What Do We Know About Entry?*, *supra* note 64, at 436–37 (suggesting that although innovations are often supply driven, potential consumers must get acquainted with new products before determining how they value their various characteristics, adding that the role of entry in introducing a variety of products may be more important in the earlier stages of the development of new markets); see also Mark Simon & Susan M. Houghton, *The Relationship Between Overconfidence and the Introduction of Risky Products: Evidence from a Field Study*, 46 *ACAD. MGMT. J.* 139 (2003) (providing evidence that overconfident managers introduced more innovative products that also experienced a higher rate of failure compared to the more incremental products introduced by their less biased peers).

95. See, e.g., William J. Baumol, *Innovation and Creative Destruction*, in *CREATIVE DESTRUCTION: BUSINESS SURVIVAL STRATEGIES IN THE GLOBAL INTERNET ECONOMY* 21, 23–26 (Lee W. McKnight, Paul M. Vaaler, & Raul L. Katz eds., 2001) (arguing the positive externalities from "spillovers" of innovation are important and of a larger magnitude than commonly recognized).

consumer demand for innovative products, making consumers aware of new possibilities for consumption.⁹⁶ These effects of boundedly rational, innovative entry therefore make important contributions to economic growth.⁹⁷

Successful, innovative, negative expected value entrants also provide an important competitive check on the behavior of incumbents.⁹⁸ The empirical findings on entry suggest that incumbent firms should have little concern with most new entrants, except possibly some of the largest diversifying ones, at the time of entry. Yet those few successful entrants who prosper and grow eventually pose a competitive threat to incumbents, forcing the latter to become more efficient and competitive in order to maintain market share and profitability. Innovative entrants are likely to pose an even greater threat to incumbents than do other successful entrants, because their innovations differ to a greater degree from the products and technologies used by incumbents. The success of such entrants facilitates consumer demand for such products and indicates not only that consumers want new products and technologies but that incumbents might become obsolete if they fail to provide them.

The competitive pressure on incumbents and dominant firms that successful innovative entrepreneurs exert is thus disproportionately greater than the threat posed by other, less innovative or non-innovative, successful entrants.⁹⁹

Ironically, a highly innovative environment may simultaneously increase the likelihood of the successful development of innovation and decrease the likelihood that the innovation will become a viable and marketable product. *See, e.g.*, David B. Audretsch, *Entrepreneurship and Economic Restructuring: An Evolutionary View*, in *ENTREPRENEURSHIP, SMALL AND MEDIUM-SIZED ENTERPRISES AND THE MACROECONOMY*, *supra* note 86, at 79, 84–85 (describing a recent study exploring the relationship between the persistently asymmetric firm size distribution in industry, in which small firms dominate, and the fact that entry is not substantially deterred in industries where scale economics and innovative activity play an important role).

96. *See, e.g.*, Dosi & Lovallo, *Rational Entrepreneurs or Optimistic Martyrs*, *supra* note 11, at 57–58 (suggesting that both the success and the failure of entrants fulfills an important role in industry learning, inter alia, by contributing to increased collective knowledge, in which case “they represent a sort of externality for the whole system”); *cf.* FREEMAN, *THE ECONOMICS OF INDUSTRIAL INNOVATION*, *supra* note 87, at 201 (stating that the direction of present research determines “the range of real choice available to consumers” when arguing for governmental support of R&D activity).
97. Thus, Bryant summarized the present state of the evidence by stating: “There is a general observation at the macro level that long-run economic growth depends on innovation. . . .” Bryant, *Promoting Innovation*, *supra* note 85, at 371. Innovation leads to growth by fostering a greater menu of options for market selection. *See, e.g.*, Pier Paolo Saviotti, *Variety, Economic and Technological Development*, in *INNOVATION IN TECHNOLOGY, INDUSTRIES, AND INSTITUTIONS*, *supra* note 89, at 27, 46 (“[I]nnovations . . . lead to qualitative change in the composition of the economic system, and this qualitative change is reflected in a growing variety”—a quantitative criterion the author develops to denote distinguishable products and economic actors.); *see generally* Chris Freeman, *Innovation and Growth*, in *HANDBOOK OF INDUSTRIAL INNOVATION* 78 (Mark Dodgson & Roy Rothwell eds., 1994) (reviewing the relationship between innovation and growth in economic theory).
98. *See, e.g.*, J. STANLEY METCALFE, *EVOLUTIONARY ECONOMICS AND CREATIVE DESTRUCTION* 115 (1998) (“Effective competition depends on diversity in behaviour and over time this can only be maintained by the continual introduction of new and better products and new and better methods of production.” Therefore, “it is the line between innovation and competition which has proved to be the mainspring of economic growth.”).
99. Although incumbents are less likely to be leading innovators, they may employ a strategy of “defensive” innovation, attempting incremental improvements in response to, or in anticipation of, more radical innovations by new entrants. *See* FREEMAN, *THE ECONOMICS OF INDUSTRIAL INNOVATION*, *supra* note 87, at 176–83 (noting also how incumbents will often not engage in pure imitation, but instead seek to improve and modify new innovations). Moreover, as Geroski notes when counting among the “stylized facts” about entry that “[h]igh rates of entry are often associated with high rates of innovation and increases in efficiency,” such facts “do not imply the entrants are always, or even often, the major source of innovation in markets. Many case studies show that entry stimulates incumbents to introduce new products and processes which they had been holding back.” Geroski, *What Do We Know About Entry?*, *supra* note 64, at 431.

IV. Entrepreneurship Policy and Antitrust

The behavioral analysis of the competition among boundedly rational entrepreneurs paints a picture that differs substantially from the traditional account of entry. On the one hand, the evidence and analysis marshalled here make clear that, due to many entrants' overconfident beliefs and (more) risk-seeking preferences, real entry attempts frequently are more risky than normative economic models allow. This excessively risky entrepreneurial activity generates substantial social costs. Yet on the other hand, boundedly rational entrepreneurship also plays an important role in facilitating innovative entry with its direct and indirect socially beneficial contributions to efficiency and economic growth.

Given the complex nature of boundedly rational entry and its market consequences, what should entrepreneurship policy aim at? It is clear that policy makers should not hasten to interfere with boundedly rational entry and thereby risk diminishing its benefits. In theory, effective detection and prevention at the margin of some negative net present value entry might be beneficial. The problem is, however, that there is no easy means of quantifying with any certainty the benefits and costs of entry in general or of a specific venture in particular. It is extremely difficult to determine *ex ante*, for instance, which ventures truly are excessively risky. Indeed, any regulatory attempt to sift among ventures and pose further hurdles to "undesirable" ones becomes even more perilous given the danger of preventing or deterring highly beneficial innovative entry.¹⁰⁰

Thus, the balance of boundedly rational entrepreneurship's social costs and benefits appears uncertain, though possibly positive, and its regulation is of questionable desirability and limited practicality. But if intervention is neither clearly necessary nor likely to be effective, the law should take the pervasive presence of excessively risky entry as given and examine whether its antitrust doctrines—which frequently rely on the competitive role of entry—require modification.

Most generally, the behavioral analysis of entry suggests that the fundamental hostility of antitrust law to unnecessary restrictions on new business entry is well-founded, given entry's important pro-competitive benefits, despite the prevalence of excessively risky entry.¹⁰¹ The benefits that flow from boundedly rational, often smaller-scale, innovative entry also indicate that the long-discarded "populist" goals of antitrust law perhaps may not contradict the accepted goal of promoting economic efficiency to the extent commonly thought.¹⁰² In fact, these early populist views may have partly reflected a well-founded concern for maintaining the social contribution of small, boundedly rational entrepreneurship. Nonetheless, as a practical matter, the analysis here confirms that an economic approach, albeit modified to account for the reality of boundedly rational behavior, still provides the most coherent framework for the interpretation of market behavior and thus for the application of the antitrust laws.¹⁰³

100. Beyond the numerous difficulties involved in any governmental regulation of entry, most of the various potential forms of intervention are likely to be ineffective in accomplishing the goal of reducing undesirable negative expected value entry. In theory, an attempt to debias entrants may be the best method of intervention, but behavioral findings suggest that such an approach is doomed to fail here. See Tor, *Methodology*, *supra* note 8, at 297–300 (discussing the limitations of debiasing in legally relevant settings).

101. See, e.g., AREEDA & HOVENKAMP, *ANTITRUST LAW*, *supra* note 6, ¶ 112b.

102. Such goals include the dispersion of economic and political power and the protection of small competitors from larger and more powerful rivals, the latter of which was especially significant in the legislative history of the Sherman Act. For a discussion of the various conflicting goals attributed to the antitrust law both historically and at the present, see *id.* at ¶¶ 100–14.

103. Antitrust commentators have long pointed out that noneconomic goals fail to provide proper guidance to the courts in their implementation of the antitrust laws. See, e.g., *id.* at ¶ 110 (arguing that the traditional economic approach to antitrust law, even if imperfect, is still far more coherent than alternative approaches); ROBERT BORK, *THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF* 6–11 (2d ed. 1993) (discussing the conflicting goals of the antitrust laws and arguing for the alignment of antitrust policy with efficiency considerations); RICHARD A. POSNER, *ANTITRUST LAW*, at vii–x (2d ed. 2001). For a broader analysis of the role of behavioral insights in antitrust analysis, see Tor, *Behavioral Antitrust*, *supra* note 8.

At the same time, however, the analysis suggests that antitrust law should be wary of relying on seemingly low barriers to entry alone to guarantee competitive pressure on incumbents in the short run because most new entrants will fail and detract little from incumbents' market power.¹⁰⁴ When these low barriers to entry are accompanied by larger scale, actual or potential, diversifying entry, on the other hand, incumbents are more likely to face competitive pressure even in the short term.¹⁰⁵

The law of predatory pricing illustrates the implications of the behavioral analysis of entrepreneurial entry for the evaluation of market power in antitrust. Entry plays an important role in the legal analysis of predatory pricing, the practice of selling at nonremunerative prices to drive out, exclude, or discipline rivals. Because predatory pricing requires the predatory firm to make a significant investment by selling at unprofitable, below-cost prices, it is deemed illegal only if the predator has the opportunity to recoup its losses.¹⁰⁶ According to the case law, for recoupment to be possible, the alleged predator must enjoy, *inter alia*, the protection of high barriers to entry; thus, the *Brooke Group* Court declared that predatory pricing allegations can be rejected summarily when entry is easy.¹⁰⁷

The present analysis suggests a somewhat different conclusion, however. Because a high rate of excessively risky entry may be accompanied by very limited market penetration, the mere evidence of entry should not be sufficient to reject predatory pricing claims out of hand. Instead, courts should focus on the actual success of entrants in penetrating the market as a better indicator of the short-term competitive threat such entrants pose for allegedly predatory incumbents. Such historical success in penetration can be based on the record of performance in the relevant market, which should not be more difficult to obtain than other evidence of market conditions or past performance that parties are often required to present in antitrust cases.¹⁰⁸

More generally, as the predatory pricing example illustrates, antitrust law doctrine and practice both should be careful when inferring the lack of market power from seemingly low barriers to entry, particularly when such barriers are not accompanied by successful market penetration or at least by likely diversifying entry. Within the intermediate time horizons of a few years that typically concern antitrust law, startup entry will rarely provide the discipline that will prevent otherwise powerful incumbents from exerting power in the market.¹⁰⁹ Yet the important long-term benefits of entry generally and boundedly rational, innovative entry in particular also require the law carefully to evaluate incumbent behavior that targets potential or actual entrants or aims to erect further barriers to entry.¹¹⁰

104. This conclusion is also supported by the findings on limited incumbent reaction to entry generally, and the rarity of price-related entry-detering strategies on the part of incumbents specifically. *Cf.* Geroski, *What Do We Know About Entry?*, *supra* note 64, at 437 (arguing in favor of antitrust law's emphasis on entry barriers but suggesting that the procompetitive effects of entry can be easily exaggerated, especially in the short run).

105. *See* Tor, *Behavioral Antitrust*, *supra* note 8, at 603–4 (noting the importance of entry in the U.S. Department of Justice and Federal Trade Commission's 2010 Horizontal Merger Guidelines and stating that “[p]rospective entry plays an important role in merger assessments because it can counteract the anticompetitive effects of increased market power that might otherwise follow a merger”).

106. Predatory pricing violates both the Sherman Act, 15 U.S.C. § 2 (2012) (the offense of monopolization) and the Robinson-Patman Act, 15 U.S.C. § 13 (2012). *See generally* AREEDA & HOVENKAMP, *ANTITRUST LAW*, *supra* note 6, ¶ 723, ¶ 726a.

107. *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 225–26 (1993).

108. *See, e.g.*, AREEDA & HOVENKAMP, *ANTITRUST LAW*, *supra* note 6, at ¶ 112. For further analysis and discussion of the implications of boundedly rational entry for the law of predatory pricing, *see* Tor, *The Fable of Entry*, *supra* note 7, at 552–55. *See also* Tor, *Behavioral Antitrust*, *supra* note 8, at 603–6.

109. These considerations, in fact, largely are compatible with analytical framework now incorporated into the horizontal merger guidelines. *See* Tor, *Behavioral Antitrust*, *supra* note 8, at 655–57 (discussing the implications of the behavioral analysis of entry for the interpretation and application of the guidelines).

110. *Cf.* *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001) (finding, *inter alia*, that Microsoft violated Section 2 of the Sherman Act by engaging in anticompetitive conduct to prevent nascent threats to its then-dominant PC operating system from the innovative middleware of Netscape and Java, though these prospective competitors were not in the operating system market at the time).

V. Conclusion

We have seen that while traditional economic models assume rational, profit-maximizing entrepreneurship, the empirical evidence on entry shows that excessively risky entry is quite prevalent. This article showed that the bounded rationality of real entrants—specifically, their tendency to exhibit overconfident judgments and risk-seeking preferences—can help account for this otherwise puzzling phenomenon.

Notably, the behavioral account of the forces driving excessively risky entry also offers a fresh perspective on the dynamics of competition among these entrepreneurs and its consequences. Boundedly rational entry, it turns out, generates a postentry landscape in which most of these excessively risky ventures fail and disappear, but the small portion of them that succeed end up constituting a substantial fraction of the cohort of successful entrants. The boundedly rational entrants who fail generate social costs, as do even those few who succeed. At the same time, however, excessively risky entry also brings about important social benefits, primarily because of its association with innovation.

This complex combination of costs and benefits that are difficult to predict in any given case and hard to measure with any precision suggests that entrepreneurship policy should not aim to curb boundedly rational entry. Antitrust law, on the other hand, should consider carefully the role of entry in its doctrines and practice, most notably those that rely on entry to limit incumbents' market power or concern private or public actions that may inhibit new entry or further limit the ability of new ventures to penetrate the market.

Finally, the recognition that entrepreneurial activity is an area rife with boundedly rational behavior suggests that additional research and scholarship into the nature of such behavior and its market effects could offer valuable insights for policy and law alike.

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