

# Property, Freedom, & Society

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Essays in Honor of  
Hans-Hermann Hoppe

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## Risk, Uncertainty, and Economic Organization

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In a recent paper, “The Limits of Numerical Probability: Frank H. Knight and Ludwig von Mises and the Frequency Interpretation,” Hans-Hermann Hoppe explores Mises’s approach to probability and its implications for economic forecasting.<sup>1</sup> Hoppe argues that Mises, like Frank Knight, subscribed to the “frequency interpretation” developed by Mises’s brother, Richard von Mises,<sup>2</sup> along with others such as Ronald Fisher, Jerzy Neyman, and Egon Pearson. At first, this might seem surprising, as the frequency interpretation is usually contrasted with the “subjectivist” approach to probability advanced by de Finetti and, among economists, usually associated with Keynes.<sup>3</sup> A thoroughgoing commitment to

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<sup>1</sup>Hans-Hermann Hoppe, “The Limits of Numerical Probability: Frank H. Knight and Ludwig von Mises and the Frequency Interpretation,” *Quarterly Journal of Austrian Economics* 10, no. 1 (2007): 1–20.

<sup>2</sup>Richard von Mises, *Probability, Statistics and Truth* (New York: Dover Publications, 1957 [1939]).

<sup>3</sup>Bruno de Finetti, “Foresight: Its Logical Laws, Its Subjective Sources,” in H.E. Kyburg and H.E. Smokler, eds., *Studies in Subjective Probability* (New

methodological subjectivism is, of course, a hallmark of the Austrian School. However, as Hoppe points out, Mises recognized two distinct kinds of probability, one applying to natural phenomena and another applying to human action. Just as Mises embraced “praxeology” in economics while endorsing the experimental method in the natural sciences, he thought a special kind of probability was relevant to economic decision-making, while accepting his brother’s frequency interpretation for other kinds.

This paper extends the discussion by drawing out implications for economic organization of Mises’s approach to probability, particularly regarding the entrepreneur’s role in guiding the economic process by establishing and dissolving firms, directing their operations, and organizing them to create and capture value. After a brief review of Hoppe’s interpretation of Knight and Mises, I summarize recent literature on the Knight-Mises approach to entrepreneurship and the firm, closing with some suggestions for future research.

#### KNIGHT, MISES, AND MISES ON PROBABILITY

Most economists are familiar with Knight’s distinction between “risk” and “uncertainty.” Risk refers to situations in which the outcome of an event is unknown, but the decision-maker knows the range of possible outcomes and the probabilities of each, such that anyone with the same information and beliefs would make the same prediction. Uncertainty, by contrast, characterizes situations in which the range of possible outcomes, let alone the relevant probabilities, is unknown. In this case the decision-maker cannot follow a formal decision rule but must rely on an intuitive understanding of the situation—what Knight calls “judgment”—to anticipate what may occur. Risk, in this sense, refers to “a quantity susceptible of measurement,” and not a “true” uncertainty that cannot be quantified.<sup>4</sup> The essential function of the entrepreneur,

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York: Wiley, 1964 [1937]); John Maynard Keynes, *A Treatise on Probability* (London: Macmillan, 1921).

<sup>4</sup>Frank H. Knight, *Risk, Uncertainty, and Profit* (New York: August M. Kelley, 1921), p. 26.

in Knight's system, is to exercise judgment, particularly in the context of purchasing factors of production.

Mises, in similar fashion, distinguished between "class probability" and "case probability." The former describes situations in which an event may be classified as a unique element of a homogeneous class, the properties of which are known. No one can predict whether a particular house in a particular neighborhood will burn down this year, but insurance companies know how many similar houses in similar locations have burned in the past, and from this the likelihood of a particular house burning within a particular period can be estimated. Case probability applies to cases in which each event is unique, such that no general class probabilities can be defined.<sup>5</sup> Here Mises, as argued by Hoppe, builds on his brother's defense of "frequentism," the idea that the probability of a particular event is the limit value of its relative frequency in a series of trials. In this understanding, probabilities can be defined only in cases in which repeated trials are feasible—i.e., in situations where each event can be meaningfully compared to other events in the same class. Moreover, and for this reason, probabilities can only be defined *ex post*, as learned through experience, and cannot exist *a priori*. Hence, Mises defines case probability, or uncertainty, as a case in which probabilities, in the frequentist sense, do not exist.<sup>6</sup>

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<sup>5</sup>O'Driscoll and Rizzo adopt the terms "typical events" and "unique events" to get at this distinction. See Gerald P. O'Driscoll, Jr., and Mario J. Rizzo, *The Economics of Time and Ignorance* (Oxford: Basil Blackwell, 1985).

<sup>6</sup>Hence the use of the term "case probability" is misleading; what Mises really means is "case non-probability," or perhaps "case judgments without probabilities." Confusingly, Mises also argues elsewhere that "[o]nly preoccupation with the mathematical treatment could result in the prejudice that probability always means frequency" (Mises, *Human Action*, p. 107). Van den Hauwe argues, in contrast to Hoppe, that Mises's position is in some ways closer to Keynes's. See Ludwig Van den Hauwe, "John Maynard Keynes and Ludwig von Mises on Probability," MPRA Paper No. 6965 (2007); Hoppe, "Limits of Numerical Probability"; and Keynes, *A Treatise on Probability*.

Hoppe summarizes Knight's and Mises's views and argues persuasively that they are variants of Richard von Mises's position.<sup>7</sup> Hoppe also goes beyond Mises in explaining why human action, in Mises's sense of purposeful behavior, cannot be made part of a homogenous class. "Without a specified collective and a (assumedly) full count of its individual members and their various attributes no numerical probability statement is possible (or is, if made, arbitrary)."<sup>8</sup> Of course, as Hoppe notes, we can define such classes in a technical sense – me writing this chapter is an element of the class "economists writing book chapters" – but defining the class is not sufficient for applying class probability to an event. There must also be randomness, or what Richard von Mises calls "complete lawlessness," within the class.<sup>9</sup> And yet, this is not possible with human action:

It is in connection with this randomness requirement where Ludwig von Mises (and presumably Knight) see insuperable difficulties in applying probability theory to human actions. True, formal-logically for every single action a corresponding collective can be defined. However, ontologically human actions (whether of individuals or groups) cannot be grouped in "true" collectives but must be conceived as unique events. Why? As Ludwig von Mises would presumably reply, the assumption that one knows nothing about any particular event except its membership in a known class is false in the case of human actions; or, as Richard von Mises would put it, in the case of human actions we know a "selection rule" the application of which leads to fundamental changes regarding the relative frequency (likelihood) of the attribute in question (thus ruling out the use of the probability calculus).<sup>10</sup>

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<sup>7</sup>Hoppe, "Limits of Numerical Probability." One might also include Shackle's notion of "self-destructive, non-serializable" decisions. See G.L.S. Shackle, *Decision, Order, and Time in Human Affairs* (Cambridge: Cambridge University Press, 1961).

<sup>8</sup>Hoppe, "Limits of Numerical Probability," p. 10.

<sup>9</sup>Richard von Mises, *Probability, Statistics, and Truth*, p. 24.

<sup>10</sup>Hoppe, "Limits of Numerical Probability," p. 11.

Hoppe touches briefly upon, without treating in detail, the subjective approach to probability, in which *a priori* probabilities are treated simply as beliefs, rather than the outcome of some objective process of repeated trial and observation. Hoppe quotes Richard von Mises's remark that subjectivists such as John Maynard Keynes fail to recognize "that if we know nothing about a thing, we cannot say anything about its probability."<sup>11</sup> Adds Mises: "The peculiar approach of the subjectivists lies in the fact that they consider 'I presume that these cases are equally probable' to be equivalent to 'These cases are equally probable,' since, for them, probability is only a subjective notion."<sup>12</sup> Subjective probability has become central in contemporary microeconomic theory, however, particularly with the rise of Bayesian approaches to decision-making. Agents acting under conditions of uncertainty are assumed to have prior beliefs—correct or incorrect—about the probabilities of various events. These prior beliefs are exogenous, they may be common to a group of agents or unique to a particular agent, and they may or may not correspond to objective probabilities (in the frequentist sense). The Bayesian approach focuses on the procedure by which agents update these prior beliefs based on new information, and this updating is assumed to take place according to a formal rule (i.e., according to Bayes's law). Hence, the *ex post* probability, in such a problem, contains an "objective" element, even if it is a revision of a purely subjective prior belief.<sup>13</sup>

Langlois<sup>14</sup> argues for a tight connection between subjectivism in the Austrian sense of value theory and subjective probability theory, arguing that probabilities should be interpreted as beliefs about information structures, rather than objective events.

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<sup>11</sup>Richard von Mises, *Probability, Statistics, and Truth*, p. 75.

<sup>12</sup>*Ibid.*, p. 76.

<sup>13</sup>Bayesian updating can also be applied to objective prior probabilities, presumably to give guidance to the decision-maker in cases where repeated trials to determine the new *ex post* probability are not possible. The "Monty Hall paradox" is a classic example.

<sup>14</sup>Richard N. Langlois, "Subjective Probability and Subjective Economics," C.V. Starr Center for Applied Economics Research Report #82-09, Faculty of Arts and Science, New York University (1982).

[I]t is not meaningful to talk about “knowing” a probability or a probability distribution. A probability assessment reflects one’s state of information about an event; it is not something ontologically separate whose value can be determined objectively.<sup>15</sup>

What distinguishes case from class probability, according to Langlois, is the character of the decision-maker’s information about the event. Objective probabilities (in the frequentist sense) are simply special cases of subjective probabilities in which the decision-maker structures the problem in terms of classes of events. Entrepreneurship, in Langlois’s interpretation, can be described as the act of formalizing the decision problem. To use the language of decision theory, a non-entrepreneur (call him, following Kirzner, a Robbinsian maximizer) is presented with a decision tree, a set of outcomes, and the probabilities for each outcome, and simply uses backwards induction to solve the problem.<sup>16</sup> The entrepreneur, as it were, re-draws the tree, by noticing a possible option or outcome that other agents failed to see. The key distinction, according to Langlois, is not whether the decision tree is populated with objective or subjective probabilities, but whether the tree itself is exogenous (Knightian risk) or endogenous (Knightian uncertainty).

Hoppe follows Richard von Mises in rejecting the subjectivist position (and obviously sees no contradiction between the frequentist approach to probability and the subjective theory of value). It is not clear exactly what is gained by redefining probabilities as “subjective with one information set” or “subjective with another information set.” As discussed in the next section, both Knight and Mises saw probability theory in economics as playing a particular role, namely allowing the theorist to distinguish situations in which prices are *predictable*, making profits and losses ephemeral, and situations in which prices can only be anticipated, using some form of *Verstehen*, by entrepreneurs. A subjectivist parameterization of *Verstehen* may be possible, without being useful.

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<sup>15</sup>Langlois, “Subjective Probability and Subjective Economics,” p. 8.

<sup>16</sup>Israel M. Kirzner, *Competition and Entrepreneurship* (Chicago and London: University of Chicago Press, 1973).

## UNCERTAINTY AND THE ENTREPRENEUR

Neither Knight nor Mises focused primarily on individual decision-making per se, but on the role of decision-making within the market system. “As economists,” Hoppe observes, Knight and Mises “come upon the subject of probability indirectly, in conjunction with the question concerning the source of entrepreneurial profits and losses.”<sup>17</sup> Indeed, while Knight devotes a chapter of *Risk, Uncertainty, and Profit* to a detailed discussion of knowledge, reasoning, and learning, his main purpose is not to analyze the ontology of judgment, but to explain the practical workings of the market. Specifically, his purpose in developing his account of probability was to decompose business income into two constituent elements, interest and profit. Interest is a reward for forgoing present consumption, is determined by the relative time preferences of borrowers and lenders, and would exist even in a world of certainty. Profit, by contrast, is a reward for anticipating the uncertain future more accurately than others (e.g., purchasing factors of production at market prices below the eventual selling price of the product), and exists only in a world of “true” uncertainty. In such a world, given that production takes time, entrepreneurs will earn either profits or losses based on the differences between factor prices paid and product prices received.

Mises, likewise, makes uncertainty central to his theory of profit and loss, a cornerstone of his well-known critique of economic planning under socialism. Mises begins with the marginal productivity theory of distribution developed by his Austrian predecessors. In the marginal productivity theory, laborers earn wages, capitalists earn interest, and owners of specific factors earn rents. Any excess (deficit) of a firm’s realized receipts over these factor payments constitutes profit (loss). Profit and loss, therefore, are returns to entrepreneurship. In a hypothetical equilibrium without uncertainty (what Mises calls the “evenly rotating economy”), capitalists would still earn interest, as a reward for lending, but there would be no profit or loss.

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<sup>17</sup>Hoppe, “Limits of Numerical Probability,” p. 4. See also James Buchanan and Alberto Di Pierro, “Cognition, Choice, and Entrepreneurship,” *Southern Economic Journal* 46, no. 3 (1980): 693–701.

Entrepreneurs, in Mises's understanding of the market, make their production plans based on the current prices of factors of production and the anticipated future prices of consumer goods. What Mises calls "economic calculation" is the comparison of these anticipated future receipts with present outlays, all expressed in common monetary units. Under socialism, the absence of factor markets and the consequent lack of factor prices, renders economic calculation—and hence rational economic planning—impossible. Mises's point is that a socialist economy may assign individuals to be workers, managers, technicians, inventors, and the like, but it cannot, by definition, have entrepreneurs, because there are no money profits and losses. Entrepreneurship, and not labor or management or technological expertise, is the crucial element of the market economy. As Mises puts it: directors of socialist enterprises may be allowed to "play market," to make capital investment decisions as if they were allocating scarce capital across activities in an economizing way, but entrepreneurs cannot be asked to "play speculation and investment."<sup>18</sup> Without entrepreneurship, a complex, dynamic economy cannot allocate resources to their highest valued use.

Why can't a central planning board mimic the operations of entrepreneurs? The key, for Mises, is that entrepreneurial appraisal is not a mechanical process of computing expected values using known probabilities, but a kind of *Verstehen* that cannot be formally modeled using decision theory. The entrepreneur, Mises writes, "is a speculator, a man eager to utilize his opinion about the future structure of the market for business operations promising profits."<sup>19</sup> The entrepreneur relies on his "specific anticipative understanding of the conditions of the uncertain future," an understanding that "defies any rules and systematization."

This concept of the entrepreneurial function is difficult to reconcile with the optimization framework of neoclassical economics. In this framework, either decision-making is "rational," meaning

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<sup>18</sup>Ludwig von Mises, *Human Action: A Treatise on Economics*, Scholars Edition (Auburn, Ala.: Ludwig von Mises Institute, 2001 [1949]), p. 705.

<sup>19</sup>*Ibid.*, p. 585.

that it can be represented by formal decision rules, or it is purely random. T. W. Schultz poses the problem this way:

[I]t is not sufficient to treat entrepreneurs solely as economic agents who only collect windfalls and bear losses that are unanticipated. If this is all they do, the much vaunted free enterprise system merely distributes in some unspecified manner the windfalls and losses that come as surprises. If entrepreneurship has some economic value it must perform a useful function which is constrained by scarcity, which implies that there is a supply and a demand for their services.<sup>20</sup>

The key to understanding this passage is to recognize Schultz's rejection, following Friedman and Savage, of Knightian uncertainty.<sup>21</sup> If all uncertainty can be parameterized in terms of (possibly subjective) probabilities, then decision-making in the absence of such probabilities must be random. Any valuable kind of decision-making must be modelable, must have a marginal revenue product, and must be determined by supply and demand. For Knight, however, decision-making in the absence of a formal decision rule or model (i.e., judgment) is not random, it is simply not modelable. It does not have a supply curve, because it is a residual or controlling factor that is inextricably linked with resource ownership. As discussed above, it is a kind of understanding, or *Verstehen*, that defies formal explanation but is rare and valuable. In short, without the concept of Knightian uncertainty, Knight's idea of entrepreneurial judgment makes little sense.

Nor is judgment simply luck.<sup>22</sup> To be sure, one could imagine a model in which entrepreneurs are systematically biased, as in

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<sup>20</sup>T. W. Schultz, "Investment in Entrepreneurial Ability," *Scandinavian Journal of Economics* 82, no. 4 (1980): 437–48, esp. pp. 437–38.

<sup>21</sup>Milton Friedman and Leonard Savage, "Utility Analysis of Choices Involving Risk," *Journal of Political Economy* 56, no. 4 (1948): 279–304.

<sup>22</sup>Kirznerian alertness is compared to luck in Harold Demsetz, "The Neglect of the Entrepreneur," in Joshua Ronen, ed. *Entrepreneurship* (Lexington: Lexington Press, 1983), pp. 271–80.

Busenitz and Barney<sup>23</sup>—individuals become owner-entrepreneurs because they overestimate their own ability to anticipate future prices—and the supply of entrepreneurs is sufficiently large that at least a few guess correctly, and earn profits. In such an economy there would be entrepreneurs, firms, profits, and losses, and profit (under uncertainty) would be distinct from interest. However, as Mises emphasizes, some individuals are more adept than others, over time, at anticipating future market conditions, and these individuals tend to acquire more resources while those whose forecasting skills are poor tend to exit the market.<sup>24</sup> Indeed, for Mises, the entrepreneurial selection mechanism in which unsuccessful entrepreneurs—those who systematically overbid for factors, relative to eventual consumer demands—are eliminated from the market is the critical “market process” of capitalism.<sup>25</sup>

#### ENTREPRENEURIAL JUDGMENT AND THE FIRM

In a series of papers, Nicolai Foss and I have used the Knight-Mises concept of the entrepreneur to explain important aspects of economic organization.<sup>26</sup> We start with Knight’s view that entrepreneurship represents judgment that cannot be assessed in terms

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<sup>23</sup>Lowell W. Busenitz and Jay B. Barney, “Differences between Entrepreneurs and Managers in Large Organizations: Biases and Heuristics in Strategic Decision-Making,” *Journal of Business Venturing* 12, no. 1 (1997): 9–30.

<sup>24</sup>Ludwig von Mises, “Profit and Loss,” in Mises, *Planning for Freedom* (South-Holland, Ill.: Libertarian Press, 1952), pp. 108–50.

<sup>25</sup>Peter G. Klein, “The Mundane Economics of the Austrian School,” *Quarterly Journal of Austrian Economics* 11, nos. 3–4 (2008): 165–87.

<sup>26</sup>Nicolai J. Foss and Peter G. Klein, “Entrepreneurship and the Economic Theory of the Firm: Any Gains from Trade?” in Rashjee Agarwal, Sharon A. Alvarez and Olaf Sorenson, eds., *Handbook of Entrepreneurship Research: Disciplinary Perspectives* (Dordrecht: Springer, 2005); Kirsten Foss, Nicolai J. Foss and Peter G. Klein, “Original and Derived Judgment: An Entrepreneurial Theory of Economic Organization,” *Organization Studies* 28, no. 12 (2007): 1893–1912; Kirsten Foss, Nicolai J. Foss, Peter G. Klein and Sandra K. Klein, “The Entrepreneurial Organization of Heterogeneous Capital,” *Journal of Management Studies* 44, no. 7 (2007): 1165–86; Peter G. Klein, “Opportunity Discovery, Entrepreneurial Action, and Economic Organization,” *Strategic Entrepreneurship Journal* 2, no. 3 (2008): 175–90.

of its marginal product and which, accordingly, cannot be paid a wage.<sup>27</sup> In other words, there is no market for the judgment that entrepreneurs rely on, and therefore exercising judgment requires the person with judgment to start a firm. Of course, judgmental decision makers can hire consultants, forecasters, technical experts, and so on. However, in doing so they are exercising their own entrepreneurial judgment.<sup>28</sup> Judgment thus implies asset ownership, for judgmental decision-making is ultimately decision-making about the employment of resources. The entrepreneur's role, then, is to arrange or organize the capital goods he owns. As Lachmann puts it: "We are living in a world of unexpected change; hence capital combinations . . . will be ever changing, will be dissolved and reformed. In this activity, we find the real function of the entrepreneur."<sup>29</sup>

This approach to the firm combines Knight's concept of judgment with the Austrian notion of capital heterogeneity. Foss, Foss, Klein, and Klein operationalize capital heterogeneity by incorporating Barzel's idea that capital goods are distinguished by their *attributes*.<sup>30</sup> Attributes are characteristics, functions, or possible uses of assets, as perceived by an entrepreneur. Assets are heterogeneous to the extent that they have different, and different levels of, valued attributes. Attributes may also vary over time, even for

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<sup>27</sup>Knight, *Risk, Uncertainty and Profit*, p. 311.

<sup>28</sup>In the terminology of Foss et al., "Original and Derived Judgment," the entrepreneur-owner exercises "original" judgment, while hired employees, to whom the owner delegates particular decision rights, exercise "derived" judgment as agents of the owner. This implies that top corporate managers, whose day-to-day decisions drive the organization of corporate resources, are acting only as "proxy-entrepreneurs," except to the extent that they themselves are part owners through equity holdings.

<sup>29</sup>Ludwig M. Lachmann, *Capital and Its Structure* (Kansas City: Sheed, Andrews and McMeel, 1956), p. 16. Lachmann does not require the entrepreneur to own the assets he recombines; see Foss et al., "Entrepreneurial Organization of Heterogeneous Capital," for a more detailed argument that ownership, as residual rights of control, is a necessary part of this entrepreneurial function.

<sup>30</sup>Foss et al., "Entrepreneurial Organization of Heterogeneous Capital"; Yoram Barzel, *Economic Analysis of Property Rights* (Cambridge: Cambridge University Press, 1997).

a particular asset. Given Knightian uncertainty or Misesian case probability, attributes do not exist objectively, but subjectively, the minds of profit-seeking entrepreneurs who put these assets to use in various lines of production. Consequently, attributes are manifested in production decisions and realized only *ex post*, after profits and losses materialize.

Entrepreneurs who seek to create or discover new attributes of capital assets will want ownership titles to the relevant assets, both for speculative reasons and for reasons of economizing on transaction costs. These arguments provide room for entrepreneurship that goes beyond deploying a superior combination of capital assets with “given” attributes, acquiring the relevant assets, and deploying these to producing for a market: Entrepreneurship may also be a matter of experimenting with capital assets in an attempt to discover new valued attributes, either by trying out new combinations through the acquisition of or merger with another firm or by trying out new combinations of assets already under the control of the entrepreneur. The entrepreneur’s success in experimenting with assets in this manner depends not only on his ability to anticipate future prices and market conditions, but also on internal and external transaction costs, the entrepreneur’s control over the relevant assets, how much of the expected return from experimental activity he can hope to appropriate, and so on. Moreover, these latter factors are key determinants of economic organization in modern theories of the firm, which suggests that there may be fruitful complementarities between the theory of economic organization and Austrian theories of capital heterogeneity and entrepreneurship.

Foss, Foss, Klein, and Klein show how this approach provides new insights into the emergence, boundaries, and internal organization of the firm.<sup>31</sup> Firms exist not only to economize on transaction costs, but also as a means for the exercise of entrepreneurial judgment, and as a low-cost mechanism for entrepreneurs to experiment with various combinations of heterogeneous capital goods. Changes in firm boundaries can likewise be understood as the result of processes of entrepreneurial experimentation. And

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<sup>31</sup>Ibid.

internal organization can be interpreted as the means by which the entrepreneur delegates particular decision rights to subordinates who exercise a form of “derived” judgment on his behalf.<sup>32</sup>

#### CONCLUSION

Uncertainty, in Knight’s and Mises’s sense, is thus fundamental to understanding not only the profit-and-loss system, and the market’s process of allocating productive resources to their highest-valued users, but also the economic nature of the business firm itself. Unfortunately, contemporary neoclassical economics tends to reject both the distinction between case and class probability and the entrepreneur. If there is no “true” uncertainty, then profits are the result of monopoly power or random error. If any firm can do what any other firm does, if all firms are always on their production possibility frontiers, and if firms always make optimal choices of inputs, then there is little for the entrepreneur to do.

Fortunately, the modern entrepreneurship literature has begun to recognize the need for a more sophisticated treatment of uncertainty (along with other cognitive issues—see the discussion in Alvarez and Barney<sup>33</sup>), and concepts of resource heterogeneity are common in to the resource- and knowledge-based views of the firm, transaction-cost economics, and the real-options approach to the firm. Far from rehashing old controversies, the reexamination of Mises’s and Knight’s views on uncertainty in Hoppe’s paper provides fresh insight into the entrepreneur, the firm, and the market process. ∞

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<sup>32</sup>Ibid.

<sup>33</sup>Sharon Alvarez and Jay B. Barney, “Discovery and Creation: Alternative Theories of Entrepreneurial Action,” *Strategic Entrepreneurship Journal* 1, nos. 1–2 (2007), pp. 11–26.