

THE MYTH OF THE “WINNER’S CURSE” IN AUCTIONS OF CAPITAL GOODS

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ABSTRACT: The *winner’s curse* was “discovered” in low rates of return on certain types of capital goods acquired in auctions or negotiated acquisitions. The inference was that companies were systematically bidding amounts in excess of their presumed “common investment worth.” In exploring this phenomenon, experimental auctions have uncritically relied on this *exogenous ex ante* standard of common capital worth. However, experiment auction are irrelevant to auctions of capital goods. Capital goods imply strategies for their employment. But an assumed common investment worth implies an absence of differentiated strategies. In fact, the prospective investment worth of a capital good inheres in strategically sought complementarities in the production of often distinctively differentiated goods and services. Hence, there is no likelihood that capital goods would ever have an appraised worth common to competing bidders. Bids can only be assessed *ex post* in the success or failure of an entrepreneurial strategy. This inquiry suggests a revised interpretation of the winner’s curse.

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JEL CLASSIFICATION: D44, D84, E22, G12, L21, M1

I. INTRODUCTION AND OVERVIEW

The winner's curse is said to characterize auctions in which winning bidders erroneously and systematically submit bids in excess of a capital good's "true common value." The discovery of the "curse" arose from an inference of low returns on investment in petroleum leases acquired in competitive auctions. Further presumptive evidence of the overbidding phenomenon has been revealed in experiments involving objects that do in fact have a demonstrable common value. Some experiments involved the participation of 50 separate groups of people (Thaler, 1992, p. 52). Each participant in each group was asked to bid for the monetary content of a transparent jar of coins. Jars were filled with coins of a single denomination. The actual content, unknown to bidders, was \$8.00. Groups of bidders were isolated and did not know the results of any other round of bidding. The average bid for the auctions was \$5.13, but the average winning bid was \$10.01, resulting in an average loss of \$2.01 per winner. To repeat, of particular note is the fact that the object auctioned actually had an *ex ante* value that was in fact "common" for each bidder.¹ Apparent "error" or "irrationality" in bidding is gauged against the presumption of a pre-existing "common value."

Similar experiments with jars of coins have been conducted many times with similar results. Proponents of this type of experimentation claim a general relevance of such results as a source of insight into auctions of capital goods. However, this contention seems to ignore the reality that entrepreneurial strategies account for the fact that certain "things" become capital goods in the first place. Unique entrepreneurial strategies for uses of capital goods essentially negate the "common-value presumption" that seems to be central to the winner's curse. The common-value premise implies an *external*

¹ One grants that a given amount of money can rank differently in the value rankings of each participating bidder.

standard of "ex ante correctness" in bidding that ignores the fact that the investment worth of capital goods always inheres in the success or failure of competitive entrepreneurial strategies.

Unraveling the winner's curse requires at least a clearer understanding of what capital goods are. Capital goods come into existence only because of the plans of savers and the strategies pursued by entrepreneurial business enterprises. Savers forsake consumption in the present in exchange for the prospect of a net gain in the future. Savings as employed by investors allow the production of capital goods that may take the form of unfinished consumer goods, tools, machinery, or plants used in the manufacture of consumer goods (Kirzner, 1996, p. 124). Entrepreneurial employment of capital goods is instrumental in expanding the quantity and variety of goods that can be produced.

While the experiments described above did not involve a capital good, most experimental auctions have focused on items *simply postulated* to be "capital goods." Auction experiments purport to be a source of insight into circumstances actually faced by business firms in the competitive acquisition of capital goods. In the *ex ante* setting of the experimental auction itself, the pretended capital good is assumed to have a prospective investment value that should somehow prove to be common to all bidders.

Acquisition of capital goods may involve either the winning of a formal auction or a competitive negotiation between a seller and competing firms. Auctions are employed by sellers in situations in which there may be considerable uncertainty concerning the price that can be charged (Brown, 1969, p. 18). But the winner's curse alleges that in formulating bids based on their assessments, firms are thought to erroneously overbid in an *ex ante* sense.² These

² This inquiry acknowledges the critical importance of capital accounting in the *ex post* assessment of overbidding. Though the accountant never makes *ex ante* appraisals of capital goods within the context of an enterprise strategy, he or she attempts imputations of the competitive market worth of capital goods even in those instances in which there are no quotable market prices. The accountant's efforts may suggest that the winning of a capital good reflects payment in excess of an attempted market imputation. But again, such an accounting imputation ignores entirely the currently pursued strategy of the enterprise. A brilliant discussion of this imputation process from an Austrian perspective is found in Thomas Taylor's doctoral dissertation (Taylor, 1970, pp. 276–301).

supposed errors are seen as “disequilibrium” situations that are correctible as bidders adapt to previous experience with adverse selection associated with winning. But, again, this bidding disequilibrium is reliant on the notion that the assets sought must have an ostensibly true “common value” (Kagel and Levin, 2002a, p. 1). Much of this earlier research ignores the much broader scope of actions and strategies of entrepreneurial enterprises in exercising the property rights implicit in the acquisition, ownership and deployment of the capital good.

This examination of the winner’s curse is prompted by several related questions. Have the events surrounding the “discovery” of the curse been properly interpreted? Can auction experiments reveal results relevant to or analogous to the winning of actual auctions for capital goods? Can a capital good realistically have an underlying investment worth that is common to all entrepreneurial enterprises competing in an auction? Can purported uncertainty and disequilibrium in bidding for a capital good be realistically conjoined with the sort of static, deterministic equilibrium that is necessarily implied in the “common-value assumption”? If one allows for the conditions of the real world of entrepreneurial strategy, how is one to discern and interpret what may appear to be overbidding for capital goods? Do the experiences in bidding necessarily reveal *ex ante* error in bidding?

This paper will answer these questions by exploring the most plausible ways in which entrepreneurial firms actually “appraise” the investment worth of capital goods within the context of their own business strategies. The net appraisal of these plans by entrepreneurial firms establishes the “investment worth” of the combined capital goods that embody business strategies. These strategies necessarily involve the grouping of capital goods to achieve desired *prospective* complementarities (Mathews, 2006, pp. 89–90). The fact that the firm may be producing a unique product and may be pursuing a strategy focused on capital-good complementarities will mean that the firm virtually creates its own production function (Kirzner, 1996, p. 124). Entrepreneurial planning and differentiated competitive strategies suggest that at the time that the firm competes for the acquisition of capital goods, no “true common value” can exist in an *ex ante* sense. “Appropriate” levels of bids for capital goods can only be suggested, after the

fact in the application of capital accounting in which the success or failure of an entrepreneurial undertaking is examined.

II. "DISCOVERY" OF THE CURSE AND "COMMON VALUE" ASSUMPTION IN EXPERIMENTS

The "discovery" of the winner's curse was a legitimate inference that low returns on investments in offshore petroleum leases reflected a pattern of overbidding for these capital goods. But this initial conclusion was subsequently augmented with the more general assumption that capital goods being auctioned had an investment worth common to all competing bidders. In other words, low returns were attributed to irrational failure of bidders to account for adverse selection associated with winning an asset presumed to have a "preexisting common value." Not surprisingly, the results of experimental research have reinforced the confused and erroneous notion that the amount of the bid is the principal determinant of whether or not the capital goods acquired in auctions are profitable.

A. THE DISCOVERY OF THE WINNER'S CURSE

While the winner's curse has drawn a great deal of attention from economists, economists were not actually responsible for the discovery. Rather, three petroleum engineers with the unlikely names of Capen, Clapp and Campbell (hereafter CCC) were the first to suggest the winner's curse idea. The results of their research are succinctly captured in their own words:

In recent years, several major companies have taken a rather careful look at their record and those of the industry in areas where sealed competitive bidding is the method of acquiring leases. The most notable of these areas is the Gulf of Mexico. Most analysts come up with the rather shocking result that, while there seems to be a lot of oil and gas in the region, the industry is not making as much return on its investment as it intended. In fact, if one ignores the era before 1950, when land was a good deal cheaper, he finds that the Gulf has paid off at something less than the local credit union (Capen, Clapp and Campbell, 1971, p. 641).

Richard Thaler describes the results of this research in the follow way: “[t]hey [CCC] report that the ratio between the highest and lowest bids by what they call ‘serious competitors’ is commonly as high as 5 to 10 and can be as high as 100....” In focusing on one auction, Thaler notes

...the sum of the winning bids was \$900 million, while the sum of the second highest bids was only \$370 million. The winning bid exceeded the second bid by a factor of 4 or more in 26 percent of the tracts, and by a factor of 2 in 77 percent of the tracts. While these figures don’t actually prove that anyone was acting irrationally, they certainly seem consistent with a winner’s curse scenario (Thaler, 1992, p. 52).

Clearly the pattern of bidding reported by CCC does reflect a dramatic dispersion of “valuations” of the part of bidders. However, does this dispersal necessarily reflect evidence the winner’s curse? One attempt to answer this question focused on subsequent efforts to estimate rates of return on the investment in these leases. A study by Mead et. al. involved the calculation of after-tax rates of return for 1223 leases in the Gulf of Mexico. They conclude:

for all 1223 leases, firms suffered an average present value loss of \$192,128 per lease using a 12.5% discount rate [employing nominal values for costs and selling prices]... 62% of all leases in our data base were dry. Consequently, the lessees had no revenue what so ever to offset their bonus and rent payments, or their exploration costs. Another 16% of the leases were unprofitable (on an after tax basis) although some production occurred. Only 22% of the leases were profitable, and these leases earned only 18.74% in aggregate on the after-tax basis.... The low and negative rates of return... appear to reflect excessive enthusiasm for the amount of oil likely to be found (Mead, Moseidjord and Sorenson, 1983, pp. 42–45).

Neoclassical theorists have interpreted the experience from these auctions as grounds for advancing the more general presumption that winning bidders in all auctions are innately prone to error in bidding. Such an inference seems to suggest a type of “market failure” in which bidders ignore the adverse selection of winning and, hence, fall victim to the “winner’s curse.” This mindset has carried over into the use of experiments to examine the role of the winner’s curse in auctions of capital goods.

B. COMMON-VALUE AND BIDDING DISEQUILIBRIUM: INTERPRETATION OF EXPERIMENTS

While the inferences of bidder error in auctions of petroleum leases were ostensibly legitimate, subsequent research has spawned a mythology based on the notion that capital goods have a *common value*, in turn, fostering a near complete neglect of the way in which entrepreneurial strategies may affect bidders' assessments of investment worth. The implicit assumption that capital goods must have a common investment worth may be attributed, in part, to the professional (engineering) orientation of those who stumbled onto the idea of the winner's curse. The common-value assumption is ostensibly based on the supposition that the capital good, once "efficiently" employed, would prove, in an *ex post* sense, to have the same investment worth for all bidders. But the presumptions of "common value" and overbidding have been uncritically applied to much experimental research into the winner's curse.

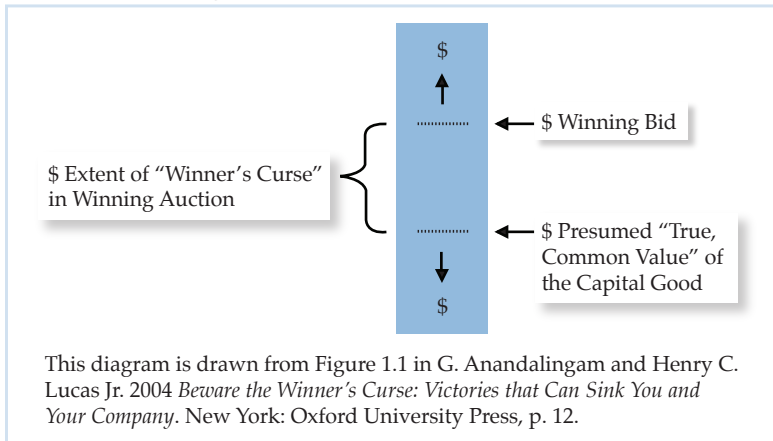
While the interpretation of the above experience with auctions of petroleum leases can be described as the "discovery" of the winner's curse, the more general theory of the winner's curse seems to have emerged out of experimental research. The subsequent experience with experimental auctions has only confirmed and affirmed the conclusion that the results reflect irrational bidding behavior. To give the concept of *irrational bidding* any precise meaning, neoclassical theorists have had to advance the peculiar notion that a thing being auctioned must somehow have an "implicit investment worth" *common to all the parties offering bids*. But how is "common value" to be interpreted? As noted above, the idea of a common value is premised on the notion that the planned use of the capital good must somehow be the same for all competitors and that the *ex ante* "investment worth" would be common to all firms. If this assumption were to hold then one would expect that "the *ex post* value of the item is the same for all bidders" (Kagel and Levin, 2002a, p. 2). One can readily accept the idea of a "common value" as applied to auctions of jars of coins, but can such an assumption be aptly applied to auctions of capital goods?

Clearly, if the bidding in auctions of petroleum leases is to reflect the winner's curse phenomenon, other assumptions are

required to make the case that these assets could have a common value. What emerges here is a model in which the size of the winning bid is the only decision variable available to the firm in its efforts to “maximize profits.” A firm bidding “too high” is disappointed. The disappointment may take the form of losses on the investment or a lower return on investment than was initially thought possible. Of note in this theory is the fact that, subsequent to winning the auction, the firm’s planned—possibly differentiated use of the capital good seems to play no role in avoiding such disappointments. With reference to bidding for petroleum leases, Anandalingham and Lucas observe, “The problem was that the amount of oil underground was fixed and its value did not depend on what was bid for it. (Economists call this a *common value auction*.) Given that the winning oil company had to have been the most optimistic, there was a good chance that it bid more (sometimes *much* more) than the lease was worth” (Anandalingham and Lucas, 2004, p. 6: emphasis in original). In other words, the common value assumption is tied to the strikingly misleading notion that the “value” of the petroleum lease is one dimensional and established solely on the basis of its physical nature, that is, in this case, the quantity of oil underground. Oddly, this type of assumption has been applied to examination of most instances in which the winner’s curse is thought to be operative in the bidding for capital goods.

Figure 1 is a presumed pictorial representation of the winner’s curse as it is thought to occur in the auction of any capital good. The capital good has a “common value” that is exceeded by the winning bid. The winner’s curse is represented as the extent to which the winning bid exceeds the presumed, true, common value of the capital good. The degree to which the winning bid exceeds the “presumed true value” of the capital good is to be interpreted as an indication of the irrationality reflected in the winner’s bid. To convincingly make the case that a capital good could ever have essentially an equal value to all bidders, one must rely on blanket “homogeneity” with respect to the abilities and circumstances of all bidders. Some type of equilibrium must be assumed if one is to argue that successful returns on investments in leases would be solely contingent on not overbidding.

Figure 1. Presumed “True, Common Value” of the Capital Good, Winning Bid and “The Winner’s Curse”

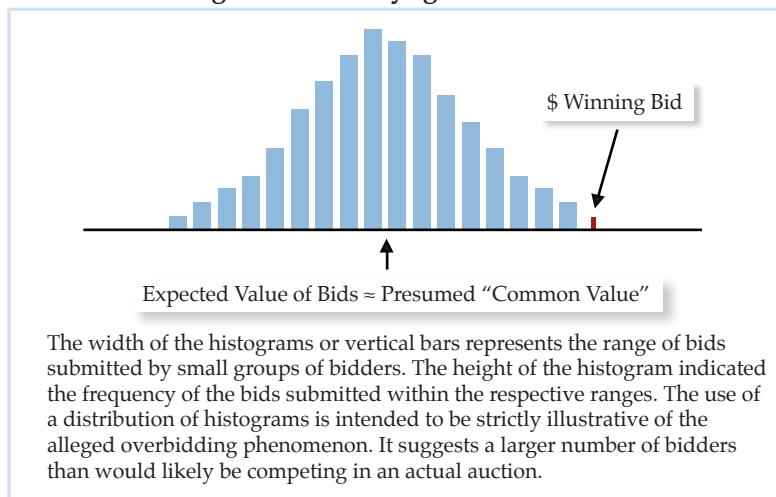


By inference, one surmises that a “true *ex ante* value” of a capital good is to be seen as essentially *exogenous* to the firm’s intended or *planned* employment of the good. Otherwise, this true-common-value assumption would seem to imply that the prospective use of the capital good must be essentially identical for all of the bidders. Identical use would further seem to imply an industry in which firms are essentially identical reflecting no distinctions in entrepreneurial strategies, or even an absence of entrepreneurs. With either interpretation, the phenomenon of the winner’s curse is seen as a “pocket” of disequilibrium in bidding reflecting a failure to account for the adverse self-selection associated with winning. The disequilibrium is interpreted as a reflection solely of suboptimal bidding behavior.

Figure 2 is intended to illustrate a hypothetical distribution of bids in which the winner’s curse is presumed to be operative. The vertical bars each represent a range of bids submitted by a small group of bidders. The height of the respective bars indicates the number of bidders submitting bids within each respective range of bids. The distribution itself reflects the uncertainty with respect to the “true common value” of the capital good; bids submitted are understood to directly reflect the valuations placed on the goods by the respective bidders. But in addition, the shape of this distribution of bids is assumed to directly reflect the physical

properties of the capital good itself.³ This presumed shape makes no allowance for differentiated planned employments within what may be a unique entrepreneurial strategy. The expected value of the bids for all participating bidders is assumed to be approximately equal to the “true common value” of the capital good. However, this assumption seems to imply that the winning bidder finds himself on the extreme right tail of the bidding distribution as shown in Figure 2. This situation is intended to suggest that, of those submitting bids, the winning bidder has most overestimated the presumptive common investment worth of the capital good and has failed to take into account the *adverse selection* associated with winning.

Figure 2. Distribution of Bids in which Adverse Selection of Winning is Presumably Ignored

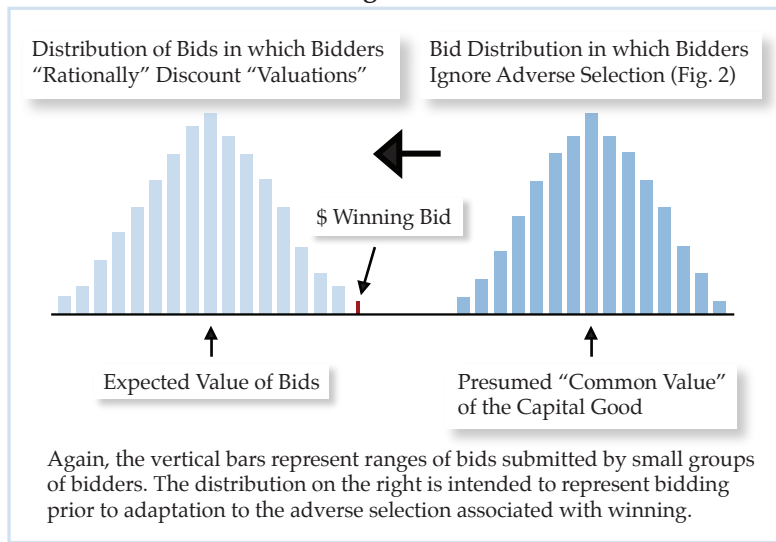


³ The shape of the bidding distribution for some capital goods is assumed to be approximately log-normal (skewed to the right); this property means that the logarithm of the bids is normally distributed. The log-normal property presumably arises in instances in which the investment worth is a multiplicative product of several quantifiable physical features (Reece, 1979, p. 11). In any case, the distribution of bids is assumed to be a direct reflection of the distribution of investment worth. However, the implicit fallacy here is that investment worth or appraisal of the capital goods is assumed to be strictly defined by the physical properties of the capital good.

Experimental evidence casts this overvaluation phenomenon as a type of "disequilibrium" that is "correctible" in subsequent auctions by bidders "rationally" adjusting their bidding to take account of adverse selection. But again, the extent of this correctible disequilibrium is assessed against the presumed "common value" of the capital good that, once revealed, would prove to be the same for all bidders. The bidding is never assessed in the context of the entrepreneurial strategy that would in reality be driving the bidding behavior. The process of discerning disequilibrium is simply premised on a presumptive "common value" that bidders must "rationally discover." Viewed in this light, disequilibrium in bidding is a kind of transitional anomaly that is presumably "remedied" by bidders acting "rationally" in subsequent auctions. Thaler goes so far as to say: "[t]he winners curse cannot occur if all the bidders are rational..." (Thaler, 1992, p. 51). According to received theory emerging from experimental research, this adaptation means that bids must be significantly discounted with respect the expected value of the capital good being auctioned.

Figure 3 depicts an adaptation of evaluations and a shift in bidding as bidders discount the worth of capital goods in their efforts to avoid the dangers of adverse selection. The distribution with the darker histograms reflects bidding prior to any adaptation. The distribution to the left represents the corrective shift in the evaluations and bidding that avoids the adverse selection associated with the winner's curse. Need for this adaptation is premised on the existence of the alleged true, "common value" of the capital good and the supposition that the bidding must be adapted to both the "exogenously determined but uncertain value" of the capital good to avoid the dangers of the winner's curse. To reiterate, these "insights" are largely the product of controlled experiments implying that the rationality on the part of bidders hinges solely of the size of the bid without any particular regard to the success of the many other decisions that would normally attend an entrepreneurial plan for the employment of the capital good.

Figure 3. Shift to Evaluation and Bidding Adapted for Adverse Selection of Winning



The focus of criticism here is the "common value assumption" that is implicit in virtually all of the presentations of winner's-curse theory. Examination of bidding largely ignores the strategic context that would in reality be driving bidding behavior. In real-world auctions of capital goods, one may note shifts in bidding as bids may be adapted to the rates of return associated with competing entrepreneurial strategies.⁴ But such shifts would not occur as an effort to tailor bids to some pre-existing common investment worth.

⁴ This author thanks a reviewer for highlighting this issue in comments submitted on an earlier version of this paper. *Ex post* losses or smaller than expected profits may induce enterprises to further discount the investment worth of the entire range of capital goods employed to achieve the objectives sought in an entrepreneurial strategy. These consequences will have differential impacts for competing enterprises depending upon the strategies pursued by each enterprise. The experience of strategic disappointment would prompt the enterprise to reexamine the uncertainty associated with the strategy itself. But this reexamination is unlikely to lead the enterprise solely to the narrowly focused conclusion that bids submitted exceeded some common investment worth of the capital good.

III. ASPECTS AND IMPLICATIONS OF HETEROGENEITY IN APPRAISAL

While the presumed intent of controlled experimentation is to highlight systemic errors that may be made by business firms in bidding for capital goods, there are compelling reasons to believe that this research has led to misleading and largely fallacious notions of actual bidding for capital goods. What seems to have been ignored is the extent to which controlled experiments can ever faithfully replicate or simulate the circumstances that prompt actual firms to "appraise" the investment worth of capital goods and compete in auctions or competitive negotiations for the acquisition of such goods.

A. INABILITY OF EXPERIMENTS TO REPLICATE AUCTIONS OF CAPITAL GOODS

The experiment described at the beginning of this paper involving the auction of a jar of coins manages to establish the fact that the winner's curse does exist and involves a degree of adverse selection of which the inexperienced bidder may be oblivious. Moreover, most of the research on the winner's curse as it is thought to arise in the context of auctions of capital goods has been conducted in the context of such experimentation. The exceptions in this research include essentially anecdotal references to what appear to be acquisitions involving overpayment for capital assets (see Anandalingam and Lucas, 2004).⁵ However, the research focusing on experimentation is of virtually no relevance to capital-good auctions essentially because, in the real world, the *ex ante* appraisal of a capital good is endogenous to an entrepreneur's strategy and expectations.⁶

⁵ Most of the Anandalingam and Lucas book is a catalogue of anecdotal stories of instances in which the winner's curse was thought to be evident.

⁶ Keith C. Brown, a bidding theorist, is not taken in by the notion of "common value." He notes that "value estimates for durable objects are dependant upon assumptions about the future. Even if two parties agreed in every detail about the present physical characteristics of the object, their estimates of its value may be quite different because of divergent expectations" (Brown, 1969, pp. 18–19). But clearly there is more to differential appraisements of capital goods than diverging expectations. Estimates of investment worth of the object would also be conditioned by differing plans for the employment of capital goods.

Experimentalists have not addressed this criticism in any coherent way. Defenders of such experiments seem to assume that the “pre-assigned common value” can serve as a proxy for the appraisal process that the bidding entrepreneur must go through in devising a bid. But the illogic of such an argument is manifest. The problem is that the assigning of a value *a priori* in an experimental setting means that, for participants, there is no competitive entrepreneurial strategy other than the formulation of a bid itself. There are no potential or prospective post-auction employments being planned in deciding upon a bid. Hence, the experimental auction can never be more than an invalid, highly misleading metaphor for actual auctions of capital goods. While the results of such experiments may yield some sort of situation-specific insight, they are glaringly irrelevant as a source of insight in the real-world auctions of capital goods.

This failure is not one of experimental design. Rather, it is the fact that the artificial and contrived circumstance of experiments can never replicate or simulate the judgments involved in committing resources to the implementation of a specific entrepreneurial strategy. In the real world, strategies are not necessarily assured of future success. In actual business situations, a plethora of decisions made by the firm will ultimately establish the profitability of acquiring and employing particular capital goods. This reality eludes experimenters.

The highly individualistic nature of the entrepreneur’s appraisal of the capital-good is described by Israel Kirzner: “An individual’s forward looking measure [appraisal] of a given stock of capital goods is thus highly individualistic, depending crucially on his own subjective expectations regarding the future” (Kirzner, 1996, p. 103). Understanding the economics of capital goods requires an understanding of entrepreneurial appraisal of capital goods and the concept of capital in the entrepreneur’s reckoning of a planned undertaking.⁷ *Only within the context of invariably unique*

⁷ The critical importance of the entrepreneurial plan is a central focus of Israel Kirzner’s research into capital theory (Kirzner, 1996). This paper employs both the terms *plan* and *strategy*. In a general sense, these terms can be seen as synonymous. However, here, some distinction between the two is intended. “Plan” is a general term common in the writings of Kirzner, Lachmann and Mises. For Mises and Kirzner, “plan” generally refers generally to an intended course of action chosen by the entrepreneur to exploit pricing discrepancies that afford opportunities for

*or heterogeneous entrepreneurial strategies can one assess the true nature of the bidding process and what may constitute overbidding. There is no legitimate, authentic way to simulate this circumstance in the context of an experiment that relies on the pretense of a competitive business decision.*⁸

B. THE VALUATION-"APPRAISEMENT" DISTINCTION

The irrelevance of auction experiments is further highlighted by their neglect of the critical distinction between valuation and entrepreneurial appraisal as these terms apply to the acquisition of goods. This distinction is more than a terminological quibble and is helpful in untangling fallacies that inhere in the theory of the winner's curse. Properly conceived, *valuation* is a more general concept referring to the rankings made by an individual human being in choosing between goods or different courses of action and is, nonetheless, subjective and unique to the individual. While valuation need not actually involve a monetary exchange, it always involves some action in which a less preferred situation is exchanged for a circumstance that is more preferred.

earning profits. Mises refers to superior abilities and Kirzner refers to the quality of *alertness* that must be possessed by the entrepreneur in implementing a profitable plan. However, the term *strategy* seems to be more Schumpeterian in its current use and would refer more to the entrepreneur's quest for profits by introducing "newness" with respect to products, markets, production technologies, organization, etc. (Schumpeter, 1959 [1934], p. 66). One clear implication of this Schumpeterian perspective is that firms tend to become unique in the process of seeking competitive advantage. Hence, there is a greater likelihood that the firm's assessment of the investment worth of a capital good (or a unique bundle of capital goods) would be unique to the firm. Thus, the legitimacy of the common-value assumption is further called into question. This issue is examined at a later point in the paper.

⁸ Defenders of experimental techniques are not totally oblivious to the fact that experiments may not replicate the conditions of auctions. Kagel and Levin observe: "A common criticism of experimental research in economics is that behavior in the laboratory is unlikely to be representative of field behavior. This criticism increases, as well it should, with the degree to which laboratory behavior deviates from accepted economic theory and common understanding of what constitutes 'rational' economic behavior" (Kagel and Levin, 2002b, p. 131). Unfortunately, these authors miss the most fundamental criticism. Auctions of capital goods involve real entrepreneurs facing future uncertainty and dealing with the challenges of real planning. These realities cannot be incorporated into experiments.

But the term “valuation” is inappropriately applied to a process by which a firm assesses (appraises) the investment worth of a capital good though it is commonly applied in that way not only in the literature focused on the winner’s curse. The appraisal is more than a relative ranking; rather it is one of judging the prospective *monetary profitability* of acquiring and employing resources in a competitive quest for future profit. Ludwig von Mises introduces the term “appraisement” to suggest the requisite distinction:

Appraisement must be clearly distinguished from valuation. Appraisement in no way depends upon the subjective valuation of the man who appraises. He is not intent upon establishing the subjective use-value of the good concerned, but upon anticipating the prices which the market will determine. Valuation is a value judgment expressive of a difference in value [ranking]. Appraisement ... aims at establishing what prices will be paid on the market for a particular commodity or what amount of money will be required for the purchase of a definite commodity. ... [B]uying and selling on the market must not disregard the structure of market prices; they depend upon appraisement (Mises, [1949] 1998, p. 329).⁹

Appraisement, not valuation, is what engages firms when they formulate bids for capital goods. Appraisement is essentially a judgment of investment worth and, at least in the mind of the entrepreneur, is quantitative.

This distinction is entirely obscured by adopting the inappropriate notion of a “common value” and attempting to apply it to capital goods. While experiments involving jars of coins represent legitimate examples of auctions in which the item could be said to have a common value, these are perhaps the only instances in which an item being auctioned could ever be legitimately characterized as having a common value. Hence, the requisite role of entrepreneurial appraisal of capital goods is fundamentally at odds with any

⁹ In this paper, the author has adhered to Mises’s distinction between “valuation” and what Mises refers to as “appraisement.” However, a reviewer has suggested that there is no useful distinction to be made between “valuation” and “appraisement” since, according to the reviewer, both involve a kind of subjective judgment. However, Mises’s distinction seems to be not only relevant but important. Also, this author has used the phrase *assessment of investment worth* as an approximate synonym for the “appraisement” term.

common-value assumption.¹⁰ Moreover, appraisements involved in bidding are probably always unique to the individual bidder since they involve attempts to judge the future structure of prices in the market and the prospective net gain involved in employing the capital goods in a particular entrepreneurial strategy.

C. CAPITAL GOODS MADE SUCH BY ENTREPRENEURIAL STRATEGIES

The "common-value" assumption necessarily implicit in the theory of the winner's curse is totally at odds with any coherent understanding of the role of capital goods, capital and entrepreneurial competition in a real-world market economy. A common *ex ante* appraisal for capital goods implicitly requires a static equilibrium in the industries in which the auctioned capital goods are to be employed.¹¹ But the profit opportunities that drive entrepreneurial action would in most cases imply different appraisals of capital goods within the strategies of competing entrepreneurs. In essence, the assumption of common *ex ante* investment worth implicit in the winner's curse is simply inconsistent with differing entrepreneurial strategies and with entrepreneurship itself.

The existence and perpetual emergence of new entrepreneurial strategies helps to highlight the fundamental distinction between capital and capital goods. Capital goods are depreciable resources that have been marshaled by the entrepreneur in the implementation

¹⁰ The idea that a capital good has a "common *ex ante* value" is, of course, untenable. But in this odd assumption, one notes a surprising echo of the "theory of natural value" as developed by Friedrich von Wieser. As described by Jörg Guido Hülsmann, Wieser's "theory of value completely dissociated the value of goods from any context of human action" (See: Hülsmann, 2007, p. 384).

¹¹ The literature on the winner's curse does not explicitly acknowledge that a static equilibrium is a prerequisite for a capital good to have a "common value" for competing bidders. The "common-value" assumption can only be convincingly postulated within the artificial context of an auction experiment. Experimenters claim relevance of Nash Equilibrium (after the mathematician John Nash) in which bidders would not change their approach to bidding if they were to "know the strategies" of competing bidders (Thaler, 1992, p. 55). According to traditional interpretation, such an equilibrium would reflect a situation in which bidding is "rational" and overbidding is avoided. In an experimental setting, such a circumstance might conceivably arise from the experience acquired in repeated auctions. In the context of experiments, bidders would presumably be adapting their bidding behavior to a presumed "common value."

of his particular business plan.¹² These goods come into being and take on the role of being capital goods because of plans of savers and the strategies of entrepreneurs. Ludwig Lachmann observes: "...capital goods have to exist in the minds of agents [entrepreneurs] ... In fact their significance for action derives from the places they occupy in individual strategies, that is, from the mental acts by which strategies are constituted" (Lachmann, 1986, p. 79). Capital, as distinct from capital goods, is in one sense, an accountant's reckoning of an enterprise's current monetary market worth. This market worth only has meaning within the price structures emerging from competitive strategies and actions of entrepreneurs. The most succinct statement on the distinction between capital and capital goods has been offered by Ludwig von Mises: "*capital*" is the sum of the money equivalent of all assets [capital goods] minus the sum of the money equivalent of all liabilities as dedicated at a definite date to the conduct of the operations of a definite business unit. It does not matter in what these assets may consist, whether they are pieces of land [inclusive of extractive resources], buildings, equipment, tools, goods of any kind and order, claims, receivables, cash or what ever" (Mises, [1949] 1998, p. 262: emphasis added). An important point in this definition is that in using the term "money equivalent," Mises is only making reference to a net assessment based on current market prices or imputations of market worth. He is not addressing the *ex ante* appraisal within the context of an entrepreneurial strategy. Existing market information gleaned by the accountant provides a calculational framework for reckoning enterprise capital worth.

In the above definition, capital emerges as an accountant's net market appraisal of the business enterprise based on current market prices imputation of current market worth. But the business enterprise is the institutional embodiment of a particular entrepreneurial strategy, which means that the concept of *capital* simultaneously has two very distinct meanings. First, it represents

¹² A reviewer poses the question: "How does a capital good differ from other 'objects' that have been marshaled by the entrepreneur in the implementation of a particular business plan?" This author would follow Hayek in defining a capital good as any depreciable object of limited durability diverted from the stream of consumption and employed in pursuance of some form of production (Hayek, 2007 [1941], p. 104).

a current balance sheet reckoning of the net worth of the enterprise as would be measured by the accountant. And second, it is the entrepreneur's monetary appraisal of an entrepreneurial strategy for the employment of the enterprise's capital goods (Taylor, 1970, p. 194). As Mises notes "capital is a praxeological concept ... its place is in the human mind. It [capital] is a mode of looking at the problems of acting, a method of appraising them from the point of view of a definite plan" (Mises, [1949] 1998, p. 512).¹³ In other words, capital goods are made such by being an integral part of competing entrepreneurial strategies undertaken to earn monetary profit. Opportunities for profit in excess of entrepreneurs' requisite return for time and uncertainty (i.e., interest) may involve a commitment of capital goods to arbitrage opportunities arising from anticipated future shortages of certain consumer goods. Or capital goods may be employed in a plan, the success of which may hinge on the success of introducing a new product to the market (Schumpeter, 1959 [1934], p. 65). In any event, strategies undertaken involving the use of capital goods will, in all reality, be appraised differently by competing entrepreneurs.

IV. CAPITAL GOOD APPRAISALS IN THE COMPLEMENTARITIES SOUGHT IN COMPETING STRATEGIES

Entrepreneurial strategies may be differentiated by efforts to establish unique complementarities within the deployment of heterogeneous capital goods. But research into the winner's curse has also ignored the scope of entrepreneurial strategies and the complementarities sought and achieved by entrepreneurial bidders. Ludwig Lachmann addressed the role of "capital-good groupings" in the implementation of entrepreneurial strategies in which a "structure of capital" emerges. In his book, *Capital and its Structure*, Ludwig Lachmann observed:

¹³ Praxeology is the deductive science of human action; it is built upon the axiom that individual human beings act in the present to attain their most highly ranked future goals; by acting, individuals bear subjectively reckoned opportunity costs of employing scarce means in to achieve chosen ends (See Rothbard, 1997 [1960], p. 32).

Each plan is a logical structure in which means and ends are coordinated by a directing and controlling mind. In the functional variety which is of the very essence of capital utilization strategies, capital resources [capital goods] exhibit those *structural* relationships. ... production plans are the primary object of capital theory ... the theory deals with the way in which capital goods are used in plans, i.e. with the capital structure of such plans (Lachmann, 1956, pp. 53–54).

The plans to group or combine capital goods are fundamentally speculative undertakings by entrepreneurs. As noted, a critical feature of this speculative process involves the grouping of capital goods on the basis of complementarities discovered and envisioned by the entrepreneur. Obviously, as Lachmann suggests, the significance attached to a complementary grouping of capital goods can only be gleaned in an understanding an entrepreneur's particular strategy.

The winning of a capital good in competitive auctions represents only the earliest stages of what Israel Kirzner refers to as an unfinished entrepreneurial plan (Kirzner, 1996, pp. 17–48).¹⁴ The further implementation of these strategies necessarily will involve the acquisition of complementary capital goods as firms construct infrastructure and build portfolios of additional capital goods.¹⁵ One may note parenthetically that this reality is germane to all industries. The scope of the entrepreneurial plan may and usually does embrace several complementary dimensions of capital goods including *economies of scale, scope and sequence*. These economies are achieved by investment in the additional complementary capital goods that make up the infrastructure thought to be required to achieve strategic success.¹⁶ For purposes addressed here, economies

¹⁴ However, one of the points implicit in Kirzner's examination is the fact that entrepreneurial plans always entail a series of critical decisions and actions subsequent to the initial implementation of the plan. These subsequent choices are as critical to the profitability of the plan as the initial choice of the plan itself.

¹⁵ Lachmann refers to this complementarity as a *praxeological category* (see: Lachmann, 1956, p. 55). Praxeology being the science of goal-oriented human action, Lachmann is emphasizing that the complementarity achieved in any specific circumstances is the specific consequences of a particular entrepreneurial plan.

¹⁶ All of these economies come into play in this context. Economies of scope are present if, in the judgment of the firm, the combined cost of producing two or more products by the single firm were less than if the products were produced separately by multiple firms (See: Baumol, Panzar and Willig, 1988 [1982], pp. 71–72).

of scale, scope and sequence can be appropriately defined as an increase of returns attainable from the complementarities embodied in the entire entrepreneurial plan. But again, a full reckoning of the economies available to the enterprise is made evident in the combination and timing of employment of the various capital goods employed in the operations. The individual capital goods must coherently fit into this system of complementarities. The appraisal of the capital good within the entrepreneurial strategy is conditioned by these complementarities.

As with all entrepreneurial undertakings, the quest for complementarity is to a degree experimental in that it always involves some type of search. John Mathews has trenchantly observed:

The point is that complementarities are not created automatically. They have to be found, indeed discovered, as part of a strategizing endeavor.... Now the conventional statement... does not seem to make clear whether resources are to be evaluated individually or in terms of the total bundle. The search for complementarities, on the other hand, makes it abundantly clear where the emphasis should lie. Complementarities can only be achieved in a bundle, and so it is the bundle as a whole that should conform to the conventional criteria of being valuable rare and hard to imitate. But this then opens the issue of how resources as individual entities ought to be evaluated by the entrepreneur. ...[I]t is not the individual resources that are important but the resource bundle taken as an aggregate, and what management does with this aggregate.... If it is the resource bundle as an aggregate that is important, then it makes sense for firms to acquire extra resources that may not be distinctive in themselves but that when added to existing bundle, can lend the firm an advantage if synergies can be extracted from the new bundle. ...[I]t is up to the entrepreneur, or the firm acquiring the resources, to package them and extract synergies, so as to earn positive entrepreneurial profits (Mathews, 2006, p. 89–90).

To reiterate a central theme, judging the rationality of bidding and assessing rates of return must be done within the context of the

Vertical integration is normally thought to be a manifestation of "economies of sequence." Economies of sequence can be described as being present when the total cost to the firm of producing both upstream products and the downstream products were less than if the goods were produced separately by different firms (See Spulber, 1989, p. 118–119). But since opportunity costs are subjective in an *ex ante* sense, these economies are not empirically measurable phenomena as they are assumed to be by Baumol, et. al. or Spulber (See Brätland, 2003, p. 3–28).

full scope of an entrepreneurial strategy encompassing a structure that takes full account of the complementary groupings of capital goods. The true objectives sought in the bidding process and what may constitute rational bidding is conditioned by the complementarities between capital goods as reckoned in the entrepreneurial strategy. Hence, “resources do not possess any objective value [appraisement] in and of themselves: their value is contingent on the synergies or complementarities that can be captured. This is why it is essential to keep the resource bundle in view, rather than the attributes of the individual resource” (Mathews, 2006, p. 90). But such entrepreneurial undertakings may fail to achieve anticipated profits and may occur because of a complex combination of errors in entrepreneurial judgments. Bidding error alone may be ancillary to such strategic failure.

V. BIDDING SEEN IN THE CONTEXT OF EX ANTE PROSPECTS AND EX POST FAILURE

The above discussion is intended to clarify the way in which the distinctively individualistic nature of entrepreneurial strategies disposes of the notion that capital goods can have an investment worth common to all bidders in auctions. *The true objectives sought in the bidding process and what may constitute rational bidding must be judged in the context of the entrepreneurial strategy, as conceived in the mind of the entrepreneur.* The “appropriateness” of a bid for a capital good can only be understood and reckoned within the scope of the success or failure of entrepreneurial strategies. But in acknowledging this reality, how does this perspective shed light on the interpretation of events leading researchers to conclude that they have discovered or discerned evidence of the “winner’s curse”? Can overbidding necessarily be revealed as an empirically measurable *ex ante* phenomenon? The following discussion explores answers to these questions.

A. PROSPECTIVE PROFITS AS EX ANTE JUSTIFICATION FOR BIDS ON CAPITAL GOODS

In the planning undertaken by competing entrepreneurs, the winning auction bid for a capital good would necessarily reflect

its investment worth in the context of a particular entrepreneurial strategy. But in a presumed equilibrium setting, economists are inclined to assume that a price revealed in a market is equal to the discounted marginal value product of the capital good in alternative competitive employments. But assumptions of equilibrium are always misleading in that they ignore the rationale and circumstance of entrepreneurial action. Kirzner highlights the role of prospects:

The highest price a person will pay for a capital good is set by his estimate of the present value to him of the addition to the flow of output that the capital good can make possible, taking into account the particular production process in which he envisages the capital good being applied and the particular manner in which he envisages it to be used in the process.... The market price of a capital good expresses the quantity of capital that it represents to other individuals in the market (the marginal buyer and marginal sellers), based on their expectations. [But] in the absence of an equilibrium situation there is not even a guarantee that that the market price fully expresses the expectation of all market participants. ... So that an individual who has his own ideas as to the future, the market price does not provide the subjective measure in which he is interested (Kirzner, 1996, p. 103).

For the entrepreneur, the investment worth of a capital good is contingent upon the prospective success of strategies that will usually involve some form of speculation and innovation. The way in which innovation and speculation come to bear upon an entrepreneurial strategy is exemplified in efforts to employ capital goods in the introduction and production of a new good or service that may not have been produced and marketed by anyone. Success in these innovative and speculative endeavors may be contingent on displacing products currently being produced by competitors and, if successful, will generate in entrepreneurial profits (Schumpeter, 1950 [1942], pp. 83–85). In the context of an entrepreneurial strategy, profit represents the success anticipated in the appraisal, acquisition and employment of capital goods. In other words, the appraisal of any particular capital good is conditioned by the prospects of success for such entrepreneurial ventures. Hence, in an *ex ante* sense, *an entrepreneur's bid for the capital good exceeding an investment worth imputed by competitors would be fully justified.*

B. BIDDING ERROR OR FAILURE OF AN ENTREPRENEUR'S PARTICULAR STRATEGY?

In an *ex post* sense, can supposed overbidding for capital goods be discerned in any meaningful way from the failure of an entrepreneurial strategy to earn a profit? This question has not been addressed in any of the research on the winner's curse. Answering this question requires some reflection on the nature and causes of entrepreneurial losses. Entrepreneurial strategies require the purchase or hiring of capital goods in the present with the intent of selling a finished product at some time in the future. But, as noted above, all such undertakings are fundamentally speculative in nature, which means that they can fail. Mises has noted: "Like every acting man, the entrepreneur... deals with the uncertain conditions of the future. His success or failure depends on the correctness of his anticipation of uncertain events. If he fails in his understanding of things to come, he is doomed" (Mises [1949] 1998, p. 288). One way of characterizing these losses is to infer an overcapitalization of capital goods or overbidding for the capital goods committed to the strategy. But judgments of overcapitalization are only revealed *ex post* when the unprofitability of earlier decisions is made evident.

Entrepreneurial failure can take other forms. For instance, internal mismanagement of the enterprise may account for entrepreneurial losses. Or, entrepreneurs may attempt to be visionary leaders but for various reasons fail in efforts to create, shape or exploit new opportunities. The entrepreneur may be unsuccessful in efforts to introduce new products for which no preexisting demand exists. Such an endeavor may include attempts to harness new technologies in consumer goods, capital goods or previously non-existent services. Failure in these latter undertakings may involve attempts to introduce new materials in the manufacture of goods. Or failure may arise from unsuccessful efforts to open up new geographic or demographic markets. The point is that having bid a higher amount in winning particular capital goods may be no more than a minor or ancillary consideration in a retrospective assessment of a failed entrepreneurial strategy.

The overall entrepreneurial strategy itself provides the only context in which one can make a judgment respecting the

appropriate amount to bid for a capital good. In any event, if such an entrepreneurial undertaking is rendered unsuccessful because of poor planning decisions, market change or mismanagement, the amount bid to acquire the services of the capital good may be an excessively narrow finding of error on the part of the entrepreneur. *One must distinguish between the entrepreneur's alleged overbidding for capital goods from the more general, and commonplace phenomenon of an entrepreneur's error in choosing and pursuing a particular strategy.* The consequences of the latter entrepreneurial error could probably not be avoided even if the capital goods were obtained for much lower auction bids. One grants that a bid itself may be a contributing factor in a failure to earn an anticipated profit, but such an acknowledgment would hardly warrant an inference of the winner's curse with respect to the winning of particular capital goods in auctions.

VI. CONCLUSIONS

The theory of the winner's curse is premised on the largely fallacious notion that capital goods offered in competitive auctions or in competitive negotiations have a "true investment worth" that is common to all bidders. The theory rests, in part, on the assumption that the average of bids submitted in such auctions will be approximately equal to this "true investment worth." But awkwardly, this supposition would only be valid if all firms were somehow locked into one identical, equilibrium use of the capital good. However, if the average of bids were equal to the true worth of the capital good, it would mean that the winning bidder would have most overestimated the investment worth of the capital good and, in so doing, would have presumably fallen prey to the winner's curse.

This overbidding inference arose from a study of the experiences of firms bidding on and winning capital goods in the form of petroleum leases in competitive auctions. Low rates of return on these investments were attributed to anomalous bidding error as bidders ignored the adverse selection involved in being the winning bidder. Bidders are thought to be able to avoid the winner's curse by making allowance for the bidding of competing bidders. By such a strategic discounting of bids, the entire bidding

distribution in subsequent auctions is supposedly shifted to the left such that a bidder can win and still earn attractive rates of return on these investments.

This theory of the winner's curse emerges out of experiments that purport to be dealing with auctions of capital goods. But such experiments can yield absolutely no insight into auctions of actual capital goods and, in fact, are totally irrelevant to such concerns. One first notes that the common-value is used as a standard of correctness and, hence, is an absurdity in the context of entrepreneurial appraisals of capital goods. A good becomes a capital good because it is a component of an entrepreneurial strategy. Moreover, the investment worth of the capital good is established within the context of the entrepreneurial strategy, which is another way of saying that the appraisal is essentially based on the entrepreneur's judgment of the prospective profitability of the project. However, entrepreneurial strategies may reflect misjudgments of profitability, which can mean that entrepreneurs may appear to have anomalously over-appraised a capital good obtained in competitive auctions. But in this sense, this allegedly anomalously over-appraisal of a capital good cannot be separately distinguished from the failure of an entrepreneurial strategy in which losses are incurred.

REFERENCES

- Anandalingam, G., and Henry C. Lucas Jr. 2004. *Beware the Winner's Curse: Victories that Can Sink You and Your Company*. New York: Oxford University Press.
- Baumol, William, John C. Panzar and Robert D. Willig. 1982. *Contestable Markets and the Theory of Industry Structure*. New York: Harcourt Brace Jovanovich, 1988.
- Brätland, John. 2003. "Contestable Market Theory as a Regulatory Framework: An Austrian Postmortem." *The Quarterly Review of Austrian Economics* 7, no. 3: 3–28.
- Brown, Keith C. 1969. *Bidding for Offshore Oil: Toward an Optimal Strategy*. Dallas, Texas: Southern Methodist University Press.
- Capen, E. C., R. V. Clapp and W.M. Campbell. 1971. "Competitive Bidding in High-Risk Situations." *Journal of Petroleum Technology* 23: 641.

- Hülsmann, Jörg Guido. 2007. *Mises: The Last Knight of Liberalism*. Auburn, Ala.: The Ludwig von Mises Institute.
- Kagel, John H., and Dan Levin. 2002a. "Bidding in Common Value Auctions: A Survey of Experimental Results." *Common Value Auctions and the Winner's Curse*. John H. Kagel and Dan Levin, eds. Princeton, N.J.: Princeton University Press.
- . 2002b. "The Winner's Curse and Public Information in Common Value Auction." *Common Value Auctions and the Winner's Curse*. John H. Kagel and Dan Levin, eds. Princeton, N.J.: Princeton University Press.
- Kirzner, Israel. 1996. *Essays on Capital and Interest: An Austrian Perspective*. Cheltenham, U.K.: Edward Elgar Publishing Company.
- Lachmann, Ludwig M. 1986. *The Market As an Economic Process*. Oxford: Basil Blackwell, Ltd.
- . 1956. *Capital and Its Structure*. London: London School of Economics, G. Bell and Sons, Ltd.
- Mathews, John A. 1996. *Strategizing, Equilibrium and Profit*. Stanford, California: Stanford University Press.
- Mead, Walter J., Asbjorn Moseidjord and Phillip Sorenson. 1983. "The Rate of Return Earned by Lessees Under Cash Bonus Bidding of Oil and Gas Leases." *The Energy Journal* 4: 42–45.
- . 1949. *Human Action: The Scholar's Edition*. Auburn, Ala.: The Ludwig von Mises Institute, 1998.
- Reece, Douglas C. 1979. *Offshore Oil Bidding Systems*. New York: Garland Publishing Company.
- . 1960. "Praxeology as the Method of the Social Sciences," reprinted in *The Logic of Action One: Method, Money and the Austrian School*. Cheltenham, UK: Edward Elgar Publishing Company, p. 32, 1997.
- Schumpeter, Joseph A. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle*. Cambridge, Mass.: Harvard University Press, 1959.
- . 1942. *Capitalism, Socialism and Democracy*. New York: Harper and Brothers Publishers, 1950.
- Spulber, Daniel F. 1989. *Regulation and Markets*. Cambridge, Mass.: The MIT Press.

Taylor, Thomas C. 1970. Accounting Theory in Light of Austrian Economic Analysis. Ph.D. Dissertation. Louisiana State University.

Thaler, Richard. 1992. *The Winner's Curse: Paradoxes and Anomalies of Economic Life*. New York: The Free Press.