

REVIEW ESSAYS

Waiting to Transit the Thorny Issues of Capital Theory

Jeffrey M. Herbener¹

¹ Grove City College

JEL Classifications: B53 Austrian, E43 Interest Rates: Determination, Term Structure, and Effects, O16 Financial Markets - Saving and Capital Investment - Corporate Finance and Governance, Y30 Book Reviews (unclassified)

<https://doi.org/10.35297/001c.161683>

Quarterly Journal of Austrian Economics

Vol. 29, Issue 2, 2026

Capital, Interest, and Waiting: Controversies, Puzzles, and New Additions to Capital Theory

Leland B. Yeager and Steve H. Hanke

Routledge, 2024; xiii + 367 pp.

Since the marginalist revolution, economists have been striving to integrate capital and interest into modern economic theory. Eugen von Böhm-Bawerk ([1884] 1959; [1889] 1959) led the way with his exhaustive critique of theories of interest and the development of his agio theory of interest. His work became the touchstone both for authors who followed his path and for those who branched out from it. In their book, Leland Yeager and Steve Hanke direct our attention to two such paths. Their view, following a trail from a neoclassical approach, is that waiting is a heretofore overlooked factor of production whose price is the rate of interest. The other view, a trail from an Austrian approach, is that the rate of interest is a discount of money to be acquired later when giving up money sooner. This view is referred to as the pure time preference theory (PTPT) of interest.

Leland Yeager entered the field in the 1970s with articles aimed at resolving the paradoxes in capital and interest that had been posed in the 1930s (Yeager 1976; 1979; Yeager and Burmeister 1978). His motive was to exonerate the marginal productivity theory of factor pricing and, with it, modern microeconomic theory. "Some of the most disturbing apparent implications of double-switching and capital reversal" Yeager (1976, 345) wrote, "[include] pervasive doubts about the whole neoclassical theory of production and functional income distribution."

^a Jeffrey M. Herbener (herbenerjm@gcc.edu) is chairman and professor of economics at Grove City College, senior fellow and Peterson-Luddy Chair at the Mises Institute, and a fellow of the Institute for Faith and Freedom at Grove City College. He is the editor of two books—*The Meaning of Ludwig von Mises* and *The Pure Time Preference Theory of Interest*, which has been translated into Chinese—and scores of articles in popular and scholarly venues including *The Wall Street Journal*, *Investor's Business Daily*, the *Quarterly Journal of Austrian Economics*, and the *Journal of Libertarian Studies*.

Steve Hanke is to be commended for calling our attention to Yeager's attempts to rescue the marginal productivity theory of factor pricing from its critics and to integrate the theory of interest into modern price theory. As Hanke explains in the introduction, he had a long-standing agreement with Yeager to coauthor such a book. By working from the notes left to him by Yeager after his passing in 2018, Hanke has fulfilled the obligation to his friend and colleague.

Yeager's outline for the book rearranges the order of his previously published articles, placing the concept of waiting as a factor of production and his defense of it first; then presenting its implication for his approach to dispelling the paradoxes and difficulties of capital and interest theory; and finally exploring issues in capital and interest that arise from his previously published work on money and monetary policy. Hanke's main task was to fill in the gaps in the manuscript notes left by Yeager. In some places, he has, understandably, relied on reproductions of Yeager's published works. He notes this method for the material in chapter 4, section 11 (85–90), which is taken from Yeager (1979, 187–92). There are a few other instances of gap filling with material previously published by Yeager. For example, chapter 1, section 8 (11–13) is from Yeager (2018, 405–7) and chapter 12, section 6 (295–98) is from Yeager (2018, 407–11).

The content of the book can be usefully divided into material Yeager published on capital and interest and previously unpublished material extending his approach. The book faithfully recounts Yeager's view of waiting as a factor of production and interest as its price, and how this resolves the apparent paradoxes raised in the literature on capital. The new material extends Yeager's criticisms of the PTPT and the Austrian business cycle theory (ABCT) and deals with the relationship between money and interest and issues raised by monetary policy, among other topics.

Regarding the literature on capital and interest, the book seeks to fill a lacuna in price theory and thereby render the theory logically complete. As Yeager and Hanke (1) put it, the interest rate problem is “Why does the value of output usually exceed the total cost of all obvious ultimate ingredients, including labor and land services? Why doesn't competition erode this discrepancy?” They go on to write that “capital and interest theory tackles such questions as part of general price theory and is a test of fully understanding it.”

In contrast, Böhm-Bawerk ([1884] 1959, 1) states the interest rate problem differently: “Whoever is the owner of a capital sum is ordinarily able to derive from it a permanent net income,” he wrote. “It arises independently of any personal act of the capitalist.”

The implication of Böhm-Bawerk's different perspective on the interest rate problem will be explored below. One similarity between his approach and that of Yeager and Hanke (1–2), however, is that they accept Böhm-Bawerk's emphasis on time in their explanation of capital and interest. "Time is indispensable for production and consumption" they write, "In the real world, some people must be willing to tie up wealth over time, forgoing immediate consumption" (1).

Despite their emphasis on the necessity of incorporating time, their solution to the interest rate problem is not traceable to Böhm-Bawerk. Instead, Yeager built on the works of Silas MacVane and Gustav Cassel, who developed the concept of waiting as a factor of production. Yeager relied most heavily on Cassel ([1903] 1957) in developing his theory of waiting as a factor of production with the rate of interest as its price. As Yeager and Hanke (290; *italics original*) put it:

Waiting is an essential factor of production. Like land and labor and many other goods used in production, waiting can also be a consumer good, as in a consumer loan. Waiting has two dimensions: (1) the *value* of resources whose output is waited for (rather than devoted to current consumption) and (2) the duration of this waiting, *time*.

To recognize waiting as a use of value, not as something physically measurable, dissolves the paradoxes examined in chapter 4 which were thought in some circles to discredit mainstream interest theory and even mainstream price theory.

Yeager (1976, 338) showed in his original article how this view resolves the paradoxes alleged in the literature: "When a switch of technique occurs, the technique adopted really is the more economical of factors in total, waiting included, the factors being valued at their prices." Yeager (345) pointed out that those who called into question neoclassical price theory inappropriately relied upon a physical measure of capital derived from a production function instead of upon the prices of capital goods.¹

Yeager and Hanke's Criticisms of Alternative Views

Because of the importance Yeager placed on the role of waiting as a factor of production, he stridently defended it against alternative views. Not surprisingly, he mustered his most passionate criticisms against alternatives coming from authors who also advocated a marginalist theory of pricing but, as he saw it, were deficient in other respects compared to his view of waiting.

¹ That the amount of heterogeneous inputs used to produce output cannot be computed in physical terms, but only in terms of their monetary prices, is a key insight in the theory of economic calculation developed by Ludwig von Mises ([1949] 1998, 201–57). Yeager (2018, 404) also recognizes this role of money prices.

One of these authors is Irving Fisher. “[Fisher] blundered into denying that interest measures any genuine cost,” Yeager (2018, 407–8) wrote. “If waiting or the interest that it earns were a true cost, he said, it should be discountable the same as any other costs; yet it is not.” Yeager and Hanke (295–98) offer no new criticism of Fisher but rest content with replicating the criticisms of Fisher that Yeager (2018, 407–11) had in print already. The main point of contention is whether interest should be considered a cost of production, as Yeager and Hanke (following Cassel) claim, or a discount of future revenue to be received, as Fisher (following Böhm-Bawerk) claims.

Fisher’s view that time preference is most usefully conceived as a discount of future revenue is shared by a group of authors offering another view Yeager considers worthy of critique. Yeager (1979, 208; *italics original*) wrote, “I cannot believe that the Austrians have a *pure* time-preference theory of interest (despite, for example, the praise that extreme subjectivists accord to Frank A. Fetter and Ludwig von Mises for supposedly having worked such a theory out). . . . Can anyone doubt that if the state of technology and other aspects of objective reality were much different from what they now are in fact, then the interest rate and the marginal rate of time preference would also be different from what they now are?”² But he is quick to walk back his dismissal of the PTPT: “Subjectivist Austrians may contend that objective, physical reality can influence the interest rate and other prices only *through* people’s subjective perceptions of it,” he wrote. “I will not quarrel with that contention, it does not banish the influence of objective reality.”

This concession, however, is in accord with the Misesian approach to economics and, therefore, with the PTPT. “Thinking man sees the serviceableness of things, i.e., their ability to minister to his ends, and acting man makes them means,” Mises ([1949] 1998, 92) wrote. “It is of primary importance to realize that parts of the external world become means only through the operation of the human mind and its offshoot, human action.”

Human action is understood by Mises as a person striving to attain a subjectively valued end by bringing objective elements within his circumstances into a logically constructed structure of action adequate to attain his chosen end. The value of objects employed in a person’s action is derived from the contribution each one makes to the anticipated value of the end it helps attain. From all the technically possible combinations of various factors of production that can objectively be used to produce the desired good, a person strives to choose the combination that entails the lowest value of its factors of production in their most valuable alternative uses. In short, action is economizing. “The individual actor chooses to employ elements in his environment as means to the expected achievement of his ends,” Murray

2 See Fetter (1977) for a sampling of his work on capital and interest.

Rothbard ([1962] 2009, 7–8; italics original) wrote, “*economizing* them by directing them toward his most valued ends (leaving his least valued ones unsatisfied), and in ways that his reason tells him are most appropriate to attain these ends.”

That a person’s mental judgments are logically primary and objective conditions are logically secondary in human action is the fundamental meaning of *pure* in the PTPT. *Pure*, then, is a descriptor used by PTPT economists to distinguish their view from the eclectic view associated with Alfred Marshall in which the subjective valuations of consumers determine demand, the objective costs of production determine supply, and this demand and supply together codetermine the price of a consumer good.

Fisher ([1930] 1970) and Hayek (1936) exemplify the Marshallian view in their theories of interest. For them, the subjective influence (i.e., time preference) and the objective influence (i.e., production relations) codetermine the rate of interest. In rejecting the eclectic view, the PTPT does not assert that the subjective valuations people make determine prices without regard to objective reality.³ The PTPT rests on the ground that all action is determined by human choice and therefore, as Yeager assents to above, a judgment of the human mind.⁴

In the Misesian approach, the rate of interest is determined in similar fashion. A person judges the significance of objective circumstances under which he will choose his preferred discount of a satisfaction to be attained later instead of sooner and the corresponding extent of his saving-investing. “Originary interest is the ratio of the value assigned to want-satisfaction in the immediate future and the value assigned to want-satisfaction in remoter periods of the future,” Mises ([1949] 1998, 523) wrote. “It is the ratio of commodity prices, not a price in itself.”

The rate of interest manifest in the market is at the height that clears the market among those who, in the circumstances of their actions, have more intense time preferences (i.e., borrowers) and those who, in the circumstances of their actions, have less intense time preferences (i.e., lenders). An exposition of this analysis can be found in Rothbard ([1962] 2009, 375–410).

Yeager and Hanke’s Views on Method in Economics

Another factor contributing to the stridency of Yeager’s defense of his approach vis-à-vis the PTPT is his view of a proper method of economic theorizing. He advocates what he calls countermethodology. “Good

³ This is not to deny that there are radical subjectivist economists who claim Carl Menger as the fountainhead of their views. The PTPT economists who build their theory consistently from the works of Fetter and Mises, however, do not belong to this group. As Yeager (1979, 208) implies in the quote above, neither Fetter nor Mises is an extreme subjectivist.

⁴ These points are made by Roger Garrison (1979, 220–21) in his comment on Yeager (1979).

methodology is mostly countermethodology,” Yeager ([1995] 2011, 225) wrote, “which strives to free working economists from methodological pressures.” Eschewing a given method as proper for economic theorizing, Yeager ([1994] 2011, 263) wrote of his approach, “We may better understand the nature and force of arguments on a particular topic by recognizing how it resembles (when it does) arguments on even quite different topics.”

As in other sciences, according to Yeager ([1994] 2011, 264), tautologies can help economists in grounding their abstract conceptualizations in reality. Another similarity economics has with other sciences is the use of conventions in building models Yeager ([1994] 2011, 267–69). The results of appropriately employing tautologies and conventions are models by which idealized economic laws can be formulated Yeager ([1994] 2011, 270–72). These laws strive to strike a balance between empirical reality, which is messy and complex, and simple but empirically empty concepts. “The analyst seeks some compromise between meaningful but unmanageable realism and detail at one extreme,” Yeager ([1994] 2011, 277) wrote, “and apparent simplicity but emptiness at the other extreme.”

Yeager likens good economics to the work of a detective. “He is willing to undertake episode-by-episode analysis, or any other kind that appears promising,” Yeager ([1995] 2011, 246) wrote. “Economists, we may hope, will become equally open-minded about novel evidence and argument.” The result of this attitude is “the method of multiple competing hypotheses” in which researchers are “developing rival hypotheses and seeking ways to rule each one out, seeing which one or more, if any, stand up to the challenges of the best evidence obtainable. The contrasting approach or attitude is simply to seek arguments and evidence in defense of one’s own favorite hypothesis.”

His attachment to countermethodology accounts for Yeager’s dismissal of the Misesian approach to method in economics. Mises ([1949] 1998, 30–71) famously argued for a praxeological approach to economic theory. As Rothbard ([1976] 1997, 58–77) put it, economic theory is built upon the ground of basic facts about human action which are understood by a person through reflection on what he knows as an acting human person about human action. For example, human action is purposeful behavior—that is, striving to attain an end the person has chosen by employing means he has chosen as suitable aids in attaining his chosen end. The logical structure of action, Rothbard (59) wrote, “is built on the fundamental axiom of action, and has a few subsidiary axioms, such as that individuals vary and that human beings regard leisure as a valuable good.”

Yeager ([1995] 2011, 229) holds that such approaches can foreordain conclusions or shield unsound arguments from questionable assumptions: “[Examples] include (in my opinion) the ‘Austrian’ theory of the business

cycle, the ‘pure-time-preference’ theory of interest,” he wrote, “and widespread mindless recitation of Friedman’s slogan about not testing a theory by its assumptions.”

Yeager seems to hold that Misesian praxeology succumbs to what he calls the Cartesian principle, which he claims would condemn science to stagnation. “Science rarely progresses by working ‘down from first principles’; it progresses and expands the other way,” he wrote, “We begin with empirical regularities and go backward to more and more complicated hypotheses and theories” (Yeager 1994, 235).

Mises ([1949] 1998, 66), however, denies Yeager’s characterization of praxeology: “Economics does not follow the procedure of logic and mathematics,” he wrote. “It does not present an integrated system of pure aprioristic ratiocination severed from any reference to reality.” Referring to assumptions such as the disutility of labor and the existence of indirect trade,⁵ he continued, “In introducing assumptions into its reasoning, it satisfies itself that the treatment of the assumptions concerned can render useful services for the comprehension of reality.”

Not only does Mises’s economic theory have touch points with reality in basic facts and assumptions, but praxeology provides a conceptual framework necessary for understanding the facts of reality that arise from contingencies of person, place, and time. Mises refers to the method of blending conceptual knowledge with understanding of contingent facts as thymology. He wrote, “The task of the sciences of human action is the comprehension of the meaning and relevance of human action. They apply for this purpose two different epistemological procedures: conception and understanding. Conception is the mental tool of praxeology; understanding is the specific mental tool of history. The cognition of praxeology . . . is cognition of universals and categories. The cognition of history refers to what is unique in each event or class of events” (Mises [1949] 1998, 51).

In contrast, Yeager ([1995] 2011, 238) claims that “both a priori models and imprecise ‘blanket’ concepts [like capitalism or socialism] can be of little help in investigating reality.” He suggests, instead, discovery of analogies between phenomena heretofore seen as distinct. “Perhaps the most fruitful procedure in physics,” he wrote, “has been the search for analogies between distinct categories of phenomena, but we should not confuse it with modeling.”

Yeager and Hanke elaborate on why ABCT should be seen as an example of the failure of a priori theories to explain historical events. While they do not outright deny the logic of ABCT, they contend that the theory

⁵ Rothbard ([1962] 2009, xlvii) lists two assumptions in his discussion of the praxeological method: there is variety of human and natural resources, and leisure is a consumer good.

cannot account for the actual history of business cycles. “Such an account is conceivable but scarcely supported by evidence. Each recession is a specific historical event,” they write. “There is scant warrant for supposing that one specific theory explains all episodes. Theory is no substitute for history” (269). Yeager and Hanke seem to assume that ABCT attempts to give a complete explanation of the particularity of all historical business cycles on theoretical grounds alone. Yet the economists who advocate ABCT clearly base both the universal and contingent features of their explanation of particular cycles on the method of thymology—for example, Rothbard ([1963] 2000) and Sennholz (1988)—and not on theory alone.

In advancing their own theory of business cycles, Yeager and Hanke (270–72) argue that economic stimulus comes from credit expansion coupled with monetary inflation. Following Knut Wicksell, they describe a cumulative process of monetary inflation to accommodate increased demand for credit deriving from a policy-induced reduction in the market rate of interest. They claim superiority for their view over ABCT because, as they argue, the Wicksellian process is cumulative and therefore proceeds apace in stimulating economic activity even if the “interest-rate sensitivity of demand for loans” is slight. “That sensitivity might well be slight,” Yeager and Hanke (270) write, “counting against the Austrian cycle theory,” since the ABCT would not account for a robust economic boom under this condition. Yet they concede the ABCT claim that a policy-induced suppression of the rate of interest in the wake of credit expansion accommodated by monetary inflation sets in motion an economic boom. Whether the boom is mild or severe or somewhere in between these extremes is not, in ABCT, a theoretical question, but contingent on the particular case at hand. Their argument against the ABCT is beside the point because the theory contains within it the possibility of varying degrees of intensity of preferences, which can be discovered by the method of thymology.

Yeager and Hanke (269) make one criticism of the logic of ABCT itself. They claim that “the Austrian theory is implausible” because entrepreneurs would come to understand that a policy-induced suppression of interest rates is a short-run phenomenon that they can ignore in making their long-run investment decisions. Beginning with Mises (1943), a significant literature on the issue of expectations and business cycles has been written. One response in this literature to the problem raised by Yeager and Hanke highlights the fact that as suppressed interest rates begin to lead people to change their behavior, the more insightful, experienced entrepreneurs who refrain from borrowing to leverage long-term investments are supplanted by the less insightful, inexperienced entrepreneurs who are willing to borrow short in order to invest long (Engelhardt 2012).

Yeager and Hanke's New Criticisms of the PTPT

After Yeager and Hanke (68–69) repeat Yeager's (1979) dismissal of the PTPT as a subjectivist-only view, they provide several additional criticisms of the PTPT in response to Israel Kirzner's (1993) defense of this view and in light of Yeager's view of Mises's method.

First, Yeager and Hanke (65) claim that the PTPT immunizes itself against refutation by appealing to a philosophical ground. Instead of building on such ground, they argue, developing useful economic theory is a conceptual, not a philosophical project. The question does not concern foundations, but instead is "What conceptualizations and terminology best link observed realities together?" One example of philosophical statements they highlight (69) is Mises's claims about what he called originary interest.

Among the numerous quotations from Mises cited by Yeager and Hanke (69n7), Mises ([1949] 1998, 484) stated, "Time preference is a categorical requisite of action. No mode of action can be thought of in which satisfaction within a nearer period of the future is not—other things being equal—preferred to that in a later period." For Mises, time preference is logically entailed in human action. He places the concept of time preference on the same footing as the concept of preference itself, which is a logically necessary requisite to choosing between alternatives in action. Mises ([1949] 1998, 12) wrote, "But acting man chooses, determines, and tries to reach an end. Of two things both of which he cannot have together he selects one and gives up the other. Action therefore always involves both taking and renunciation." For Mises, preference is not a wish list untethered from reality, but a mental judgment about actual alternatives between competing ends and among competing combinations of means a person considers when choosing an action. Likewise, time preference is not divorced from the real alternatives a person faces in considering the intertemporal aspects of employing means to attain ends. Just as preference is a necessary requisite of action because of the finitude of the human condition, which entails the distinction between more and less, time preference is a necessary requisite of action because of the temporality of the human condition, which entails the distinction between sooner and later. About acting man, Mises ([1949] 1998, 480; *italics original*) wrote, "His choices regarding the removal of felt uneasiness are directed by the categories *sooner* and *later*."

If Mises's claims about preference and time preference are basic facts of the human condition, then it seems fitting and proper for theories about human action to be immunized from any deviation from or inconsistency with them. As noted in the quote above, Yeager ([1995] 2011, 229) rejects the "widespread mindless recitation of Friedman's slogan about not testing a theory by its assumptions." Given Yeager's interest in the reality of theory, what better test of a theory's assumptions is there than demonstrating that they are basic facts of reality?

Second, Yeager and Hanke (66–67) assert that the PTPT is a case of “methodological essentialism,” a view that only explains the existence of interest, but not its rate. They argue that by appealing to a fact of the human condition, and thereby constructing an essentialist theory, the PTPT ignores marginalism, a central principle of modern economics. “A person never faces a choice between consuming all now and all at a future date,” they write. “Each case presents a marginal choice of giving up some of the one for more of the other” (66). Because the PTPT forgoes a marginalist approach in favor of essentialism, Yeager and Hanke (67) claim that advocates of the PTPT concede that they cannot explain the height of the rate of interest: “Diehard adherents say that the PTPT is meant to explain the existence of interest, not necessarily what determines its rate.” “But insisting on that distinction,” they write, “is diversionary” (68). The level of the price of a good or of the rate of interest, they claim, is all that is necessary to explain; by accomplishing this task, their functionalist approach is sufficient for economic analysis.

The reasoning of the PTPT advocates, in contrast to Yeager and Hanke’s, is that the treatment of time preference in praxeology has the same logical status as the preference a person has for a consumer good. If people lack a preference for a consumer good, it has no price at all. Given that people have such a preference, the intensity of their preferences determines whether the good’s price is higher or lower. The quantitative height of its price is analyzed either theoretically by stipulation in a mental experiment (e.g., if demand for housing is greater with a given supply, the price of housing will be at least as high and the quantity traded will be at least as large as otherwise), or historically by thymological analysis of the contingent factors that affect the intensity of people’s preferences (e.g., the median price for the 621 houses that sold in San Francisco in October 2025 was 4.5 percent lower than that of the 499 houses that sold in October 2024 because net migration from San Francisco to other locations reduced the demand for housing relative to its supply). Likewise, time preferences explain why there is a rate of interest at all; and the contingent factors of person, place, and time, in turn, affect the intensity of time preferences, which determine the quantitative height of the rate of interest.

Yeager and Hanke’s claim, in contrast, derives from Yeager’s dismissal of the efficacy of using praxeology to derive basic supply and demand analysis in a top-down manner from first principles and that of using thymology to render a plausible judgment concerning the quantitative impact of the various causal factors operating in the contingent circumstances of person, place, and time. For Yeager, there is no universally applicable method of economics.

Furthermore, as noted above, the praxeological status of time preference is similar to that of preference. If one rests on an “essentialist” claim, then the other does also. In the face of scarcity, preferring one alternative to another is essential for choosing among competing ends and among competing

combinations of means. In the face of the passage of time, time preference is essential to choosing among the various intertemporal allocations of means in attaining ends. Resting on what we know reflectively about human action, praxeology accepts the fact that both subjective and objective factors influence the intensity of preferences and time preferences, with the caveat that the influence of objective factors on an action is determined by human judgment. The quantitative magnitudes of the price of a good and the rate of interest are determined by the intensity of preferences people have for the good and the intensity of time preferences they have for satisfactions, respectively.

Yeager and Hanke (71–73) also employ an analysis of how circumstances can affect the intensity of time preference a person has. They even concede that both Mises and Rothbard integrate various intensities of time preferences among people into their theory of the rate of interest. They claim, however, that Rothbard does not go far enough along this line. “Yet Rothbard still inadequately recognizes how investment opportunities, including the productivity of roundaboutness,” they write, “also influence the *level* at which market transactions harmonize people’s marginal rates of time preference” (72; *italics original*).

But why must this effect be a logically necessary result (i.e., part of economic theory)? Since the Misesian concepts of preference and time preference are analogous, consider this analogy to Yeager and Hanke’s case against the PTPT applied to the price of a consumer good: Suppose a person has a preference for buying items of a particular kind, say sticks of butter. Why would his preference for the number of sticks of butter increase in the face of the entry of new butter he considers of higher quality? Why couldn’t a person, without logical contradiction, simply shift his preference away from the now less valuable good to the more valuable one, leaving the number of sticks of butter he prefers the same? And if he bought more butter at a higher price, would it not follow that the intensity of his preference for the higher-quality butter was greater than that for the original butter? Similarly, why couldn’t a person shift his saving-investing from existing, less physically productive processes to new, more physically productive processes without changing the intensity of his time preference, thereby leaving both the total amount of his saving-investing and his discount of later over sooner satisfaction the same? And if he increased his saving-investing and lowered his discount of later over sooner satisfaction in the face of the more productive alternative, would we not conclude that the intensity of his time preference was lower? And why is it implausible to claim that the extent to which people increase their saving-investing and lower their discount of later satisfaction in the face of new circumstances is a matter of their valuing, judging, and choosing and not merely a mechanical reaction to the new circumstances? The PTPT, after all, claims that time preferences synchronously determine both the rate

of interest and the amount of funds saved and invested, just as preferences synchronously determine both the price of a consumer good and the quantity of the consumer good traded.

Third, Yeager and Hanke (65–66) judge the inferiority of the PTPT by contrasting it with their view of waiting as a factor of production. Their attempt to do so, however, merely rehearses the description of their view. But this presupposes the superiority of their conceptualization of the rate of interest as the price of the factor of production called waiting. What if the Misesian approach of grounding the theory in basic facts proves to have a firmer foundation in reality than Yeager's appeal to analogies and conventions? Why would a superior theory of interest follow from disregarding the factual distinction between time and factors of production that Mises ([1949] 1998, 480) makes, as quoted above?

Fourth, to show that physical productivity influences the rate of interest, Yeager and Hanke bring up the case posed by Paul Samuelson (1981, 22–23) of 100 units of rice today ripening into 110 in a year. They write that in such a case “not even neutral time preference can block a positive interest rate in terms of rice” (67). According to the PTPT, however, the intensity of a person's time preference would discount the future gain from saving-investing in 100 units of rice today. Discounting the 110 units of rice to be received in a year permits an apples-to-apples comparison between having present units of rice at the present moment and having the prospect of future units of rice at the present moment. If a person's time preferences render a 5 percent discount of future rice, then he would not reject saving and investing in rice today. The present value of 110 units of rice to be received in a year would be 104.76 units, which is more than his present 100 units of rice. The rate of return in terms of value from saving-investing in rice would be 5 percent, not the 10 percent gain in physical terms. But if the person's time preferences render a 15 percent discount, the present value of 110 units of rice in a year would be 95.65 units, which is less than his present 100 units of rice. In the latter case, he would reject saving-investing in rice and search out an alternative line to invest in that generated a rate of return above 15 percent. With no saving-investing in rice, there would be no return on investment in rice despite its generating a 10 percent gain in physical units.

Furthermore, if rice were traded in the market, its future physical productivity would affect the current market price of rice, but not the rate of interest from saving-investing in rice. Suppose that (1) 100 units of rice will ripen into 110 units in a year, (2) the anticipated price of a unit of rice sold in a year is \$2, and (3) the rate of interest is 0.05. Then the price of 100 units of rice today would be bid to $\$209.52 = \$220/1.05$. If instead the marginal physical productivity of 100 units of rice today is twice as large, 20 units instead of 10 units, then the price of 100 units of rice today would be bid to $\$228.57 = \$240/1.05$. No matter what the physical productivity

of rice might be, the rate of interest on saving-investing in rice conforms to the rate of interest which is the intertemporal discount of satisfactions. Therefore, higher physical productivity provides no stimulus to increase saving-investing. Greater physical productivity raises the current price of the factor of production commensurate with the increased productivity expected to be realized in the future and therefore leaves the rate of interest from saving-investing in it the same. Only if people lower the intensity of their time preferences at the prospect of greater productivity will saving-investing increase and, thereby, fund additional investment in the now more physically productive line of production.

Even in cases in which the physical productivity of a producer good in some line of production increases, this does not increase saving-investing or change the discount of later satisfaction relative to sooner satisfaction unless the intensity of time preferences change. Consider the dynamic set in motion by an increase in physical productivity of rice in the market for rice described above. Starting with 100 units of rice producing 110 units of rice in a year, the anticipated price of a unit of rice of \$2 in one year, and the rate of interest at 0.05, the price of 100 units of rice would be \$209.52. If the marginal physical productivity of rice were to double from 10 to 20 units in a year, entrepreneurs with superior foresight in anticipating the impact of this change would begin to bid the price of 100 units of present rice up in order to acquire more of it now in anticipation of selling it for \$240 instead of \$220 in one year. As other entrepreneurs came to anticipate more accurately the higher realizable price in the future, their additional bidding would push the price of 100 units of rice up to \$228.57. Without a change in the intensity of time preference, the saving-investing for this additional bidding for rice would come from reductions in saving-investing in other lines of production which were earning only the 0.05 rate of interest. The monetary gain accruing to entrepreneurs during this dynamic process is profit earned for their superior foresight, not interest. From beginning to end of the adjustment, the rate of interest and interest income remain the same unless time preferences change during the process.

Finally, Yeager and Hanke (70) recognize that Mises ([1949] 1998, 536–38, 538–42, 547–63, 564–67) includes other factors besides time preference as components of the various market rates of interest: the entrepreneurial component, the price premium, monetary inflation and credit expansion, and monetary deflation and credit contraction.⁶ These other factors generate nonarbitraged differences in rates of interest across the various lending-borrowing alternatives. The *pure* in PTPT, then, does not refer to a claim that time preference is the only causal element operating on interest rates

⁶ Rothbard ([1962] 2009, 797) also lists causal components of the various market rates of interest: time preferences, entrepreneurial, purchasing power of money, and terms of trade.

in the market economy. According to Mises, time preferences determine the originary rate of interest, which is uniform across all intertemporal exchange of present satisfactions for future satisfactions. The intertemporal trade of money under varying degrees and combinations of the four conditions Mises highlights above is the PTPT explanation of the spectrum of market rates of interest. The PTPT is not essentialist, as Yeager and Hanke claim. It incorporates both various intensities of time preferences and other causal factors in explaining market rates of interest.

Yeager and Hanke (chap. 9) also rely on other causal factors to explain the variation in interest rates across diverse saving-investing opportunities. Their recognition and use of other causal factors in addition to waiting in explaining market interest rates blunts the force of the claims they levy against the PTPT for its methodological essentialism. The difference between Yeager and Hanke's approach and that of the PTPT does not lie in the former being functionalist and the latter essentialist. The difference between them is in how they claim that other causal factors bring about the spectrum of rates of interest across various types of saving-investing. Yeager and Hanke argue that these other factors influence the height of the rate of time preferences and the degree of roundaboutness of production, leading to various equilibrium rates of interest across various types of saving-investing alternatives. The PTPT authors argue that these other factors generate additional compensatory payments (e.g., uncertainty premiums) to the uniform compensation for time preference across various types of saving-investing alternatives.

Critical Comments on Waiting as a Factor of Production

In addition to striving to integrate capital and interest into modern economic theory in the wake of the marginalist revolution, economists of various approaches, dissatisfied with the bifurcation of price theory within British classical theory (e.g., short-run prices determined by demand and long-run prices by costs of production), have sought to construct a general theory of price and production. Yeager (1979, 207–8) shares this concern, giving him three reasons to tenaciously hold on to the theory of waiting as a factor of production: rescuing price theory from paradoxes; solving the interest rate problem posed by Böhm-Bawerk; and advancing the unification of economic theory.

Yeager's idea that there is a missing factor of production whose price, if included in costs of production, would solve the interest rate problem seems a viable candidate to fill the lacuna in neoclassical price theory while maintaining a uniform theory of factor pricing. As noted above, Yeager solves the capital paradoxes by defining waiting in terms of the use of value for a set duration. While labor and land are measured in physical amounts per

unit of time, Yeager and Hanke (33) concede that “the amount of goods or productive factors not consumed and instead waited for must be expressed in numéraire goods like money.”⁷

By defining waiting in this manner, Yeager seeks to accomplish his three goals listed above. His definition, which is critical for him in dissolving capital paradoxes, raises problems for treating waiting as a factor of production, however. The main issue can be highlighted by considering the straightforward, realistic manner in which Mises ([1949] 1998, 476–85) integrated time into economic theory. In human action, a person does not accumulate hours of time and direct a sum of them toward the attainment of chosen ends. He places his action in the stream of time, beginning the period of production at the moment he prefers to do so, then employing his means step-by-step in a sequence of stages of production of intermediate capital goods culminating in the production of a consumer good, and finally attaining his ends by using the consumer good step-by-step over its useful lifespan. Every action includes a period of production of a consumer good and a duration of serviceableness of the consumer good.

For Mises, time preference is not an abstract concept divorced from reality. It is the mental judgment a person makes in considering the intertemporal aspects of alternative capital structures of production and of the length of serviceableness of the consumer goods they produce. “Time preference is a categorial requisite of human action,” Mises ([1949] 1998, 481) wrote. “No mode of action can be thought of in which satisfaction within a nearer period of the future is not—other things equal—preferred to that in a later period.” Time preference implies that a person always prefers to begin the duration of serviceableness of the consumer good closer in time to the beginning of the period of production. In other words, a person prefers to shrink the time taken up to complete the period of production, *ceteris paribus*. As Mises ([1949] 1998, 480) put it, the passage of time entailed in production of a consumer good has disutility, and therefore a person will always discount satisfactions to be attained later instead of sooner in making any intertemporal choice in the present.

Yeager’s concept of waiting, in contrast, sounds like a description of saving-investing. Some authors, including Robert Dorfman (1959, 359) and J. R. Hicks ([2002] 2016, 61–62), have noted this meaning. “There has been no agreement on the name of that [overlooked] factor. . . . It is quite hard to resist calling it Saving!” wrote Hicks (61–62). “[But it] must imply . . . an increase in saving that is matched by an increase in investment.”

Yeager (1994, 70), too, is aware that waiting is just saving-investing:

⁷ The implications of the conspicuous absence of capital goods in Yeager and Hanke’s analysis will be treated in the discussion of the capital structure below.

Drawing on Cassel (1903), I will try to explain the concept briefly. Waiting is the use of value over time. Suppliers of that service (a saver or owner of a bond or other capital asset) delay exercising command over resources for their own purposes, making early command over them available instead to whoever acquires it from them. The combined willingness and capacity to tie up resources in wisely chosen roundabout productive processes (including houses and durable consumer goods) is productive. Businesses borrow for investment purposes because they expect the time-consuming projects to be productive enough to cover interest charges and yield profit in addition.

Like Dorfman and Hicks, Yeager seems reluctant to name saving-investing as a factor of production. There are several reasons for the reticence to do so. The first difficulty is that saving-investing is unlike factors of production in crucial ways. Modern price theory holds that the price of a unit of service rendered by a factor of production conforms to the factor's marginal revenue product (MRP). The MRP of a factor of production is the additional monetary revenue generated by the sale of the marginal physical product (MPP) produced by adding a unit of service of the factor used in combination with fixed amounts of complementary factors of production. If the wage rate of some type of manual labor is \$50 per hour, the marginal hour of such labor is contributing additional units of output that sell for \$50. The MRP of waiting (i.e., saving-investing), however, is the additional monetary revenue generated by an added unit of saving-investing. If \$500 of saving-investing for a month generates a monetary gain of \$50, then the MRP and price of waiting is 0.10 per month. As Mises ([1949] 1998, 523) wrote, "[Interest] is a ratio of commodity prices, not a price itself."

More fundamentally, unlike other factors of production, the MRP of saving-investing is not independent of a change in the amounts of the other factors of production. According to marginal productivity theory, the MPP of a factor of production can be calculated by adding a unit of the factor, leaving the amount of all other factors the same, and measuring what happens to output. An added unit of saving-investing, in contrast, is used to buy other factors of production. The resulting additional production of output and the resulting revenue from that added output's sale, then, depend on the MPP of the additional complementary physical factors of production purchased with the added saving-investing. The added contribution to output from saving-investing thus cannot be distinguished from the added contribution of the physical inputs purchased (i.e., the investment) with the funds spent to buy them (i.e., the saving). In calculating the MRP of a unit of service provided by labor, land, or capital goods, the amounts of complementary factors of production must be held constant. The MRP of an additional unit of saving-

investing, in contrast, cannot be calculated because it necessarily includes a change in the amount of the complementary factors of production that the saving-investing buys.

Perhaps such considerations are the reason that Yeager and Hanke do not apply marginal productivity theory to waiting to give an explanation of its price (i.e., the rate of interest). Instead, they argue that “like other prices, the interest rate is determined by ‘supply and demand,’ which reflect concern for the timing of consumption[,] and by opportunities to increase the productivity of land and labor by well-chosen time-consuming processes” (162).

It is insufficient for Yeager and Hanke (162) to establish waiting as a factor of production in their remark that “the principle of derived demand applies to waiting as much as to other factors.” To accomplish their goal of extending general theory to cover analogous cases not yet integrated, they must show how the marginal productivity explanation of the price of a factor of production applies to waiting. How can saving-investing, which is denominated in money, be integrated into a production function with physical factors of production, and how can the rate of interest, which is a pure number, be integrated into cost functions?

Aside from sounding more like Fisher ([1930] 1970) or Hayek (1936b; 1941, 216–44) on interest rate determination, Yeager and Hanke only incorporate saving-investing allocated to more time-consuming or roundabout methods of production that are physically more productive as direct causes of the rate of interest.⁸ Entrepreneurs, however, also devote savings to invest in working capital used to purchase the services of labor, land, and intermediate capital goods for the purpose of replenishing ongoing production processes. In addition to investments in more roundabout methods of production, their investments in fixed capital include maintenance and replacement of existing capital goods to repeat existing production processes and duplication of capital goods used to replicate existing production processes. How, then, do these categories of waiting (i.e., saving-investing) that do not extend the roundaboutness of production influence the rate of interest, and what does their influence do the claim made by Yeager and Hanke (129–30) that the equilibrium rate of interest is both the marginal rate of time preferences and the marginal rate of production in more roundabout processes? Is it just that everything depends upon everything else?⁹

⁸ Yeager and Hanke (chaps. 5 and 6) employ a Fisher-Hayek model of the subjective and objective trade-offs between present and future goods determining the rate of interest.

⁹ In reference to the influence of the money relation on the rate of interest, Yeager and Hanke (258) write, “Interdependence is general: everything has some causal relation to everything else, even if of infinitesimal strength.”

Whatever answers may be given to such questions, the MRP of saving-investing in production is always coincident with the MRP of the factors of production purchased by investing the savings, vitiating the application of the marginal productivity theory of factor pricing to waiting. If the price of waiting cannot be encompassed under the uniform theory of factor pricing, treating waiting as a factor of production fails to achieve Yeager's goal of extending a theory more generally to cover like cases heretofore unincorporated.

The second difficulty in treating saving-investing as a factor of production is that if the rate of interest is the price of waiting, why are the prices of all other factors of production discounted by it? This issue was raised by Böhm-Bawerk in the positive and then by Fisher in the negative, as noted above. As Fetter ([1905] 2003, 123; *italics original*) wrote, "Our proposition must suggest itself as self-evidently true in this form: the value of any good is the sum of the entire series of rents it contains, discounted, at *some* rate to their present worth." This rate of discount is the market rate of interest. Fetter (147; *italics removed*) wrote, "The rate of capitalization of income and the rate of contract interest on money capital tend to unite into a single market rate." In fact, Fetter (130) characterized his approach to interest rate theory as a capitalization theory: "Capital value in modern industry is everywhere the expression of the serial rents of wealth," he wrote, "discounted at a prevailing rate of time discount."¹⁰

In contrast, Yeager (1994, 71) sees the interest rate as rationing waiting (i.e., saving-investing) across various lines of production in the way a factor of production's price rations the allocation of the factor. Failure to conceive of the rate of interest as the discount rate of future revenue leads Yeager and Hanke into some analytical difficulties. For example, concerning the market-clearing process for establishing the height of the rate of interest, Yeager and Hanke (129–30) give the following example to illustrate the market adjustment process establishing a market-clearing rate of interest: Suppose the rate of time preference was 0.05, the rate of roundaboutness of production was 0.20, and the market rate of interest was 0.10. Taking advantage of the arbitrage gains, the additional saving would increase the premium of present goods, and the additional investment would reduce the rate of return until the rate of time preference and the rate of roundaboutness came together.

By using an example of the interest rate expressed in goods, Yeager and Hanke open themselves to the same criticism that Yeager levels against those who advocate for capital paradoxes. Just as the paradoxes dissolve when money prices are introduced, the adjustment process in the market between the rate

¹⁰ Time discount for Fetter ([1905] 2003, 131) corresponds to what Mises called time preference.

of time preference and rates of physical production processes in terms of goods dissolves when the rates are stated in terms of money, as shown above in the analysis of the case of Samuelson's rice.

Furthermore, lengthening production requires building up the capital structure of the economy, which entails combining various producer goods to make more intermediate and fixed capital goods step-by-step until more and better consumer goods are produced by the greater quantity and quality of capital goods. Rates of return in physical terms cannot be computed for such a process. Amounts of heterogeneous producer goods cannot be added together to compute the overall physical productivity of the combination used. New capital goods produced during the process also necessitate changes in the combinations of producer goods used at the various stages of production downstream. If Yeager and Hanke (67) rely in their analysis on Samuelson's one-good model of units of rice in the present ripening to more units of rice in the future to conduct their market adjustment process in the quote above, then they have given up altogether the possibility of more roundabout production by capital accumulation. If instead they rely on their claim (1–2) that to include production of capital goods in analyzing the macroeconomy, presumably including the roundaboutness of production within it, would be double counting, then they ignore a basic fact of human action (Mises [1949] 1998, 477).

If, to sidestep the theoretical difficulties posed by the heterogeneity of goods across the capital structure, Yeager and Hanke (33) rely instead on the claim that money is merely a numéraire, then they face the problem noted by Mises ([1949] 1998, 215) that to perform the function of economic calculation, money must be a good traded in the market for and against all other goods. Mises (415; *italics original*) insisted that “money is neither an abstract *numéraire* nor a standard of value or prices. It is necessarily an economic good and as such it is valued and appraised on its own merits, i.e., the services which a man expects from holding cash.” Money prices are actual exchange ratios of amounts of money traded for amounts of other goods. They are not abstract cross-computations of various pairs of barter exchange ratios.

In any case, the interest rate only emerges in the exchange of present money for future money, not present goods for future goods. As Fetter ([1905] 2003, 116) put it, “In the interest contract for the loan of capital the interest always is and must be expressed in money.” The reason is that money is the unit of economic calculation. Fetter (141–42) wrote: “But two or more quite different things may be expressed in terms of another thing and so be made comparable. Money becomes the value-unit through which different things may be reduced to the same terms for comparison. With this mode of expressing the value-equivalence of various goods, the interest contract first becomes possible, money (the standard of deferred payments) being the thing exchanged (possibly only in name) at two periods of time.”

Introducing money into the Yeager and Hanke example of adjustment in the rate of interest above brings home the relevance of the rate of interest as a discount of future monetary gains. Referring again to Yeager and Hanke's (67) use of Samuelson's case, if the time preference rate of discount were 0.05 and the productivity of 100 units of rice rendered 110 units in a year, each anticipated to sell for \$1, then the buying price paid now for the resources used, in this case 100 units of rice, to earn a monetary sum of \$110 in a year would be \$104.76 and not \$100. All the prices paid now to buy the productive services of factors of production in every other investment made in the economy would be discounted in the same manner, regardless of their physical productivity. A production process expected to yield \$80 in a year would have input prices of \$76.19, and one yielding \$120 in the sale of output in a year would have input prices now of \$114.29. In short, investment in every production process would earn the time preference discount rate of 0.05. This result comes about because of competitive bidding by entrepreneurs using saving, either their own or that borrowed from capitalists, to invest in the requisite inputs, bidding more heavily in higher-return areas and less heavily in lower-return areas. The gap between output prices and input prices is not from a missing factor of production, but from the discounting of future revenue entailed in entrepreneurs' calculation of what they can pay for inputs now without impairing the financial integrity of their enterprises.

Furthermore, as Yeager and Hanke stipulate, if the market rate of interest of 0.10 was a disequilibrium rate above the going rate of time preference discount of 0.05, then the market would have excess supply of saving. Competitive offering by the more eager savers would lower the rate of interest and thereby reduce the quantity of money supplied (lent) by savers and increase the quantity of money demanded (borrowed) by investors until equilibrium was established at a level intermediate between 0.10 and 0.05, say 0.07. Then the rate of return on each of the now-larger number of investable projects made possible by the increased quantity of saving would adjust to the rate of interest of 0.07 on all existing lines of saving-investing, regardless of their varying physical productivity.

If the rate of interest is not a discount of future revenues from saving-investing, then it cannot be the source of present-value calculations. As noted above, Fetter argued that for entrepreneurs to allocate saving-investing across different intertemporal alternatives, they must be able to calculate an equivalence between present money given up and future money attained; otherwise, intertemporal economic calculation, and with it economizing intertemporal allocation of goods, would not be possible. The rate of interest makes such calculations possible. Waiting (i.e., saving-investing), is not merely allocated into alternative lines of production according to economic

calculation, as Yeager and Hanke contend. It must also be allocated into alternative intertemporal production processes in each line of production according to economic calculation.

As noted by Böhm-Bawerk ([1884] 1959, 1), “[Interest] can be derived from any capital [sum], no matter what be the kind of goods of which the capital consists.” Perceiving the rate of interest as a discount of future money compared to present money gives a universal explanation of all cases of the intertemporal exchange of money. As Fetter ([1905] 2003, 147; italics removed) put it, “The rate of capitalization of income and the rate of contract interest on money capital tend to unite into a single market rate.”

In contrast, Yeager and Hanke’s view that the rate of interest (i.e., the price of waiting) is codetermined by time preferences and roundaboutness of production raises the issue of how the rate of interest, so determined, conforms to the rate of interest for saving-investing in lines other than those that flow into extending the roundaboutness of production.

This issue is the third difficulty of Yeager and Hanke’s approach. Two categories of saving-investing in production which drain resources away from more roundabout processes have been suggested above: working capital and fixed capital to maintain or replace existing capital goods. These two alternatives for saving-investing in production that do not extend its roundaboutness are not analyzed by Yeager and Hanke. Three additional alternatives that are addressed in the book will be considered below.

One is newly produced consumer goods. In this case, Yeager and Hanke argue that saving-investing in the production of consumer goods imbeds waiting into the flow of units of service rendered by the consumer good throughout its useful lifespan. “The services of original factors of production are channeled *through* them [i.e., capital goods], first into and then from them,” they write. “Factories, equipment, and consumer durable goods all require waiting in both construction and use” (47; italics original).

Consumer loans, however, divert saving-investing away from more roundabout production processes into production of goods more directly useful to producing the final good. General merchandise loans are often spent on restaurant dining or beach vacations (i.e., nondurable consumer goods), which lack stored-up waiting. Even consumer loans for durable consumer goods such as mortgage loans divert saving-investing away from building up the capital capacity of the economy by lengthening the capital structure (i.e., more roundabout production) into producing more materials for building houses more directly. With the addition of consumer loans, how does the interest rate bring into equality the rate of time preferences and the rate of more roundabout production? Is it just another case of everything depends upon everything else?

Another alternative to saving-investing in more roundabout production is saving-investing in existing durable consumer goods. Yeager and Hanke (27–31) rely on arbitrage to bring the interest rate on saving invested to buy existing durable consumer goods into equality with the rate of interest on saving invested in more roundabout production. But the rate of interest on saving used by consumers to buy existing houses, appliances, automobiles, and the like lacks any direct influence on production, let alone on roundabout production. Why isn't saving-investing directed into existing durable consumer goods treated as a drain from capital accumulation in more roundabout production, and the movement of the rate of interest driven by accommodating such saving-investing considered a deviation from the level as explained by Yeager and Hanke's theory? What if the intensity of time preferences is so strong that the proportion of loans going to buy consumer goods is large enough that the remaining saving-investing into producer goods is inadequate to even maintain the capital stock of the economy, and therefore the rate of change in roundaboutness turns negative as the capital structure shrinks? In any case, cannot time preferences rising in intensity cause capital consumption and therefore a falling degree of roundaboutness in production instead of equalizing the two rates?

Because Yeager (1994, 71) sees the rate of interest as a rationing method, he relies on the concept of opportunity cost to encompass consumer loans, whether used to buy newly produced or existing consumer goods, under the same theoretical umbrella as producer loans. Opportunity cost is “a measure of the trade-offs required, at the margin, by a factor's or a product's being desired and scarce and having to be rationed somehow” (Yeager 2018, 403). In a modern, advanced economy reliant on Misesian economic calculation, as opposed to a one-good world or calculation of barter exchange ratios using a numéraire good, Yeager (2018, 404) concedes that waiting as a factor of production, like all other factors of production, will be allocated according to monetary gains. Since the rate of interest is not a discount of future revenue for Yeager, there can be no present-value calculations of the various intertemporal allocation possibilities, however. How would Yeager and Hanke calculate whether saving-investing \$1,000 for a year is more or less waiting than \$200 for five years? “Waiting has two dimensions, amount and time,” they write. “A quantity of waiting is the amount of value waited for multiplied by the length of time that the value is tied up” (33). In their view, \$1,000 saved and invested for a year would be the same amount of waiting as \$200 saved and invested for 5 years. In terms of economic calculation, however, the two alternatives are not equal in amount. At an interest rate of 5 percent per annum, for example, the present value of \$1,000 to be received in a year would be \$952.38, and the present value of \$200 to be received in five years would be \$156.71. Put the other way around, \$1,000 saved today would compound to \$1,050 in a year, and \$200 saved today would compound to \$255.26 in five years.

A final alternative to more roundabout production for saving-investing is that borrowers may allocate their saving-investing into existing goods which they anticipate will generate a capital gain. “The more people satisfy their desire to hold savings by holding wealth of a privately genuine but socially spurious kind, such as the bid-up value of collectibles and land,” Yeager ([2003] 2011, 216–17) wrote, “the less they satisfy their desires for savings by holding capital goods (or securities issued to finance capital goods).” Yeager claims that all is not lost. People who borrow to buy land to hold for a capital gain instead of employing it in a production process provide waiting indirectly. By tying up their wealth in landholdings instead of buying consumer goods, Yeager (210) wrote, “they free resources otherwise allocated to consumption for construction and maintenance of machines, buildings, and other capital goods [and] thereby contribute to productivity and economic growth.” Only a small portion of the funds saved in acquiring landholdings is wasted to capital accumulation, Yeager (211) wrote, because “the supply of land is highly price-inelastic, while quantities of capital goods can respond to price.” As a consequence, it takes a relatively small amount of saving directed at investing in landholding to accomplish the capital gain desired by savers. The wasted saving-investing from landholding, Yeager (212) concludes, is counterbalanced by the stimulus to overall saving, as the higher rate of return on investment in landholding, by arbitrage, pushes up the general rate of return on investment in producer goods.

Two considerations, however, challenge Yeager’s conclusion. One, as shown above, is that if the rate of interest is a discount of future monetary results, it will be uniform for all alternatives. If time preference intensities stay the same, then saving-investing allocated toward items such as land to earn a capital gain will reduce saving-investing dollar-for-dollar in other lines, leaving the total saving-investing and the rate of interest the same. The other consideration challenging Yeager’s conclusion is that if time preference intensities change, then the rate of interest and the amount of saving-investing move in opposite directions. If time preference intensities increase, then the rate of interest will be higher, as Yeager stipulates, but the amount of saving-investing will be smaller, not larger. If time preferences intensities decrease, then the amount of saving-investing will be larger, as Yeager stipulates, but the rate of interest will be lower, not higher.

The fourth difficulty in treating waiting as a factor of production is that if supply of waiting is just saving and demand for waiting is investment, then intermediation in the market economy is critical to the balance between them. The amount of saving by a lender transfers waiting directly to borrowers only to the extent that the borrowers invest the savings in production. It is possible, however, for some amount of savings to be wasted if the full amount is not invested in production.

Various forms of financial intermediation preserve the full integrity of the amount of waiting. According to Yeager and Hanke (236–37), when intermediation is performed by a financial intermediary, savings are lent by savers purchasing claims on the financial intermediary, which in turn lends the funds to investors by purchasing claims issued by investors, who in turn use the funds to buy producer goods. Moreover, by improving the efficiency of the transfer of funds from savers to investors, financial intermediation increases the amount of saving-investing and thereby increases productivity in the economy.

If people direct their increased thrift (i.e., saving) to holding more money, Yeager claims, it is also a form of intermediation of saving into investment. “In a sense, money itself can be a vehicle of financial intermediation,” Yeager ([2003] 2011, 220–21) wrote, “a means of conveying command over resources from savers to real investors. This possibility hinges on the nature of the particular monetary system.” Only under particular monetary systems will saving-investing result in exact intermediation.

Yeager and Hanke’s framework for analyzing the relationship between money and interest entails a dichotomy between the real economy and money. Following Yeager’s admonition to adopt countermethodology, they rely on the work of Don Patinkin ([1956] 1965). “An economy’s ‘real framework’ [generates] the resulting real outcomes[, which] include quantities of goods and services and relative prices, of which the interest rate is one,” they write. “The ‘monetary framework’ is the nominal quantity of money and the price level” (236).

In this approach, the dichotomy between the real and monetary frameworks is not strict. Money is not neutral with respect to the real economy. Changes in the money relation will have an impact on the real economy and its price structure, including the rate of interest. Following Patinkin, Yeager and Hanke (238–39) model money holding as one form of saving, the other being bonds. Saving consists of financial assets, while consumption spending contributes dollar-for-dollar to the production of consumer commodities. Saving invested in bonds contributes dollar-for-dollar to the production of producer commodities. Money holding, however, contributes nothing directly to the production of consumer commodities and only contributes to the production of producer commodities indirectly. Compared to bonds, then, saving-investing in money only partially intermediates saving into investing. Patinkin’s model determines the price level and the rate of interest as the general equilibrium solution to three functions of the pairs of price levels and rates of interest that equilibrate the markets for commodities, bond holdings, and money holdings. Yeager and Hanke (258) use Patinkin’s model to demonstrate what happens to production of producer commodities when preferences shift toward and away from money. They consider two cases. First, preferences shift away from consumption toward holding money. Since

this is an increase in saving, the rate of interest falls, which promotes capital construction. Although this effect would be greater if preferences shifted toward bonds instead of toward money, it is positive. Second, preferences shift away from money holding and toward bonds, which generates price inflation and a reduced rate of interest. The latter effect, in turn, stimulates investment.

Concerning the monetary system, Yeager (1997) conceives of money as a fluttering veil. As an advocate of monetary disequilibrium theory, he argues that the ideal monetary system would have a process of monetary accommodation to changes in money demand, thereby retaining a relatively stable purchasing power of money, which optimizes money's role as a unit of account (Yeager 1986; Yeager and Rabin 1997); in the absence of monetary disturbances generating sizable movements in the value of the unit of account, the real economy reaches a more efficient state. In analyzing the impact on investing in production when savers increase their money holding, Yeager ([2003] 2011, 221) highlights two cases of accommodation by monetary inflation via credit expansion. First, the credit expansion shifts command over resources toward investors at the expense of consumers, who must pay prices driven up by monetary inflation. Second, economic growth increases people's demand for money, which monetary inflation then accommodates. In this case, banks issue new media of exchange to accommodate the increased demand to hold money, leaving the purchasing power of money relatively stable. Since the new money accommodates the entire increase in money holding, saving-investing in production would be maintained. In the first case, however, if there is excessive monetary inflation, the resulting price inflation would cause real wealth and therefore consumption to decline. This "forced saving" would intermediate excessive amounts toward investment beyond the amount of increased money holdings. In contrast to excessive monetary inflation, if monetary accommodation is insufficient, then the economy would experience price deflation, which would increase real wealth and therefore increase consumption. The funds saved by holding more money would not be fully intermediated into production. There would be "forced consumption."

In contrast to how Yeager's framework puts the real and money aspects of an economy together, Mises ([1949] 1998, 488–89) holds that production entails more than distinctions between consumer goods and producer goods, among various consumer goods, and among various producer goods. Production of any consumer good also entails a capital structure, a logically necessary sequence of stages of production from extraction of natural resources, down through the production of intermediate capital goods, and culminating in the production of consumer goods.

Models of an economy that do not incorporate a capital structure ignore a basic fact of human action. The production of any consumer good begins with the extraction of natural resources. For the production of any consumer good that requires going beyond that initial step, production of intermediate capital goods must occur step-by-step until the final step, the production of the consumer good. The omission of a capital structure eclipses the intertemporal process connecting production with consumption and thereby cuts macroeconomic analysis loose from its realistic microeconomic foundation.

Additionally, Mises ([1949] 1998, 414–15) holds that money is neither a numéraire, by which all relative prices are computed to allow for economic calculation, nor a veil (fluttering or otherwise) covering over relative prices, which Patinkin, Yeager, and others claim to be the real underlying phenomena of market prices. Money is an economic good valued by people who are assessing the service it renders as an aid in attaining their ends.

Mises ([1949] 1998, 414) also holds that money holding is not an act of postponing sooner satisfaction to attain a more valuable future satisfaction. Money is held in the present by people as the economizing means of dealing with the uncertainty of the future. They receive the full benefit conveyed by their chosen cash balances at each moment they hold it. It is true that people incur an opportunity cost by doing so in a forgone value of consumption or a forgone rate of return from saving-investing. But this cost is born at each moment cash balances are held. Both the benefit and the cost of holding money are incurred in the present. There is no intertemporal dimension to money holding.¹¹

Yeager and Hanke (238; italics original) are aware of the view that money is a present good: “Non-interest bearing cash,” they write, “is sometimes called ‘the present good *par excellence*,’ ‘the dominant present good,’ as distinguished from future goods (Rothbard 1962, 375).” Yet they interpret money holding as waiting, delaying until the future buying and receiving the enjoyment of a consumer good or investing and earning a rate of return instead of doing so immediately. Mises’s view is that sacrificing the satisfaction from present consumption to attain a greater satisfaction in the future occurs when a person lends money to a borrower in exchange for principle plus interest paid by the borrower to him in the future. In considering how to allocate his income between consumption, saving-investing, and money holding, a person balances the benefits of the contribution to the subjective value of his total stock of goods made by his marginal consumer goods, the rate of return from his marginal saving-investment, and his marginal money holding.

¹¹ Mises ([1949] 1998, 250) contends that in the evenly rotating economy, in which there is no uncertainty about the future, there would be no money holdings whatsoever. Interest and an intertemporal capital structure, however, would exist.

Finally, Mises argues that when a person directs his income away from consumption and toward saving-investing, it sets in motion a process of capital accumulation. In contrast, if he directs his income toward money holding, it results in price deflation. Even without any accommodation of increasing money demand by monetary inflation, his increase in money holding will not affect capital accumulation. “The two processes—increased cash holding and increased capital accumulation,” Mises ([1949] 1998, 519) wrote, “take place side by side.”¹²

In summing up their view of the relationship between money holding and interest, Yeager and Hanke (262) dismiss Mises’s analysis by claiming that injection effects are of little concern because monetary theories in general account for them as part of increases in the supply of money. “No monetary institutions,” they write, “can avoid injection effects altogether.”

Mises’s attention to injection effects, however, concerns new money coming into existence through credit expansion, which is the very process Yeager employs in his analysis of monetary disequilibrium. For Mises, under a banking system that promotes the issue of fiduciary media, monetary inflation via credit expansion suppresses the rate of interest below that dictated by people’s time preferences and therefore alters the pattern of their saving-investing. As Joseph Salerno (2012) has explained, the resulting process of building up and lengthening out the intertemporal capital structure cannot be completed, as the suppressed interest rate (1) increases the present value and profitability of investing in higher-stage capital goods relative to those for lower-stage capital goods and (2) increases the wealth of those who own the assets whose prices rise disproportionately, leading to greater demand and profitability for producing consumer goods. As resources move into stages of production further remote from and nearer to the production of consumer goods, the remaining available resources are insufficient to complete the middle stages of a built-up and lengthened-out capital structure. At some point in the process, the capital structure inevitably fractures. To repair the capital structure, the malinvested capital projects and misallocated resources must be reallocated into an intertemporal capital structure supported by people’s time preferences.

Because it lacks an intertemporal capital structure, Yeager and Hanke’s model fails to capture the full implications of the intertemporal function of the rate of interest in economizing the allocation of resources.

12 At this spot, Mises ([1949] 1998, 518n18) inserts the following footnote: “Indirectly capital accumulation is affected by the changes in wealth and incomes which every instance of cash-induced change in the purchasing power of money brings about.”

Conclusion

Despite libraries of material on capital and interest written by economists, the debate about how we should understand these topics remains unresolved. As scientists, economists strive to understand the social world. They formulate conceptual explanations that render the broadest scope and deepest understanding of historical cases. They do not share, however, a common epistemological ground upon which to formulate their explanations and develop their understandings.

Yeager and Hanke's theory of interest developed within their commitment to Yeager's vision of economics as a science. His countermethodology relies on reasoning by analogy and using tautologies and conventions to anchor theory in reality. Yeager formulated his conceptual explanation of waiting as a factor of production with interest as its price to dissolve various paradoxes and solve various puzzles in the field of capital and interest. More importantly, he viewed his theory of interest as a bulwark against critics of modern economics and its general theory of price.

Yeager's published work on capital and interest spanned more than four decades. Until the appearance of this volume, his work was scattered among various sources. It took a dedicated effort by Hanke to bring Yeager's published work together in this volume, which is augmented by previously unpublished material. The book is a testament to Yeager's fertile mind and to Hanke's skill in filling gaps in the notes Yeager left for the book and organizing such extensive material in what may be the most difficult area of economic theory.

The book has two tasks that have arrested the attention of this review essay. First, it develops and defends Yeager and Hanke's theory of interest. Yeager had three motives for developing his theory that waiting is a heretofore missing factor of production and that the rate of interest is its price. He sought to (1) rebut claims against the modern theory of pricing raised by authors who advanced the existence of capital paradoxes as discrediting this theory; (2) explain the gap between revenue and costs of production exposed by Böhm-Bawerk; and (3) expand the general theory of pricing of factors of production to encompass the rate of interest.

Second, the book offers critiques of the pure time preference theory of interest and Austrian business cycle theory. Yeager raises objections to the praxeological method used to develop these theories, the assumption of the dominance of subjective over objective factors in economic theory, the essentialist character of the PTPT, and the universalist character of ABCT.

By skillfully organizing Yeager's views on capital and interest within his approach to economic theory, this volume represents the leading work for scholars to assess his contribution in these fields. This review essay has highlighted several points provisionally thought to be relevant to the conversation concerning such an assessment.

Submitted: January 28, 2026 CDT. Accepted: March 23, 2026 CDT. Published: June 08, 2026 CDT.



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

REFERENCES

- Böhm-Bawerk, Eugen von. (1884) 1959. *History and Critique of Interest Theories*. Libertarian Press.
- Böhm-Bawerk, Eugen von. (1889) 1959. *Positive Theory of Capital*. Libertarian Press.
- Cassel, Gustav. (1903) 1957. *The Nature and Necessity of Interest*. Kelley and Millman.
- Dorfman, Robert. 1959. "Waiting and the Period of Production." *Quarterly Journal of Economics* 73 (3): 351–72. <https://doi.org/10.2307/1880609>.
- Engelhardt, Lucas M. 2012. "Expansionary Monetary Policy and Decreasing Entrepreneurial Quality." *Quarterly Journal of Austrian Economics* 15 (2): 172–94. <https://mises.org/quarterly-journal-austrian-economics/expansionary-monetary-policy-and-decreasing-entrepreneurial-quality>.
- Fetter, Frank A. 1977. *Capital, Interest, and Rent*. Edited by Murray N. Rothbard. Sheed Andrews and McMeel.
- Fetter, Frank A. (1905) 2003. *Principles of Economics, with Applications to Practical Problems*. Mises Institute. <https://mises.org/library/book/principles-economics-applications-practical-problems>.
- Fisher, Irving. (1930) 1970. *The Theory of Interest: As Determined by Impatience to Spend Income and Opportunity to Invest It*. Augustus M. Kelley.
- Garrison, Roger. 1979. "Comment: Waiting in Vienna." In *Time, Uncertainty, and Disequilibrium*, edited by Mario J. Rizzo. D. C. Heath.
- Hayek, F. A. 1936. "Utility Analysis and Interest." *Economic Journal* 46 (181): 44–60. <https://doi.org/10.2307/2225131>.
- Hicks, John R. (2002) 2016. "Is Interest the Price of a Factor of Production?" In *The Age of Dispersal*. Vol 2. of *Modern Austrian Economics*, edited by Sandye Gloria-Palermo, Peter Boettke, and Stephan Boehm. Routledge.
- Kirzner, Israel. 1993. "The Pure Time Preference Theory of Interest: An Attempt at Clarification." In *The Meaning of Ludwig von Mises*, edited by Jeffrey M. Herbener. Kluwer. https://doi.org/10.1007/978-94-011-2176-7_7.
- Mises, Ludwig von. 1943. "'Elastic Expectations' and the Austrian Theory of the Trade Cycle." *Economica* 10 (39): 251–52. <https://doi.org/10.2307/2549987>.
- Mises, Ludwig von. (1949) 1998. *Human Action: A Treatise on Economics*. Scholar's ed. Mises Institute. <https://mises.org/library/book/human-action>.
- Patinkin, Donald. (1956) 1965. *Money, Interest, and Prices*. 2nd ed. Harper and Row.
- Rothbard, Murray N. (1976) 1997. "Praxeology: The Methodology of Austrian Economics." In *The Logic of Action One: Method, Money, and the Austrian School*. Edward Elgar.
- Rothbard, Murray N. (1963) 2000. *America's Great Depression*. 5th ed. Mises Institute. <https://mises.org/library/book/americas-great-depression>.
- Rothbard, Murray N. (1962) 2009. *Man, Economy, and State with Power and Market*. 2nd scholar's ed. Mises Institute. <https://mises.org/library/book/man-economy-and-state-power-and-market>.
- Salerno, Joseph T. 2012. "A Reformulation of Austrian Business Cycle Theory in Light of the Financial Crisis." *Quarterly Journal of Austrian Economics* 15 (1): 3–44. <https://doi.org/10.2139/ssrn.1974196>.
- Samuelson, Paul. 1981. "Schumpeter as an Economic Theorist." In *Schumpeterian Economics*, edited by Helmut Frisch. Praeger.
- Sennholz, Hans F. 1988. *The Great Depression: Will We Repeat It?* Libertarian Press.

- Yeager, Leland B. 1976. "Toward Understanding Some Paradoxes in Capital Theory." *Economic Inquiry* 14: 313–46. <https://doi.org/10.1111/j.1465-7295.1976.tb00425.x>.
- Yeager, Leland B. 1979. "Capital Paradoxes and the Concept of Waiting." In *Time, Uncertainty, and Disequilibrium*, edited by Mario J. Rizzo. D. C. Heath.
- Yeager, Leland B. 1986. "The Significance of Monetary Disequilibrium." *Cato Journal* 6 (2): 369–98. <https://www.cato.org/cato-journal/fall-1986>.
- Yeager, Leland B. 1994. "Eucken on Capital and Interest." *Journal of Economic Studies* 21 (4): 61–75. <https://doi.org/10.1108/01443589410070798>.
- Yeager, Leland B. 1997. *The Fluttering Veil: Essays on Monetary Disequilibrium*. Liberty Fund.
- Yeager, Leland B. 2011. *Is the Market a Test of Truth and Beauty? Essays in Political Economy*. Mises Institute. <https://mises.org/library/book/market-test-truth-and-beauty>.
- Yeager, Leland B. (1994) 2011. "Tautologies in Economics and the Natural Sciences." In Yeager 2011.
- Yeager, Leland B. (1995) 2011. "Tacit Preachments Are the Worst Kind." In Yeager 2011.
- Yeager, Leland B. (2003) 2011. "Land, Money, and Capital Formation." In Yeager 2011.
- Yeager, Leland B. 2018. "Cassel and Fisher on Interest and Opportunity Cost." *History of Political Economy* 50 (2): 403–12. <https://doi.org/10.1215/00182702-6608638>.
- Yeager, Leland B., and Edwin Burmeister. 1978. "Continuity and Capital-Reversal: Reply." *Economic Inquiry* 16 (1): 147–49. <https://doi.org/10.1111/j.1465-7295.1978.tb00503.x>.
- Yeager, Leland B., and Alan A. Rabin. 1997. "Monetary Aspects of Walras's Law and the Stock-Flow Problem." *Atlantic Economic Journal* 25 (1): 18–36. <https://doi.org/10.1007/BF02298474>.