A Defense of the Traditional Austrian Theory of Interest*

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Section 1: Introduction

The concept of the interest rate seems rather simple; it is the price that connects savers to borrowers. However, the origin and nature of the interest rate is more complex. The debate over the nature of interest can be traced to humanity's earliest economic writings. The doctrine of usury was long held in the West, though it has since been discarded due to scientific study.

At its root, interest is the difference in value an individual assesses between present goods and future goods. Economists continue to debate the necessary and sufficient conditions for the formation of an interest rate. The analysis of the interest rate should separate the examination of the positive theory of interest into two parts. Specifically, it should be divided into a question of the origin of interest, an essentialist question, and a question of the formation of interest rates in the real world, a functionalist question.[1] After the essentialist question has been answered, the functionalist question can be addressed.

As illustrated by Conard (1959), interest rate theories fall into two broad categories: non-monetary theories and monetary theories. The Austrian theory of the interest rate is a non-monetary theory. The most representative authors of the traditional

* This paper is a derivation from and an elaboration upon several sections of this author's third chapter in his dissertation, "An Investigation of Inverted Yield Curves and Economic Downturns."

[1] Although the terms "Essentialist" and "Functionalist" are not unique to interest rate theory, they will be used in manner of Pellengahr (1986b, 1996).

Austrian view of interest (also known as the pure time-preference theory-PTPT) are Fetter (1977), Rothbard (1977, 1993), Mises (1966) and Kirzner (1996). Recently, Pellengahr (1986a, 1996), Reisman (1996), Lewin (1997, 1999), Hülsmann (2002) and Murphy (2003)[2] have brought forward criticisms of the traditional Austrian approach. This paper reviews the traditional Austrian approach, addresses the criticisms and presents a defense to these criticisms.

Section 2: The Traditional Austrian Theory of Interest

The spectrum of non-monetary theories is bounded at one end by Fetter, who states that interest is formed only by time-preference, and at the other end by Knight, who states that interest is formed only by the productivity of capital. The other theories lie between Fetter and Knight. It remains a matter of debate where to place Böhm-Bawerk.

Time-preference forms the core of Böhm-Bawerk's theory. Simply put, time-preference is the preference of having a good sooner rather than later.[3] Mises adds that time-preference is an essential requisite of action.[4] To illustrate the idea of time-preference, suppose two people (A and B) are considering a trade. Let person A have good X. Further assume that both people desire good X. Since a precondition for trade is that the exchange must be mutually beneficial, B must make an offer that is acceptable to A. B may offer either present goods or future goods to A. If B offers future goods (in terms of X), he must offer a sufficient quantity of these future goods to induce A to part

[2] All references to Murphy are to his 2003 dissertation and the parenthetical notation is dropped.

[3] Böhm-Bawerk (1959) vol. II, p. 259, states, "Present goods are as a general rule worth more than future goods of equal quality and quantity. That sentence is the nub and kernel of the theory of interest...." (italics removed)

[4] See Mises (1966) pp. 483-490 ff. Pellengahr (1996), Lewin (1997, 1999), Murphy and other Austrians object to classifying time-preference as a praxeological law. The issue of whether time-preference is a praxeological law is presented in Section 4.

with good X now. The ratio of exchange becomes the intertemporal price of future goods relative to present goods.[5] Thus, an interest rate can be established by using the standard formula:

$$\text{Interest} = \frac{\text{Value of Future Goods} - \text{Value of Present Goods}}{\text{Value of Present Goods}}. \qquad \text{Equation 1}$$

With the exchange, an interest rate emerges, becoming the intertemporal price of goods over time. Therefore, time-preference alone is a necessary and sufficient condition for the formation of an interest rate. Each person acts at his respective margins in his choices. These economic agents make their decisions according to the first two of Böhm-Bawerk's three reasons for the formation of interest rates. Yeager summarizes these reasons as follows:

> 1. Present wants are more intense than future wants in relation to the means for satisfying them, chiefly for the following reasons:
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> a. Earning capacity may be greater in the future than at present.
>
> b. Some people are in more urgent need now because of illness, loss, and so forth.
>
> c. The holder of a durable asset is at liberty to use it either now or in the future. Money in particular is durable and cheap to store; hence a person intending to spend it only in the future nevertheless values present money

[5] Although this example uses a good, the essential question is centered on utility. The question may be rephrased as, "Why are 100 present utility units (utils) valued more than 100 future utils?" The difference in value between present and future utils is interest. While Murphy demonstrates that using cardinal utility is inconsistent with the Austrian position on cardinal versus ordinal utility, this inconsistency is not a refutation of the time-preference argument. To avoid resorting to cardinal utility, time-preference can be defined of as the opportunity cost of waiting. (See Section 4 for a more detailed response to Murphy.)

more highly because holding it is a way of keeping his options open. (This point obviously abstracts from inflation.)

2. Many people underestimate future wants relative to present wants because they lack imagination or will power or are uncertain about their life spans.

3. Present goods have a technical superiority over future goods; roundaboutness is productive.[6]

The third reason Böhm-Bawerk gives for the formation of interest is based on the marginal productivity of capital. This third reason is rejected by Fetter (1977) and Rothbard (1977, 1993). Knight (1964), however, views the marginal productivity of capital as the sole reason for the formation of interest rates.

Rothbard and Fetter criticize Böhm-Bawerk's inclusion of his third reason, stating that Böhm-Bawerk has created an incongruity in his theory.[7] It is unclear in Böhm-Bawerk's own writings whether he maintained the third reason as an independent condition for the formation of interest or if he believed that it was the prime influence on the height of interest rates as they emerge in the market.[8] While there remains

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[6] Yeager (1993) pp. 118-119. The three causes are found in Böhm-Bawerk (1959) vol. II, pp. 265-289. See also Conard (1959) pp. 36-38.

[7] See Rothbard's introduction in Fetter (1977) p. 7, where he states: "...Fetter quite properly pointed to the major textual contradiction in Böhm-Bawerk's theory of interest: Böhm-Bawerk's initial finding that interest stems from time preference for present goods over future goods is contradicted by his later claim that the greater productivity of roundabout production processes is what accounts for interest." Fetter's analysis takes place on pages 185-187.

[8] Böhm-Bawerk's theory of interest centers on the difference in value between present goods and "future goods of equal quality and quantity." (vol. II, p. 259.) In responding to the criticism of Bortkiewicz and Fisher, Böhm-Bawerk states, "I do not believe that any reader or opponent of mine doubts in the least that the phenomenon of interest would vanish, or at least be seriously affected in scope and extent, if the fact of higher productivity of capitalist production methods would cease to exist." (vol. III, p. 151.) This sentence is representative of Böhm-Bawerk's style. Unfortunately, the construction of this sentence does not make his position clear and leaves it open to interpretation. It is plain that Böhm-Bawerk argues that his third reason is an explanation for the difference in the valuation between present and future goods. However, by including the phrase "or at least..." it seems that he is admitting that his third reason is not an "essentialist" reason for the formation of interest rates. Thus, Böhm-Bawerk is unmistakably arguing that his third reason has a significant influence on the market rate of interest, but at the same time it seems that he agrees

controversy on this point, the traditional Austrian theory adopts Böhm-Bawerk's later position; although the third factor, the marginal productivity of capital, has a significant influence on the market rate of interest, it is not a necessary and sufficient condition for the formation of interest rates.

The pursuit of the answer to the essentialist question is the search for the necessary and sufficient conditions for the formation of any interest rate. Since, time-preference is based upon the internal and subjective valuations of each actor, the traditional Austrian theory answers the essentialist question. Wieser states:

> The future want, wherever it comes into the domain of the present, is preceded by a physical reflection, and this reflection is a totally different nature from the want itself. It is far finer, more *innerlich*, and, even in the case of purely bodily wants, is always mental. The hunger of a future day, e.g., does not act as hunger, but as anxiety for sustenance; the object of desire is the same, but the desiring is different. Instead of a *want* of we have an *interest* in.[9] (italics in the original)

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that it is not an originary (ursprünglicher) factor of interest. Wicksell (1958) upholds this interpretation by stating that it wasn't until "*subsequent* parts of [Böhm-Bawerk's] work" that he explores this topic. Wicksell further argues in the later works, "[Böhm-Bawerk] was only concerned to explain the existence of interest, its *quale*, [and] he evidently considered that details about its *quantum* could be disregarded, thinking to reach his immediate goal by a short-cut." (italics in the original) (p. 183.) Wicksell suggests that even Böhm-Bawerk did not use his third reason when examining the essentialist question, by writing, "In order to avoid the absurdity that … all production ought really to be extended indefinitely, Böhm-Bawerk here falls back upon the 'first and second main grounds,' to ensure that the 'economic centre of gravity' will be brought closer in time." (p. 182.) See also Wicksell (1961) pp. 167-171. Additionally, Lutz presents Böhm-Bawerk's model to differentiate between the market rate of interest and the internal rate of return (ursprünglicher Zins). See Lutz (1968) p. 12. See also Hennings (1997) pp. 116-129.

[9] Wieser (1989) pp. 16-17. While Wieser favored a productivity theory of interest, he correctly identifies the problem as subjective valuations.

A modern interpretation of Wieser is that time-preference is subjectively determined by each individual and that the intensity of wants are different between present and future goods.

The formation of market interest rates is the result of the combination of the following: time-preference, the productivity of capital, changes in wealth, changes in expectations, the length of time to complete an investment project, risk of default, liquidity assessments, inflation, information costs, and institutional factors. Time-preference is endogenous to the action of individuals, while the other factors are exogenous and simply modify the market rate of interest.

In the model of the investable[10] funds market (i.e., financial capital) the subjective and objective factors are present in both the demand *and* supply sides. Through their interplay a market rate emerges and aligns the quantity of investable funds supplied with the quantity of investable funds demanded.

In a single interest rate market, all the exogenous factors are initially held constant. The demand for investable funds can be shown as a typical downward sloping demand curve, which is due to the application of the law of diminishing marginal returns on projects for which the funds are borrowed. The supply of investable funds are shown as an upward sloping supply curve. Again, the law of diminishing marginal returns is applied to the alternatives for holding money (the reservation demand for holding onto money). The interest rate and quantity of investable funds tend to move toward the intersection of the curves (the point of equilibrium). Within both demand and supply

[10] Garrison (2001) uses the phrase "investable funds" instead of "loanable funds" to draw attention to the link between savings and investment.

functions, time-preference, as well as objective factors, influence the formation of the interest rate.

Böhm-Bawerk argues that in the short run, the marginal productivity of capital dominates all other factors in the formation of market interest rates.[11] While the issue of which element holds the most influence may be disputed, the current debate between Austrians is whether the productivity of capital has any influence at all on the formation of interest rates. The resolution of the Austrian debate between Böhm-Bawerk and Fetter (with Rothbard) is this: Time-preference is the core of interest theory; i.e., time-preference is a necessary and sufficient condition to the formation of interest rates. However, in the real world, it is not the sole determinant. Böhm-Bawerk makes the distinction between "the *origin* of interest from that of its *rate*," in stating, "All interest-originating causes undoubtedly are also determining factors for the actual rate. But not all rate-determining factors are also interest-creating causes; they may also be *obstacles* that we have to overcome."[12]

Austrians and fellow travelers have been debating the issue of whether to include Böhm-Bawerk's third reason, capital's productivity, into their models. As established above, Rothbard and Fetter state that interest is to be explained by time-preference alone. Rothbard states:

> We have seen that in order for more capital to be invested [in a stationary economy], there must be a fall in the pure rate of interest, reflecting general declines in time preferences. ... It should be noticed what we are *not* saying. We are *not* asserting that the pure rate of interest is determined by the quantity or value of capital goods available.

[11] See Böhm-Bawerk (1959) vol. II.
[12] Böhm-Bawerk (1959) vol. III, pp. 191, 192.

> We are not concluding, therefore, that an increase in the quantity or value of capital goods lowers the pure rate of interest because interest is the "price of capital" (or for any other reason). On the contrary, we are asserting *precisely the reverse:* namely, *that a lower pure rate of interest increases the quantity and value of capital goods available*.[13] (italics in the original)

One must note two points regarding Rothbard. First, Rothbard is only referring to the "pure" rate of interest. Although the pure rate of interest is not necessarily the rate seen in the real world, he makes no distinction later. Second, the relationship is unidirectional—from the rate of interest to the capital structure.[14] In a functionalist model, the marginal productivity of capital does influence the market rate of interest, whereas in an essentialist model the marginal productivity of capital does not influence the rate of interest.[15] In his criticism of Böhm-Bawerk, Rothbard, following Fetter, falls into the same trap that Fisher (1930) makes, namely not separating the essentialist question from the functionalist question. Fisher mistakenly characterizes Böhm-Bawerk as only using the productivity of capital to explain interest rates. By focusing on Böhm-Bawerk's lengthy discussion on capital productivity's influence on interest, Rothbard, Fetter and Fisher misinterpret Böhm-Bawerk's separation of the essentialist and functionalist questions.[16] Fisher, responding to Böhm-Bawerk, states:

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[13] Rothbard (1993) pp. 495-496. Also see Rothbard (1993) pp. 313-350, and Mises (1966) pp. 527-528. For a summary of the Subjectivist Austrian position, see Pellengahr (1986a) p. 65.

[14] Rothbard (1977) p. 7, reaffirms his position, "[W]hile this [increased] productivity may increase the rents to be derived from capital goods, it cannot account for an increase in the rate of interest return, that is, the ratio between the annual rents derived from these capital goods and their present price. That ratio is strictly determined by time preference."

[15] Section 3 provides an explanation on how the marginal productivity of capital affects the market rate of interest.

[16] Admittedly, Böhm-Bawerk's exposition can at times be unclear, inconsistent, and contradictory. See Wicksell (1961) p. 147 and pp. 167-171. (See also fn. 8 above.)

> The causal solution cannot be so simply conceived as to make one factor solely cause and another solely effect. The advance of all science has required the abandonment of such simplified conceptions of causal relationship for the more realistic conception of equilibrium. Here, all factors, are considered as variables. Any disturbance in one factor reacts on all the others, and the variations in these other factors react upon the factor of the original disturbance.[17]

Böhm-Bawerk, however, is not using changes in the productivity of capital as the *sole* cause of changes in nominal interest rates. He argues that it is the dominant factor in his functionalist model.

Section 3: Integrating Capital's Productivity with Austrian Interest Theory[18]

Over the course of the debate on capital's productivity and interest, the essentialist and functionalist questions have been muddled. The Reswitching debate has not helped make the separation of these questions clear.[19] Yeager is correct when he states:

> The physical productivity of waiting or roundaboutness is an objective element in interest-rate determination. Objective and subjective factors interact. The rate of time preference, or the subjectively appraised agio of present over future goods, is a marginal concept; and where the margin occurs depends largely on how extensively people have

[17] Fisher (1930) fn. 39, p. 484.
[18] While the Reswitching debate centers on the use of capital equipment in relation to changing interest rates, this paper focuses only on its impact on interest rate theory.
[19] See Yeager (1979) and Garrison (1979).

> made provision for present and future consumption. This in turn depends partly on the transformability through investment of present goods into future goods.[20]

In order to convey this idea more forcefully, he uses an example of a machine that instantly becomes more productive. Unfortunately, this example obscures his own position: an increase in productivity depends upon investment, which is based on the entrepreneur's time horizon—his time preference. Yeager's example is misleading (but not necessarily incorrect) because one needs to remember that growth is not magical and exogenous. In the course of the debate, his rivals focus on the example's lack of realism and the gist of the argument is lost in the confusion.

To clarify the argument, consider the example recast in this way. When an entrepreneur comes up with a new idea of how to operate more efficiently, he generates economic growth. As this cost cutting idea is implemented, it has unintended effects on the rest of the economic actors. In other words, there is a wealth effect. Each person, at the margin, decides how to apportion this wealth and determines whether relatively more funds will flow into consumption or savings. Unlike the Keynesian models, Austrians do not subscribe to an iron rule of the marginal propensity to consume. Individuals make this consumption/saving decision at the margin of their own time preferences.[21] There is no way to make an *a priori* prediction as to whether supply or demand will be more strongly affected. In other words, the wealth effect will shift both the supply and demand

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[20] Yeager (1979) p. 206.

[21] Individuals are not programmed with a specific rate of time-preference that controls how they decide between future and present goods. Instead, this decision is made at the margin of the individual's supply of and demand for investable funds and can vary across maturities. However, even if each person is programmed with a specific rate of discount, this case does not mean that everyone has the *same* rate of discount. As long as individuals are different, the impact on interest rates depends on *who* gets the new money first.

for investable funds. There is no way to tell whether these shifts will create an equilibrium at the same rate (price).

To use a more familiar analogy, one can examine the effects of inflation in a model where money is non-neutral.[22] When there is an increase in the money supply, it is injected into the economy at specific points. Different people receive the new money at different times. A person receiving this new money experiences a wealth effect. In his view, he has become richer. This perception changes the individual's demand for the various present goods and services, as well as for the various future goods and services. The people who experience the wealth effect first have the initial impact on interest rates. If the less anxious people receive the new money first, one would see a relative increase in savings over consumption. *Ceteris paribus*, the effect would be a relative expansion of investable funds, and would exert downward pressure on interest rates.

However, instead of monetary expansion causing the wealth effect, the wealth effect stems from increased productivity. The same process would occur. If the less anxious people experience the wealth effect first, one would again see downward pressure on interest rates. Regardless of the final equilibrium position, the change in productivity affects the equilibrium rate of interest.

The Reswitching debate has stifled the development and application of interest rate theory. A false dichotomy has been created. Garrison poses it in this way:

> Are time preferences of market participants and capital productivity independent co-determinants of the rate of interest, as Irving Fisher would have it? Or does time

[22] See Mises (1990).

> preference alone—the systematic discounting of the future—account of the payment that we call interest? [23]

However unintentional, this blending of the essentialist and functionalist questions has led to a waste of effort that could be more wisely applied. It is not a choice between these two alternatives. Like all economic modeling, the nature of the problem that the economist is studying should determine the relevant variables. However, in general, when applying the Austrian theory of interest rates to real world problems, one should first establish the rate formed by time preferences and then allow these other factors to modify it. As Pellengahr points out, Austrian theorists have failed to offer a "satisfactory explanation of the determination of the size of the rate of interest."[24] It wasn't until recently that Böhm-Bawerk's original separation of the questions has been reestablished.[25] As a result of the wasted effort, most modern Austrian models have not developed beyond the use of one interest rate. Modern Austrian macroeconomic analysis has suffered by its unwillingness to take into account the impact changes of productivity have on interest rates.

In the real world, there are several structures of interest rates. An Austrian theory explaining the yield curve has not been developed because of the focus on the natural rate of interest, and the development of the Austrian Business Cycle Theory has suffered as a result. The Austrian Business Cycle Theory and other Austrian models have lacked the sophistication necessary to be taken seriously by other professional economists. Austrian

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[23] Garrison (1988) p. 45.

[24] Pellengahr (1996) p. 59. Pellengahr further concludes that Austrian Subjectivists are also unable to prove why the signs of interest rates are positive due to an incomplete definition of "time-preference." In Section 4, time-preference is redefined as the opportunity cost of waiting. Characterizing time-preference in this manner addresses Pellengahr's objection.

[25] See Pellengahr (1986a, 1986b) and Kirzner (1996) especially pp. 146-148.

economics has also suffered when examining financial markets due to its theory of interest.

Section 4: Recent Criticisms of the Austrian Theory

There have been several objections to the traditional Austrian view of interest. These arguments tend to overlap and fall into the same traps. They all seem to stem from the original mistake made by Böhm-Bawerk when he cast the question as a relation between present and future goods.

The sources of dissatisfaction stem from this focus on goods. By comparing goods across time, the questions arise: what exactly time-preference means and what is held constant. Lewin (1997) argues that there are at least four different definitions of time-preference, each depending on what is being held constant.

This paper identifies five major criticisms of the traditional Austrian Theory of interest. The first criticism is that the theory fails to demonstrate that time-preference is an *a priori* (praxeological) category of action. The second criticism is that the traditional theory cannot demonstrate that time-preference is necessarily positive. The third criticism argues that the *ceteris paribus* assumption cannot and should not be held constant across time. The fourth criticism is that the Austrians must resort to cardinal utility to demonstrate time-preference. The fifth criticism centers on the "Original Factors Doctrine." Finally, there are additional arguments that Hülsmann (2002), Reisman (1996) and Murphy (2003) present against the traditional Austrian theory of interest.

Failure to Demonstrate *A Priori* Reasoning

Mises and Rothbard argue "that a positive rate [of time preference] is deducible from the fact of human action."[26] The argument is that since individuals consume, they display a time preference. If they did not have time-preference, they would never consume. Pellengahr (1996) finds this argument unacceptable because, in the real world, actions may be deferred. Pellengahr (1986b, 1996) challenge Austrian economists to show an "*a priori* reason why future goods should not be preferred over present goods."[27] Following Pellengahr's challenge, Lewin (1997, 1999) and Murphy have sided against the standard Austrian position. "Moreover," Pellengahr states, "it is not clear what meaning we are to attach to the proposition that earlier satisfaction is preferred over later satisfaction."[28] Murphy takes the argument a step further and argues that Mises and Rothbard must be assuming "an omniscient, immortal agent who behaves mechanistically according to external stimuli."[29] Murphy then asks, "Since we are dealing with an immortal being, who can say that the agent wouldn't prefer to consume everything on February 25, 2525?"[30] Murphy then states that Mises' argument

> demonstrates that, at best, [Mises] has proven the universal validity of "time preference" only when the term is couched in an entirely vacuous sense, in which, say, hot dogs are preferred to future hot dogs because one can only eat a hot dog in the present. Needless to say, [time preference] in this sense does not bear any relation to interest theory: It does not explain the discount on goods (such as hot dogs) available in the future, since even a

[26] Rothbard (1987) p. 421. See also Mises (1966) p. 483.
[27] Pellengahr (1996) p. 58
[28] ibid. p. 41.
[29] Murphy p. 93.
[30] ibid. p. 94.

> decision to postpone current consumption would be viewed in this sense as "positive time preference" (at the eventual moment of consumption).[31]

These arguments against the Austrian theory miss the central point. The Austrian theorist is not concerned with the actual utility derived from consuming the good now or the level of satisfaction derived from the good in some future period. The thought experiment the theorist is constructing is very rigid. By holding *all other factors constant*, the theorist is arguing that the agent is constrained to choose between acting now or waiting, not engaging in other activities until a specific date arrives, such as the year 2525. Waiting has a cost—an opportunity cost.[32] Waiting is the consumption (or wasting) of time.[33]

Time is not only scarce, it only moves in one direction. Once lost, it cannot be recovered. The interest rate is an intertemporal price; it is the opportunity cost of acting in time. The observation that some people prefer to delay gratification does not invalidate the *a priori* nature of time-preference, it is merely a reflection that events in the real world are not held constant. The very fact that the real world violates the *ceteris paribus* constraint illustrates the need for thought experiments. If one observes an event where the price and the quantity demanded of a good increases, it does not invalidate the law of demand. Austrian theorists are very conscious of the relation between theory and

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[31] ibid. p. 95.

[32] Hülsmann (2002) calls the opportunity cost of waiting, one's "counterfactual future (alternative) use." He further argues that "Mises rightly states that the very fact that one chooses the good A demonstrates that a sooner use of A is preferred to a later one. Time preference in this sense exists … and is indeed a universal feature of human action." p. 84. Nevertheless, Hülsmann argues against the time-preference theory of interest and his objection is analyzed below.

[33] If an individual is relaxing, then he is consuming leisure which is different than waiting.

history.[34] In order to better understand the world around us, theory is deduced from true statements and then applied to the real world.

The examples Murphy presents violate the *ceteris paribus* constraint for the choice to consume now or to consume in the future. In the spirit of Murphy, suppose the good to be consumed is the aforementioned hot dog which will yield 70 utils at t_0 or 100 utils at lunchtime (t_1).[35] The first point is that Murphy violates the *ceteris paribus* assumption by making the distinction between lunchtime and the period before lunch (when the individual is less hungry). Setting this point aside, the next step for Murphy is to discount the value of the hot dog at t_1 by an assumed rate of discount, say 10%. Thus the actor has the choice between the value derived from eating now, which yields 70 utils, and the present value of eating at lunchtime, which yields 90 utils. Murphy concludes that despite positive time-preference, a negative interest rate could emerge. Thus, Murphy concludes, time-preference is not a necessary or sufficient condition to the formation of interest.

Such an example confuses the origin of time-preference with an operational use of the concept. The subtraction of an arbitrary 10% from the 100 future utils is incorrect. Time-preference can be expressed as the opportunity cost of waiting. If the individual chooses not to eat the hot dog and waits until t_1, his cost is 70 utils, not 10. The opportunity cost is the amount of utility the individual would have received if he ate the hot dog in t_0. From the perspective at t_0, the total utility the individual would gain at t_1 is the 100 utils derived from consuming the hot dog minus the cost of waiting for t_1, or 100 - 70 = 30 utils. (Since the example uses discrete time units, the full cost of 70 utils is

[34] See Mises (1985).

[35] This example stems from Murphy pp. 65-91, and in subsequent discussions this author has had with him.

realized at the end of period t_0 and at the beginning of t_1.) Thus the choice that confronts the individual is not between 70 utils and 90 utils, but between 70 and 30. One could argue that a hot dog that yields more than 140 utils at t_1 would produce a result where the individual waits. However, this scenario is not a refutation of the argument of time-preference; it simply reinforces the point that this example stems from a violation of the *ceteris paribus* assumption.

The argument that there are multiple meanings of time-preference originates from Böhm-Bawerk's characterization of the problem of present goods versus future goods. The problem of interest does not need to consider goods at all. As shown in this example, time-preference is based on the opportunity cost of waiting. An interest rate may emerge from the opportunity cost of not acting. Time-preference depends on the next best alternative one could pursue during that time. Thus, the objections that time-preference does not provide an *a priori* reason for the valuation of present goods over future goods must be dismissed.

Failure to Show A Positive Rate

Pellengahr critically remarks that the Austrians "have not offered a satisfactory explanation of why time preference, and thus the rate of interest, is generally positive."[36] Murphy agrees by stating that Mises "does not show that interest rates must be positive, but only proves that we should not expect them to be negative infinity."[37] Pellengahr argues that the problem in the analysis is initially caused by Mises' attempt to integrate time-preference into his praxeological framework. He states:

[36] Pellengahr (1996) p. 59.
[37] Murphy fn. 7, p. 70.

> In his [Mises'] attempt to deduce the positivity of the rate of time preference (and thus the rate of interest) "praxeologically" from the axiom of human action, he unfortunately introduces a confusion into the concept of time preference – which is instrumental in invalidating his analysis. The confusion is deepened by Rothbard – who implicitly interprets Mises (sic) "same" satisfaction as "one and the same" satisfaction – and perpetuated in more recent Austrian subjectivist contributions. It is this confusion that has led Austrian subjectivists to cling almost unanimously to the mistaken belief that they have indeed succeeded in explaining the general positivity of the rate of interest – *by time preference alone*.[38] (italics in the original)

At first one may conclude that Pellengahr, himself, is confusing the essentialist question with the functionalist, but then he suggests:

> Either the Austrian subjectivists must reform their analysis to include an investigation of the relationship between productivity conditions and the explanation of the positivity of the sign and the determination of the size of the rate of interest – a reform which does perhaps not necessarily compel them to revoke their view that interest is the market reflection of individual time preference conditions – or they must declare that, being merely a theory of the *essence* of interest, the time preference theory is not concerned with these more empirical questions.[39]

Pellengahr's case against the Austrian theory is that even if time-preference is shown to always be positive, Austrians cannot show that the market interest rate is always positive. The condition that the Austrians must always show that a market rate of

[38] Pellengahr (1996) p. 62.
[39] ibid. p. 63.

interest is unfair. Historically, market interest rates have been negative. For example, on December 31, 1932, the yield on a 3½% United States Liberty Bond was –1.74%.[40] Thus, the condition that Pellengahr places on the Austrian theory is unrealistic.

There are many influences that determine the market rate. This author agrees with Pellengahr that the Austrian theory is an essentialist theory—one that explains the necessary and sufficient conditions to the formation of interest. By expressing time-preference as the opportunity cost of waiting, the Austrian theory meets the challenge to show that time-preference is always positive. Only by violating the *ceteris paribus* assumption can one show that later is preferred to sooner. The cost of wasting time reflects the positive value of time, and thus this objection cannot be upheld.

Knowing One's Future Goods

Comparing goods across time is perhaps the most confusing area in the debate of the theory of time-preference. The standard Austrian position is that because of time-preference an individual will choose present goods over future goods, when holding all else constant. Many examples have been given, e.g., "Would you prefer a new car now or one year from now?" or "Would you prefer $10 now or the same $10 next week?"[41] Lewin (1997, 1999) argues that Mises and Rothbard are "in a logical contradiction" because they assume "the absence of uncertainty in order to 'prove' the necessity of time preference as an implication of action, when action in a world without uncertainty is, by

[40] See Cecchetti (1987). Cecchetti states, "In fact, from mid-1932 through mid-1942, the vast majority of coupon bearing U.S. Government securities bore negative nominal yields as they neared maturity." p. 1.
[41] See Lewin (1997) p. 156 and Lewin (1999) p. 105.

[Mises'] own definition impossible."[42] In other words, the time-preference theory assumes the value of the future good and thus removes uncertainty from the analysis.

The argument is usually presented in the context of the ice-in-the-winter/ice-in-the-summer example. The example's line of reasoning is as follows: The Austrian theorist states that present goods are more valuable than future goods. The critic then states that ice-in-the-summer (a future good) is more valuable than ice-in-the-winter (the present good). Therefore future goods are valued more than present goods. The counterargument to this example is that the ice-in-the-winter is not the same good as ice-in-the-summer, because the conditions have changed. The *ceteris paribus* assumption is violated and the individual perceives these goods as different, despite the physical similarity of the ice. Murphy argues that the ice-in-the-winter/ice-in-the-summer example cannot be maintained because it assumes constant preferences, assumes a constant framework of choice, and it fails to maintain a constant definition of different goods.[43] Only the first of Murphy's objections parallels Lewin's argument.

The argument of constant preferences is a strong argument against the Austrian theory if it holds. The argument is that, by holding all other things constant, the theorist is also restricting the set of possible options one could do with the good in question. Thus, what the person can do (and, consequently, the amount of utility gained from using the good) is held constant. Due to the constancy of preferences and of utility derived

[42] Lewin (1999) p. 104 and Lewin (1997) pp. 155-156.

[43] Murphy pp. 116-120. Murphy further argues that the Austrian theorist, by holding preferences constant, resorts to cardinal utility. Even if such a position is true, it is not a condemnation of the traditional Austrian theory. However, this reasoning is not the position of the Austrian theorist and is explained in the next criticism below.

from the action (either now or in the future), uncertainty is removed from the model.[44] Lewin further argues that a world of certainty is in direct contradiction to the framework of action built by Mises.

Such an objection leads one to ask if this is truly a world of certainty, and does certainty deny action? Granted, in the Evenly Rotating Economy (ERE) model, time and action are not consistent with traditional Austrian theory, but is this world what the Austrian theorist is assuming when he is stating, "Sooner is preferred to later"? The answer is no. When an individual chooses to consume an apple and not an orange, he appraises the levels of satisfaction he thinks will be gained from the apple and orange. All action begins with a projection into the future. However when choosing between two present goods, the moment of appraisal is in the present. When deciding between present and *future* goods, the moment of appraisal is also in the present. The individual makes a cost/benefit choice: what is the benefit of consuming now (or undertaking an action now) versus the opportunity cost of waiting. By stating that all other factors are held constant, the Austrian theorist does not assume an ERE. In other words, the assumption of the ERE is not necessary to derive time-preference. The other factors are held constant because the time of appraisal is at a particular moment of time when nothing changes. The actor assesses the values at a particular moment. He chooses at that same moment. It is at this moment of assessing and choosing that nothing changes. The assumption of constant preferences only refers to one's perception at a particular moment in time. Therefore, the use of time-preference does not remove action or uncertainty from the model.

[44] Lewin (1997) argues that the Evenly Rotating Economy "is not helpful in establishing the notion of originary interest." p. 155.

It could be argued that Murphy recognizes this moment of appraisal in offering the following example, but unfortunately mischaracterizes the process:

> A young boy, who has never tasted alcohol, would (if he were sufficiently well-informed) exchange a present bottle of beer for a future one, since presumably by that time [when he is older] his preferences will have changed. The PTPT theorist does not simply ask, "What is the boy's estimate of his current utility from future beer consumption?" No, the PTPT theorist *first* requires the boy to imagine *how much* ***present*** *satisfaction the beer will give him at that future date*, and *then* the boy must discount this value because of its remoteness.[45] (italics in the original)

Murphy's example is flawed. The young boy would not follow either of Murphy's PTPT theorist's questions. Instead, the boy would weigh the benefits of using the beer now (gained through either consumption or trade) against the opportunity cost of not using the beer now. The issue of how he might value the beer in the future is reflected in the full cost of not using it now. It is not that future value, however, which is discounted to the present. Here Murphy is assuming that the beer has a value that is discountable, i.e., he is assuming cardinal utility which he criticizes the Austrians of doing. (See the criticism on cardinal utility below.) Time-preference is not a process of only discounting future values. For each individual, it is the ratio of the benefit derived from acting in the present relative to the opportunity cost of waiting.

Murphy's second argument is that "An actor *never chooses* between present ice-in-the-winter and present ice-in-the-summer, and thus the PTPT theorist's comparison of

[45] Murphy fn. 42, p. 117.

the utilities offered by the two items is nonsensical."[46] Of course, such a choice never occurs. However, this is not an indictment of the theory, rather it is an indictment against the ice example which was first used as a criticism against the Austrian position. Moreover, this observation reinforces the position of the Austrian who argues that ice-in-winter is a different good than ice-in-winter.

Murphy's third objection to the Austrian response to the ice example is as follows:

> Most damaging of all, the PTPT definition of a *good* in an intertemporal context differs—and absurdly so—from the definition of a good in an intratemporal context. The PTPT theorist says that the marginal utility of the unit of ice in summer is higher than in the winter, and so the two physical items are not really units of the same good.[47]

In this argument, Murphy confuses the issue. The PTPT theorist is not arguing that it is *because* ice-in-the-summer has a value different than ice-in-the-winter that they are two different goods. On the contrary, the external conditions around the individual who makes the choice have changed. It is because of this change that the individual perceives the ice as two different goods. The individual derives a different value from the ice in the summer because the summer is hotter than the winter.

The example of ice in the summer and in the winter is not designed to *prove* the validity of the theory of time-preference. In fact, the ice example is an attack on the theory. Thus, even if the arguments invalidate the responses to the example, the theory is not invalidated, only the counterarguments to the example. Nevertheless, with the careful

[46] Murphy p. 118.
[47] ibid. p. 119.

use of the *ceteris paribus* assumption at the moment of appraisal and the characterization of interest as the opportunity cost of acting/waiting, the time-preference position holds against these objections.

Cardinal Utility

When the example comparing discrete units of utility is used to explain time-preference, as in the example of comparing 100 utils today versus 100 future utils, the theorist is employing cardinal utility.[48] Murphy argues that when a theorist holds preferences constant across time, the theorist "invites a cardinal conception of utility."[49] Murphy continues, "What the PTPT advocate really means is that the same *psychic satisfaction* is always preferred sooner rather than later."[50] Murphy completes his argument with the following:

> Finally, I will close with an example drawn from Ludwig von Mises. I find this downright shocking, since it so blatantly demonstrates that the PTPT forces even Mises to (inadvertently) employ a cardinal conception of utility: "Originary interest is the ratio of the value assigned to want-satisfaction in the immediate future and the value assigned to want-satisfaction in remote periods of the future" (Mises, 1966, p. 526)
>
> There is no getting around Mises' words. The PTPT has led him to literally divide one subjective value by another. Obviously Mises does not 'mean' to actually place subjective values in a ratio, but that is what he wrote. What clearer evidence could

[48] See also fn. 5 above.
[49] Murphy p. 121. See also his Chapter 2, Section 8, pp. 120-125.
[50] ibid. p. 121. Italics in the original.

there be that that pure time preference theory of interest does not belong in Austrian economics?[51]

If Murphy is correct and the use of the pure time-preference theory resorts to cardinal utility, what are the implications? The first point that should be noted is that this argument does not invalidate the theory. It is not a refutation. All that Murphy has done is point out an inconsistency in the style of argumentation employed by the Austrian theorists. However, this inconsistency does not truly exist. Murphy has provided a service to the Austrian theorist—a warning to be careful and avoid phrases such as "the same psychic satisfaction" and "ratio of value."

When time-preference is defined as the opportunity cost of waiting, there is no need to resort to the use of cardinal utility. A comparison of utilities (such as "Would you prefer 100 utils now or in the future?") is only a simplified example to illustrate the concept of time-preference. The decision maker compares the benefit of consuming or acting now relative to the cost of not consuming or acting. This appraisal is no different than the act of choosing between an apple or an orange. For each decision, there is an appraisal made between goods or courses of action. However, these weights are subjective and are made internally, i.e., within the individual. The weighing of trade-offs do not imply ratios in the strict mathematical sense. Suppose that a person is presented with the choice between two goods, A and B. He finds them both useful, but he prefers good A relative to good B. Nevertheless, there is a rate of exchange that will induce this person to part with good A for good B. Does this trade-off have a cardinal component? Yes, it is the price of exchange. However, the existence of this price does not negate the

[51] ibid. p. 125.

fact that the preferences are completely subjective. In the same way, the interest rate is the objective component and time-preference is the subjective factor underlying the exchange. Thus Murphy's argument fails to refute the traditional Austrian theory.

Original Factors Doctrine

Austrian economists have argued that each factor of production has a cost and thus a rate of return. The original factors of production (natural resources, labor and time) yield rents, wages and interest, respectively. Murphy claims that "[t]he original factors doctrine is perhaps the single most dangerous in all of the PTPT literature."[52] He maintains that a return on time is only applicable in a stationary equilibrium (an ERE). Murphy argues that in the real world, or in a dynamic model, the Austrian position falls apart.

In order to present his argument, Murphy uses a 3-stage production model where umbrellas are made.[53] He posits that for three periods there is an abnormally large amount of rainfall. In this example, he argues that before the new umbrellas are brought to the market, the amount of rainfall returns to normal levels. Thus the higher demand at the consumer level is never completely imputed back to the original factors of production, and in particular, it is not imputed back to time.

The flaw in this example is that there is no role for the entrepreneur, the speculator or the arbitrager. Murphy implicitly assumes that the price of a good at an earlier stage cannot change until the next time period. Let us compare this model with an event that is familiar to everyone, gasoline prices. Under Murphy's model, whenever

[52] ibid. p. 109. See also Pellengahr (1986b) pp. 82-83 where he refers to the "linkage argument."
[53] See Murphy pp. 110-113.

there is a change in the supply of crude oil, the consumer would not see the price at the pump change until that unit of oil is processed and brought to the pump for his consumption (some months hence). However in the real world, this pattern is not empirically true. As seen in recent events in the Persian Gulf, the *forecast* of a reduction in the supply of future crude oil is reflected in today's price at the pump. In other words, today's sale at the pump is used to purchase future crude oil. Entrepreneurs, speculators and arbitragers act together to quickly adjust prices across the entire structure of production to meet future conditions. Thus, in the context of the real world, or a dynamic model, it is Murphy's example that fails to make its argument. The fact that there is a price associated with time stems from the scarcity of time. It is this point that Murphy fails to address.

Hülsmann's Objection

Hülsmann (2002) argues that Mises' concept of time-preference is logically valid, but it does not explain interest. He agrees that time-preference is a "universal feature of human action." However, Hülsmann argues that Mises' concept of time-preference only explains one action. Unlike Böhm-Bawerk's formulation of the question where he compares the value of a present good relative to a future good, time-preference, argues Hülsmann, does not connect two points in time. Since interest is the result of at least two actions (e.g., "the granting of credit and the payment of principle and interest"), time-preference cannot explain interest. Hülsmann states, "The problem of interest theory is … to explain a particular relationship between at least two actions. Yet this is something

that time preference by its very nature cannot do."[54] Although a particular example can arise where a person will exchange an amount of present goods for a larger amount of future goods, Hülsmann claims that such cases are not generalizable. Hülsmann concludes that "Mises's time preference theory of interest does not explain why there should be, under any set of circumstances, a systematic relationship between time preference on the one hand, and the spread between selling receipts and cost expenditures on the other hand. It does not explain why the interest rate should *ever* be positive rather than zero or even negative."[55]

The thrust of Hülsmann's indictment is that time-preference cannot explain the market rate of interest—the functionalist question. Indeed, Hülsmann concludes that "Misesian time preference *cannot* account for price spreads. It can only account for the value differential between the actual use of the good and the counterfactual (unrealized) future uses of the same good."[56]

The key to Hülsmann's argument is whether a particular example is generalizable. Suppose that an individual has $100.[57] This individual has the ability to use this sum now and to receive utility from it. The question that arises is, "What is the price at which this individual can be persuaded to part with this sum now for a future sum?" Hülsmann argues that even if this sum is 105 future dollars, he would prefer to receive these future dollars sooner than later, i.e., he would prefer to receive the $105 in six months instead of one year. Hülsmann further argues that regardless of the size of the future amount (even an amount less than $100), he would prefer the future dollars sooner than later.

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[54] Hülsmann (2002) p. 84.
[55] ibid. p. 85. Italics in the original.
[56] ibid.
[57] This example follows Hülsmann's example on p. 85.

While it is true that the individual would prefer the future dollars sooner than later, the error that Hülsmann is committing is that he is focused on the wrong element: on the rate of exchange, not on time-preference. If the individual contracts to exchange his $100 for $105 a year from now, the rate of exchange is 5%. To say that one would prefer the $105 in less than a year is an observation on the rate of exchange (the price), it is not a claim on time-preference. In other words, the rate of exchange increases if he gets the $105 sooner than one year. This scenario is no different than a seller setting a minimum selling price of a good. If he gets more, then he gains producer surplus. In the same manner, if the individual receives the $105 sooner than one year, he too, gains a producer surplus. Hülsmann attempts to deny the generality of this example by stating that if this individual agreed to 120 future dollars, he would prefer the $120 sooner than later. Furthermore, he presents an example where the individual would only receive 90 future dollars. Again, Hülsmann argues that one would prefer to receive the $90 sooner than later. By stating that the individual would prefer the 105, 120 or 90 future dollars sooner than later is simply an argument that an individual prefers to receive a higher price rather than a lower price. Each of these examples do not refute the time-preference theory of interest.

In each of these examples what Hülsmann ignores is *why* the individual chooses to contract for $105, $120 or $90. With regard to the first two sums of $105 or $120, the individual will only contract with these projects if and only if these returns meet his opportunity cost of the 100 present dollars—his time preference. So in one period the 105 future dollars maybe agreed upon, but at another period his preferences may change where nothing less than $120 would be acceptable.

The market rate of interest emerges through the interplay of both supply and demand forces. The borrower, too, has his own, individual, time-preference. The borrower's time preference is such that he values the use of the $100 now more than the discounted value of the future payment. Through these two sides a market rate of interest emerges and it the result of at least two actions. It is not clear in Hülsmann's critique how this example is not generalizable.

The example of an exchange of 100 present dollars for 90 future dollars is odd because of Hülsmann's acknowledgment that time-preference is a universal condition of human action. The conditions that would make 90 future dollars preferable to 100 present dollars must be such that a state of change must exist between these two time periods. Thus, this example violates the *ceteris paribus* assumption. It commits the same error that is explained above in the section on "Knowing One's Future Goods."

Hülsmann fails to explain how such examples are not generalizable and thus fails to make his argument. This argument merits more attention and should be explored in further research, but as it stands now, it is not a valid criticism against the traditional Austrian theory.

Reisman's Objection

Reisman's objection is similar to Hülsmann's examples. Reisman argues that time-preference fails to explain the height of interest rates that appear in the market—the functionalist question. He states, "…the establishment of a relationship between the value of the factors of production expressed in terms of present goods, and quantity of present goods that in the future will result from those factors of production, does not in

fact convey any information whatever about the height of the rate of return."[58] Reisman then provides an example comparing 9 present apples (as factors of production) with 10, 20 or 5 future apples. He then assumes that the price of each apple is a constant $1 in both periods. "According to the time-preference theory, the rate of return implied in these three cases is 11 percent, 122 percent, and –44 percent, respectively." Reisman concludes, "In fact, the example shows that the time-preference theory commits exactly the same kind of error as the productivity theory."[59]

While it is true that the example provided by Reisman falls into the as same error produced by the productivity theory, this example is not faithful to the time-preference theory of interest. If there were an entrepreneur considering whether to invest his $9 in a project that is supposed to yield an 11% return,[60] then the entrepreneur would evaluate the potential return of his alternatives. He may find other projects that would be more profitable, but suppose that he did not find another such project. To be accepted by the entrepreneur, the final hurdle that the project would need to clear would be whether the rate of return justifies, in the mind of the entrepreneur, the sacrifice of the current use of the money. In other words, the rate of return must be high enough to induce the entrepreneur to part with his money at the present moment. So the entrepreneur could look at a project that yields an 11% rate of return and decide that it is not "worth it." However, the same entrepreneur may look at a project that yields 12% and decide that it is "worth it." In other words, the profitability of the project does not create an interest

[58] Reisman (1996) p. 793.
[59] ibid. p. 793, 794.
[60] The entrepreneur may also calculate the expected rate of return of a project by using a weighted average of the different possible market outcomes. Scenarios a, b and c represent the probability of moderate, high and low demand, respectively. The following formula would then be used: expected rate of return = a•(11%) + b•(122%) + c•(-44%), where a + b + c = 1.

rate. The entrepreneur's time preference shapes his decisions, but is not the only factor in determining the market rate of interest. As outlined in the discussion on the wealth effect above, productive factors influence the market rate of interest due to different time preferences of the different individuals in the market.

Murphy's Final Objections

Murphy presents several other objections to the Austrian theory of interest. However, these objections confuse the essentialist and functionalist questions. Murphy argues (in his Chapter 2, Section 5) that the Austrians contend that "there arises a uniform rate of originary interest among all individuals and across all goods."[61] Murphy acknowledges that Rothbard is operating under the Evenly Rotating Economy (ERE) model. However, he claims that in a dynamic context a single interest rate does not emerge.

Murphy is being uncharitable and is attacking a straw man. Of course, when the assumption of *ceteris paribus* is relaxed, the interest rate is not a single and uniform rate. This is evidenced in the real world by the various structures of interest rates, e.g., the term structure of interest and the risk structure of interest. Murphy confuses the functionalist implications with the essentialist formulation of interest. The ERE is supposed to be an abstraction from the real world. The ERE is not designed to examine multiple structures of rates. Furthermore, the use of the simplifying assumption of a single interest rate does not disprove the traditional Austrian theory of interest.

[61] Murphy p. 100.

Murphy presents three arguments in his Chapter 2, Section 4.[62] In the first argument, Murphy argues that Austrian theory "involves an aggregation just as heroic as that performed by any mainstream macroeconomist."[63] He then states,

> If someone "explained" the higher valuation of pounds versus yen by reference to "geography preference," or by the fact that "British goods" were preferred to "Japanese goods," surely the Austrian would shudder. Yet this is precisely how the PTPT theorist explains the higher valuation of present dollars versus future dollars.[64]

It is difficult to understand how, even if this were a fair characterization of the Austrian theory, that it would be an argument against the theory. It is simply an inaccurate accusation. Murphy fails to explain where and how the aggregation takes place and how it would invalidate the theory. Murphy only implies that Austrians should divorce themselves from the traditional theory because it "should seem very strange indeed to the Austrian."[65] Murphy does not present an argument against the traditional theory. Time-preference is not a characteristic such as geography. It is the ratio between the subjective valuation of benefits and costs as perceived by the acting individual.

Section 5: Conclusion

The traditional Austrian theory of interest is more complex and sophisticated than the casual observer would expect. The theory answers the essentialist question (What are

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[62] Only the first is relevant to this paper. The second argument accuses the Austrians of denying the existence of money. The argument that Austrians deny money in interest theory is untrue and inaccurate. The third argues against a single or uniform rate on interest, and was just examined.
[63] Murphy p. 99.
[64] ibid. fn. 24 p. 99.
[65] ibid. p. 99.

the necessary and sufficient conditions to the formation of interest?) with the use of the concept of time-preference. The economic agent under study is confronted with a choice between consuming (or acting) now versus consuming (or acting) in the future. The individual weighs his options at the moment of appraisal. The moment of appraisal exists at a particular point in time. The agent projects his expectations forward across time. He is able to hold everything else constant (in his mind) because at the moment of appraisal he has no further (new) information to modify or change his preferences. It is in this process that a carefully constructed use of the *ceteris paribus* assumption leads the agent to a choice where he compares the benefit of consuming (or acting) now with the opportunity cost of waiting. The Austrian theorist is able to conclude from this thought experiment that sooner is preferred to later because acting later involves a cost—the wasting of a scarce resource, time. From this construction of the problem, the Austrian theorist is able to conclude that time-preference is not only an *a priori* component of human action, but also that time-preference is always positive.

The traditional Austrian theory of interest answers the essentialist question, but does not answer the functionalist question. Other forces outside of the individual influence the height of interest in the market. However, these forces are only modifiers to an underlying essentialist rate. These exogenous forces are not a part of the necessary or sufficient conditions to the formation of interest. For example, the traditional Austrian theory demonstrates that if there were no production, there would still be interest.

Constructing the interest rate as a reflection of the opportunity cost of waiting addresses each of the objections raised by this paper. In fact, the single rate that is

generated in the time-preference model can be transformed into several structures of rates.

Much confusion has arisen due to the blending and confusing of the essentialist and functionalist questions. This confusion has led many theorists down unproductive paths, yet a positive effect of this work is that the Austrian theorist has been challenged to refine the argument. By moving Austrian theory along the direction presented in this paper, a much needed level of sophistication will be brought to the models and, it is hoped, will promote their acceptance in non-Austrian circles.

References:

Böhm-Bawerk, Eugen von 1959. *Capital and Interest*, 3 vols., South Holland, IL: Libertarian Press

Cecchetti, Stephan, 1987. "The Case of the Negative Nominal Interest Rates: New Estimates of the Term Structure of Interest Rates During the Great Depression," NBER, Working Paper no. 2472, 36.

Conard, Joseph, 1959. *Introduction to the Theory of Interest*, Berkeley and Los Angeles, CA: University of California Press.

Fetter, Frank 1977. *Capital, Interest and Rent: Essays in the Theory of Distribution*, Rothbard, Murray (Ed.), Kansas City, KS: Sheed, Andrews and McMeel, Inc.

Fisher, Irving, 1930. *The Theory of Interest: As Determined by Impatience to Spend Income and Opportunity to Invest It*, New York, NY: The Macmillian Company.

Garrison, Roger, 2001. *Time and Money: The Macroeconomics of Capital Structure*, New York, NY: Routledge.

_____, 1988. "Professor Rothbard and the Theory of Interest ," in Block, Walter and Llewellyn Rockwell, Jr. (Eds.) *Man, Economy, and Liberty: Essays in Honor of Murray N. Rothbard*, Auburn, AL: Ludwig von Mises Institute.

_____, 1979. "Waiting in Vienna," in *Time, Uncertainty, and Disequilibrium: Exploration of Austrian Themes*, Rizzo, Mario (Ed.), Lexington, MA: Lexington Books, 215-226.

Hennings, Klaus, 1997. *The Austrian Theory of Value and Capital: Studies in the Life and Work of Eugen von Böhm-Bawerk*, Brookfield, VT: Edward Elgar Publishing Company.

Hülsmann, Jörg Guido, 2002. "A Theory of Interest," *The Quarterly Journal of Austrian Economics*, 5(4), 77-110.

Kirzner, Israel, 1996. *Essays on Capital and Interest: An Austrian Perspective*, Brookfield, VT: Edward Elgar.

Knight, Frank, 1964. *Risk, Uncertainty and Profit*, New York, NY: Augustus M. Kelley, Bookseller.

Lewin, Peter, 1999. *Capital in Disequilibrium: The Role of Capital in a Changing World*, New York, NY: Routledge.

_____, 1997. "Rothbard and Mises on Interest: An Exercise in Theoretical Purity," *Journal of the History of Economic Thought*, 19(1), 141-159.

Lutz, Friedrich, 1968. *The Theory of Interest*, Chicago, Ill.: Aldine Publishing Company.

Mises, Ludwig von, 1990. "The Non-Neutrality of Money," in Ebeling, Richard (Ed.) *Money, Method, and the Market Process*, Norwell, MA: Kluwer Academic Publishers, 69-77

_____, 1985 [1957]. *Theory and History: An Interpretation of Social and Economic Evolution*, Auburn, AL: Ludwig von Mises Institute.

_____, 1966. *Human Action: A Treatise on Economics*, Third Revised Edition, Chicago, IL: Contemporary Books, Inc.

Murphy, Robert, 2003. "Unanticipated Intertemporal Change in Theories of Interest," Ph.D. Dissertation, New York University.

Pellengahr, Ingo, 1996. *The Austrian Subjectivist Theory of Interest: An Investigation into the History of Thought*, New York, N.Y.: Peter Lang.

_____, 1986a. "Austrians Versus Austrians I: A Subjectivist View of Interest," in *Studies in Austrian Capital Theory, Investment and Time*, Faber, Malte, (Ed.), series - Lecture Notes in Economics and Mathematical Systems, #277, 60-77.

_____, 1986b. "Austrians Versus Austrians II: Functionalist Versus Essentialist Theories of Interest," in *Studies in Austrian Capital Theory, Investment and Time*, Faber, Malte, (Ed.), series - Lecture Notes in Economics and Mathematical Systems, #277, 78-95.

Reisman, George, 1996. *Capitalism: A Treatise on Economics*, Ottawa, IL: Jameson Books.

Rothbard, Murray, 1993. *Man, Economy, and State: A Treatise on Economic Principles*, Revised Edition, Auburn, AL: Ludwig von Mises Institute.

_____, 1987. "Time Preference," in Eatwell, John, Murray Millgate and Peter Newmans (Eds.), *The New Palgrave: A Dictionary of Economics*, Macmillan, New York; reprinted in *Austrian Economics: A Reader*, Ebeling, Richard (Ed.), Hillsdale College Press, 1991

_____, 1977. "Introduction," in *Capital, Interest and Rent: Essays in the Theory of Distribution* by Frank A. Fetter, Rothbard, Murray (Ed.), Kansas City, KS: Sheed, Andrews and McMeel, Inc.

Wicksell, Knut, 1961 [1934 English / 1901]. *Lectures on Political Economy, Volume I: General Theory*, 2nd edition, E. Classen (Tr.), London: Routledge & Kegan Paul Ltd.

_____, 1958 [1911]. "Böhm-Bawerk's Theory of Capital," in Lindahl, Erik (Ed.) *Selected Papers on Economic Theory*, Cambridge, Mass.:Harvard University Press.

Wieser, Friedrich von, 1989 [1893]. *Natural Value*, William Smart (Tr.), Fairfield, N.J.: Augustus M. Kelley, Publishers.

Yeager, Leland, 1993. "Capital and Interest," unpublished manuscript.

_____, 1979. "Capital Paradoxes and the Concept of Waiting," in *Time, Uncertainty, and Disequilibrium: Exploration of Austrian Themes*, Rizzo, Mario (Ed.), Lexington, MA: Lexington Books, 187-214.