

A STUDY ON THE PROPOSITION OF TIME PREFERENCE

Yannis Petrzak  
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Dr. Herbener  
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## I. INTRODUCTION

Time preference, and its consequence interest, have been much-discussed topics in the Austrian tradition. Beginning with Böhm's extensive study of past theories and with the presentation of his own views, the subject became of major importance to the school. The foundational concept, however, that is, time preference, has undergone many different formulations, and only in the latter half of the 20<sup>th</sup> century has there been an attempt to purify the proposition into what has become known as "pure time preference."

Even today, however, the concept time preference is often discussed only in passing, and if so, generally very briefly and often in imprecise terms. The concept being foundational to economic analysis, as interest and thus many other economic phenomena rest upon it, it is helpful to review past and present statements of the same and rid the concept from any clutter or mistaken interpretation.

The scope of this paper is hence narrow. It is not meant to be an investigation of different approaches to the explanation of interest as it *manifests* in action, and in particular on the market. No discussion of discounting, capitalization, production, time markets, and so forth, for example, will be presented. Rather, what follows is to be a survey of the different statements of the fundamental *proposition*, or *principle* of time preference itself.

Hence, first, after a brief pre-history of time preference, these main statements of the same will be listed more or less chronologically, and it will be investigated whether or not the same can be regarded, in the form that they were presented in, as *general*

*principles of human action*. In doing so, secondly, the contribution of Mises will be emphasized, since the same purified time preference is presented as a universal law of action. Lastly, based on this historical survey and clarification of Mises's work, an attempt at applying the insight of Rothbard's notion of demonstrated preference will be utilized to illustrate the proposition of pure time preference and its universal validity.

## **II. PAST PROPOSITIONS OF TIME PREFERENCE**

The concept of time preference has an extended history. Man tends to seek to explain things as they occur around him. Naturally, then, philosophical concepts tend to arise alongside the manifestation of real world phenomena. Economic concepts similarly arise alongside developing commercial conditions. Not surprisingly, then, the discussion of loans and interest dominated much scholarly thought during the renaissance period, when commerce expanded and time markets, in particular loan markets, blossomed. As far as we know today, the scholastic thinkers, such as Summenhart or Navarrus, were the first to attempt, in this increasingly commercial Western environment, the explanation of interest based on a rudimentary conception of time preference (Rothbard 2008, 281-2). Following occasional hints to the concept, its first explicit exposition before the works of the marginal revolutionaries can be found in the works of Turgot (Rothbard 2008, 282).

## A. CARL MENGER

Within the Austrian School, it was Carl Menger, the school's founder, who first explicitly and clearly stated the concept of time preference in his *Principles of Economics* (1981), without however attempting to demonstrate its general validity, and without showing its place within the axiomatic-deductive conceptual apparatus. In the course of his discussion of economic expansion brought about by roundabout production, Menger (152-156) notes that there is a factor limiting the extent to which man chooses roundabout production, even if it is more productive. That factor is time preference:

The most anxious care of men is always directed to assuring themselves the consumption goods necessary for the maintenance of their lives and well-being in the present or in the immediate future, but their anxiety diminishes as the time period over which it is extended becomes longer. (153)

He notes that this is not an accidental property of action, but a general principle of man's nature.

This phenomenon is not accidental but deeply imbedded in human nature. To the extent that the maintenance of our lives depends on the satisfaction of our needs, guaranteeing the satisfaction of earlier needs must necessarily precede attention to later ones. And even where not our lives but merely our continuing well-being (above all our health) is dependent on command of a quantity of goods, the attainment of well-being in a nearer period is, as a rule, a prerequisite of well-being in a later period. (153)

Menger (153-4) thus concludes that all "experience teaches that a present enjoyment or one in the near future usually appears more important to men than one of equal intensity at a more remote time in the future."

While he does claim that this fact is “deeply imbedded in human nature,” Menger does not attempt to demonstrate its *universal* validity, as the clause “all experience” illustrates. Hence, while he states the concept of (pure) time preference, namely that present satisfaction of a given end is preferred to future satisfaction of the same end, and while he surely appears to believe it to be true generally, Menger does not attempt to prove its universal validity as a law of action.

## **B. BÖHM-BAWERK**

Whether or not Menger’s rendition of time preference was satisfactory in terms of its universal applicability, or lack thereof, his most famous student, Eugen von Böhm-Bawerk in no way improved upon his mentor’s formulation, and in fact even led the interest investigation onto a misleading path. Böhm’s changes were twofold.

First, he changed the emphasis of the analysis, away from from satisfactions and wants, to goods. Although discussing (1921, 319-23) the concepts of future wants, and how they, as well as the goods that help us attain them, relate to present wants, he sets his statement of time preference up in terms of goods. To Böhm (327), time preference thus signifies the idea that as “a rule, present goods have a higher subjective value than future goods of like kind and number” (translation mine). Hence, time preference, to Böhm, signifies the idea that man generally prefers present goods over future goods of “like kind and number,” giving the latter a lower value. This value spread is interest.

Second, in order to prove the proposition of time preference, he stepped, at least in part, away from man's fundamental nature. In presenting his "three grounds" for time preference, he then turned toward psychological tendencies and technical arguments.

The first ground (328) pertains to differences in want and provision in present and future. It states that if, through time, the relationship between wants and their provision changes, so that they are more amply provided for, the value of the goods achieving the provision will, due to their larger quantity and consequent lower marginal utility, be lower. Although Böhm (329) admits that this ground is not necessarily always operative, he holds it to be a regularity and hence sufficient to drive time preference. Besides criticism of the argument itself, most importantly its lack of general validity (Mises 1949, 485), it must simply be noted that it is not the same as time preference (Herbener 2011, 32).

Similarly, the second ground. There, Böhm (1921, 332) states that man tends to err in his anticipation of future wants, and thus generally errs in his present valuation of the future goods that will aid in satisfying the same, generally placing a lower value on them than what will in the course of time be realized as their correct, higher value. This argument, however, again both lacks general validity (Mises 1940, 447) and constitutes something entirely different than time preference, rather just a (not necessarily true) psychological tendency (Herbener 2011, 32).

The third ground Böhm (1921, 338-9) presents is the one that received most criticism, since Böhm does not even bother to make an economic-psychological argument

here. Rather, he states that present goods tend to be preferable means of satisfying our wants, and thus have a higher value, since they are technically superior in extending the degree of roundaboutness of production. In presenting this argument based on technological considerations, Böhm fell back into the old productivity theory of interest (Fetter 1902), understanding the same (and time preference that causes it), as driven by the higher technical productivity of present goods, thereby failing to present time preference as a general principle of human action.

Therefore, Böhm's approach must, in its entirety, be discarded as foreign to a sound understanding of time preference, as it has been by some, notably Fetter (1902) and Mises (1940, 439-43; 1949, 485-6).

### **C. FRANK A. FETTER**

Frank A. Fetter (1863-1949) was the first to attempt to cast off the muddled notions that Böhm introduced into his definition and defense of time preference. Fetter presents his analysis of time preference and interest in both his *Principles of Economics* (1910), as well as in his *Economic Principles* (1915). Fetter proposes that there are multiple underlying phenomena driving time preference. Generally, then, time preference is “the difference in value of a given satisfaction obtained sooner instead of later” (Herbener 2011, 40). It arises from the fact that man exists and acts in, and throughout time, and is faced with the “typical human choice” between “goods in different periods” (1915, 237).

To Fetter, however, there is no general requirement for time preference to be in favor of present over future goods. He lists (1915, 237-39) various cases where later satisfaction of a given end is said to be preferred over sooner satisfaction. Nevertheless, for various reasons, Fetter argues that man,

with all his foresight, and with all his appreciation of future needs, even the most provident of men is, like the animals compelled to live very largely in the present. [...] The needs of the present and the desires for present goods are, in much the larger number of cases, the more insistent. [...] The typical or average preference of men is for present goods or uses. (239-40)

As concluded by Herbener (2011, 36), then, following “Menger, pure time preference, for Fetter, is the preference people have for a given satisfaction sooner instead of the same satisfaction later.” Fetter thus elaborated on Menger’s ideas, without injecting, into the definition of time preference, elements foreign to economic analysis. It was nevertheless left to Mises to prove that what Fetter regarded as a generally positive time preference, is in fact a universal law of all action.

#### **D. LUDWIG VON MISES**

What Fetter had begun, namely to establish time preference as a universal law of action, was finished only by Mises. Only he was able to cast off all circumstantial arguments and concepts, and to present time preference as an inviolable law of all action. His argument proceeds as follows.

All action takes place throughout time. Man thus distinguishes between present and future, and between different gradations of the latter. He not only distinguishes and



chooses between actions with “regard to their dimension” (1949, 480), but also with regard to their temporal placement. Given then that man seeks to satisfy a given end, the timing of the satisfaction, that is, whether it is satisfied *sooner* rather than *later*, is a choice variable that he must take into account. That is to say, argues Mises (1949, 480), “his choices regarding the removal of future uneasiness are directed by the categories *sooner* and *later*.”

Given this fact, that man in all action is faced between choosing sooner or later satisfaction, Mises (480-81) holds that “satisfaction of a want in the nearer future is, other things being equal, preferred to that in the farther distant future. Present goods are more valuable than future goods.” This principle is, Mises (481) emphasizes, operative always and everywhere

Time preference is a categorial requisite of human 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.

Time preference is hence a universally valid law of all human action, and no action in which (positive) time preference is not exhibited can be imagined. Having defined time preference as such, Mises (483) furthermore also cleanses the concept from psychological and physiological connotations.

While it “is possible to search for a psychological understanding of the problem of time preference,” “the praxeological problem is in no way related to psychological issues” (ibid.), since economic, or praxeological law, is not arrived at by understanding, but by conception.

Likewise, time preference must not be established based on physiological facts (483-4), which are never enough to understand *purposeful* behavior.

In the same way in which as economists we do not ask why albumin, carbohydrates, and fat are demanded by man, we do not inquire why the satisfaction of vital needs appears imperative and does not brook any delay. (484)

Therewith, Mises had presented time preference as a universally valid law of all human action, which, once more, states simply that, *ceteris paribus*, *man prefers to satisfy a given want sooner rather than later* (480). This, and nothing else, is what a careful reading of Mises yields. Disregarding Mises's presentation, time preference was subsequently nevertheless defined and presented differently by many authors, thereby subtracting from its universal validity and conceptual clarity.

#### **E. LATER STATEMENTS AND DEFENSES OF TIME PREFERENCE**

Presenting all subsequent statements of time preference, true and false, would be far beyond the scope of this paper, and would furthermore yield little insight. Rather, multiple examples will be used to illustrate two different types of misleading statements and defenses of time preference, which are not fully in alignment with Mises's praxeological definition, and which can lead to many erroneous implications.

The first, commonly found presentation of time preference understands the same as a preference of "present goods over future goods." Such statements can be found in

manifold works. Rothbard, who also follows Mises's approach elsewhere,<sup>1</sup> defines time preference as follows in his 1987 entry in *The New Palgrave*.

Time Preference is the insight that people prefer “present goods” (goods available for use at present) to “future goods” (present expectations of goods becoming available at some date [...]). (2008, 281).

This definition of time preference follows closely that of Böhm, even though it is presented as a universal law of human action, as found in Mises (1949). While Mises (481) does in fact state that “present goods are more valuable than future goods,” this is just an outflow, or immediate consequence of time preference, not time preference itself. The concept of time preference itself only makes sense in terms of satisfactions being achieved sooner rather than later. Insofar as the idea of “present and future goods” (of “like kind and number” or of “the same quality”) makes any sense, these present and future goods display a value and then price spread only in light of their relation to the actor's capability to use them to satisfy a given want sooner (present) or later (future).

Further, expressing time preference in terms of present and future goods can lead to awkward statements of the same principle. Huerta de Soto (2012, 270), for example, first presents time preference in terms of satisfactions to be achieved sooner or later, then also expresses the same as meaning that “other things being equal, ‘present goods’ are always preferable to ‘future goods,’” leading him ultimately to propose that “when the

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<sup>1</sup> In *Man, Economy, and State* (2004, 15), he defines time preference as follows. “A fundamental and constant truth about human action is that man prefers his end to be achieved in the shortest possible time. Given the specific satisfaction, the sooner it arrives, the better.”

actor is faced with two goals of equal subjective value to him, he will always prefer the one he can attain in less time.”

The last sentence illustrates the confusing conceptions that can arise out of presenting time preference not in terms of sooner or later satisfactions of a given end. Is Huerta de Soto saying that of two different goals, man prefers the one he can achieve sooner? How can that be a praxeological law? What does it mean for two different goals to be of “equal subjective value?” A charitable reading of course would interpret the same to mean that of two different goals that seek to attain “the same outcome” (hence “equal value”), the actor prefers whichever path brings him to the outcome sooner.

But such a reading is not self-evident, and other interpretations could be pulled from the text. Hence, time preference is best stated unambiguously in terms of satisfactions of a given want, in order to avoid confusion, both through having to pose different goals with “equal value,” and through having to make reference to the conceptually secondary categories of present and future goods.

Another dangerous way of presenting time preference is based on a mis-reading of Mises. The most famous presentation of time preference, contained in a critique of Mises, is found in Hülsmann’s (2002) attempt to present his “means-ends” theory of interest. There (79), the same states that Mises “followed Frank Fetter and Franz Cuhel in arguing that time preference was caused by the necessity for consumption.” This is said to be the case since

Fact is that human beings could not survive if they did not consume. Hence, there must be some time preference in human action, lest the human race would perish. This does not mean that human beings must consume through every single action, so that time preference would be the only factor determining their actions. Rather, it means that in order to survive human beings must, at some point, prefer shorter production processes to longer ones, even though the longer ones are more physically productive. (80)

Hülsmann here thus claims that the necessity of (ultimately, food) consumption, in order to ensure survival, is what causes time preference. It is hence, as Mises had emphatically denied earlier (1949, 483-4), caused by *physiological* factors.

While Hülsmann is the most drastic in this interpretation of Mises, similar readings can be found throughout many other works, seeking to “prove” time preference through acts of consumption.

Going back to Huerta de Soto, for example, we can also read that in “a world without time preference people would consume nothing and save everything, and eventually humans would die of starvation and civilization would disappear.” Huerta de Soto thus also holds that there is a fundamental physiological drive behind time preference.

Similar considerations drive others, such as Topan and Paun (2013), to argue that the Misesian statement of the concept of time preference must be “proven” through a *reductio ad absurdum*, namely through asking whether or not consumptive acts could occur if the time preferences were in fact universally negative. Herbener (2013, 318-9) demonstrates how this argument is based upon a misunderstanding of the epistemological quality of economic concepts, reminding us that praxeological laws are not “proven” as

the results of chains of arguments, but are rather, upon their proper conception by the human mind, made evident as true to the same (Herbener 2013, 318; Mises 1949, 34-35).

Besides Herbener's valid point and subsequent correct restatement of time preference and Fetter's approach to the theory of interest, one must nevertheless wonder why these consumption-based "proofs" are regularly presented. The answer, which will also shed light on what Mises's true opinion on the "need for consumption" was, is found in the German-language version, or predecessor to *Human Action*, the 1940 work entitled *Nationalökonomie* (1940).

### **III. SETTING THE RECORD STRAIGHT ON MISES**

Mises's *Human Action* is, although heavily edited, essentially a revised and improved version of *Nationalökonomie*. Thus, the latter work, published in Geneva in 1940 by Editions Union, is in very large sections entirely identical with *Human Action*. One such very similar section is that one time preference in the chapter on "Das Handeln im Ablauf der Zeit" (1940, 434-74) or, "Action in the Passing of Time" (1949, 476-520). In an important paragraph in this section, nevertheless, during the translation process, a rather small, but significant change was made to the text. This mistake, combined with somewhat ambiguous expressions by Mises elsewhere lead to the infamous misinterpretation of his theory as "consumption-based."

The main passage (481) that seemingly appears to justify the consumption theory is found in the Section on "Time Preference as an Essential Requisite of Action" in

*Human Action*. The German original passage is very similar, and in large parts identical.

*Human Action*, for example, adds the words “of the capitalist West” to page 481, removes a reference to Franz Cuhel (1940, 444), or introduces the very term time preference, which Mises avoided in the German, simply speaking of the “higher valuation of temporally closer satisfaction” (1940, 443).

In this passage, Mises argues that the “very act of gratifying a desire implies that gratification at the present instant is preferred to that at a later instant.” So far, so good.

But then, the English version reads that

He who consumes a nonperishable good instead of postponing consumption for an indefinite later moment thereby reveals a higher valuation of present satisfaction as compared with later satisfaction. If he were not to prefer satisfaction in a nearer period of the future to that in a remoter period, he would never consume and so satisfy wants. He would always accumulate, he would never consume and enjoy. He would not consume today, but he would not consume tomorrow either, as the morrow would confront him with the same alternative. (1949, 481)

This is the passage that Hülsmann (2002, 83), for example, draws from in order to justify his interpretation of Mises. The problem is that this passage frankly mistranslates Mises’s thought. The mistake is a subtle one, so Mises can be excused for not noting it.

The German-language version, when all particles of the sentence are translated, reads

[He] who consumes *or uses*, who, through his action, seeks to remove unsatisfaction to a greater or smaller extent, must in doing so always prefer the satisfaction in a closer time period to that in a more remote time period. [He] who consumes and enjoys has thereby made a choice between satisfaction in a closer time period and satisfaction in a more remote time period, and has chosen earlier satisfaction. Were he to decide differently, [that is to say,] were he not to prefer the earlier satisfaction to the later one, he could never achieve enjoyment [or,

satisfaction, or consumption]. He could neither consume or enjoy tomorrow, since the decision, between the tomorrow that will then have become the today, and the day after tomorrow that will then have become the tomorrow, also demands the higher valuation of earlier satisfaction over later satisfaction, if no further postponement of consumption is to occur. (1940, 443-44, emphasis added)

Careful reading of the first sentence alone will make the difference between the two texts plain and clear, and will help interpreting the passages in *Human Action* correctly. Mises says that *both* consumption and use, meaning not just acts of the enjoyment of the services yielded by first order goods, but also productive acts, *demonstrate* time preference. In a word, *all action demonstrates time preference*. However man acts, insofar as he acts, he is demonstrating time preference. No consumption is needed to justify time preference, and it is also not a physiological driving force behind the same.

In some writings in defense of Mises, this understanding is evident. Roger Garrison (2011), for example, in refuting Moss (1978), pointedly argues that the latter wrongly attributes the difference to semantic considerations. Mises's theory was formulated not in terms of consumption goods or patterns of consumption, but rather in terms of *action*. That is, his time- preference theory is a praxeological theory. For Mises the *act* of consuming is evidence of time preference because action per se is evidence of time preference. By acting now the individual reveals that such is preferred to deferring action, and as all acts are ultimately directed at achieving consumption, the individual reveals a preference for consumption in the nearer future to consumption in the more remote future. (89).

Mises's argument is hereby put again on the ground on which Mises himself had put it. There do remain passages that could be referred to in support of the consumption



view of time preference, such as that found on page 483 of *Human Action*, which reads that we “must conceive that a man who does not prefer satisfaction within a nearer period of the future to that in a remoter period would never achieve consumption and enjoyment at all.” Given the above restatement, it should be clear, however, that such as passage is a statement of one (consumption) category of action that demonstrates time preference (as would production). The consumption-based time preference theory must hence be cast aside.

#### **IV. TIME PREFERENCE AS DEMONSTRATED PREFERENCE**

Given the thereby clarified manner in which Mises stated time preference, one can then apply Rothbard’s (1956)<sup>2</sup> understanding of “demonstrated preference” to time preference, and restate the latter even more emphatically as a principle governing all action.

Mises (1949, 94-6) had already laid the groundwork for Rothbard’s ideas. In *Human Action*, the former posited that all human action reveals valuation. He states that

[...] one must not forget that the scale of values or wants manifests itself only in the reality of action. These scales have no independent existence apart from the actual behavior of individuals. The only source from which our knowledge concerning these scales is derived is the observation of a man's actions. Every action is always in perfect agreement with the scale of values or wants because these scales are nothing but an instrument for the interpretation of a man's acting. (1949, 95)

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<sup>2</sup> For an analysis of Rothbard’s argument, see Herbener (1997).

Rothbard, acknowledging and following Mises's ideas (1956, 225), defines demonstrated preference as follows

The concept of demonstrated preference is simply this: that actual choice reveals, or demonstrates, a man's preferences; i.e., that his preferences are deducible from what he has chosen in action. (225)

The concept is evidently true, even if some like to dream up supposedly tricky situations to refute it. A man is offered two ice cream cones, one vanilla, one chocolate. He argues that he doesn't have a strong preference for either one, and is, in fact, "undecided," but then chooses the vanilla cone, he thereby *demonstrated* his preference for it.<sup>3</sup> In other words, action demonstrates preference for the action chosen over its alternatives. No action that does not demonstrate preference at all can even be conceived of.

The argument can be extended to time preference, thereby illustrating the irrefutably true nature of the proposition. It must be pointed out that the following argument serves not as "proof" for the concept of time preference, but just as a counterfactual illustration of the same.

The question is simple: can any action demonstrate negative time preference or apathy with regard to the dimensions of sooner or later? Based on the above discussion of Mises's argument, the answer has to be a clear no. *Every action demonstrates that the*

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<sup>3</sup> The next, albeit for the actual argument irrelevant question in such cases would be whether it is really the vanilla that he prefers or the ease of not having to consider the two options any longer. This question is, again, however, irrelevant, as the argument holds in any case.

*sooner satisfaction of the end which the action aims to achieve is preferred to the satisfaction of the same end later.*

The opposite case cannot even be reasonably imagined. Could any action demonstrate that a given end is preferred to be achieved later rather than sooner? The answer, again, is no. If time preference is understood as encompassing all action, and not just consumption, this of course makes perfect sense, for even undertaking production demonstrates time preference.

How, then, about the possibility of there not being a law pertaining to choosing sooner satisfaction over later satisfaction? That is to say, is it possible that people sometimes prefer sooner satisfaction, and sometimes later satisfaction, without there being a general principle strictly determining one of the two? This is, again, not possible, if we remind ourselves that all action *demonstrates preference*. Apathy with regard to timing, in terms of sooner or later, would simply lead to no action at all, and thus be irrelevant.

It can hence be concluded that the principle of demonstrated preference can be applied to illustrate the underlying valuation phenomena of not just the choice between two given ends or means, but also with regard to the sooner or later satisfaction of a given end. Extending Rothbard's words, *time preference is deducible from all actions*.

## V. CONCLUSION

The concept of time preference has an extended history. Its first modern statement within the Austrian School was presented by Carl Menger, who, even though he didn't formulate it as a universal law of action, believed the phenomenon to be rooted in the nature of man. Eugen von Böhm-Bawerk took Menger's basic insight and introduced various, well-documented errors into it, polluting the concept of time preference with psychological-technological arguments. First Frank A. Fetter, and then in particular Ludwig von Mises, refined time preference as a preference of sooner satisfaction of a given end over later satisfaction of the same end, in the case of Mises as a universal, praxeological law. Mises's presentation of the law has been misinterpreted by some, and many subsequent modern statements of time preference suffered from such misinterpretation. Modern Austrian economists must return to Mises's pure definition of the same. In order to illuminate Mises's argument, and to illustrate also the phenomenon itself, as well as its general validity, Murray N. Rothbard's concept of demonstrated preference can be extended to the question as to whether or not action, in general, demonstrates the choice of sooner or later satisfaction of an end.

## LITERATURE

- von Böhm-Bawerk, Eugen. 1889. *Kapital und Kapitalzins. Zweite Abteilung. Positive Theorie des Kapitals*. Jena: Gustav Fischer.
- Fetter, Frank A. 1915. *Economics, vol. 1. Economic Principles*. New York: The Century Co.
- . 1910. *Principles of Economics, with Applications to Practical Problems*. New York: The Century Co.
- . 1902. “The ‘Roundabout Process’ in the Interest Theory.” *The Quarterly Journal of Economics* 17, No. 1: 163-190.
- Garrison, Roger W. 2011. “In Defense of the Misesian Theory of Interest.” In *The Pure Time-Preference Theory of Interest*, edited by Jeffrey M. Herbener, 85-98. Auburn: Ludwig von Mises Institute.
- Herbener, Jeffrey M. 2013. “Comment on ‘A Note on Two Erroneous Ways of Defending the PTPT of Interest.’” *Quarterly Journal of Austrian Economics* 16, No. 3: 317-30.
- . 2011. “Introduction.” In *The Pure Time-Preference Theory of Interest*, edited by Jeffrey M. Herbener, 11-58. Auburn: Ludwig von Mises Institute.
- . 1997. “The Pareto Rule and Welfare Economics.” *Review of Austrian Economics* 10: 79-106.
- Hülsmann, Jörg Guido. 2002. “A Theory of Interest.” *Quarterly Journal of Austrian Economics* 5, No. 4: 77-110.
- Huerta de Soto, Jesus. 2012. *Money, Bank Credit, and Economic Cycles*. Auburn: Ludwig von Mises Institute.
- Menger, Carl. 1981. *Principles of Economics*. New York University Press.
- von Mises, Ludwig. 1949. *Human Action. A Treatise on Economics*. New Haven: Yale University Press.
- . 1940. *Nationalökonomie. Theorie des Handelns und Wirtschaftens*. Genf: Editions Union.

- Moss, Laurence S. 1978. "The Emergence of Interest in a Pure Exchange Economy: Notes on a Theorem Attributed to Ludwig von Mises," *New Directions in Austrian Economics*, edited by Louis. M. Spadaro, 157-66. Kansas City: Sheed Andrews and McMeel.
- Rothbard, Murray N. 2008. "Time Preference." *The New Palgrave Dictionary of Economics*, vol. 8, edited by Lawrence Blume, 281-84. New York: Palgrave MacMillan.
- . 1962. *Man, Economy, and State*. Auburn: Ludwig von Mises Institute, 2004.
- . 1956. "Toward a Reconstruction of Utility and Welfare Economics." *On Freedom and Free Enterprise: The Economics of Free Enterprise*, edited by May Sennholz, 224-62. Princeton: D. Van Nostrand.
- Topan, Vlad, and Cristian Păun. 2013. "A Note on Two Erroneous Ways of Defending the PTPT of Interest." *Quarterly Journal of Austrian Economics* 16, No. 3: 299-315.